THE RELATIONSHIP BETWEEN POVERTY, INEQUALITY, AND GROWTH IN THE RURAL ETHIOPIA: MICRO EVIDENCE

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Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, Chinal, August 16-22, 2009

Introduction

Not so long ago development was conceived of almost exclusively in terms of growth targets with very little regard to the beneficiaries of growth. Distribution was central to the classical economists, yet its implication on long-term development was not clear until the seminal work of Simon Kuznets. Kuznets (1955) postulated that growth, in the early stage of an economy (predominantly agrarian), would first lead to increases, and then to a decrease, in income inequality which then provided the "Kuznets's curve" or inverted-U curve. Since then, many studies attempted to assess the relationship between growth and inequality.

Studies until 1990's, based on cross-sectional comparisons, generally supported the hypothesis that income inequality initially increase then declines as the country grows. Many recent studies, however, such as Bourningon, 2003, Deininger and Square, (1998), Li, Squire and Zou (1998), Bruno et al., (1996), Ravallion and Datt, (1995), and others, based on larger data set, have consistently refuted of the inverted-U curve of Kuznets on the ground that either there is no systematic relationship between the two or the relationship is country specific.[1]

Even if the Kuznets hypothesis failed to be universal, at least in the current situation, country specific studies show mixed results. Ferreira (1999) for Tanzania, Aghion, et al., (1999), Balisca and Fuwa (2003) for Philippines, Meng et al., (2005) for China, Odedokun and Round (2001) using cross-country data of 35 African countries, all have found positive relationship between inequality and growth. Jeong (2005), on the other hand, using micro data of Thailand, and Iradian (2005) using 82 countries cross-country evidences, both found a quadratic relationship between inequality and growth – a rising inequality followed by declining inequality as per-capita grows over time – supporting the Kuznets hypothesis.

Still, Barro (1999) using a three-stage least squares estimator which treats the country-specific terms as random, finds that the effect of inequality on growth is negative in poor countries (GDP per capita below or around US$ 2000 at 1985 prices), but is positive in rich countries (GDP per capita above US$ 2000 at 1985 prices) – a real U-curve as opposed to Kuznets.

[1] These studies were made based on the compilation of the Dieninger-Square (1996a) international inequality database which contains 682 'high-quality' observations of Gini coefficient and quantile shares), than used by Kuznets,

In balance, there seems to be agreement on the positive relationship between inequality and growth in the developing countries. Studies in the past focused more on the relationship between growth and inequality with little consideration of the aspect poverty to provide empirical evidences for theoretical explanations and to justify policies targeted to achieve higher growth and lower inequality.

Recently, however, the recurring issue in discussion on development is whether the main focus of development strategies should be placed on growth, or poverty, and/or inequality (Bourguignon, 2004 and Fuentes, 2005). Failure of the past studies to provide empirical evidences and generally accepted theoretical explanation for the systematic relationship between inequality and growth had dampened the issue for some times. When poverty became one of the overriding development objectives, especially in most of the developing countries, it was natural to view its long term effects and solutions from in relation with growth and inequality.

This inclusion of poverty aspect into the questions of the relationship between growth and inequality resurfaced the old growth-inequality issue back into the development agenda. Availability of household panel data in recent times in some developing countries has also created fertile conditions for the many empirical studies that have been made so far.

The resurface of the old issue from poverty perspective brought about important developments in the field. Firstly, it has broadened the spectrum of analysis into the analysis of inequality-poverty, poverty-growth, inequality-growth relationships and into a more comprehensive analysis of inequality-growth-poverty interrelationship. Secondly, it has changed the orientation of inequality-growth studies from finding strong theoretical explanation for causal link between the two (inequality on growth or growth on inequality) into assessing the possible implications of growth-inequality relationships to poverty reduction. Thirdly, it has brought about methodological ferment in the area. Fourthly, encouraged different countries to construct longitudinal household survey data set rather than relying on macro level data.

Continuing the past traditions, studies on poverty-inequality-growth interrelationship have also attempted to provide strong empirical evidences on the systematic relationship between the three. Past attempts to establishing systematic correlation between per capita income and inequality using cross-country aggregate data could be misleading if their relationships is the outcome of policies. A given policy in a given country or at a given time may have affected inequality and

growth to be related negatively and yet other policies in other countries or at other times may have affected positively. Kanbur and Lustig (1999) argues that the distribution of income is the result of a number of complex forces which sometimes move in the same direction but sometimes countervail each other even to the point that their effects cancel each other out.

Perhaps it might be due to this that even those studies that have used same cross-country data set have found conflicting results in the analysis of the broader poverty-growth-inequality interrelationship too. While cross-country analysis is useful and has generated many insights, this approach tends to neglect country heterogeneity in the poverty-growth–inequality interrelationship and is empirically unable to generate robust determinants of pro-poor growth that are valid across the developing world (Son, 2007). Studies based on household survey panel data can be important to identify the determinants of inequality of the observed interrelationships and hence can give important insight to policy recommendations.

Growth could be generally beneficial in reducing the proportion of the poor, their poverty gap and severity, if it raises the income of the poor by about as much as it raises the income of everybody else. However, aggregate growth rate, measured by the percentage change in mean income, can be pro-poor, neutral or even against poor depending on what possible correlation growth has with inequality. If income distributions are relatively stable over time, economic growth has the general effect of raising incomes for all members of society, including the poor (e.g., Adams, 2003, Li, Squire and Zou, 1998). Such analysis is dangerous because it leads to an easy leap to a stylized assumption that, since growth is distribution neutral in the reduced form, the same is true in the structural form (Kanbur and Lustig, 1999).

