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Identifying determinants of income inequality in the presence of multiple income sources: the case of Korean farm households

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Abstract

We extend the existing regression-based inequality decomposition methods to account for the existence of different income sources. We apply this extension to data on Korean farm households, and find that they lead to more informative conclusions. In particular, our results show that non-farm labor income is an inequality-decreasing source of income, relative to farm income. In addition, much of the inequality in farm household income comes through variations in family size and composition and in land ownership. However, family size and land ownership contribute to income inequality mostly through farm income, while family composition contributes mostly through non-farm labor income. Uniform increases in education are likely to reduce inequality overall, but increase inequality through farm income. Uniform increases in landholdings are also likely to reduce inequality overall, but increase inequality through non-farm labor income. Our results imply that a continued increase in the variability of landholding distribution could worsen income inequality among farm households in Korea. Expanding rural education could reduce income inequality, provided that it is achieved equitably.

Introduction

The purpose of this paper is to suggest an empirical framework for identifying determinants of income inequality in societies in which significant fractions of households have multiple income sources. This is relevant for many low- and middle-income countries, and we illustrate the usefulness of this framework using Korean farm household data.

The issue of inequality received much attention in the economic literature in the last two decades, motivated by the recognition that inequality is not only an outcome of growth but also a determinant of growth. Recently, much concern has been expressed with regard to increased inequality in fast-growing economies such as

China, India and Vietnam. The increased availability of suitable data has led to numerous empirical studies of inequality based on cross-country data, labor force surveys, household surveys, and population censuses (Kimhi 2004). Much of this effort has been devoted to low and middle income countries. However, the methodologies used were in many cases adopted from more developed countries. For example, analysis of demand and supply factors in the evolution of wage inequality is perhaps suitable for an advanced economy in which the vast majority of the population is engaged in full-time wage employment, but not for a developing country with considerable self employment, informal employment and multiple jobholding.

In this paper we adopt and extend regression-based inequality decomposition methods for the case of multiple income sources, and demonstrate their usefulness using data on Korean farm households. As can be seen in figure 1, income inequality is more pronounced among Korean farm households than in the Korean economy as a whole. The Gini index of inequality of per-capita income in our sample of farm households is 0.42, versus 0.32 for Korea as a whole (in 2003). Using cross-sectional income data, we examine the contribution of various income sources, and their determinants, to overall income inequality of farm households. Heshmati (2004) reports that inequality can be "decomposed by sub-groups, income sources, causal factors and by other socio-demographic characteristics" (page 1). Decomposition by population groups is perhaps the most popular of these, and will not be dealt with in this paper. Regarding inequality decomposition by income sources, Shorrocks (1983) has shown that the "natural" decomposition rule of the Gini index of inequality is $G(\mathbf{y})= \Sigma_k\{2\Sigma_i[i\text{-}(n+1)/2]y_i^k/n^2/\mu\}$, where $\mathbf{y}_k$ is income derived from source k, $\mathbf{y}$ is total income, G is the Gini index, μ is mean income, n is the number of households, and i is the rank of the household in the total income distribution. Therefore, the term inside the curled brackets, denoted S^k, is the contribution of $\mathbf{y}_k$ to $G(\mathbf{y})$, and the proportional contribution of $\mathbf{y}_k$, or the share of income-source k in total inequality, is $s^k = S^k / G(\mathbf{y})$. Further, Lerman and Yitzhaki (1985) have shown that the change in $G(\mathbf{y})$ resulting from a percentage change in $\mathbf{y}_k$ is $(s^k - \mu_k/\mu)G(\mathbf{y})$, where μ_k is the mean of $\mathbf{y}_k$.

Table 1 shows the income shares and the proportional and marginal contributions to the Gini index of income inequality of several income sources of Korean farm households. One can see that farm business income, the main single source of income of these households, contributes more than half of the total income inequality, proportionately more than its income share. Moreover, a uniform one-percent increase in farm business income would increase total income inequality by six percentage points. On the other hand, non-farm labor income contributes to inequality less than its income share, and a uniform one-percent increase in non-farm labor income would decrease total income inequality by three percentage points. This implies that non-farm labor is an equalizing source of income. Non-farm business income and capital income contribute to inequality more or less proportionally to their income shares, and their marginal effects on inequality are negligible. Transfer income and irregular income also reduce inequality, but not as much as non-farm labor income. A similar conclusion is obtained by looking at Gini coefficients for different groups of households defined by income regime. As can be seen in table 2, farm households that derive income from non-farm labor (regimes 2 and 3) have lower per-capita income Gini coefficients than other farm households.

