Does Non-Farm Income Increase Farm-Household Income Inequality?
Evidence from Three Continents

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Abstract

This paper performs inequality decomposition by income sources using data from three different continents, using a unified inequality decomposition approach. Household survey data from Ethiopia, Georgia and Korea are used for this purpose, and the uniform result is that non-farm labor income is an equalizing source of income, in the sense that increasing non-farm labor income by 1% uniformly results in a lower Gini index of inequality. These results shed light on the processes that affect farm-household inequality under various geographical, economic and institutional conditions, and imply that policy directed towards non-farm income sources could not only raise rural incomes on average but also potentially reduce inequality, i.e., be pro-poor.

Key words: Inequality; Non-Farm Income; Decomposition.

Introduction

Despite the common wisdom that income inequality in rural areas is not as large as in urban areas, rural inequality is not negligible. Rural income inequality is also expected to rise over time, as an outcome of structural changes in agriculture, and in particular as a result of the increased diversification in the income sources of rural households. Economic theory does not provide a clear indication whether the increased reliance of farm households on off-farm income sources increase or decreases household income inequality. On one hand, households that rely more on off-farm income could be those who have better qualifications, and these qualifications are likely to be positively correlated with farm managerial ability, in which case off-farm income could contribute to higher total income inequality. On the

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other hand, household that rely more on off-farm income could be those with insufficient farm income, in which case off-farm income could contribute to lower total income inequality.

Empirical studies found off-farm income to be an equalizing income source in many countries, including the U.S. (See El-Osta et al., 1995, and references therein), China (Zhu and Luo, 2006), Georgia (Kalakashvili, 2005), Egypt (Adams, 2001), Taiwan (Chinn, 1979), and the Philippines (Leones and Feldman, 1998). Gallup (2002), on the other hand, found that income other than farming contributed positively to inequality in Vietnam, and similar results were obtained by Elbers and Lanjouw (2001) for Ecuador. de Janvri and Sadoulet (2001) found that in Mexico, non-farm income as a whole reduced household income inequality, but non-agricultural wages in particular increased inequality. On the contrary, Canagarajah et al. (2001) found that in Ghana and Uganda, non-farm self-employment income was much more disequalizing than non-farm wages. Estudillo et al. (2001) found that non-farm income changed from an equalizing to a disequalizing source as it became a major income source in Philippine rice villages. Altogether, the evidence is mixed.

This paper aims at comparing empirical results from three different continents using a unified inequality decomposition approach. Household survey data from Ethiopia, Georgia and Korea will be used for this purpose. While the data sets are not entirely comparable, a comparison of the results could shed light on the processes that affect farm-household inequality under various geographical, economic and institutional conditions.

The next section presents the decomposition methodology. After that the data sets are described. The following section presents the decomposition results, and the final section offers concluding comments.

Empirical methodology

The empirical analysis in this paper is based on the method for decomposing income inequality by income sources developed by Shorrocks (1982). He suggested focusing on inequality measures that can be written as a weighted sum of incomes:

(1) $I(\mathbf{y}) = \Sigma_i a_i(\mathbf{y}) y_i,$

where a_i are the weights (as functions of the entire income distribution), y_i is the income of household i, and $\mathbf{y}$ is the vector of household incomes. If income is observed as the sum of incomes from k different sources, $y_i = \Sigma_k y_i^k$, the inequality measure (1) can be written as the sum of source-specific components S^k:

(2) $I(\mathbf{y}) = \Sigma_i a_i(\mathbf{y}) \Sigma_k y_i^k = \Sigma_k [\Sigma_i a_i(\mathbf{y}) y_i^k] \equiv \Sigma_k S^k.$

Dividing (2) through by $I(\mathbf{y})$, one obtains the proportional contribution of income source k to overall inequality as:

(3) $s^k = \Sigma_i a_i(\mathbf{y}) y_i^k / I(\mathbf{y}).$

Shorrocks (1982) noted that the decomposition procedure (3) yields an infinite number of potential decomposition rules for each inequality index, because in principle, the weights $a_i(\mathbf{y})$ can be chosen in numerous ways, so that the proportional contribution assigned to any income source can be made to take any value between minus and plus infinity. Shorrocks (1982) further showed that additional restrictions

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on the choice of weights can reduce the number of potential decomposition rules, and even obtain a unique decomposition rule, which turns out to be based on the weights related to the squared coefficient of variation inequality index. Fields (2003) reached the same conclusion in a different way. However, several authors, including Shorrocks (1983), Morduch and Sicular (2002) and others chose not to rely solely on this decomposition rule in empirical analyses.