On the other hand, if inequality and growth are positively correlated, growth benefits more the not-so-poor than it does the poor. In this case, some of the gains from growth for the poor could be lost due to a rise in inequality and hence the impact of growth in many of the developing countries – in the sense of income growth – on poverty would be lower than it would otherwise be (e.g., Smolensky et al., 1994, Ravallion, 1999, Bourguignon, 2004 and Son, 2007). In a similar vein, Dollar and Kraay, (2000) found that average income of the poorest fifth of society rise proportionately with average income and they concluded that growth generally does benefit the poor.

Finding no correlation between inequality and growth over long time, from these cross-country studies, may not ensure growth to be pro-poor. If a certain policy intended to attain fast growth increase inequality in some country and another policy quite the opposite in other countries, the overall correlation between growth and inequality would turnout to be zero. This, however, should not lead to a general conclusion that growth is pro-poor. Even in studies made based on household survey panel data, lack of correlation between the two may not imply that any policy instruments that help to attain fast growth is pro-poor.

Growth could benefit the not-so-poor more than it does for the poor and hence it could be positively correlated with inequality in the short run. Its contribution to poverty reduction in this case could be lower or even negative. It could, however, contribute to poverty reduction if the growth trickles down to the poor in the long run. This depends on the time path it takes for the higher income growth attained by the not-so-poor trickles down to the poor. Poverty in African and in the Sub-Sahara African countries is serious and requires immediate policy responses.

In a country like Ethiopia where the per-capita income is the lowest in the world and far below one dollar a day, even a person earning the mean income would be far below this international poverty line. In the view of such extreme poverty, a benevolent government should place poverty reduction objective at the top of its development agenda. The Government of Ethiopia, in its Poverty Reduction Strategy Paper, designed medium- to long-term target to reduce the absolute size of the food insecure rural population substantially as to exit from food aid, and rely on fiscal transfer of resources to support a residual of relatively small numbers of food-deficit households (EFDRE, 2000).

The program has identified different projects that are designed to alleviate poverty and to improve the rural and urban community. Many of the programs are comprehensive development programs that attempt to improve the welfare of the society through the development of economic, social and infrastructural services such as: education, health, electricity, road, irrigation scheme, financial, etc.

Other programs can be categorized into three categories: ‘progressive’, ‘preemptive’ and ‘redemptive’ programs. The progressive programs focus on identified potential and, adequate and reliable rainfall areas in order to enhance productivity and production while ‘preemptive’ programs, aims at preventing the not-so-poor and transitorily poor groups from falling into

chronic poverty. The 'redemptive', programs are emergency responses against shocks (commonly recurrent drought).

The Government of Ethiopia, in its policies and strategies, boldly states that attaining very fast growth that creates equitable distribution as a means to achieving poverty reduction objective without clearly articulating the possible effects of attaining fast growth on income distribution. Even though Poverty Reduction Strategy Paper was prepared in 2000, various development efforts have been made towards reducing poverty since the Government came to power in 1991. Assessing to what extent the Government achieved its core objective of reducing poverty through attaining fast growth and equitable distribution was the main purpose of this study.

Thus, the main objective of this paper was to analyze the dynamic relationships of inequality, poverty and growth by using five round panel data set collected through Ethiopian Rural Household Survey (ERHS). Section I describes the levels of poverty, inequality and growth at regional level and Peasant Associations levels. Section II analyses and discusses the inequality-growth-poverty interrelationships observed over the past survey periods. Finally, Section III summarizes key findings and concludes by indicating their policy implications.

The Data

The study used panel data of Ethiopian Rural Household Survey (ERHS). The ERHS is comprehensive and wide data in that it was collected from a number of villages in rural Ethiopia. The data was collected from 18 Peasant Associations (PAs) in six rounds.[2] Even though, PA is the lowest administrative region in the hierarchy of the political administrative structure of the country, farming systems were considered a much more important stratification basis than administrative boundaries. Thus, in the selection of the 18 sample villages, attempts were made to account for the diversity of the sedentary farming systems common in the country. Dercon, (2004) noted that one to three sample villages were included from each sedentary farming system, namely; the grain-plough areas of the Northern and Central highlands, the *enset*-growing areas and the sorghum-hoe areas. Inaccessibility, security and other factors have hindered from strictly representing each stratum by the required number of sample villages and households proportional to the respective sizes.

[2] From the six rounds, data collected in the second round (1994b) was not considered in this study for the sake of consistency.

Starting from the 1994a survey period, the ERHS was collected from 18 villages, for 6 rounds and the attrition rate was as low as about 7 percent. According to Dercon, the number of sample households in each village was allocated proportional to the size of the population. A good representation of female household heads was also made through stratification and few landless households were also included due to the exerted effort in including them. On average 20.6 percent of the sample respondents in a round were female-headed households. An exact proportion of female-headed are taken in the sample through stratification (Dercon, 2004). This was purposely done in order to get enough information about females in the rural area which would otherwise be impossible due the culture.

Methods of Analysis

Household expenditure on food and consumables was used in this study to measure inequality as well poverty. Expenditure/consumption was preferred for the reason that expenditure/ consumption data are more reliable and simple to compute than income (Deaton, 1997, Dercon, 2005, Duclos and Araar, 2006). Deaton (1997) explained that income is often a more sensitive topic than is consumption, especially since the latter is more obvious to friends and neighbors than the former. Moreover, estimating income requires knowledge on assets and profits – the estimation of both is a very difficult task. Thus, consumption/expenditure was taken as a proxy variable for income or to measure inequality. For the sake convenience, the term income or consumption are used in this paper interchangeably.

