# OFF-FARM EMPLOYMENT AND INCOME INEQUALITY: THE IMPLICATION FOR POVERTY REDUCTION STRATEGY*

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## *Abstract*

*This study in Tigray, Northern Ethiopia, using micro data collected from a sample of households asses the contributions of farm and off-farm income sources to the over all income inequality. Some interesting results are obtained. Due to entry barriers, relatively wealthy farm households dominate the most lucrative rural non-farm activities such as masonry, carpentry and petty trade. This has widened the income inequality in rural areas. The main sources of inequality are non-farm activities such as non-farm skilled wage work and non-farm self-employment. Since the present public works program favors the poor, it reduces the income inequality that exists in the rural areas. If off-farm employment become the main source of income inequality in rural areas, its role in the alleviation of poverty will be very limited. Therefore a policy reform is required to manage the redistribution effect of expanding economic activities into off-farm employment. In order to reduce the income inequality effect of diversifying income sources into non-farm activities, the underlying elements that hinder participation of poor households in non-farm activities such as credit constraints and lack of skill, have to be tackled by providing credit and technical training to the poor. Provision of information the public on the labor market could also be helpful to reduce the transaction cost of searching for non-farm jobs. Moreover improving rural infrastructure can reduce spatial income inequality.*

***Keywords**: Income diversification, off-farm employment; entry barrier; income inequality, policy reform, Northern Ethiopia*

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## 1. INTRODUCTION

Farmers in developing countries are often encouraged by policy makers to diversify their income sources into off-farm activities so that poor farmers could supplement their farm income, and reduce income inequality and poverty in rural areas.

After the collapse of the Derg regime, the focus of the Ethiopia government has been to reduce poverty through expansion of farm and off-farm employment (TGE 1994). Promotion of off-farm employment has also been given particular emphasis in the poverty reduction strategy paper (PRSP) of Ethiopia (MoFED 2002). This effort will have a stronger impact on poverty if poor farmers diversify their income sources into off-farm activities. If, however, there are entry barriers in to the labor market, off-farm employment may not reduce income inequality among farm households. This may also prevent it from reducing poverty substantially.

The incentive to diversify income sources into off-farm activities is stronger for poor than for rich farm households because the relative return to off-farm work is greater for the poor than for the rich. The risk aversion motive to diversify income into off-farm activities declines as the wealth of farm households increases, if risk aversion is negatively related with wealth (Newbery and Stiglitz 1981). However, if there are entry barriers to and rationing in the labor market, diversifying income into off-farm activities will be more difficult for the poor than for the rich farm households (Reardon 1997). A credit (liquidity) constraint may make it difficult for poor farm households to finance investment (such as equipment purchase or rent, skill acquisition, capital for initial investment and a license fee) that is required to participate in off-farm activities. Community level barriers can also exist that prevent farm households from participating in off-farm activities. Due to poor infrastructure there is further limited labor market integration (Sadoulet and de Janvry 1995). Absence of labor market integration leads to rationing of off-farm jobs in some communities. Lack of infrastructural facilities may restrict the movement of labor between communities or may make it costly to move to towns. If off-farm activities are risky and correlate positively with farm income, risk averse poorer farm households may not enter into off-farm activities. As a result, off-farm employment may worsen rather than lessen income inequality. If off-farm employment increases income inequality, its role to reduce poverty will be very limited.

Given the general lack of studies on off-farm activities, analyzing the relationship of various off-farm activities to overall income inequality is crucial for a better targeting of programs designed to alleviate poverty. The objective of this paper is, therefore, to analyze the relative importance of different types of off-farm and farm activities to overall household income and income inequality. The total farm household income is decomposed into various categories of farm and non-farm incomes. The income categories used are crop income, livestock income, off-farm self-employment, off-farm wage employment (paid food for work, non-farm manual wage employment and non-farm skilled wage employment) and non-labor income. The relative contributions of these income sources to overall income inequality are assessed using the G*ini decomposition method* (Lerman and Yitzhaki 1985).