The existing literature often confuses proportional contributions to inequality and marginal effects, but these are not equivalent terms: the contribution to inequality of an income source reflects its variability and its correlation with total income, and does not inform us what happens to inequality if income from this source increases. In fact, Shorrocks (1983) has noted that comparing s^k, the proportional contribution to inequality of income source k, and μ^k, the share of income from source k in total income, is useful for knowing whether the kth income source is equalizing or disequalizing. Lerman and Yitzhaki (1985) have shown that the relative change in the Gini inequality index following a uniform percentage change in $\mathbf{y}^k$ is

(4) $ME^k = (s^k - \mu^k)G(\mathbf{y})$,

Where G is the Gini index of inequality. This is essentially a marginal effect. For this reason, we chose the decomposition rule based on the Gini inequality index for our inequality decomposition computations. We use bootstrapping to obtain standard errors for both proportional contributions to inequality and marginal effects.

Data Sources

Household survey data from Ethiopia, Georgia and Korea are used for the analysis of inequality. Each data source will be described in the following paragraphs.

The Ethiopian data was collected through a household survey, which was conducted during January-March of 1995 in the Ejana-Wolene, one of the sub-districts of the Guragie administrative zone, in the Southern region of Ethiopia. Ejana Wolene is a rural area located 240 km South of Addis Ababa, the capital of Ethiopia. According to 1995 district administration records, total population was estimated to be 217,840. Ensete (false banana) is the major crop and food source in the region, and is grown by most households on small plots around the house. The cultivation of Ensete is highly labor-intensive, with men responsible for transplanting and harvesting, and women responsible for further processing and preparation.

Nineteen peasant associations out of the sixty-five peasant associations in the district were selected for the survey. The selection was based on accessibility and on an attempt to represent the diverse agro-economical conditions of the district. A total of 583 households were surveyed, about 31 in each of the 19 peasant associations (an average peasant association in Guragie includes around 400 households). In each peasant association the households were chosen at random with the assistance of the local chief. An enumerator recorded food intakes of all household members during three consecutive days, and also administered a questionnaire, which included questions about personal and family characteristics, food production and expenditures, income and assets, health, and time allocation.

The Georgian data were obtained from a farm-household survey conducted in 2003 in four rural districts surrounding the capital city of Tbilisi: Dusheti, Mtskheta, Sagarejo, and Gardabani. The survey included 2,520 individual farms. In each district, ten villages (Sakrebulos) were selected randomly in 2003, and sixty three households

were surveyed in each village using the "random walk" procedure. The survey collected information about the demographic profile of the household, household income and its sources, land resources and other farm assets, and the farming activity (Kan et al., 2006).

The Korean data were obtained from the 2003 nationally-representative farm book-keeping survey that included 3,200 farm households. A farm household is defined as a household engaged in farming for the purpose of making a living, in which the farm operator manages at least 300 pyeong (about 0.1 ha) of cultivated land and generates annual sales of at least 500,000 Won (roughly $420). Excluded are single-person households, foreigners, and those employing more than five full-time employees. The survey provides information about household income from various farm and non-farm sources, as well as assets, expenditures, and demographics.

Inequality decomposition results

Before moving to the decomposition results, let's examine the income statistics. Table 1 compares mean per-capita income and Gini coefficients across countries. We find considerable differences among the countries, and also that income inequality is inversely related to mean income. It is difficult to imagine that Ethiopia and Georgia will be on the declining portion of the same Kuznets curve, so it must be that the inverse relation is due to structural differences between the countries. In any case, we conclude that income inequality in all three surveys is far from being negligible.

Table 2 presents the decomposition results. The first column shows that the classification of income sources is not homogeneous. Non-farm labor income is divided into self-employment income and wage income in Ethiopia and Korea, but

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not in Georgia. Other than farm income and non-farm labor income, we have only remittances in Ethiopia and "other income" in Georgia, while for Korea we have capital income, transfer income and irregular income. The second column shows the income shares of the different income sources. Non-farm labor income accounts for 28% of total per-capita household income in both Ethiopia and Korea, but in Ethiopia most of it is attributed to self-employment income while in Korea most of it is attributed to wage income. This is reasonable, given the gaps in the levels of development of the two countries. In Georgia, non-farm labor income accounts for 24% of total per-capita household income. Farm income accounts for 51% in Ethiopia, 70% in Georgia, and 42% in Korea. The Georgian figure is perhaps an outlier, given the disorganized nature of markets in Georgia after independence that made rural households rely more on subsistence farming (Kan et al., 2006).

