Does Non-farm Income Improve or Worsen Income Inequality?
Evidence from Rural Ghana

Bernardin Senadza[2#]

Abstract

This paper uses nationally representative household survey data of 2006 to examine the effect of non-farm income on income inequality in rural Ghana. Employing the Gini-decomposition technique, results indicate that aggregate non-farm income increased income inequality among rural households in Ghana. In terms of its components, while non-farm self-employment income reduced income inequality, non-farm wage income increased income inequality. A factor-decomposition of inequality revealed that education is the single most important variable contributing to the inequality-increasing nature of non-farm income. The effect of education on inequality is more pronounced for non-farm wage income. The policy implication is for a narrowing of education inequality among rural households in Ghana to create greater access to non-farm employment to reduce rural income inequality and poverty.

1.   Introduction

There is overwhelming evidence in the literature that rural households in developing countries receive quite a significant proportion of their incomes from non-farm employment. Non-farm income (or non-agricultural income, see Barrett et al., 2001) refers to income earned from non-agricultural sources, either in wage-employment or self-employment. Haggblade et al. (2005), for instance, report that non-farm income constitutes 30 - 45 per cent of rural household income across the developing world. Based on a review of a number of studies using rural household surveys conducted between the mid 1970s and the late 1990s,

[#] Correspondence to : Bernardin Senadza, Department of Economics, University of Ghana, P.O. Box LG57, Legon, Accra, Ghana. Email: bsenadza@ug.edu.gh

Reardon et al. (1998) finds that non-farm income as a share of total household income averaged 42 per cent for Africa, 32 per cent for Asia and 40 per cent for Latin America. In Ghana, non-farm employment is an equally important source of income for rural households. Senadza (2011) reports that non-farm income as a share of total household income in rural Ghana increased from 35 per cent in 1998 to 41 per cent in 2006.

Non-farm income is important for poverty reduction (de Janvry and Sadoulet, 2001) and for improving household welfare (Reardon et al., 1992; Dercon and Krishnan, 1996; Reardon et al., 1998; Barrett et al., 2000; Block and Webb, 2001; Canagarajah et al., 2001; Rahut, 2006; Babatunde and Qaim, 2009; Senadza, 2011). While non-farm income can contribute to minimizing the variability of rural household income from agriculture, it may also impact on the distribution of income. Empirical evidence on the effect of non-farm income on rural income inequality is mixed. Canagarajah et al. (2001) observes that this result may be due to the heterogeneity of the non-farm sector. In addition the components of non-farm income may have differential effects on income inequality. Thus analysing aggregate non-farm income may fail to reveal the differential income-inequality effects of the components of non-farm income.

Ghana has made remarkable progress in reducing poverty over the last one and a half decades with the headcount poverty rate declining from 52 per cent in 1991 to 28 per cent in 2006 (Ghana Statistical Service 2000, 2007). The country is however confronted with rising inequality among various population groups (Coulombe and Wodon, 2007). Though non-farm income constitutes a significant proportion of rural household income and is found to be associated with higher welfare levels (Senadza, 2011) the pattern of distribution of non-farm income has implications for the overall distribution of rural income. The important question then is how does non-farm income affect rural income inequality? Does it decrease or increase it? The objective of the paper is to examine the effect of non-farm income on income inequality in rural Ghana. Specifically, the paper 1) examines the effect of aggregate non-farm income as well as its components on income inequality, and 2) investigates which household level factor(s) drives the inequality in each income component.

The rest of the paper proceeds as follows. Section 2 surveys the literature on non-farm income and income inequality. In section 3, the methodology and the data are discussed, whiles section 4 presents the empirical results. Section 5 concludes with policy implications.

2. Literature Review

The empirical evidence on the effect of non-farm income on rural income inequality shows mixed results. Canagarajah et al. (2001) opines that this may be due to the heterogeneity of the non-farm sector and the wide range of contexts in which the question has been posed. Studies such as Reardon and Taylor (1996), Reardon et al. (1998), Adams (2001), Elbers and Lanjouw (2001) and Woldehanna (2002) find that non-farm income increases inequality because non-farm income is unequally distributed in favour of the rich. On the other hand, Adams (1994), Lanjouw (1998) and Zhu and Luo (2006) find that non-farm income decreases rural income inequality. Reardon et al. (2000) observes that the assertion that non-farm income reduces income inequality is premised on three empirical assumptions: 1) that non-farm income is large enough to influence rural income distribution, 2) that non-farm income is unequally distributed, and 3) that this unequally distributed non-farm income favours the poor. Lanjouw and Feder (2001) however emphasise the need to distinguish between non-farm activities, whether high-productivity or low-productivity, in ascertaining the effect of non-farm income on income inequality. They observe that since high-productivity activities generally accrue to wealthier households, income from this source tends to increase inequality because the poor usually do not have the skills, contacts and assets required for accessing such jobs.