The two most common measures of inequality are Gini coefficient and the General Entropy class. The Gini index is the oldest and famous inequality measure. It computes the average distance between the cumulated population shares and cumulated income shares. In other words, it the ratio of the area between the Lorenze curve and the diagonal equality line to the total area of the triangle. The standard Gini index is thus

$$Gini = 2\,\mathrm{cov}(Y, F)/\overline{Y} \qquad \text{eq 1}$$

Where Y is the income of the individual or household, F is the rank and $\overline{Y}$ is the mean income.

The GE class has important advantages: First, they can be decomposed into within- and between-group inequality over space and time. The within-group inequality shows how much of the

overall inequality is attributed due to the change in income distribution within the group taking the group as a population. The between-group inequality index helps to examine how much of the overall inequality is due to change in income of each group by assuming all members in the group earn/consume the average amount equally. Second, different entropy class of measures are sensitive to different parts of the distribution.

One of the most frequently used inequality measures for this decomposition purpose is the General Entropy class of measures introduce by Sharrok (1980) and Cowell (1980) which is defined as:

$$GE(\alpha)=\begin{cases}\dfrac{1}{\alpha^2-\alpha}\left[\dfrac{1}{n}\sum_{i=1}^{n}\left(\dfrac{y_i}{\bar{y}}\right)^{\alpha}-1\right] & \alpha\neq 0,1\\ \dfrac{1}{n}\sum_{i=1}^{n}\log\left(\dfrac{\bar{y}}{y_i}\right) & \alpha=0\\ \dfrac{1}{n}\sum_{i=1}^{n}\dfrac{y_i}{\bar{y}}\log\dfrac{y_i}{\bar{y}} & \alpha=1\\ \dfrac{1}{n\bar{y}^2}\sum_{i=1}^{n}\left(y_i-\bar{y}\right)^2 & \alpha=2\end{cases} \qquad \text{Eq 2}$$

where y_i is the income of the i^{th} household and $\bar{y}$ is the mean income and α is the distributional parameter. As the value to of α approaches to zero, the GE class is more sensitive to changes at the lower end of the distribution and equally sensitive to changes across the distribution for α equal to one (which is the Thiel index) and sensitive to changes at the higher end of the distribution for higher values (Foster, 1980).

The total inequality obtained above can be decomposed into a component of inequality between the population groups I_b and the remaining within group inequality I_w. The decomposition by population group at a point in time of the GE class is defined as

$$I=I_b+I_w=\sum_{j}^{k}V_j^{\alpha}f_j^{1-\alpha}GE(\alpha)_j+\frac{1}{\alpha^2-\alpha}\left[\sum_{j=1}^{k}f_j\left(\frac{y_n}{\bar{y}}\right)^{\alpha}-1\right] \qquad \text{Eq 3}$$

Where f_j is the population share of group j (j = 1, 2, …, k); V_j is the income/consumption share of group j; and y_j is the average income in groups j.

The General Entropy (GE) inequality indices can be also be decomposed into three changes: 1) the change in the number of people in various groups or "allocation" effect; 2) changes in relative incomes of the various groups or "income" effects; and 3) changes in inequality within groups or "pure inequality" effects. The decomposition for $\alpha = 0$ is:

$$\Delta GE(0) = \underbrace{\sum_{j=1}^{k} \overline{f_j} \Delta GE(0)_j}_{\text{Pure inequality effects}} + \underbrace{\sum_{j=1}^{k} \overline{GE(0)_j \Delta f} + \sum_{j=1}^{k} [\overline{\lambda_j} - \overline{\log(\lambda_j)}] \Delta f_j}_{\text{Allocation effects}} + \underbrace{\sum_{j=1}^{k} (\overline{V}_j - \overline{f}_j) \Delta \log(\mu(y))_j}_{\text{Income effects}} \quad \text{Eq 4}$$

Where Δ is the difference operator, λ_j is the mean income of group *j* relative to the overall mean (*i.e.,* $\lambda_j = \mu(y_j) / \mu(y)$) and the over-bar represents averages.

The FGT classes of aggregate poverty measures, developed by Foster et al (1984), are: Headcount index (H), Poverty Gap (PG) and Poverty Severity (PS).

$$P_\alpha = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{z - c}{z} \right)^\alpha \text{ where } \alpha \geq 0 \quad \text{Eq 5}$$

If $\alpha = 0$, P_α measures Headcount index, if $\alpha = 1$, P_α measures Poverty Gap, and if $\alpha = 2$, P_α measures Poverty Severity.

Growth, Inequality and Poverty

The study used unbalanced panel data of five rounds, 1994a, 1995, 1997, 1999 and 2004 obtained from ERHS[3]. Measurement of inequality, poverty and growth was made based on the level of real consumption expenditure per adult equivalent.[4]

The result of the study shows that poverty level in Ethiopia is generally higher. Despite poverty reduction has been the fundamental objective of the government of Ethiopia and agriculture and rural development were given top priorities, poverty in the rural areas generally have shown no much improvement over the past years (Table 1). The level of poverty measured by the head

[3] Though this survey contains panel data of 7 rounds, the first round (1989/90) and the third round (1994b) are dropped in this study. The data of 1989/90 does not much conform in scope, content and sample number with the other rounds. The 1994b data, though perfectly conform with the rounds preceding (1994a) and the other successive rounds, its timing is different from other rounds and the 1994a is sufficiently representative.

