

Patterns of income diversification in rural Nigeria: determinants and impacts

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Abstract

While the determinants of rural income diversification have been analyzed in various developing countries, the results remain somewhat ambiguous. Likewise, many previous studies failed to consider the impacts of diversification. Hence, more research is needed to understand what conditions lead to what outcomes and to identify appropriate policy responses. Here, we analyze the situation in rural Nigeria based on recent survey data. The majority of households is fairly diversified; 50% of total income is from off-farm sources. Strikingly, richer households tend to be more diversified, suggesting that diversification is not only considered a risk management strategy but also a means to increase overall income. Econometric analysis confirms that the marginal income effect is positive. Yet, due to market imperfections, resource-poor households are constrained in diversifying their income sources. Reducing market failures through infrastructure improvements could enhance their situation, while, at the same time, promoting specialization among the relatively better off.

Keywords: farm households, income diversification, Nigeria, off-farm activities

JEL: D10, J21, Q12, R20

1. Introduction

Income diversification among rural households in developing countries is a research topic that has received quite a bit of attention in the development economics literature (DAMITE and NEGATU, 2004; ELLIS, 2000). Income diversification refers to the allocation of productive resources among different income generating activities, both on-farm and off-farm (ABDULAI and CROLEREES, 2001). According to BARRETT, REARDON and WEBB (2001), very few people collect all their income from any one source, hold all their wealth in the form of any single asset, or use their resources in just one activity. Researchers have identified several reasons for households to diversify their income sources. The main driving forces include: first, to increase

income when the resources needed for the main activity are too limited to provide a sufficient livelihood (MINOT et al., 2006); second, to reduce income risks in the face of missing insurance markets (REARDON, 1997; BARRETT, BEZUNEH and ABOUD, 2001); third, to exploit strategic complementarities and positive interactions between different activities; and fourth, and related to the third point, to earn cash income to finance farm investments in the face of credit market failures (REARDON, 1997; RUBEN and VAN DEN BERG, 2001).

But what are the main patterns of income diversification in a particular setting? According to ELLIS (1998), these may vary substantially across different countries and regions. For instance, SCHWARZE and ZELLER (2005) showed that rural income diversification is higher among poorer than richer households in Indonesia, while ABDULAI and CROLEREES (2001) and BLOCK and WEBB (2001) showed that the opposite holds true in Mali and Ethiopia, respectively. Also with respect to the driving forces, the empirical literature offers mixed results, particularly concerning the role of farm land. Many of the available studies for countries in Asia recognized the key role of shrinking farm land availability (MINOT et al., 2006). By contrast, land scarcity seems to be less important in some parts of Africa (CANAGARAJAH et al., 2001; LANJOUW et al., 2001). These divergent results call for further empirical research, to better understand the situation in specific settings and provide knowledge that is needed for appropriate policy responses.

Here, we analyze the patterns and driving forces of income diversification in rural Nigeria, based on data from a household survey carried out in 2006. The results contribute to the empirical literature, because no related, recent evidence is available for Nigeria. In addition, we make a conceptual contribution by not only looking at the causes, but also at the impacts of diversification on household incomes. This reverse causality has hardly been analyzed before in quantitative terms. Obviously, estimating impacts econometrically could easily lead to biased results when not accounting for endogeneity. Therefore, we use two-stage least squares (2SLS) techniques to obtain unbiased and robust estimates.

The article proceeds as follows. Section 2 describes the household survey data and methodologies used, while section 3 analyzes the patterns of income diversification with descriptive statistics. Subsequently, determinants and impacts are analyzed econometrically in section 4. Section 5 concludes and discusses policy implications.

2. Data and methodology

2.1 Household survey

The data we use in this study are derived from an interview-based sample survey of farm households in Kwara State, north-central Nigeria. The survey was conducted between April and August 2006. Kwara State is an interesting area for this study, because of its location and considerable socio-economic heterogeneity. The state is regarded as the gateway between the northern and southern regions of Nigeria, and it has a good mixture of the three major ethnic groups in the country. Kwara State as a whole has a population of 2.4 million people, out of which 70% can be classified as peasant farmers (KWSG, 2006). Local farm produce is often sold to itinerant traders from the north and south, while the presence of these traders encourages off-farm businesses and income diversification among farmers. The farming system is characterized by low quality land, low population density, and predominantly cereal-based cropping patterns. Farm enterprises are generally small in size, so that – in spite of own production – most households are net buyers of food, at least seasonally.

Our sample consists of 220 farm households, which were selected through a multi-stage random sampling technique. Eight out of the 16 local government areas in the state were randomly selected in the first stage. Then, five villages were randomly chosen from each of the selected 8 local government areas, and finally, five households were sampled in each of the 40 villages, using complete village household lists provided by the local authorities. A standardized questionnaire was used to collect information on household composition, socioeconomic characteristics, consumption, and income, including details of participation in different farm and off-farm activities. For the purpose of our analysis, we disaggregate income sources into seven categories: i) crop income; ii) livestock income; iii) agricultural wage income; iv) non-agricultural wage income, including from both formal and informal employment; v) self-employed income from own businesses; vi) remittance income received from relatives and friends not presently living with the household; and vii) other income, mostly comprising capital earnings and pensions. Crop and livestock income together make up farm income, while the other five categories constitute off-farm income.