The rest of this paper is organized as follows. The nature of off-farm work in the study areas is described in the next section. In section three, Gini-decomposition technique is described and a conceptual framework is briefly discussed in section four. The impact of off-farm income on overall household income inequality is presented in section five. The paper ends with some concluding remarks.

## 2. THE NATURE OF OFF-FARM EMPLOYMENT

A questionnaire based survey was conducted in *Enderta* and *Adigudom* Districts (Woreda) southern Tigray, to analyze farm and off-farm employment in the region. The survey covered 201 heads of 'farm households' chosen randomly from a stratified sample area. The survey data include detailed information on the allocation of labor (for home, farm and off-farm activities), income sources, the purchase of farm outputs and inputs (including hired labor), the sale of farm outputs, consumption expenditure, credit and household compositions. The data were collected for the years 1996 and 1997[1].

Off-farm activities in which farm households participate can be categorized into wage employment and self-employment. Three types of wage employment can be distinguished, namely paid development work, manual non-farm work, and skilled

[1] The questionnaire is available at the web site: www.sls.wau.nl/twoldehanna/. See also Woldehanna (2000, p. 28-37) for detail description of the data.

(non-manual) non-farm work. Paid development work consists of jobs in community micro dam construction, community soil and water conservation activities such as construction of terraces and afforestation, and other community activities undertaken under the food for work program. Manual non-farm work is an activity in which farm households work for private and public construction companies in and around urban areas. Skilled (non-manual) non-farm work involves masonry, carpentry, cementing and related activities in public and private construction sites. Off-farm self-employment comprises mainly petty trade, transporting goods using pack animals, stone mining, pottery and handicraft, selling of wood and charcoal, local drinks making and selling of fruits.

Employment in paid development work does not require experience, skill and initial capital investment. Its wage rate is the lowest of all types of wage employment. If there are not enough jobs in paid development work, priority is given to poorer farm households. Manual non-farm work requires up to 40 Birr[2] in initial capital for the purchase of equipment. Although experience and skill are not required, farm households may spend a lot of time searching for a job in manual non-farm work. Usually, friendship and kinship play a dominant role in getting employment in this type of work. Skilled non-farm work definitely requires experience, skill and initial investment in equipment. To get involved in skilled non-farm work, farmers require at least 150-300 Birr initial investment. The wage rate for this type of activity is three times higher than that paid for manual work and those who have their own equipment are given priority in the local labor market. In off-farm self-employment, farm households need to have some amount of money as working capital to start the business (such as petty trade, handicraft and transport in goods using pack animals). Although public intervention in the provision of skill and capital was limited, two local non-governmental organizations (NGOs) called Tigray Development Association (TDA) and Relief Society of Tigray (REST) were involved in the promotion of off-farm activities in the Tigray Region. TDA was providing training to farmers in masonry, carpentry and handicrafts. REST was involved in providing training and startup capital, on credit, for various off-farm activities. Currently, REST is no more involved in the provision of credit. Credit is rather being provided to farmers by a microfinance institute called Dedebit Credit and Saving Institution (DECSI).

[2] One US Dollar was equivalent on seven Ethiopian Birr during the survey period.

The average return to family labor from farm and off-farm activities is given in Table 1. Off-farm self-employment has the highest return among all the activities carried out by farm households. The average return to family labor on the farm (1.34 Birr/hour) or the marginal product of family labor on the farm (1.36 Birr/hour)[3] is lower than the return to labor in off-farm self-employment (2.96 Birr/hour), but higher than the return to labor in off-farm wage employment (0.72Birr/hour). It is also higher than the wage rate paid for hired farm labor (1.08 Birr/hour). The structure of the wage rate looks different when off-farm employment is decomposed into specific categories. The return to labor in paid development work (0.45 Birr/hour) is the lowest among all the activities. The return to labor in manual non-farm work (0.89 Birr/hour) is lower than the payment to family labor on the farm and the wage rate for hired farm labor. However, skilled non-farm wage employment has a return (2.8 Birr/hour) higher than the return to family labor on the farm and the wage rate for hired farm labor. It has a return close to that of off-farm self-employment. In general, the return to labor seems to be higher in *Enderta* than in *Adigudom*, although the marginal product of labor is almost equal in both districts. Non-farm wage employment is mainly available in the *Enderta* District. No skilled non-farm activity was observed and only one household was found to be involved in manual non-farm work in the sample drawn from *Adigudom* district.