Reardon (1997) observes that in rural Africa non-farm income constituted a greater share of total income for richer households compared to poorer households. Majority of studies (for instance, Reardon and Taylor, 1996; Canagarajah et al., 2001) on Africa therefore find that non-farm income negatively affected rural income distribution. Rationalising these findings, Barrett et al. (2001) observes that while reliance on non-farm income is quite common among rural households it is wealthier (and landowning) households that tend to have easy access to attractive and high-return non-farm activities. Poor households on the other hand face significant entry barriers into these high-return activities and this causes the non-farm sector to have an inequality-increasing effect on rural income distribution (Barrett et al., 2001).

Canagarajah et al. (2001) however argues that very poor households may be pushed into non-farm activities, especially if they are landless and cannot work in agriculture. Thus non-farm income may not necessarily have a positive linear correlation with wealth status but rather a U-like pattern may emerge in the distribution of non-farm income whereby the very poor (and landless)

and the wealthy (land-rich) receive proportionately more of their total income from non-farm sources. For instance, Barrett et al. (2000) finds this relationship to hold in Cote d'Ivoire although the income received by the land-poor came predominantly from unskilled off-farm activities (agricultural wage and low skill non-agricultural wage- and self-employment), while the land-rich derived non-farm income from trades and skilled employment. Thus the existence of entry barriers creates a rich-poor dichotomy of non-farm activities.

The mixed findings on the effect of non-farm income on rural income inequality suggest the need to examine the non-farm sector in different country contexts (Canagarajah et al., 2001). Adams (2001), for instance, investigates the impact of different sources of income on poverty and inequality in rural Egypt and Jordan. He finds that while non-farm income reduces poverty and improves income distribution in Egypt, in Jordan non-farm income goes mainly to the rich and thus tends to increase rural income inequality. Adams attributes the different findings to land. In Egypt land is highly productive, but the poor lack access to land and are thus "pushed" to work in the non-farm sector. However, in Jordan land is not very productive and so the rich are "pulled" by more attractive rates of return into the non-farm sector.

Analysing aggregate non-farm income does not reveal the differential impacts on income inequality of the different components of non-farm income. Studies (Adams, 2001; Canagarajah et al., 2001; Zhu and Luo, 2006) using disaggregated non-farm income data reveal that the different components of non-farm income contributed to inequality differently. Zhu and Luo (2006) find that in China, self-employment income worsens income inequality, while wage employment had an equalising effect on income distribution. Adams (2001) obtained similar results for Egypt, and so did Canagarajah et al. (2001) for Ghana and Uganda. These findings perhaps confirm the existence of entry barriers in some types (for instance, self-employment) of non-farm activities. Because the poor lack the needed capital to venture into lucrative self-employment non-farm activities, they predominantly engage in wage employment, particularly lower-skill casual wage employment, hence the inequality-reducing effect of wage income.

3. Methodology and Data
3.1 Gini Decomposition
Any reliable measure of inequality must meet five basic properties, namely, (1) Pigou-Dalton transfer sensitivity; (2) symmetry or anonymity; (3) mean

independence; (4) population homogeneity; and (5) decomposability. A measure of income inequality that meets all the above properties is the Gini coefficient (Litchfield, 1999).

Pigou-Dalton transfer sensitivity principle requires the inequality measure to rise (or at least not fall) in response to a mean-preserving spread. In other words, the Pigou-Dalton transfer principle holds if the measure of inequality increases whenever income is transferred from a poorer person to a richer person and decreases when income is transferred from a richer to a poorer person. Symmetry or anonymity requires that the inequality measure be independent of any characteristic of individuals other than their income. Thus symmetry holds if the inequality measure remains unchanged when individuals switch places in the income order. Mean independence requires the inequality measure to be invariant to uniform proportional changes. In other words, proportionate change in all incomes must leave the measure of inequality unchanged. Population homogeneity requires that the inequality measure be invariant to replications of the population. Thus increasing (or decreasing) the population size across all income levels must have no effect on the measured level of inequality.