Off-farm income was found as an equalizing income source in other countries as well, including the U.S. (See El-Osta et al., 1995, and references therein), China (Zhu and Luo, 2006), the Republic of 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.

Morduch and Sicular (2002) proposed a general approach to regression-based inequality decomposition. This approach brings together inequality decomposition by income source (Shorrocks 1982) and decomposition by population sub-groups (Shorrocks 1984). Adams (2001) extended the regression-based decomposition method of Morduch and Sicular (2002) to the case in which the composition of income by the different sources (e.g., labor, capital, transfers) is observed. As explanatory variables may have different effects on the different sources of income, he computed the income-source-specific contribution to inequality of each explanatory variable. The income from each source was estimated by a Tobit model, since not all households in his sample had positive income from all sources. Bardham and Boucher (1998) treated the selectivity problem differently. In particular, they were interested in the earnings equation of non-migrants in order to derive the counter-factual earnings of migrants. They estimated a Bivariate Probit selection model for non-migration and for labor force participation, and then corrected the earnings equation for selectivity using the method introduced by Tunali (1986).

In this paper, we carry the regression-based inequality decomposition method a step forward, by proposing a decomposition method that allows the source-specific contributions to inequality of Adams (2001) to be aggregated and comparable to the Morduch and Sicular (2002) aggregate contributions. We demonstrate our method with data for farm households in Korea which were collected in 2003. This choice of data is particularly suitable for our purpose since, as in many other countries, non-farm income is an important source of income for Korean farm households (Suh, 2004). Thus, many farm households derive income from the farm as well as from non-farm businesses and/or non-farm labor activities, and each of these income sources is likely to have a unique income-generating equation. We proceed by describing the decomposition methodology in the next section. After that we present the data. Next, we move to the empirical application, and present the estimated income-generating equations and the regression-based inequality decomposition results, by income source. The last section summarizes the paper, proposes several policy implications and portrays avenues for future research.

Regression-based inequality decomposition methodology

We start with the regression-based decomposition method suggested by Morduch and Sicular (2002), which is relevant for inequality indices that can be written as a weighted sum of household incomes:

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

where a_i are the weights. The Gini index and the squared coefficient of variation are among the inequality measures that can be expresses as (1).

Income is expressed as a linear regression:

(2) $\mathbf{y}=\mathbf{X\beta}+\boldsymbol{\varepsilon}$,

where $\mathbf{X}$ is a matrix of explanatory variables, $\boldsymbol{\beta}$ is a vector of coefficients, and $\boldsymbol{\varepsilon}$ is a vector of residuals. Given a vector of consistent estimated coefficients **b**, income can be expressed as a sum of predicted income and a prediction error according to:

(3) $\mathbf{y} = \mathbf{Xb}+\mathbf{e}$.

Substituting (3) into (1) and dividing through by $I(\mathbf{y})$, we obtain that the share of inequality attributed to explanatory variable m is:

(4) $s^m = b_m\Sigma_i a_i(\mathbf{y})x_i^m/I(\mathbf{y})$.[1]

The partial derivatives of the Gini index of inequality with respect to an overall change in each explanatory variable can be derived by adapting the Lerman and Yitzhaki (1985) result described above to the formulation of (3) and (4). In particular, the partial derivative corresponding to x^m is $(s^m - \mu_m/\mu)\mathrm{G}(\mathbf{y})$, where μ_m is the sample mean of $b_m x_i^m$.

Moving to inequality decomposition differentiated by income sources, we specify the k^{th} source-specific income-generating function as:

(5) $\mathbf{y}_k = \mathbf{X}\boldsymbol{\beta}_k+\boldsymbol{\varepsilon}_k$,

where $\boldsymbol{\beta}_k$ could include zero elements corresponding to explanatory variables that do not affect the k'th source of income. Since $\mathbf{y} = \Sigma_k\mathbf{y}_k = \mathbf{X}\Sigma_k\boldsymbol{\beta}_k + \Sigma_k\boldsymbol{\varepsilon}_k$, using consistent estimates $\mathbf{b}_k$ of $\boldsymbol{\beta}_k$ and substituting into (1), the fraction of the inequality contribution of explanatory variable m in overall inequality is:

(6) $s^m = (\Sigma_k b_{km})\Sigma_i a_i(\mathbf{y})x_i^m/I(\mathbf{y})$.