There was rationing in the off-farm labor market in the sample area. When farmers are asked why they do not work more in off-farm activities, about 66 % of them responded that they could not obtain off-farm employment in and around their district (Table 2). This shows that agriculture is unable to absorb the available labor and there is potentially rationing in the off-farm labor market.

[3] The marginal physical product of family labour is derived from a Cobb-Douglass production function. The estimated Cobb-Douglas production function used is linearly homogenous and it produces a reasonable estimate of marginal productivity of family farm labor. It has an advantage of being easily interpreted. However, it is more restrictive than a translog production function (Lau 1986). If the coefficients of the translog function on the interaction terms are jointly significant, use of Cobb-Douglas function may represent mis-specification. In our case, in addition to the problem of multicollinearity, the estimated elasticity of family labor on the farm (and the shadow price of family farm labor) turned out to be negative for more than half of the households (53%) when the translog production function is used. The detailed specification and estimated results of the Cobb-Douglas production is given in Woldehanna, 2000.

**Table 1: Average (median) farm and off-farm return to family labor (Birr‡/hour) by districts**

| Activity | Enderta | Adigudom‡‡ | Total average |
|---|---|---|---|
| Average product of family labor on the farm* | 2.76 | 2.56 | 2.73 |
| Return to family labor on the farm** | 1.50 | 1.26 | 1.34 |
| Marginal product of family labor*** | 1.36 | 1.37 | 1.36 |
| Wage rate paid for hired farm work | 1.11 | 1.04 | 1.08 |
| Wage rate for wage employment | 0.89 | 0.55 | 0.72 |
| Wage rate for food for work | 0.62 | 0.55 | 0.45 |
| Wage rate for manual non-farm wage work | 0.90 | 0.85 | 0.89 |
| Wage rate for skilled non-farm work | 2.8 | - | 2.8 |
| Return from off-farm self-employment | 3.66 | 1.52 | 2.96 |

** The average product of family labor is calculated as the total value of farm output divided by the hours of family labor used on the farm;*

*** The average return of farm labor is computed as crop income minus variable inputs and one year depreciation of farm equipment and livestock wealth divided by the family labor hours used on the farm;*

**** The marginal product of family labor is calculated from a Cobb-Douglas production function.*

*‡ One US Dollar is equivalent to seven Ethiopian Birr.*

*‡‡ No one participated in skilled non-farm work in Adigudom District.*

**Table 2: Reasons for not working more on off-farm employment**

| Reasons | % responding |
|---|---|
| No employment opportunity near by | 66.4 |
| Labor is needed on-farm | 45.5 |
| Wages too low for the kind of work | 19.6 |
| Just do not want to work off-farm | 29.1 |

*It is does not add up to 100 because the respondents were allowed to choose more than one answer.*

**Source:** Own computation.

Table 3 shows the distribution of various income sources by income quintile. While the share of income from crop production and food for work employment declines as one moves to the higher income quintile, the share of income received from non-farm skilled wages work and non-farm self employment increases with the income quintile. The share of income from non-farm unskilled wage work increases with income, up to the fourth income quintile and declines thereafter, implying that there is a U-shaped relationship between income and the share of non-farm unskilled wage income.

Table 3 also shows that food for work is the most important supplementary income for the poorest households, while the role of incomes from non-farm self-employment

and skilled non-farm work is extremely small, implying that poor household do not have the capacity to generate income from activities that require capital and skill.