Decomposability is the property that requires overall inequality to be partitioned into its constituent parts, either over sub-populations or sources. That is, an inequality measure can be regarded as source decomposable if total inequality can be broken down into a weighted sum of inequality by various income components. The income equalising or dis-equalising effect of non-farm income can therefore be ascertained by decomposing the Gini coefficient of total income into its component parts.

Let $y_1, y_2 \ldots y_k$, represent the K components of household income and y the total household income, where,

$$y = \sum_{i=1}^{k} y_i \tag{1}$$

Following Pyatt, Chen and Fei (1980) and Stark, Taylor and Yitzhaki (1986), the Gini coefficient for total income, G, can be decomposed as follows:

$$G = \sum_{k=1}^{k} R_k G_k S_k \tag{2}$$

Where, S_k is the share of income component k in total income, G_k is the Gini coefficient of income component k, and R_k is the Gini correlation of income component k with total income defined as:

$$R_k = \frac{\text{cov}[Y_k, F(Y)]}{\text{cov}[Y_k, F(Y_k)]} \qquad (3)$$

Using the Gini decomposition technique, it is possible to find out how much of the overall income inequality is attributable to a particular income source, and whether an income source contributes to increasing or decreasing overall inequality. The relative concentration coefficient of income component k which determines whether an income component (source) worsens or improves overall income inequality is given by:

$$g_k = R_k \frac{G_k}{G} \qquad (4)$$

where g_k is the relative concentration coefficient of income component k in overall inequality. Income component k worsens overall income inequality if $g_k > 1$ and it has an equalizing effect if $g_k < 1$.

3.2   Regression Decomposition of Inequality

The Gini decomposition technique discussed above answers the question: How much does each income component contribute to overall inequality and which income components increase or decrease total inequality? While it is important to know whether an income component increases or decreases income inequality, it might also be useful to ascertain what factors contribute most to the inequality-increasing or inequality-decreasing effect in a given income component. The regression-based approach to inequality decomposition quantifies the relative contribution of the various income determinants to the inequality in a given income component (Adams, 2001).

Following Morduch and Sicular (2002), the regression based approach begins with the income equation:

$$Y = X\beta + \in \qquad (5)$$

where X is an $n \times M$ matrix of independent variables with the first column given by the n-vector $e = (1,1,...,1)$, β is an M-vector of regression coefficients, and $\in$ is an n-vector of residuals. The M coefficients can be estimated using appropriate econometric techniques with specification corrections as required (Morduch and Sicular, 2002). Predictions of per capita income from each income source $\hat{Y}_k = X\beta$ can be formed using information from the entire data set. The econometric results yield estimates of the income flows attributed to various household variables, and this allows for decomposition by income source. Decomposition by income source basically apportions inequality to the various income components, where the sum of these components equals total income,

$$Y_i = \sum_{k=1}^{K} Y_{ik} \, .$$

Let $\hat{Y^m} = X\beta^m$ represent income contributed by various household level factors such as age, education, land, location etc., as given by the regression results. By construction, total income from a given income source is the sum of these flows plus the regression residual (Morduch and Sicular, 2002).
That is

$$Y_{ik} = \sum_{m=1}^{M+1} \hat{Y}_{ik}^m \qquad \text{for all } i, \qquad (6)$$

where

$$\hat{Y}_{ik}^m = \hat{\beta}_m X_{ik}^m \qquad \text{for } m = 1,...,M$$

$$\hat{Y}_{ik}^m = \in_{ik} \qquad \text{for } m = M+1$$

These estimated income flows can then be used to determine the contribution of all regression variables to inequality in an income source or component. The shares take the form

$$s^m = \hat{\beta}_m \left(\frac{\sum_{i=1}^{n} a_i(y) x_i^m}{I(y)} \right) \qquad \text{for } m = 1,...,M. \qquad (7)$$

This formula can be applied to the decomposition of any inequality index that can be written as a weighted sum of income (Morduch and Sicular, 2002).