[1] Wan (2004) extended this method to account for the contribution of the intercept of the income regression to inequality. Wan and Zhou (2005) presented an alternative method. It should be noted that Morduch and Sicular (2002) suggested a simple procedure to compute standard errors of s^m, but the procedure turns out to be incorrect. At least for the Gini index of inequality, it is not straightforward to compute standard error of the index itself (See Modarres and Gastwirth 2006 and references therein), so it is reasonable to expect that computing standard errors of *components* of that index would not be straightforward either.

This can be broken down to source-specific contributions of each explanatory variable to overall inequality, denoted s^{mk}, which is implicitly defined by:

(7) $s^m = \Sigma_k[b_{km}\Sigma_i a_i(\mathbf{y})x_i^m/I(\mathbf{y})] = \Sigma_k s^{mk}$.

It is easy to see that (4), the decomposition proposed by Morduch and Sicular (2002), is a special case of (6), in the case of identical income-generating equations for all income sources. However, this only holds when all households derive income from all sources. Otherwise, (5) has to be estimated using selectivity-correction methods, and therefore b_{km} measures the effect of x_i^m on y_{ik}^*, which is the *latent* income of household *i* from source *k*. In this case, the equalities in (6) and (7) do not hold, if x_i^m affects not only income from source *k* but also the tendency of household *i* to have income from source *k*. The intuitive reason is that the contribution of x_i^m to overall income inequality is also affected by the effects of x_i^m on getting in and out of the different corner solutions. Deriving these effects is beyond the scope of this paper. However, the source-specific inequality shares s^{mk} are still informative for the channels through which x_i^m contributes to overall income inequality, hence we derive and present them in the empirical analysis below.

Note that for each case in which inequality contributions are estimated, marginal effects of explanatory variables on inequality can be derived using an appropriate modification of the Lerman and Yitzhaki (1985) formula described above.

Data

We use data 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.

The variables we use to explain per-capita income are listed in table 3. We include age of the head of household and its squared value, to account for life-cycle effects. We also include a dummy indicator for the household head having at least middle-school education, assumed to increase per-capita income. The demographic structure of the household is represented by two variables: family size, which is expected to reduce per-capita income, and the fraction of working-age individuals in the family, which is expected to increase per-capita income. The working age was determined to be from 19 to 64. The economic resources of the household are represented by per-capita land owned. We have experimented with a set of regional dummies, and eventually decided to include a dummy indicator for south-west regions only. [2] The bottom part of table 3 shows that the means of these variables vary by income regime. In particular, in households with only farm income, household heads are older and less educated, families are smaller and a smaller fraction of household members is in working age. Landholdings are highest among households with both farm and non-farm business income, and lowest among households with non-farm labor income.

Regression-based inequality decomposition results

The first column of table 4 shows the coefficients of the per-capita income generating function (2) for our sample. All coefficients are statistically significant and have the expected sign. Age has a nonlinear effect on income, first positive and subsequently negative, implying that income is highest at 55 years of age. Education has a positive effect on per-capita income. Income decreases with family size, and increases with the fraction of working-age individuals. Income increases with the size of land owned per-capita. Households located in the southern and western regions have lower per-capita income than in the rest of the country.

Next, we estimated separate income-generating functions (5) for each source of income, except for irregular income which we consider as a residual source of income. Except for the case of farm income, which was reported for all households, each function was estimated by the Tobit maximum likelihood model in order to account for censoring at zero. We have used the same set of explanatory variables in all the equations, because these equations are essentially reduced-form equations (encompassing elements of labor allocation, asset ownership, and returns to labor and assets), and hence exclusion restrictions do not follow naturally.

[2] We have also initially included dummy indicators for female-headed households and landless households. While their effects were statistically significant, their exclusion did not change the results, and we decided to exclude them because they represented fairly small numbers of households. We also separated the fraction of working-age individuals by gender, but the results were very similar.

The results are shown in the remaining columns of table 4, and it is quite clear that the effects of explanatory variables on the different sources of income are substantially different. Considering the three main sources of income, namely farm income, non-farm business income and non-farm labor income, we find statistically significant effects in opposite directions of family size and landholdings. Specifically, family size increases non-farm labor income, but decreases farm income, while landholdings decrease non-farm labor income and increase farm income and non-farm business income. Also, regional differences are twice larger for farm income than for non-farm business or labor income. In summary, the importance of several determinants of income varies considerably across income sources.