[4] The consumption expenditure includes food and non-food items. Non-food consumption items were restricted to direct consumables (matches, soap, linen, clothes) but exclude school and health expenditure, as well as taxes and extraordinary contributions (Dercon and Hoddinott, 2004).

count index, the poverty gap index and severity of poverty index were all high in the rural Ethiopia. World Bank (2005) reported that the poverty incidence in 1999 in the country (including urban population) was 26.3 and 80.7 percents based on international poverty lines of 1.0 US$ a day and 2.0 US$ per day at Purchasing Power Parity, respectively. While the level of poverty in the same period, measured by the national poverty line, was 44.2 percent. The reason for such differences was that the national poverty line adopted by the government was about 1.5 US$ per day in 1993 PPP.

In the aftermath of the implementation of the structural adjustment policies since 1991 and the design of Poverty Reduction Strategic Paper in 2001, the level of poverty in 2004 was not different from the level it was before five years (1999). Given the large amounts of food aid the country was receiving in the past (just to smooth out consumption), there has been high fluctuation in the level of poverty from one period to the other. In the face of recurrent drought the country was facing, such fluctuations seem to be reasonably low. The level of poverty was 48.2 in the first round and increased to its highest level of 54.6 percent in 1995. Surprisingly, the level of poverty declined to 32.5 in 1997 and increased to about 36 percents in the following two rounds. The other two FTG measures of poverty: poverty gap and poverty severity, also follow similar pattern with the head count index.

As shown in the last column of Table 1, there was fluctuation in the level of mean per real capita consumption in the survey periods. The level of mean real per capita consumption declined from Birr 70.45 per month to 61.57 from 1994a to 1995 and rose to 91.5 in the next round. Two years later, in 1999, it again declined but slightly to 87.73 and showed very small improvement even after five years in 2004. The agricultural system in the country is very traditional and virtually fully rainfall-dependent. Moreover, hazards of pest, disease, flood, frost etc are common in the rural area. When God generously provides the rain and a favorable weather conditions to crops and livestock, consumption will be high and poverty level will be lower.

Table 1 the level of poverty over the five survey periods using Headcount, Poverty Gap and Poverty Severity

	N	Mean Poverty line*	Proportion of the poor			Mean real per capita consumption
			Head Count Index	Poverty Gap	Poverty Severity	
1994a	1434	44.54	48.2	0.183	0.105	70.45
1995	1398	50.29	54.6	0.232	0.130	61.57
1997	1405	44.86	32.5	0.110	0.053	91.50
1999	1353	48.97	35.7	0.122	0.060	87.73
2004	1297	48.46	35.6	0.125	0.064	91.68

Source: own computation based on five rounds of ERHS between 1994 to 2004
* The poverty line were estimated using the same data set[5]

The result is fairly similar with the poverty levels, for urban and rural households, of 48.0, 45.5 and 44.2 in the years 1981, 1995 and 2000, respectively (see Iradian, 2005).

In addition to describing the level of poverty, assessing how frequent households failed into poverty over the survey rounds indicates their vulnerability to poverty. As shown in Table 2 except few proportions of the total households, about 83 percent of the households were found to be poor at least once in five rounds (20 percent of the time) or about 60.5 percent of the households were found to be poor at least twice. Surprisingly, only 7.2 percent were found to be persistently poor all through the rounds. The result indicates that the mobility of households in terms of falling into and climbing out of poverty was high. Idiosyncratic and common shocks, including rainfall and household-specific crop failure are common in most rural areas of the country and consumption is highly viable among households.

Table 2 Poverty profile of households over the survey rounds

Number of rounds a household was poor	Number of households	Percent	Cumulative percentage
Never been poor	213	17.4	17.4
Poor in one round	270	22.1	39.5
Poor in two rounds	283	23.1	62.6
Poor in three rounds	202	16.5	79.2
Poor in four rounds	167	13.7	92.8
Poor in all rounds	88	7.2	100.0

Source: own computation based on data 1994 – 2004 Ethiopian Rural Household Survey

[5] The poverty line used for each period uses the same basket throughout, but valued at the prices for the survey period (Dercon and Krishnan, 1998).

Though the level of poverty and mean real per capita consumption have shown similar pattern in the survey periods, the contribution of growth of mean real per capita consumption in reducing poverty depends how the benefits of growth were distributed among the population. It is therefore essential to see the pattern of inequality in these periods.

The overall inequality, measured in Gini index, of real consumption per adult equivalent in the rural Ethiopia have not improved over the survey periods. As shown in Table 3, the level of inequality was about 0.45 for first two survey periods (1994a and 1995). Then the level of inequality increased from its lowest level of 0.41 in 1997 to 0.44 in 2004 (8 percent rise in inequality). The General Entropy (GE_0) and the quantile distribution also show the same pattern over the years.

Table 3 the level of inequality over the five survey periods using Gini index, Thiel index and Varianc log

	N	Gini Index	General Entropy (GE_0)	Thiel index (GE(1))	Share of the group from the total per capita consumption		
					Poorest 40%	Medium 40%	Richest 20%
1994a	1476	0.442	0.349	0.344	13.75	36.10	50.15
1995	1421	0.443	0.346	0.374	13.80	35.71	50.49
1997	1409	0.405	0.291	0.323	15.77	38.42	45.80
1999	1451	0.419	0.304	0.306	15.33	37.73	46.93
2004	1366	0.436	0.333	0.343	13.10	35.49	51.42

Source: own computation based on five rounds of ERHS between 1994 to 2004

The result is not much different the Gini index of 0.32, 0.40 and 0.41 in the years 1981, 1995 and 2000, respectively (see Iradian, 2005). The level of inequality for African countries ranges from 0.67 (S. Leone in 1991) to 0.27 (Ghana 1997) and the mean being 0.41 (see Odedokun and Round, 2001).