3.3   Data

Data used for the paper is from the fifth round of the Ghana Living Standards Survey (GLSS 5) conducted in 2005/2006. The Ghana Living Standards Survey is a nationally-representative survey of households and individuals, designed along the lines of the World Bank's Living Standards Measurement Surveys (LSMS). The GLSS is conducted by the Ghana Statistical Service with technical assistance from the World Bank. The GLSS is a probability sample survey. The Ghana Statistical Service maintains a complete list of enumeration areas (EAs), together with their respective population and number of households. This information was used as the sampling frame for the GLSS 5. A two-stage stratified random sampling design was used. The EAs were designated as primary sampling units (PSUs) while households within each EA constituted the secondary sampling units (SSUs). The EAs were first stratified into ten administrative regions and within each region the EAs were further subdivided according to rural and urban areas of location. The EAs were also classified according to the three ecological zones (coastal, forest and savannah). The survey collected information on demographic characteristics of households and individuals, and all aspects of living conditions including health, education, housing, household income, consumption and expenditure, credit, assets and savings, prices and employment (Ghana Statistical Service, 2008). The GLSS 5 also gathered data on non-farm household enterprises, tourism, migrants and remittances. Out of the 8,687 households, 5069 (58%) were rural households. Four rural observations were single-person unemployed households and were therefore dropped leaving 5065 observations for analysis.

4.   Results
4.1   Decomposition of Gini Coefficient
Table 1 reports the results of the decomposition of the Gini coefficient of per capita income (Per capita household income is adjusted by adult equivalence scale) for all households in rural Ghana. Table 1 shows that the per capita share of non-farm income in total income is 31 per cent, with non-farm self-employment income accounting for more than 60 per cent. Expectedly, on-farm income accounts for the largest share of total income (59%) and also contributes the largest to overall inequality (58%). The Gini coefficient for total income

is 0.56, a value that lies within the range obtained for many other developing countries. Recent computations show that income Ginis range from a low of 0.42 for Bolivia to 0.60 for Brazil (Adams, 2001). The Gini coefficients for the various income components are much higher than that of total income because not all households derive income from each of the income sources. The Gini coefficients of the income components range from 0.67 for rental income to 0.99 for other income.

Table 1 Inequality decomposition by income source for all rural households

Income source	Share in total income S_k	Gini coefficient G_k	Gini correlation with total income R_k	Absolute contribution to overall inequality	Relative contribution to overall inequality	Relative concentration coefficient $g_k = R_k G_k / G$
Farm	0.59	0.69	0.80	0.32	0.58	0.99
Farm wage	0.02	0.98	0.69	0.01	0.02	1.20
Non-farm self-employ	0.19	0.83	0.67	0.10	0.18	0.99
Non-farm wage employ	0.12	0.94	0.78	0.08	0.14	1.31
Rental	0.02	0.67	0.34	0.01	0.01	0.41
Remittance	0.06	0.89	0.61	0.03	0.06	0.97
Other	0.01	0.99	0.86	0.00	0.01	1.52
Total income	1.00	0.56		0.56	1.00	
Total non-farm income	0.31	0.80	0.78	0.18	0.32	1.11

Source: Author's computation based on GLSS 5 data.

As an aggregate, Table 1 shows that non-farm income increased income inequality among rural households in Ghana, thus confirming the findings of Canagarajah et al (2001) for Ghana. Adams (2001) obtained similar results for Jordan and attributed it to land. He argues that in Jordan, land is not very productive so the rich are "pulled" by more attractive rates of return in the non-farm sector where they earn proportionately more than the poor thereby worsening income inequality.

Aggregate non-farm income however may hide the effects of its respective components on income inequality. Table 1 also reports the individual effects of non-farm self-employment income and non-farm wage employment income on income inequality. Table 1 shows that while non-farm wage-employment income increased income inequality, non-farm self-employment income on the other hand, decreased income inequality in rural Ghana, highlighting the importance of distinguishing between self-employment and wage-employment income when assessing the effect of non-farm income on income inequality. This finding however is the inverse of what was obtained by Canagarajah et al.

(2001) for Ghana (Canagarajah et al. 2001 was based on GLSS 1 and 3 data) and Uganda. While the tendency for non-farm income to increase income inequality is sometimes attributed to entry barriers that prevent poor households from participating actively, especially entry into high return activities, the finding that non-farm self-employment reduced income inequality may be an indication that there may not be significant barriers to entry into non-farm self-employment in rural Ghana, perhaps due to the nature of the activities. The results however seem to suggest the existence of entry barriers into non-farm wage employment, and here education may be a crucial factor. For instance, gaining employment as a "village" teacher requires a certain minimum level of education. Senadza (2011), for instance, finds that more educated households tend to be engaged in non-farm wage employment activities in rural Ghana. The results in Table 1 also show that farm wage income had a dis-equalising effect on total income, while on-farm income decreased income inequality.