We now turn to the decomposition of inequality by determinants of income. The first column in table 5 shows the decomposition of the Gini index of total income inequality using (4).[3] We find that only 17% of income inequality is explained by the set of explanatory variables as a whole. This is not too bad, given that only 12% of the variance in income is explained by these explanatory variables (table 4). We find that major contributions to inequality are assigned to family size and composition and to land ownership. Education only explains about 0.5% of inequality. Turning to the marginal effects at the bottom part of the table, we find that an increase in age is likely to increase inequality, but increases in education, family size, the fraction of working-age individuals and landownership are all expected to reduce inequality. This is particularly relevant for education and landholdings, which could be affected by policy. The remaining columns in table 5 show the source-specific contributions of income determinants, computed according to (7). We find that land ownership and family size contribute the most to income inequality through farm income. In fact, land ownership has a negative contribution to overall income inequality through non-farm labor income, while family size has a negative contribution to income inequality through both non-farm business income and non-farm labor income. Education has a negative contribution to income inequality through farm income and positive contributions through all other sources of income.

Turning to the marginal effects, we find statistically significant marginal effects in opposite directions of education, family size and landholdings. Specifically, uniform increases in education are expected to increase inequality through farm

[3] We have repeated the analysis using the squared coefficient of variation inequality index, with no qualitative change in the results. Significance tests are based on bootstrapped standard errors.

income and decrease inequality through all other income sources. Uniform increases in family size are expected to decrease inequality through non-farm business and labor income, and increase inequality through all other income sources. Uniform increases in landholdings are expected to increase inequality through non-farm labor income and decrease inequality through all other income sources. In summary, the importance of several determinants of income varies considerably across income sources.

Summary and conclusions

In this paper, we have proposed an extension of the regression-based inequality decomposition method suggested by Morduch and Sicular (2002), which differentiates between contributions to inequality of determinants of income operating through different sources of income. We found that this differentiation does lead to interesting results that cannot be obtained in the aggregate analysis.

In the case of Korean farm households, we found that non-farm labor income is an inequality-decreasing source of income, relative to farm income. Decomposing aggregate income inequality into components attributable to the different determinants of income, we found that as a fraction of the explained inequality, family size, family composition and land ownership are the major contributors to inequality. However, when looking at specific sources of income, we found that family size and land ownership are mostly contributing to income inequality through farm income, while family composition is mostly contributing to income inequality through non-farm labor income. Also, education has a negative contribution to inequality through farm income, while landholdings have a negative contribution to inequality through non-farm labor income, and family size has negative contributions to inequality through non-farm business or labor income. Uniform increases in education are likely to reduce inequality overall, but increase inequality through farm income. Uniform increases in landholdings are also likely to reduce inequality overall, but increase inequality through non-farm labor income.

Despite the fact that we are not able to explain a large fraction of inequality, our results can be used for policy analysis, because the parts that we are able to explain are related to important policy variables such as education and landholdings. In other words, we explain the part of inequality that is related to inequality in resources and opportunities, and this is most relevant for policy makers. The unexplained part of inequality could be due to unobserved preference variability that is less interesting. In this case, our results have several policy implications. First, we found that land ownership is one of the major contributors to income inequality, mostly through farm income. The size distribution of rice farms in Korea has become less equal in last few decades, and if this trend continues, as is the case in many other developed economies, income inequality could further increase.

Second, an increase in family size could reduce income inequality through non-farm business or labor income inequality. Over the years, the extent of off-farm work on Korean farm households has increased remarkably. To the extent that farm households are multi-generational, the tendency of farmers' offspring to join their parents on the family farm depends largely on their income opportunities. We can expect to find more adult offspring, and as a result larger families, on more profitable farms, and this process could lead to increased income inequality in the long run. Developing non-farm income opportunities in rural areas could counteract this effect, especially in times and places in which the objective prospects of farming are less favorable.

Finally, the role of education in reducing income inequality should not be overlooked. Given that our results imply that non-farm labor income is an equalizing source of income, the increased tendency by farm household members to work off the farm could reduce income inequality. One of the key policy tools for achieving this is rural education. However, if rural education is not expanded in an equitable way, this could lead to an increase rather than a decrease in farm household income inequality.

This research can be expanded in at least three directions. First, we could refine the estimation of the income-generating functions to account for multiple corner solutions, by differentiating between the effects of explanatory variables in different regimes defined by combinations of household income sources. This could enable to compute, for example, different effects of education on non-farm labor income inequality, depending on the presence of other income sources. Second, our results call for an extension of this analysis in the time dimension. In particular, it would be very useful to examine the trends of income inequality and its determinants over time, along the lines of Bourguignon, Fournier, and Gurgand (2001). In this way it might be possible to endogenize the trends in some of the income determinants. Empirically, more detailed information on non-farm labor supply could enable one to differentiate between the effect of labor supply, which could be endogenous, and the effect of the returns to labor, which are largely exogenous but may be affected by public policy. Finally, the framework used in this research and its extensions could be applied to other countries.