Such descriptions, though indicative and give some picture about the level and change in inequality-poverty and growth, it never show the dynamic relationships that may exist between them which is more relevant from the perspectives of development strategy.

Change in overall inequality may come due three factors: firstly, due to temporal movement of individuals between the two groups (i.e. falling into poverty and climbing out of poverty or 'allocation effects'); secondly, due to fluctuation of income of individuals within each group (inequality change due to the change in inequality within each group or 'pure inequality effects'); and thirdly, due to the change in the mean income one group relative to the other – 'income effects'.

As shown in Table 4, the changes in overall inequalities between any two periods were mainly due to allocation and pure inequality effects. Income effects had little contribution in explaining the overall inequality except in between 1994 and 1995. For instance, between 1995 and 1997, 70 and 27 percents of the total decline in inequality were mainly due to allocation and pure inequality effects, respectively. Income effect explained only 3 percents of the change in overall inequality[6]. Given the lower attrition rate in the survey periods, such higher value for allocation effects precisely indicates that the changes in inequalities were caused by the mobility of the households between the two groups - climbing out of and falling into poverty. In most cases the three effects moved in the same direction except in 1994-1995 where part of the decline in inequality (though very small) due to income effects was canceled by the increase in inequality due to the other two effects.

Table 4 Inequality decomposition between two successive survey periods

	1994 -1995	**1995-1997**	**1997-1999**	**1999-2004**
$GE(0)_{t+1}$	0.346	0.291	0.304	0.333
$GE(0)_t$	0.349	0.346	0.291	0.304
ΔGE	**-0.002**	**-0.056**	**0.013**	**0.029**
$\%\Delta GE(0)$	-1.7	-16.6	2.0	12.6
%Δproportion of the poor	13.05	-40.57	9.65	2.02
Pure inequality effects	0.002 (74.3)	-0.014 (-27.1)	0.001 (7.6)	0.022 (75.6)
Allocation effects	0.008 (355.0)	-0.037 (-70.0)	0.008 (62.1)	0.000 (-0.3)
Income effects	-0.011 (-529.3)	-0.002 (-(2.9)	0.004 (30.4)	0.007 (24.7)
	-0.002	**-0.053**	**0.013**	**0.029**

+ Note that numbers in bracket indicate the percentage of each effect to the absolute change in overall inequality

[6] The negative sign indicate the decline in inequality from one survey period to the next survey period.

However the results of the above decompositions of the overall inequality over time and space help to describe inequalities observed in the past, they are less useful to link inequality with poverty.

Apart from decomposing total inequality over time, further disaggregation of the overall inequalities into within- and between-villages helps to explain the observed inequality and also important for policy intervention. They allow useful depictions of patterns that can be a first step in identifying the proximate causes of inequality. Such inequality decompositions, and related statistics, can also sometimes underpin policy analysis and normative arguments with caution (Kanbur, 2003). Thus, the decomposition analysis in its own right has relevance in positive and normative analysis of inequality.

The decomposition result shows (see Appendix 1) that the sample villages were different in their mean consumption, inequality and poverty levels. The inequality level ranged from a mean-min of 0.14 to a mean-max of 0.45. However, these differences are not large enough as they appear to explain the overall inequality. Much of the overall inequality, about 75 percent, was due to the within-inequality (the interpersonal inequalities within the sample villages). This implies that if all sample villages were equal in their mean consumption levels, the total inequality would have reduced by 25 percent indicating.

The difference in the level of poverty (for instance the headcount index) was even wider across villages over the survey periods. The headcount index ranges from a mean-min of 0.074 (nearly no poor) to a mean-max of 0.82 (nearly of all-poor). In some areas, such as Adado, Korodega, Gelben, Haresaw, Imdibir and Aze Debo poverty was very deep and especially was persistently deep in areas like Adado. These indicate that some areas need immediate action in the move towards reducing poverty.

Apart from decomposing the total inequality and poverty levels over the survey periods by sample villages, decomposing the overall inequality into the two groups: the poor and the not-so-poor help to assess the link between inequality and poverty. The poverty index or the poverty gap simply measures the levels of poverty without showing as to what extent the poor are distributed below the poverty line. They also show nothing about distribution among the not-so-

poor or as to what extent the not-so-poor are far from the poor. Decompositions of the total inequality into the two groups therefore help to understand what caused the existing overall inequality: the *between* groups (between the not-so-poor and poor) or the *within* inequality.

The scope for larger inequality *within* the poor is expected to be very low as the level of consumption for this group is censored between the poverty line and nearly zero consumption[7]. However, as presented in Table 5, of the overall inequalities over the survey periods, about 43 to 55 percents were due to the *within* the not-so-poor inequality and about 25 to 33 percents of the total inequalities were due to inequalities *within* the poor group. The inequalities between the two groups were not so large and explained only 16 to 23 percents of the overall inequality. It can then be concluded that the rural poor in Ethiopia are *not equally poor*.

Despite the potential variations among people above the poverty line are higher, the inequalities *within* the *not-so-poor* explain only about half of the overall inequalities. This indicates that the *not-so-poor* were narrowly scattered over the income space near above the poverty line. The implication is that any small shock in consumption, caused by, say, crop failure which is most common in the rural areas of the country, would send many into poverty.