Tables 2, 3 and 4 present the results of the decomposition of the Gini for the coastal-, forest-, and savannah-zones respectively so as to ascertain the geographical location effects of non-farm employment on income inequality. Income inequality (Gini coefficient) is lowest in the forest zone (Table 3) and highest in the savannah zone (Table 4). With a Gini coefficient of 0.56 (Table 2), the distribution of total income in the coastal zone mirrors closely the national distribution of income in rural Ghana.

Table 2 Inequality decomposition by income source for households in coastal zone

Income source	Share in total income S_k	Gini coefficient G_k	Gini correlation with total income R_k	Absolute contribution to overall inequality	Relative contribution to overall inequality	Relative concentration coefficient $g_k=R_k*G_k/G$
Farm	0.48	0.77	0.77	0.29	0.51	1.05
Farm wage	0.04	0.97	0.65	0.02	0.04	1.13
Non-farm self-employ	0.20	0.79	0.63	0.10	0.18	0.88
Non-farm wage employ	0.17	0.93	0.78	0.12	0.21	1.29
Rental	0.02	0.60	0.10	0.00	0.01	0.10
Remittance	0.07	0.87	0.53	0.03	0.06	0.82
Other	0.00	0.99	0.56	0.00	0.00	1.00
Total	1.00	0.56		0.56	1.00	
Total non-farm income	0.38	0.77	0.78	0.21	0.38	1.06

Source: Author's computation based on GLSS 5 data.

Table 3 Inequality decomposition by income source for households in forest zone

Income source	Share in total income S_k	Gini coefficient G_k	Gini correlation with total income R_k	Absolute contribution to overall inequality	Relative contribution to overall inequality	Relative concentration coefficient $g_k=R_k*G_k/G$
Farm	0.51	0.66	0.75	0.25	0.48	0.95
Farm wage	0.02	0.98	0.58	0.01	0.02	1.09
Non-farm self-employ	0.23	0.83	0.66	0.13	0.24	1.05
Non-farm wage employ	0.14	0.92	0.73	0.08	0.16	1.28
Rental	0.02	0.72	0.36	0.01	0.01	0.50
Remittance	0.07	0.87	0.58	0.04	0.07	0.97
Other	0.01	0.99	0.87	0.01	0.02	1.66
Total	1.00	0.52		0.52	1.00	
Total non-farm income	0.36	0.78	0.76	0.21	0.39	1.14

Source: Author's computation based on GLSS 5 data.

Table 4 Inequality decomposition by income source for households in savannah zone

Income source	Share in total income S_k	Gini coefficient G_k	Gini correlation with total income R_k	Absolute contribution to overall inequality	Relative contribution to overall inequality	Relative concentration coefficient $g_k=R_k*G_k/G$
Farm	0.75	0.69	0.89	0.46	0.77	1.02
Farm wage	0.00	1.00	0.79	0.00	0.00	1.31
Non-farm self-employ	0.12	0.83	0.63	0.06	0.11	0.87
Non-farm wage employ	0.06	0.97	0.81	0.04	0.06	1.30
Rental	0.02	0.62	0.46	0.01	0.01	0.48
Remittance	0.04	0.92	0.60	0.03	0.04	0.92
Other	0.00	1.00	0.79	0.00	0.00	1.30
Total	1.00	0.60		0.60	1.00	
Total non-farm income	0.18	0.83	0.75	0.10	0.17	1.02

Source: Author's computation based on GLSS 5 data.

Tables 2, 3 and 4 indicate that aggregate non-farm income increased income inequality. Geographically, non-farm wage employment still emerges as an income source that tends to worsen income inequality. Differences emerge when it comes to non-farm self-employment income. In the coastal and savannah zones, non-farm self-employment income maintains the status quo as an income source that decreased income inequality (Tables 2 and 4). In the forest zone (Table 3) however non-farm self-employment income increased income inequality. This may be read as an indication of the existence of entry barriers to non-farm self-employment in addition to non-farm wage employment in the forest region. In the coastal and savannah zones, on-farm and farm wage income have dis-

equalising effects on total income (Tables 2 and 4), while in the forest zone it is only farm wage income that increased inequality (Table 3).