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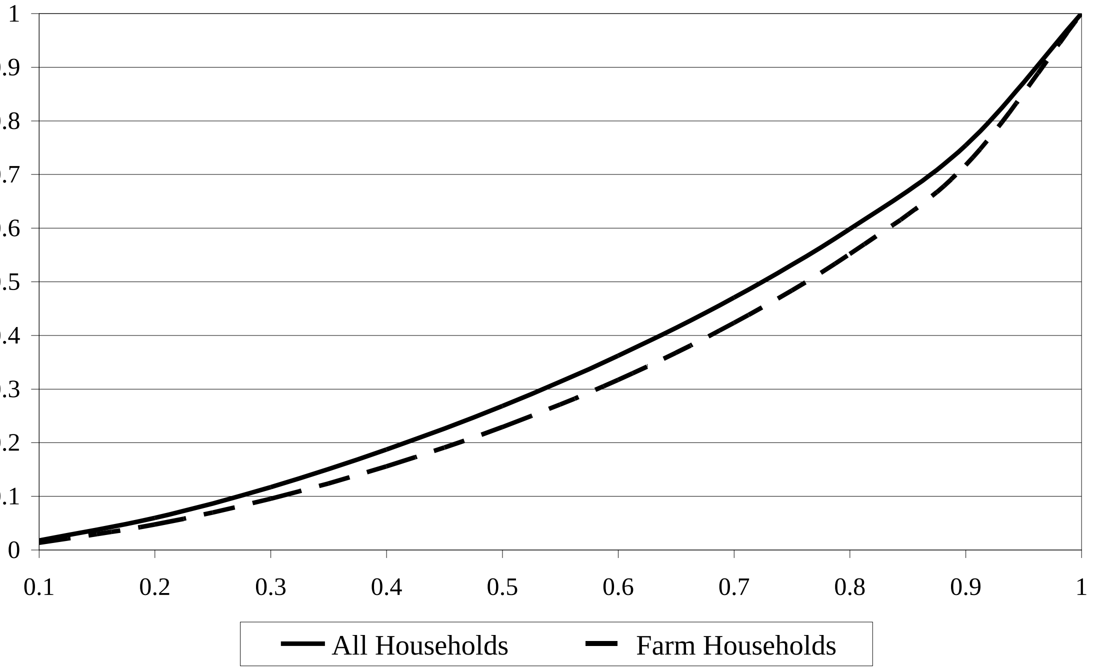

Figure 1. Lorenz curves

Table 1. Sources of Farm household Income and their Contribution to Inequality

Income Component	Income Share	Proportional Contribution to Gini	Marginal Contribution to Gini (%)
Farm business income	0.4247	0.5795**	+0.0643**
Nonfarm business income	0.0778	0.0846**	+0.0023
Nonfarm labor income	0.1987	0.1190**	-0.0329**
Capital income	0.0300	0.0226**	-0.0030**
Transfer income	0.0846	0.0443**	-0.0165**
Irregular income	0.1843	0.1500**	-0.0141**
Total	1.0000	1.0000	

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

Table 2. Per-Capita Income and Inequality by Income Regime

Group of households	Mean per-capita income	Gini coefficient	Number of observations
All cases	9.06	0.4147	3,042
Regime=0	8.96	0.5050	423
Regime=1	9.76	0.4564	350
Regime=2	8.29	0.3911	1,016
Regime=3	9.52	0.3863	1,253

Notes:
Income is measured in millions of Won. All farm households have farm income by definition.
Regime=0: household with no income from non-farm business or labor
Regime=1: household with income from non-farm business only
Regime=2: household with income from non-farm labor only
Regime=3: household with income from both non-farm business and non-farm labor

Table 3. Explanatory Variables[a]

A. Overall means

Variable	Mean	Min	Max
Age	58.800	27	89
Education[b]	0.467	0	1
Family size	3.211	2	10
Fraction 19-64[c]	0.591	0	1
Land owned per capita[d]	0.476	0	21.5
South-west	0.441	0	1