Table 5 inequality decomposition not-so-poor and poor groups

Year	Inequality within				Inequality between the not-so-poor and poor		Overall inequality
	Not-so-poor		Poor				
	G(0)	%	G(0)	%	G(0)	%	
1994	0.151	43.4	0.116	33.2	0.082	23.5	0.349
1995	0.155	44.7	0.115	33.3	0.076	22.0	0.346
1997	0.160	55.0	0.076	26.0	0.055	19.0	0.291
1999	0.161	53.0	0.076	24.9	0.067	22.1	0.304
2004	0.186	55.7	0.094	28.2	0.054	16.1	0.333

The above decomposition of the overall inequality over space does not show the changes within and between the two groups over time and hence obscured what happened over the survey periods.

[7] this actually may not hold in measuring income inequality as there could be negative incomes

Further decomposition of the inequality disaggregated into the poor and not-so-poor over time will provide clearer picture on the dynamics of inequality. Such decomposition would not only show the source of inequality over time, it would also indicate dynamic relationships of inequality, poverty and growth.

In this case, change in inequality due to 'income effects' also convey more important information by showing how the change in relative income in the two groups contributed to the change in the inequality. Similarly, decomposing inequality due to the change in 'allocative effects' into poor and not-so-poor explains how change in the proportion of the population in that group contributed for the change in inequality.

Table 6 decomposition of total inequality by poor and not-so-poor between successive survey periods

Survey periods	Groups	change in inequalirty within each group due to						Overall change within each group
		Pure inequality effects		Allocation effects		Income effects		
		change	%	Change	%	Change	%	
1994-95	Not-so-poor	0.002	-1.8	-0.084	88.1	-0.013	13.7	-0.095
	Poor	0.000	-0.1	0.091	98.3	0.002	1.8	0.093
1995-97	Not-so-poor	0.003	0.9	0.277	88.2	0.034	10.9	0.314
	Poor	-0.017	4.7	-0.314	85.6	-0.036	9.7	-0.368
1997-99	Not-so-poor	0.001	-2.9	-0.038	110.7	0.003	-7.8	-0.034
	Poor	0.000	0.1	0.046	97.0	0.001	2.9	0.048
1999-04	Not-so-poor	0.016	80.5	0.000	2.3	0.003	17.3	0.020
	Poor	0.007	66.0	-0.001	-5.4	0.004	39.5	0.010

As indicated in column 3 of Table 6, the changes in inequalities within each group between the surveys were due to allocation effects (i.e change in inequalities caused by change in the proportion of population in each group between the survey periods). Except between the 1999 and 2004, more than 85 percents of the changes within each group were due to the change in the proportion of population of each group. In addition, the directions of the changes in inequalities due to allocation effects were opposite between the two groups. For instance, an increase in inequality within the poor was followed by a decline in inequality within the not-so-poor. According to 'population principle', mobility of a certain proportion of households from one group to the other, say from not-so-poor to poor, would not change the inequality of the poor if the distributional pattern of incoming not-so-poor was the same as the existing poor group.

Similarly, inequality of the not-so-poor would not change if certain proportion from each of the income group within the not-so-poor group failed into poverty.

But, as one may expect, it is those not-so-poor group that were near to the poverty line vulnerable to falling into poverty. Similarly, it those poor that were near the poverty line easily climb out of poverty. Thus, mobility of households into and out of poverty was the major causes for the inequality changes within each group. Given an increase in poverty between these periods, a certain proportion of the not-so-poor must have failed into the poor.

Another important result of this decomposition is the change in relative income, in between the survey periods, of the poor was negative all through the survey periods implies that overall inequality declined due to growth in income of the poor (though the magnitude was very small)[8].

Differences in inequality between poor and not-so-poor households (across-group inequality) may be natural as the not-so-poor households are censored below the poverty line and the scope for higher variability is constrained between the absolute poverty line and zero level of consumption. This static analysis does not show the dynamics and source of inequality.

The relationship between poverty, growth and inequality

Many economists in the field, since Kuznets's work, attempted to analyze the relationships between inequality and growth, and recently, with the inclusion of poverty. Most of these studies attempted to analyze the dynamic relationships of the three based on cross-country comparison by aggregating two or more household survey data of those countries that were at different development stages. Cross-country comparisons have many conceptual and practical problems arising from PPP currency conversions, different survey-based measures of living standards, and different stages of development (Ravallion and Chen, 1997). Bourguignon in his article 'The Poverty-Growth-Inequality Triangle' argues that poverty reduction in a given country and at a given point in time is fully determined by the rate of growth of the mean income of the population and in the distribution of income (Bourguignon, 2004).

[8] The value in the bracket in the last term eq 4 shows how far the mean income of the group was from the overall mean income and will be negative for the poor and positive for not-so-poor. When the value multiplied by the positive change in log of mean income (growth), the value will be negative for the poor and positive for the not-so-poor groups.

Growth rate, however important, they only show the percentage change in mean level of consumption/income by ignoring the changes in the rest of the distribution. Which is why more and more people investigate growth as a process of distributional dynamics, focusing on changes in the entire distribution, rather than only on its mean (Feirreira, 1999). Thus, growth may not bring the intended improvements unless supported by policies that would reduce the initial inequality level. In a country where poverty reduction is the fundamental objective of development strategies, the goal of development should balance between growth and equity targets.

When poverty reduction is the overriding policy objective, poorer and relatively an equal country may be willing to tolerate modest increases in income inequality in exchange for faster growth - more so than richer and highly unequal countries (Bourguignon, 2004). Trading inequality for higher poverty reduction could be accepted as the next best policy option if the poverty elasticity of growth is sufficiently larger than the inequality elasticity of growth. However, in the Rural Ethiopian context the inequality level is not that small and tolerating high income inequality seems difficult.