**Table 3: Share of income sources in total income by income quintile**

| Income sources | Income quintile | | | | |
|---|---|---|---|---|---|
| | 1st | 2nd | 3rd | 4th | 5th |
| Wage employment | 28.7 | 26.5 | 32.1 | 28.1 | 24.8 |
| Non-farm self employment | 2.9 | 3.3 | 6.9 | 9.1 | 11.8 |
| Non labor income | 2.5 | 0.8 | 3.4 | 4.1 | 8.9 |
| Crop income | 54.5 | 45.4 | 43.7 | 39.2 | 41.2 |
| Livestock income | 11.4 | 23.9 | 14 | 19.5 | 13.3 |
| Food for work income | 24.7 | 18.4 | 21.2 | 13.4 | 9.3 |
| Unskilled non-farm labor work | 3.9 | 7.5 | 8.6 | 13.6 | 8.8 |
| Skilled non-farm labor work | 0 | 0 | 2.1 | 2.1 | 7 |

**Source:** Own computation

## 3. CONCEPTUAL FRAMEWORK

In a farm household economy with a perfect market, labor is allocated between farm and off-farm activities in such a way that the reservation wage rate equals the wage rate for off-farm activities (Becker 1965; Gronau 1973; Huffman and Lange 1989). This means that individuals are willing to participate in off-farm work as long as their marginal value of farm labor (or reservation wage) is less than the off-farm wage rate they command. This implies that poorer farm households have a stronger incentive to diversify their income sources into off-farm activities because they have a lower marginal value of farm labor. The other motive to diversify income sources into off-farm activities is to manage the risk associated with agricultural production. The extent of the motive to take risk to diversify income depends critically on risk aversion. Because risk aversion varies inversely with wealth (Newbery and Stiglitz 1981), the incentive to take risk to diversify income sources is stronger for poor than for rich if off-farm income is negatively related with farm income.

However, there can be entry barriers in the off-farm labor market because off-farm activities may require investment for equipment purchase or rent, skill acquisition and license fees. If households face binding liquidity and credit constraints, poor households cannot afford the investment required in the off-farm labor market.

Hence, if there are entry barriers in the off-farm labor market, the capacity to diversify income sources into off-farm activities is lower for poorer farm households. Individual assets and wealth can affect the type of non-farm activities a farmer picks up and can worsen the income distribution (Reardon and Taylor 1996). As a result less wealthy farmers spend most of their time in low paying off-farm activities for which the entry barrier is low. If agriculture is risky (and households are risk averse), a household will choose an occupation that is negatively correlated with agricultural income (Newbery and Stiglitz 1981).

If a farmer faces liquidity (or credit) and skill constraints, he will prefer the one that requires less initial capital and less skill. A farmer with better assets faces relatively less liquidity (credit) constraints and may be able to work in off-farm activities that require some skill and initial capital such as trading, carpentry and masonry. Therefore, off-farm activities that require skill and initial capital worsen the income distribution if there is liquidity and borrowing constraint.

If off-farm activities are risky and are positively related with farm income, richer farm households have more incentive and ability to diversify their income sources into off-farm activities than poorer households because of the fact that richer households are less risk averse.

Given the egalitarian type of land distribution, farm income is not expected to be the source of income inequality in rural areas.

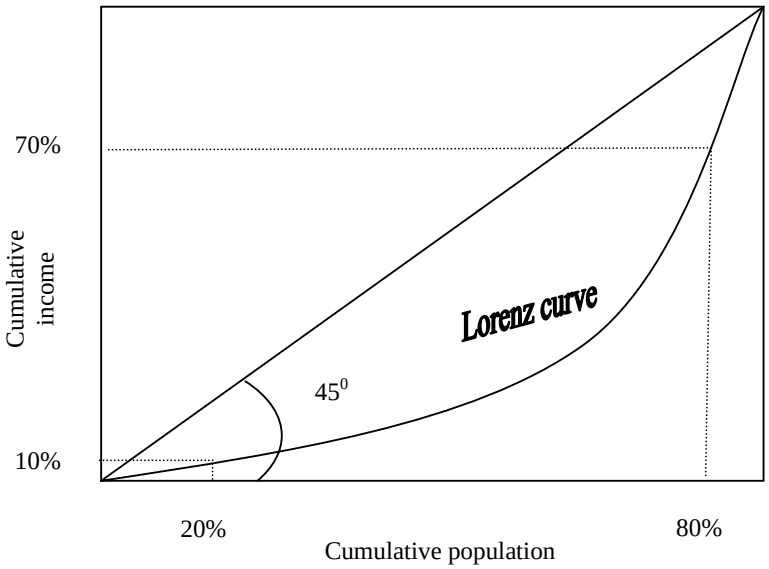
In order to reduce inequality in the society, it is important to examine inequality among individuals not households. The total inequality calculated will be underestimated if household instead of individual data are used (Haddad and Kanbur 1990). Researchers, however, use household level data because it is difficult to generate data at individual level.