B. Means by regime

Variable	Regime 0	Regime 1	Regime 2	Regime 3
Age	62.868	59.274	58.749	57.337
Education[b]	0.428	0.483	0.469	0.475
Family size	2.695	3.060	3.271	3.379
Fraction 19-64[c]	0.460	0.528	0.621	0.629
Land owned per capita[d]	0.546	0.639	0.415	0.457
South-west	0.503	0.383	0.432	0.443

Notes:
a. 3,042 households
b. Middle school, high school or higher education.
c. Fraction of household members between the ages 19 and 64.
d. Land is measured in hectares.
Regime=0: household with no income from non-farm business or labor
Regime=1: household with income from non-farm business only
Regime=2: household with income from non-farm labor only
Regime=3: household with income from both non-farm business and non-farm labor

Table 4. Source-Specific Per-Capita Income Generating Equations

Variable	Total income	Farm income	Non-farm business income	Non-farm labor income	Capital income	Transfer income
Age	0.491**	0.299*	-0.005	0.203**	0.024	0.032
	(3.25)	(2.43)	(-0.05)	(2.92)	(0.96)	(1.10)
Age squared/100	-0.444**	-0.314**	-0.038	-0.178**	-0.006	-0.001
	(-3.30)	(-2.86)	(-0.45)	(-2.86)	(-0.28)	(-0.02)
Education	1.088**	-0.122	0.183	0.264	0.246**	0.360**
	(3.34)	(-0.46)	(0.92)	(1.83)	(4.53)	(5.77)
Family size	-0.975**	-0.672**	0.048	0.331**	-0.036	-0.135**
	(-7.98)	(-6.73)	(0.66)	(6.16)	(-1.77)	(-5.78)
Fraction 19-64	4.096**	1.636**	0.958**	2.462**	0.158	-0.346**
	(7.36)	(3.60)	(2.77)	(9.83)	(1.70)	(-3.26)
Land owned per capita	1.708**	1.681**	0.580**	-0.532**	0.048	0.028
	(8.65)	(10.44)	(5.01)	(-5.90)	(1.50)	(0.75)
South-west	-1.417**	-0.601*	-0.387*	-0.382**	-0.052	-0.014
	(-4.91)	(-2.55)	(-2.19)	(-2.97)	(-1.07)	(-0.25)
Intercept	-3.913	-1.825	-0.388	-6.641**	-1.381*	-0.738
	(-0.96)	(-0.55)	(-0.16)	(-3.56)	(-1.99)	(-0.93)
(Pseudo) R^2	11.72%	8.50%	0.92%	2.66%	0.81%	2.59%
Number of positive cases	3,042 (100%)	3,042 (100%)	1,603 (52.7%)	2,269 (74.6%)	1,995 (65.6%)	2,724 (89.5%)

Notes: OLS estimates for total income and farm income, Tobit estimates for other income sources. All farm households have farm income by definition. R^2 in Tobit results is Pseudo R^2. * coefficient significant at 5%. ** coefficient significant at 1%.

Table 5. Regression-Based Source-Specific Inequality Decompositions

Variable	Total income	Farm income	Non-farm business income	Non-farm labor income	Capital income	Transfer income
Inequality shares (%)						
Age	-2.623	-1.729	0.026*	-1.091	-0.145	-0.183
Age squared/100	4.806**	3.555**	0.427**	1.938**	0.073**	0.007**
Education	0.507**	-0.061**	0.089**	0.128**	0.118**	0.165**
Family size	4.194**	2.882**	-0.208**	-1.416**	0.155**	0.567**
Fraction 19-64	6.023**	2.383**	1.410**	3.601**	0.234**	-0.506**
Land owned per capita	3.288**	3.200**	1.119**	-1.026**	0.092**	0.054**
South-west	0.361	0.145	0.102*	0.095	0.013	0.003
Marginal effects (%)						
Age	0.170**	0.253**	0.141**	0.050**	-0.045**	-0.085**
Education	-2.503**	0.329**	-0.469**	-0.676**	-0.627**	-0.907**
Family size	4.981**	3.331**	-0.219**	-1.461**	0.166**	0.626**
Fraction 19-64	-1.786**	-0.738**	-0.431**	-1.097**	-0.072**	0.159**
Land owned per capita	-0.023**	-0.023**	-0.008**	0.007**	-0.001**	-0.000**
South-west	4.137**	1.597**	0.988**	0.983**	0.128**	0.034**

Significance tests are based on bootstrapped standard errors. * coefficient significant at 5%. ** coefficient significant at 1%. Marginal effects are simulated as following: Age: +1; Education: changing education status to high education; Family size: +1; Fraction 19-64: +0.1; Land: +1%; South-west: changing region to south-west.