It is not conceivable to assess the dynamic relationship of the three important variables – poverty-growth-inequality – using only five observations of indices derived from the five rounds. But, it is possible to create more observations (in similar ways as that of cross-country comparison studies) by decomposing the five rounds' inequality, growth and poverty indices into 18 sample villages. Even if these locations may differ in many respects, the method will not suffer, at least, from the two main inconsistencies that arise in cross-country comparisons; namely, differences in currency conversion and difference in measures of living standards[9].

The study thus decomposed the aggregate growth, inequality and poverty indices generated from five rounds. The decomposition would then create a total of 5 times 18 equal to 90 observations of mean indices.

[9] As an example, in Argentina the headcount poverty was in 2002 close to 60 percent when calculated on the basis of the nationally-defined poverty line, while internationally comparable poverty indicators based on a dollar-a-day poverty line would place the poverty rate around 3 percent (Lopez and Luis Servén, 2006). In addition, cross-country comparisons were made using mixed data sets of expenditure and income which may not be fully captured by consumption smoothing model especially in developing countries.

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Assuming growth and inequality are independently affect poverty, the model can be specified as:

$$\ln pgap_{it} = \delta \ln rcon_{it} + \beta \ln gini + \alpha igini_{it-1} + e_{it} \quad \text{Eq 6}$$

Where $\ln pgap_{it}$ is the change in poverty gap between two rounds of the i^{th} village, $\ln rcon_{it}$ is the change in real consumption per adult equivalent between two rounds of the i^{th} village (a proxy for growth), $igini_{it}$ is the initial Gini index of the i^{th} village at time *t-1*, and $\ln gini_{it}$ is the change in inequality between two rounds and δ, β *and* α are parameters to be estimated.

Table 7 Estimated result of Fixed Effect (FE) regression model for growth and inequality

lnpovgap	Coef.	Std. Err.	t	P>t
lncon	-3.25	0.51	-6.36***	0.00
Change in lngini	2.65	1.34	1.97**	0.05
iGini in at t-1	1.11	3.27	0.34	0.74
Constant	14.27	3.02	4.73***	0.00
sigma_u	1.33			
sigma_e	4.18			
rho	0.09	(fraction of variance due to u_i)		

***significant at 1 percent, **significant at 5 percent

The estimation result shows that growth and change in inequality significantly affect the poverty gap. The effect of initial inequality to change in poverty gap was insignificant. What mattered was the change in inequality not the initial inequality. The growth elasticity of poverty, as given by the value of δ, is -3.25 implying that a one percent growth of mean consumption reduces poverty gap by 3.25 percent. On the contrary, a one percent increases in the level of inequality increases the poverty gap by 2.65 percent.

The result has important policy implication in that if appropriate measures to reducing inequality are not taken, part of the positive benefits of growth to reducing the poverty gap will be offset by the negative effects of change inequality. If a one percent growth is followed by the same one percent growth in inequality, the net effect of the two changes will then be less than one percent reduction in poverty gap.

The implicit assumption in the pro-poor growth argument is that inequality remains unchanged. If growth is followed by change in inequality, the extent to which growth will benefit the poor

depends on the direction and the magnitude of the change in inequality. If, for instance, inequality decreases following growth, then inequality will re-enforces the effects of growth and growth can be considered as pro-poor growth. Thus, the net effect of growth and change in inequality on poverty reduction will depend on their relative magnitude the two changes. If growth reduced poverty by less than what inequality increased poverty, then growth will be against the poor.

As reflected in virtually all sectoral policy documents of the Government, the fundamental objectives of these policies were to attain fast growth and to move towards more equitable distribution. To this end, various development efforts were made by the Government. But, to what extent these development interventions brought about the intended effect remains a question. As the result of this study indicates, the fundamental objectives of achieving fast growth and equitable distribution were not met as the two moved in opposite direction – one counteracting the other.

On paper, the Government gives priority to rural than urban development, and agricultural than industrial development interventions. Given nearly 85 percent of the population is living in the rural area and almost the same proportion of the population is engaging in agriculture, such emphasis is acceptable. On top of this, studies indicate that poverty in Ethiopia is higher in rural part of the country than in urban. Thus, such focus, if realized, would enable the Government achieve its poverty reduction targets.

However, as the result reveals, these objectives have not been realized in the past as the two objectives moved in opposite directions. The rural poor, constrained by scarcity of resources especially land and technological inputs, gained no more benefits than the not-so-poor.

Bourguignon, based on cross-country time series data, found a result consistent with the worst scenario such that the negative effect of inequality on poverty reduction was more than the positive effect of growth. He stated that growth in Ethiopia could have decreased poverty by about 31 percent between 1981 and 1995. Yet, because of changes in the distribution that contributed to a 37 percent increase in poverty, the final effect has been a net increase in poverty of 6 percent (Bourguignon, 2004).

Conclusions

Ethiopia being one of the poorest in the world and even among Sub-saharan Countries, poverty in the country remained higher. Despite reducing poverty has been the fundamental development objective of the country, there has not been substantial reduction in poverty rather it has been on the rise. Moreover, the rural population of the country is highly vulnerable to poverty in that about 83 percent of the population would fall into poverty once in five rounds. Idiosyncratic and common shocks, including rainfall and household-specific crop failure are common in most rural areas of the country and consumption is highly viable among households. The change in overall inequalities observed between the survey periods was much due to 'allocation effects' and 'pure inequality effects' and the contributions of 'income effects' was very marginal.

Given the country's diverse physical, topographical and socio-cultural setup and farming system, the level of poverty, inequality and growth vary from sample villages to sample villages. Poverty incidence ranges from mean-min of 0.074 to a mean max of 0.82 percents. The rural parts of the country are not also equally unequal.