Tables 5 and 6 present the results of the Gini decomposition by gender of household head and indicate that the pattern of the distribution of total income is fairly identical between male-headed and female headed households, with income Ginis of 0.56 and 0.55 respectively. Aggregate non-farm income increased inequality among both types of households and this again may be explained by better access of the wealthy to more remunerative activities. The tendency for non-farm income to contribute to inequality is greater among female-headed households for whom self-employment is more important. Table 6 thus shows that non-farm self-employment income increased inequality among female-headed households while it decreased income inequality among households headed by men (Table 5). The fact that non-farm self-employment increased inequality among female-headed households while decreasing it among male-headed households per se is not indicative that it is the gender of the household head that determines whether a particular income source will increase or decrease income inequality. Household composition may also be important. For both types of households non-farm wage employment is a source of increased income-inequality. The results for male-headed and female-headed households regarding the effects of on-farm and farm wage income on inequality are consistent with the results obtained for all households combined.

Table 5 Inequality decomposition by income source for male-headed households

Income source	Share in total income S_k	Gini coefficient G_k	Gini correlation with total income R_k	Absolute contribution to overall inequality	Relative contribution to overall inequality	Relative concentration coefficient $g_k = R_k * G_k / G$
Farm	0.62	0.68	0.82	0.35	0.61	0.99
Farm wage	0.02	0.98	0.70	0.01	0.02	1.22
Non-farm self-employ	0.17	0.83	0.64	0.09	0.16	0.95
Non-farm wage employ	0.12	0.93	0.77	0.08	0.14	1.28
Rental	0.02	0.64	0.37	0.01	0.01	0.42
Remittance	0.04	0.90	0.63	0.02	0.04	1.01
Other	0.01	1.00	0.88	0.01	0.01	1.55
Total	1.00	0.56		0.56	1.00	
Total non-farm income	0.29	0.81	0.77	0.17	0.30	1.10

Source: Author's computation based on GLSS 5 data.

Table 6 Inequality decomposition by income source for female-headed households

Income source	Share in total income S_k	Gini coefficient G_k	Gini correlation with total income R_k	Absolute contribution to overall inequality	Relative contribution to overall inequality	Relative concentration coefficient $g_k=R_k*G_k/G$
Farm	0.42	0.73	0.75	0.22	0.41	0.99
Farm wage	0.02	0.99	0.61	0.01	0.02	1.10
Non-farm self-employ	0.28	0.80	0.74	0.16	0.29	1.08
Non-farm wage employ	0.09	0.97	0.83	0.06	0.12	1.47
Rental	0.02	0.74	0.28	0.01	0.02	0.38
Remittance	0.16	0.81	0.64	0.08	0.15	0.94
Other	0.00	0.99	0.53	0.00	0.00	0.95
Total	1.00	0.55		0.55	1.00	
Total non-farm income	0.37	0.79	0.80	0.22	0.40	1.15

Source: Author's computation based on GLSS 5 data

4.2   *Regression-based Inequality Decomposition*

Table 7 presents the results from the regression-based inequality decomposition to identify and quantify the relative contribution of various household level factors to inequality. In the decompositions, the proportional contribution of a factor to inequality is zero when income from that factor is distributed uniformly among households. It is for this reason that the constant term contributes zero to inequality for each of the income sources (Adams, 2001). Also a factor's contribution depends only on the variation of that factor's income around the mean, and not on the mean itself. Thus those factors which are distributed fairly equally among households will not contribute substantially to inequality. When a factor's contribution is positive it contributes to increasing inequality and a factor decreases inequality when its contribution is negative (Adams, 2001).

Table 7 indicates that education is the single most important factor contributing to the income inequality-increasing effect of non-farm income. Variations in the average years of schooling across households contributes almost 40 per cent to the inequality-increasing effect of non-farm income whiles the years of schooling of the head of household contributes another 10 per cent. The effect of education on inequality is even more pronounced for non-farm wage income. Variations in the average years of schooling of household members and the years of schooling of the household head together account for about 77 per cent of the inequality-increasing effect of non-farm wage income.