## 4. GINI COEFFICIENT AND GINI DECOMPOSITION TECHNIQUE

*Gini decomposition* is used to analyze the contribution of alternative income sources to overall income inequality (Lerman and Yotzhaki 1985; Reardon and Taylor 1996). A *Gini coefficient* is a number that summarizes inequality among individuals. It is the

ratio of the area between the *Lorenz curve* and the $45^0$ line of perfect equality to the area of the triangle below the $45^0$ line (Figure 1). It satisfies the four principles of inequality measurement (Ray 1998, p. 174-178): anonymity, population, relative income and Dalton's transfer principles. A Gini index has the advantage of being decomposed into various sub-groups and the marginal effects of each subgroup to the over all *Gini index* can be computed. It is also possible to compute A Gini index from a magnitude that can be negative.

**Figure 1: Lorenz curve of an income distribution**




Algebraically, a Gini coefficient (*G*) can be calculated from an individual income (record data) using the following formula (Lerman and Yotzhaki 1985)

$$G = \frac{2\,cov\,[Y, F(Y)]}{\bar{Y}} \qquad \textbf{(1)}$$

where *cov[Y, F(Y)]* is the covariance of total income with its cumulative distribution of income (*F(Y)*), *Y* is total household income, and $\bar{Y}$ is mean household income.

Household total income can be decomposed into *K* sources ($y_k$). Assuming that the various income sources are not correlated to each other, the overall Gini coefficient can be rewritten as

$$G = 2\frac{\sum_{k=1}^{K} cov\,[\,y_k, F(Y)]}{\bar{Y}} \qquad \textbf{(2)}$$

Then dividing and multiplying each component *k* by $cov(y_k, F_k)$ and the mean income of source *k* ( $\bar{y}_k$) yields Gini decomposition by income source as

$$G = \sum_{k=1}^{K} \frac{\mathrm{cov}\,[y_k, F(Y)]}{\mathrm{cov}\,(y_k, F_k)} \times 2\frac{\mathrm{cov}\,(y_k, F_k)}{\bar{y}_k} \times \frac{\bar{y}_k}{\bar{Y}} \quad = \sum_{k=1}^{K} R_k\, G_k\, S_k \qquad \textbf{(3)}$$

where $F_k$ is the cumulative distribution of income from source *k*, $R_k$ is the Gini correlation between income from source *k* and total household income, $G_k$ is the relative Gini of income from source *k*, $S_k$ is the income from source *k*'s share of total household income.

The over all Gini coefficient (*G*) is, therefore, obtained as the sum of production of Gini correlation ($R_k$), the relative Gini of income sources ($G_k$) and the share of the income sources in total income ($S_k$). The relative contribution of each income from source *k* to the over all Gini index is obtained by dividing the products of $R_k$, $G_k$, and $S_k$ by the over all Gini. That is, the relative contribution of income from source *k* to the income inequality (Gini index) is given by: $\frac{S_k * R_k * G_k}{G}$ .

To analyze how changes in particular income sources affect overall income inequality, consider a change in each household's income from source *k* equal to $e_k y_k$ where $e_k$ is close to one. The partial derivative of the overall Gini (*G*) with respect to a percentage change (*e*) in income source *k* is given by (Lerman and Yotzhaki, 1985, p. 152):

$$\frac{\partial G}{\partial e_k} = S_k (R_k G_k - G) \qquad \textbf{(4)}$$

Then dividing (4) by G, the relative effect of a marginal change in source *k's* income on the Gini for total income is given by

$$\frac{\partial G}{\partial e_k}\frac{1}{G} = S_k (R_k G_k - G)\frac{1}{G} = \frac{S_k R_k G_k}{G} - S_k . \qquad \textbf{(5)}$$

This is equal to the relative contribution of income from source *k* to the overall income inequality minus the share of income from source *k* in total income.