The Fixed Effect estimation result shows that growth and change in inequality significantly affected the poverty gap. The effect of initial inequality was insignificant in affecting poverty. Growth in the past would have reduced poverty substantially if the growth was not followed by increased inequality in the rural area. This has important policy implication in that appropriate measures need to be taken to reduce the existing inequality to achieve a pro-poor growth.

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Appendix

Appendix 1 The Gini Index by Peasant Association and Woreda in the five survey periods

Peasant Associations	Logmean consumption					GE(0)					Headcount index				
	1994a	1995	1997	1999	2004	1994a	1995	1997	1999	2004	1994a	1995	1997	1999	2004
Haresaw	4.09	4.17	4.53	4.40	4.57	0.22	0.40	0.28	0.23	0.24	0.52	0.56	0.32	0.28	0.41
Geblen	3.51	3.51	4.43	4.13	4.55	0.22	0.24	0.24	0.26	0.44	0.83	0.80	0.36	0.52	0.34
Dinki	4.20	3.83	4.02	4.29	4.43	0.50	0.19	0.19	0.32	0.26	0.67	0.66	0.59	0.54	0.39
Yetemen	4.58	4.11	4.52	4.25	4.93	0.28	0.20	0.10	0.18	0.19	0.26	0.57	0.12	0.44	0.15
Shumsha	4.64	4.59	4.73	4.79	4.98	0.30	0.21	0.29	0.19	0.22	0.26	0.23	0.17	0.10	0.17
Sirbana	4.66	4.40	4.62	5.14	5.18	0.26	0.15	0.21	0.18	0.21	0.22	0.24	0.22	0.00	0.08
Adele Ke	4.53	4.86	4.86	4.32	4.47	0.18	0.40	0.14	0.20	0.41	0.19	0.14	0.07	0.39	0.54
Korodega	3.53	3.72	4.11	4.50	4.20	0.21	0.17	0.14	0.23	0.24	0.79	0.78	0.49	0.22	0.52
Trirufe	4.47	4.09	4.30	4.75	4.73	0.35	0.23	0.19	0.30	0.38	0.38	0.52	0.40	0.24	0.31
Imdibir	3.77	3.37	4.08	3.90	3.75	0.15	0.32	0.23	0.16	0.23	0.72	0.93	0.54	0.69	0.70
Aze Debo	4.32	3.89	4.31	3.46	4.83	0.22	0.40	0.24	0.17	0.34	0.37	0.73	0.43	0.86	0.33
Adado	4.21	3.91	4.55	4.21	4.03	0.21	0.21	0.21	0.19	0.26	0.42	0.70	0.24	0.46	0.68
Gara God	3.22	3.17	3.88	3.87	4.56	0.34	0.26	0.33	0.24	0.42	0.89	0.92	0.73	0.67	0.43
Doma	3.77	4.50	4.08	4.49	4.62	0.31	0.45	0.30	0.30	0.30	0.78	0.41	0.55	0.30	0.35
Fagy and Bokafya*	4.59	4.36	5.34	4.90	5.44	0.33	0.25	0.48	0.20	0.52	0.34	0.42	0.10	0.17	0.09
Koremargefia*	4.39	4.41	5.00	4.84	5.12	0.27	0.30	0.16	0.18	0.25	0.37	0.33	0.04	0.20	0.11
Karafino*	4.66	4.04	4.75	4.78	4.73	0.30	0.13	0.12	0.23	0.18	0.32	0.42	0.06	0.16	0.18
Milki*	4.70	4.29	5.04	4.95	5.49	0.24	0.18	0.17	0.24	0.25	0.32	0.50	0.00	0.13	0.04
National (overall)						**0.36**	**0.36**	**0.30**	**0.30**	**0.38**	**0.55**	**0.32**	**0.32**	**0.36**	**0.36**
Within inequality						**0.27**	**0.26**	**0.23**	**0.22**	**0.30**					
Between inequality						**0.09**	**0.10**	**0.07**	**0.08**	**0.08**					

* these villages were considered as one village in the survey but their agro-ecology and other socio-economic characterizes are different and are separated as independent village in the study

Appendix 2 **Coefficients of variations between rounds**

Peasant Associations	Coefficients of Variation between sample villages		
	Growth (Log of mean consumption)	Inequality (G(0)	Poverty (Head Count Index)
Haresaw	0.18	0.05	0.10
Geblen	0.41	0.06	0.20
Dinki	0.18	0.09	0.08
Yetemen	0.24	0.04	0.16
Shumsha	0.11	0.04	0.05
Sirbana	0.29	0.03	0.09
Adele Ke	0.20	0.11	0.16
Korodega	0.31	0.03	0.18
Trirufe	0.22	0.06	0.08
Imdibir	0.17	0.05	0.09
Aze Debo	0.39	0.08	0.20
Adado	0.17	0.02	0.15
Gara God	0.44	0.05	0.14
Doma	0.29	0.05	0.15
Fagy and Bokafya*	0.37	0.12	0.12
Koremargefia*	0.28	0.05	0.11
Karafino*	0.22	0.06	0.11
Milki*	0.32	0.03	0.17
Mean CV	**0.27**	**0.06**	**0.13**

Appendix 3 **Coefficients of variations between rounds**

Years	Coefficient of Variation between samples		
	logmean cons	G(0)	Poverty (HCR)
1994a	0.38	0.06	0.20
1995	0.34	0.08	0.19
1997	0.32	0.07	0.19
1999	0.35	0.04	0.19
2004	0.35	0.08	0.16
Mean CV	**0.35**	**0.07**	**0.19**