Table 7 Factor contribution to inequality in income component (per cent)

	On-farm income	Farm wage income	Total non-farm income	Non-farm self-employ income	Non-farm wage income
Household head is male	6.82	3.60	0.05	3.23	3.70
No. of household members	1.75	5.33	7.04	9.53	3.06
No. of males 15 yrs & above	0.31	8.28	1.32	2.07	0.48
No. of females 15 yrs & above	1.22	0.34	-0.04	-0.12	0.62
Avg. yrs of sch of hh members	3.42	21.81	39.24	13.80	65.01
Years of schooling of hh head	1.46	0.67	9.95	6.33	11.76
Household received remittances	4.20	0.21	0.46	0.18	0.70
Land owned (hectares)	0.80	0.43	0.01	0.02	0.02
Farmsize (hectares)	0.24	0.05	0.83	1.21	0.25
Livestock owned (TLU)	0.01	0.29	-0.05	-0.06	-0.02
Value of farm equipment	0.02	0.09	0.00	0.00	0.08
Constant	0.00	0.00	0.00	0.00	0.00
Regression residual	79.75	58.91	41.19	63.81	14.34
Total	100.00	100.00	100.00	100.00	100.00
Gini coefficient	0.69	0.98	0.80	0.83	0.94

Source: Author's estimation based on GLSS 5 data.

Household size (number of household members) is also an important factor contributing to the inequality-increasing effect of non-farm income, particularly self-employment income. Household size contributes 7 per cent to the income-inequality-increasing effect of aggregate non-farm. Although self-employment income is found to decrease income-inequality overall, household size per se has an inequality-increasing effect on self-employment non-farm income, accounting for 10 per cent.

The relative contribution of household agricultural assets (such as land and livestock) to inequality (or the Gini coefficient) of the various income components is less than 1 per cent in most cases. This means that ownership of agricultural assets is not a major factor contributing to income inequality-increasing effect of non-farm income in rural Ghana. This seems plausible on account of the fact that on-farm income and non-farm self-employment income (household agricultural assets are often considered a proxy for the capital required for entry into non-farm self-employment) are found (Table 1) to be inequality-decreasing.

5. Conclusion

This paper used nationally representative household survey data to examine the effect of non-farm income on income inequality in rural Ghana. Two approaches were adopted, namely, Gini decomposition of inequality by income source, and

regression-based factor decomposition of inequality.

Results indicate that aggregate non-farm income increased income inequality among rural households in Ghana. In terms of its components, while non-farm self-employment income reduced income inequality, non-farm wage income increased income inequality. The tendency for non-farm income to increase income inequality is often attributed to entry barriers that prevent poorer households from participating actively in the non-farm sector, particularly entry into high return activities. The finding that non-farm self-employment reduced income inequality indicates that there may not be significant barriers to entry into non-farm self-employment in rural Ghana, perhaps due to the nature of the activities. That non-farm wage-employment increased income inequality, however, seems to suggest the existence of entry barriers.

A factor-decomposition of inequality revealed that education is the single most important variable contributing to the inequality-increasing nature of non-farm income. Variations in the average years of schooling across households contributed almost 40 per cent to the inequality-increasing effect of non-farm income whiles the years of schooling of the head of household contributed another 10 per cent. The effect of education on inequality is more pronounced for non-farm wage income. The policy implication is that narrowing education inequality among rural households could be one of the ways to enhancing greater access of poorer households to non-farm activities so as to reduce rural income inequality and poverty. In this vein, the policy of free compulsory universal basic education must be taken seriously to narrow the education gap between richer and poorer households in rural Ghana.

References

Adams, R. H. (1994). Non-farm Income and Inequality in Rural Pakistan: A Decomposition Analysis. Journal of Development Studies 31:1. pp. 110-133.

Adams, R. H. (2001). Nonfarm Income, Inequality and Poverty in Rural Egypt and Jordan. Policy Research Working Paper Series No. 2572. World Bank. http://www-wds.worldbank.org/WDSP/IB/2001/Rendered/PDF/multi0page.pdf, (Accessed 30 January 2007).

Babatunde, R.O. and Qaim, R. (2009). Patterns of Income Diversification in Rural Nigeria: Determinants and Impacts. Quarterly Journal of International Agriculture 48:4. pp. 305-320.

Barrett, C.B., Bezuneh, M., and Aboud, A. (2000). The Response of Income Diversification to Macro and Micro Policy Shocks in Cote d' Ivoire and Kenya.

http://pdf.usaid.gov/pdf_docs/Pnacl436.pdf, (Accessed 21 September 2010).

Barrett, C.B., Reardon, T., and Webb, P. (2001). Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics, and Policy Implication. Food Policy, 26:4. pp. 315-331.

Block, S. and Webb, P. (2001). The Dynamics of Livelihood Diversification in Post-famine Ethiopia. Food Policy 26:4. pp. 333-350.

Canagarajah, S., Newman, C., and Bhattamishra, R. (2001). Non-farm Income, Gender, and Inequality: Evidence from Rural Ghana and Uganda. Food Policy 26:4. pp. 405-420.