Selected household characteristics are shown in table 1. The average household size of five adult equivalents (AE) is consistent with the national average reported by NBS (2006). About 10% of the households are headed by women. The average educational status is slightly higher than the national average, which can probably be explained by the fact that the density of elementary schools is relatively high in rural areas of Kwara State. The average farm size of 1.9 hectares is comparable to the national average of two hectares. The infrastructure variables indicate that many of the farm households

do not have access to electricity and pipe-borne water. Even fewer households have access to formal or informal credit, and the distance to the nearest market place is quite far on average. Total annual household income is about 30 thousand naira (250 US\$) per AE. Farming accounts for half of this total; the other half is off-farm income. This share of off-farm income fits reasonably well into the available recent literature for Sub-Saharan Africa (DAVIS et al., 2007; WOLDENHANNA and OSKAM, 2001), although the definition of what exactly constitutes off-farm income slightly varies across studies.

Table 1. Descriptive statistics

Variable	Description	Mean	Std. Dev.
Household size	Number of household members expressed in adult equivalents (AE)	5.1	1.305
Male	Dummy for gender of household head (male = 1, female = 0)	0.895	0.306
Age	Age of household head (years)	59.1	6.8
Education	Number of years of schooling of the household head (years)	6.89	3.93
Farm size	Area cultivated by household in survey year (ha)	1.90	0.58
Productive assets	Value of household productive assets (naira)	73761.8	53154.0
Electricity	Dummy for access to electricity (yes = 1, no = 0)	0.827	0.378
Pipe-borne water	Dummy for access to pipe-borne water (yes = 1, no = 0)	0.650	0.478
Tarred road	Dummy for tarred road in the village (yes = 1, no = 0)	0.740	0.439
Distance to market	Distance from the village to the nearest market place (km)	11.71	12.89
Credit	Dummy for access to formal or informal credit (yes = 1, no = 0)	0.204	0.404
Income	Total annual household income (naira/AE)	30245.7	23416.4
Farm income	Annual income from farming (naira/AE)	15226.5	12824.7
Off-farm income	Annual income from off-farm sources (naira/AE)	15019.2	17930.5

Note: Official exchange rate in 2006: 1 US dollar = 120 naira; Std. Dev = standard deviation. AE is adult equivalent. N = 220.

Source: computed from survey data

2.2 Methodology

There are two commonly used methods described in the literature for analyzing household income diversification strategies. The first method is the income-based approach, which looks at household participation in different income earning activities of the rural economy (BARRETT et al., 2005; DAMITE and NEGATU, 2004; BARRETT,

BEZUNEH and ABOUD, 2001). The second is the asset-based approach, which analyzes income diversification behavior by direct examination of the household's asset endowment (CARTER and BARRETT, 2006; BROWN et al., 2006). Here, we use the income-based approach, focusing on three measures of income diversification: i) the number of income sources (NIS); ii) the share of off-farm income in total income (OFS); and iii) the Herfindahl diversification index (HDI).

The NIS, which has also been used by MINOT et al. (2006) and ERSADO (2005), is relatively easy to measure, though it has been criticized for its arbitrariness. For instance, it has been argued that a household with more economically active adults, other things being equal, will be more likely to have more income sources. This may reflect household labor supply decisions as much as the desire for diversification. We recognize this criticism in general, but since we use the NIS in connection with other measures, we do not consider this as a major problem in our context. The OFS indicates the importance of off-farm income, while the HDI is a measure of overall diversification, not only taking into account the number of income sources, but also the magnitude of income derived from them. The HDI is based on the Herfindahl index, which originates in the industrial literature where it is used to measure the degree of industry concentration. It can also be used to measure the degree of concentration of income from various sources at the individual household level. It is then calculated as the sums of squares of income shares from each income source (ERSADO, 2003). The Herfindahl index as such is increasing in concentration, whereby households with perfect specialization (i.e., having only one source of income) have a value of one. As we are interested in diversification, which is the reverse of concentration, we use the HDI, which is defined as one minus the Herfindahl index. Thus, households with most diversified income sources have the largest HDI and vice versa (BARRETT and REARDON, 2000).¹

In the descriptive part of the analysis in section 3, we use these three measures in order to portray patterns of income diversification across different types of households. Moreover, we classify households by livelihood strategies, in order to gain further insights into the relationship between diversification and household income.² The livelihood strategy pursued by a particular household provides indirect evidence as to what it considers the best option, given individual preferences and constraints. Following BARRETT et al. (2005), we distinguish between the following four strategies:

¹ Similar measures of income diversification, such as the Simpson index and the Shannon-Weaver index have also been used in empirical analyses (SCHWARZE and ZELLER, 2005; MINOT et al., 2006).

² Livelihood strategy refers to the combination of assets and activities chosen by households to generate income (ELLIS, 1998).