## 5. INCOME INEQUALITY AND INCOME SOURCES

In this section, Gini coefficients for the total household (1) and various farm and non-farm incomes (3) are calculated. Total household income is decomposed into livestock income, crop income, off-farm wage employment income, off-farm self-employment income and non-labor income. Income from off-farm wage employment is further decomposed into income from paid development work (food for work), income from non-farm manual work, and income from skilled (non-manual) non-farm work. Then the income sources elasticity of the overall Gini index is computed using equation (5).

Gini coefficients for total income as well as the share of income from various sources and their marginal contribution to overall Gini coefficients are presented in Tables 4 and 5 respectively. Except for income from livestock, there is no change in the order of Gini coefficients and their marginal contribution when they are calculated from incomes stated at household level and in per capita terms. Crop income has the highest contribution to overall income inequality (as measured by relative Gini coefficients, 0.42) followed by wage employment (0.26) and livestock income (0.14). When income is stated in per capita terms, the contributions of crop, wage employment and livestock are 0.44, 0.27, and 0.17, respectively. The effects of crop and off-farm wage incomes on the income inequality among households are negative implying that when crop income and wage employment increase, the income that will

be earned by the people in the lower income bracket will be higher than that earned by those in the higher income bracket. The fact that cropping (which is land intensive) reduces income inequality reflects that owning land leads to egaliterianism. The results are mixed when wage income is decomposed into various categories. Paid food for work program is the only type of off-farm wage income that reduces income inequality. It is unequally distributed by itself (with a Gini index of 0.66), but favors the poor. The elasticity of total income inequality with respect to food for work income is the highest of all the other elasticities of income sources.

**Table 4: Gini Decomposition by income sources (income stated at household level)**

| Household Income components | Mean | $S_k$ | $R_k$ | $G_k$ | $G_k*R_k$ | $S_k*R_k*G_k$ | $(S_k*R_k*G_k)/G$ | $(S_k*R_k*G_k)/G-S_k$ |
|---|---|---|---|---|---|---|---|---|
| Off-farm self-employ income | 262.50 | 0.068 | 0.598 | 0.836 | 0.500 | 0.034 | 0.103 | 0.035 |
| Off-farm wage income | 858.75 | 0.280 | 0.489 | 0.628 | 0.308 | 0.086 | 0.261 | -0.019 |
| Income from food for work | 437.89 | 0.174 | 0.183 | 0.664 | 0.122 | 0.021 | 0.064 | -0.110 |
| Manual non-farm wag income | 284.58 | 0.085 | 0.406 | 0.883 | 0.358 | 0.030 | 0.092 | 0.007 |
| Skilled non-farm wage income | 136.28 | 0.022 | 0.794 | 0.978 | 0.777 | 0.017 | 0.053 | 0.031 |
| Non-labor income | 194.31 | 0.039 | 0.707 | 0.951 | 0.672 | 0.026 | 0.080 | 0.041 |
| Net farm crop income | 1339.65 | 0.448 | 0.698 | 0.442 | 0.308 | 0.138 | 0.419 | -0.029 |
| Livestock income | 497.40 | 0.164 | 0.425 | 0.643 | 0.273 | 0.045 | 0.136 | -0.028 |
| Total household income | 3152.60 | | | | | 0.330 | | |

*$S_k$ is the average share of income from source k in total income; $G_k$ is Gini index of inequality for income from source k; $R_k$ is Gini correlation with total income ranking; G is the Gini index of total income inequality; $\frac{S_k * R_k * G_k}{G}$ is the relative contribution of income from source k to the Gini index of total income inequality; $\frac{S_k * R_k * G_k}{G} - S_k$ is the elasticity of the Gini index of inequality with respect to income source k.*

The effect of income from livestock on income inequality is negative when income is calculated in per capita terms, but positive when it is stated at household level. The results in Table 5 (stated in per capita income terms) give more sense given that

livestock activities require capital and labor which poor farmers and female headed households (labor poor) can not afford.