The third column shows the inequality shares of the different income sources (equation 3). In terms of relative magnitudes, the inequality shares roughly correspond to the income shares. For example, farm income accounts for more than 50% of total per-capita income inequality in all three countries. Moreover, the inequality share of farm income is larger than its income share, implying that the marginal effect of farm income is positive. This can be seen in the last column of table 2, which includes the marginal effects computed using equation 4, namely the increase in inequality implied by a 1% uniform increase in each income source. The conclusion is that farm income is a disequalizing source of income. Non-farm labor income, on the other hand, has negative marginal effects in all cases, with the exception of self-employment income in Korea, which has a positive but insignificant marginal effect. Given that self employment accounts for less than 30% of non-farm labor income in Korea, we can safely say that non-farm labor income is an equalizing

source of income in all three countries.[1] Other income sources seem to also be equalizing in Georgia and Korea, whereas remittances have a positive but insignificant marginal effect in Ethiopia.

Concluding comments

The inequality decomposition results show that despite the vast differences in the levels of development, in geographical conditions and in the institutional structure, non-farm labor income helps to equalize total farm-household income in Ethiopia, Georgia and Korea. Before declaring that this result is uniform throughout the world, there are several caveats to mention. First, recall that the marginal effects on which this result is based reflect uniform increases in non-farm labor income. If non-farm labor income increases in such a way that richer households gain more (in percentage terms) than poorer households, the result could be reversed. Second, the marginal effects are computed only for households that already have non-farm labor income. If non-farm labor income increases in the rural population as a result of an increase in the number of households than engage in non-farm labor activities, the result could be different. These two caveats should be kept in mind when making policy recommendations based on these results. Finally, three countries are perhaps not sufficient to draw worldwide conclusions, and further research is needed to substantiate the generalization. It is not too difficult, as household surveys in numerous countries were used to analyze inequality, and not much effort is needed to

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[1] Note that the marginal effect of non-farm wage income in Ethiopia is also insignificant, but in this case it is of the same sign of the marginal effect of self-employment income, which is strongly significant and accounts for 60% of non-farm labor income, hence this fact does not change our conclusion that non-farm labor income in Ethiopia is equalizing.

compute the marginal effects.[2] Under these caveats, the results imply that policy directed towards non-farm income sources could not only raise rural incomes on average but also potentially reduce inequality, i.e., be pro-poor.

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[2] For example, unpublished background work that was prepared for the 2008 World Development Report performed inequality decomposition by income sources for a wide range of countries, but the authors incorrectly interpret the inequality shares as indicating marginal effects and therefore reach the opposite conclusion that non-farm income sources are disequalizing.

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Table 1. Mean Per-Capita Income (in $U.S.) and Gini Coefficient

	Mean Per-Capita Income	Gini Coefficient
Ethiopia	137*	0.5340
Georgia	560**	0.4906
Korea	7,612**	0.4147

* 1995 prices
** 2002 prices

Table 2. Sources of Farm household Income and their Contribution to Inequality

Income Component	Income Share	Proportional Contribution to Gini	Marginal Contribution to Gini (%)
Ethiopia			
Farm income	0.51	0.5683**	+0.0594**
Non-farm self-employment income	0.17	0.1036**	-0.0655**
Non-farm wage income	0.11	0.0999**	-0.0113
Remittances	0.21	0.2282**	+0.0180
Georgia			
Farm income	0.70	0.7660**	+0.0717**
Non-farm labor income	0.24	0.1757**	-0.0634**
Other income	0.07	0.0583**	-0.0082**
Korea			
Farm income	0.42	0.5795**	+0.0643**
Non-farm self-employment income	0.08	0.0846**	+0.0023
Non-farm wage income	0.20	0.1190**	-0.0329**
Capital income	0.03	0.0226**	-0.0030**
Transfer income	0.08	0.0443**	-0.0165**
Irregular income	0.18	0.1500**	-0.0141**

Statistical significance is based on bootstrapped standard errors. * statistically significant at 5%. ** statistically significant at 1%.