Coulombe, H. and Wodon, Q. (2007). Poverty Livelihoods and Access to Basic Services in

Ghana. Ghana CEM: Meeting the Challenge of Accelerated and Shared Growth. http://siteresources.worldbank.org/INTGHANA/Resources/CEM_poverty.pdf, (Accessed 12 January 2011).

de Janvry, A. and Sadoulet, E. (2001). Income Strategies Among Rural Households in Mexico: The Role of Off-farm Activities. World Development 29:3. pp. 467-480.

Dercon, S., Krishnan, P. (1996). Income Portfolios in Rural Ethiopia and Tanzania: Choices and Constraints. Journal of Development Studies 32:6. pp. 850–875.

Elbers, C. and Lanjouw, P. (2001). Intersectoral Transfer, Growth and Inequality in Rural Ecuador. World Development 29:3. pp. 481-496.

Ghana Statistical Service (2000). Ghana Living Standards Survey: Report of Fourth Round (GLSS4). Ghana Statistical Service, Accra.

Ghana Statistical Service (2007). Pattern and Trends in Poverty in Ghana: 1991-2006. Ghana Statistical Service, Accra.

Ghana Statistical Service, (2008). Ghana Living Standards Survey: Report of Fifth Round (GLSS5). Ghana Statistical Service, Accra.

Haggblade, S., Hazell, P., and Reardon, T. (2005). The Rural Nonfarm Economy: Pathway out of Poverty or Pathway in?

http://www.ifpri.org/events/seminars/2005/smallfarms/sfproc/S04_haggblade.pdf, (Accessed 15 January 2008).

Lanjouw, P. (1998). Ecuador's Rural Nonfarm Sector as a Route Out of Poverty. Policy Research Working Paper Series, No. 1904. World Bank. http://www-wds.worldbank.org/external/default//IW3P/IB/1998/multi_page.txt, (Accessed 2 April 2008).

Lanjouw, P. and Feder, G. (2001). Rural Non-Farm Activities and Rural Development: From Experience Towards Strategy. Rural Development Strategy Background Paper #4, The World Bank. http://www-wds.worldbank.org/servlet/WDSP/IB/2001/PDF/multi0page.pdf, (Accessed 2 April 2008).

Litchfield, J. (1999). Inequality: Methods and Tools. Washington, D.C.: The World Bank.

Morduch, J. and Sicular, T. (2002). Rethinking Inequality Decomposition with Evidence from Rural China. The Economic Journal 112. pp. 93-106.

Pyatt, G., Chen, C.N., and Fei, J. (1980). The Distribution of Income by Factor Components. Quarterly Journal of Economics 95:3. pp. 451-474.

Rahut, D.B. (2006). Rural Non-farm Employment in the Lower Himalayas of Eastern India: A Micro-econometric Analysis. Cuvillier Verlag, Gottingen.

Reardon, T., Delgado, C., and Matlon, P. (1992). Determinants and Effects of Income Diversification Amongst Farm Households in Burkina Faso. Journal of Development Studies 28:2. pp. 264 – 296.

Reardon, T. and Taylor, J.E. (1996). Agroclimatic Shock, Income Inequality and Poverty: Evidence from Burkina Faso. World Development 24:5. pp. 901-914.

Reardon, T. (1997). Using Evidence of Household Income Diversification to Inform Study of the Rural Nonfarm Labor Market in Africa. World Development 25:5. pp. 735-748.

Reardon, T., Stamoulis, K., Balisacan, A., Cruz, M.E., Berdegue, J., and Banks, B. (1998). Rural Nonfarm Income in Developing Countries. In: FAO, The State of Food and Agriculture 1998. Rome: FAO.

Senadza, B. (2011). Non-farm Income Diversification in Rural Ghana: Determinants and Implications for Income distribution and Welfare. Verlag Dr. Muller, Saarbrucken.

Stark, O., Taylor, E., and Yitzhaki, S. (1986). Remittances and Inequality. Economic Journal 96. pp. 722-740.

Woldenhanna, T. and Oskam, A. (2001). Income Diversification and Entry Barriers: Evidence from the Tigary Region of Northern Ethiopia. Food

Policy 26:4. pp. 351-365.

Zhu, N. and Luo, X. (2006). Non-farm Activity and Rural Income Inequality: A Case Study of Two Provinces in China, Policy Research Working Paper Series No. 3811. World Bank.