Non-farm wage and self-employment incomes have a non-equalizing effect. Income from unskilled (manual) and skilled (non-manual) non-farm work increases overall income inequality. Non-labor income (such as gifts, remittances, and property rent) also increases income inequality. The marginal effect on income inequality is higher for non-labor income than for non-farm wage and self-employment income.

**Table 5. Gini Decomposition of per capita household income sources**

| Per capita household income components | Mean | $S_k$ | $R_k$ | $G_k$ | $G_k*R_k$ | $S_k*R_k*G_k$ | $(S_k*R_k*G_k)/G$ | $(S_k*R_k*G_k)/G-S_k$ |
|---|---|---|---|---|---|---|---|---|
| Off-farm self-employ income | 77.55 | 0.068 | 0.608 | 0.853 | 0.518 | 0.035 | 0.107 | 0.039 |
| Off-farm wage income | 243.59 | 0.280 | 0.499 | 0.633 | 0.316 | 0.089 | 0.268 | -0.012 |
| Income from food for work | 130.81 | 0.175 | 0.303 | 0.696 | 0.211 | 0.037 | 0.112 | -0.063 |
| Manual non-farm wag income | 90.16 | 0.083 | 0.499 | 0.899 | 0.449 | 0.037 | 0.112 | 0.030 |
| Skilled non-farm wage income | 22.63 | 0.022 | 0.401 | 0.977 | 0.392 | 0.009 | 0.027 | 0.004 |
| Non-labor income | 65.57 | 0.039 | 0.733 | 0.960 | 0.704 | 0.028 | 0.084 | 0.044 |
| Net farm crop income | 391.38 | 0.448 | 0.712 | 0.453 | 0.323 | 0.145 | 0.438 | -0.011 |
| Livestock income | 153.19 | 0.164 | 0.553 | 0.683 | 0.378 | 0.062 | 0.188 | 0.023 |
| Total household income | 931.28 | 1.000 | | | | 0.330 | 1.000 | |

*$S_k$ is the average share of per capita income from source k in total per capita household income;*
*$G_k$ is Gini index of inequality for per capita income from source k;*
*$R_k$ is Gini correlation with total per capita household income ranking;*
*G is the Gini index of total per capita income inequality;*

$\frac{S_k * R_k * G_k}{G}$ *is the relative contribution of income from source k to the Gini index of total per capita income inequality;*

$\frac{S_k * R_k * G_k}{G} - S_k$ *is the elasticity of the Gini index of per capita income inequality with respect to income source k.*

In principle, inequality has to be calculated from individual instead of household data. However, obtaining individual data and intra household resource allocation is problematic. Thus, in many surveys, income data is collection at household level data. For this paper, the survey data available are at household level and as a result the actual income inequality will be higher than what is presented (Haddad and Kanbur 1990). Hence the estimated inequality figures in this paper must be interpreted cautiously.

Findings from previous studies regarding the impact of off-farm income on rural income inequality appears to be very diverse. Making a comparison of the various results is not easy either, as most empirical studies do not use the same type of income definition as well as income decomposition and methodology. In Palanpur (India), Lanjouw and Stern (1993) found that off-farm income in general increased income inequality in 1983/84 and reduced it in 1981/82. Stark, Taylor and Yitzhaki (1986) found that remittance from domestic and international sources had both positive and negative effects on income inequality in two villages of Mexico. In rural Pakistan, Adams (1994) found that non-farm income makes a small contribution to income inequality despite its large share in total income. Non-farm income also has a low Gini coefficient and is poorly correlated with total income. When non-farm income is decomposed into different categories, income from government employment and off-farm self-employment is found to increase income inequality while income from unskilled labor reduces it. In the Philippines, Leones and Feldman (1998) found that while income from remittance, trading and skilled labor increases inequality, income from agricultural wage labor and gathering activities such as fishing and logging reduces inequality. All these studies appear to have one thing in common. Income sources that need skill and capital to enter (such as non-farm self-employment and income from skilled wage labor) increase income inequality.

The fudings of this study also confirm this. Off-farm activities that have entry barriers and require capital to start have a positive impact on income inequality. It is only income from food for work programs that has a negative effect on rural income inequality. This is because the food for work jobs not need skill and capital and are initially targeted to provide employment for poorer farm households. However, there is a peculiar finding in this study which indicates that unskilled non-farm wage work increases income inequality. One possible explanation for this is that unskilled non-farm wage work does not require education and skill, but it involves a high transaction

cost (such as search and commuting cost) which poor farmers cannot afford. The survey from which the data is obtained indicates that farmers need to have their own equipment (worth at least 40 Birr) and should be able to commute to towns in order to get jobs in the unskilled non-farm labor market (Woldehanna and Oskam, 2001).

The fact that there is an entry barrier for the poor is a possible reason for non-farm income to have a dis-equalizing effect from an investment perspective (Reardon, Crawford and Kelly, 1994). Skilled non-farm wage employment and off-farm self-employment require skill and capital to start. In the absence of a perfect credit market, it is only the rich households that can afford to enter into self-employment. Even in the unskilled non-farm labor market, the transaction cost of looking for jobs in nearby urban areas, coupled with the existence rationing in the labor market, provides an advantage to richer farm households.

We can also explain the dis-equalizing effects of non-farm income from the perspective of risk-taking behavior of farmers. Some of the non-farm activities such as trading may be risky and are positively correlated with farm income. Because of the consumption linkages, there will be more trading and non-farm business in rural areas when there is a good harvest. Hence, given the fact that off-farm business activities are risky and since a positive relationship exists between off-farm business income and farm income, it is only less risk averse farmers (richer) who have the incentive and the capacity to undertake off-farm self-employment activities.

As a result, income from the non-farm labor market increases income inequality. This implies that unless rural non-farm activities are promoted targeting particularly the poor, wealthy farm households will dominate the most lucrative form of non-farm activities such as masonry, carpentry and trading.

## 6. CONCLUSIONS

Rural Poverty can be reduced by increasing income and/or reducing income inequality because poverty is a function of both income and inequality in income. Even if income in rural areas increases, poverty can still increase if the additional income goes to the richer households only. If there are entry barriers in the labor markets, off-farm employment may not reduce income inequality among farm

households in rural areas. Since increasing off-farm employment in rural areas is one of the policy instruments for reducing poverty in Ethiopia (MoFED 2002), it is crucial to examine the effect of increasing rural non-farm income on income inequality.

This study found that off-farm income is one of the sources of income inequality among farm households in the rural areas because of wealthy farmers dominate the most lucrative and risky non-farm activity such as masonry, carpentry and trading. Since the present public work program favors the poor it reduces the income inequality that exists in the rural areas.

Poverty does not only depend on economic growth but also on the distribution of income. If off-farm employment becomes the main source of income inequality in rural areas, its role in the alleviation of poverty will be very limited. Therefore, some policy reform is required to manage the redistribution effect of expanding economic activities into off-farm employment.

A number of measures can be taken in order to reduce the income inequality effect of non-farm activities so that off-farm employment will have a strong impact on poverty. First, rural non-farm investment programs need to focus on non-farm activities in which the poor would participate more than the rich. Second, the underlying elements that hinder the participation of farm households in non-farm activities must be addressed and removed. Measures such as the establishment of training centers to tackle skill barriers, the provision of credit for the poor together with business-extension advice and the expansion of public employment schemes could be taken towards this end. Provision of information to increase public awareness about the labour market could also be helpful reduce the transaction cost of searching for non-farm jobs. Improving rural infrastructure can also reduce spatial income inequality by increasing farmers' income earning opportunities. These recommendations can fit quite well to the activities of TDA, REST and DESCI, which are involved in providing training, and credit to farmers in non-farm activities in the region.

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