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DETERMINANTS OF INCOME DIVERSIFICATION DECISION FOR OFF-FARM WORK OF RURAL HOUSEHOLDS IN KONTUM PROVINCE, VIETNAM

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Abstract: Kon Tum, a mountainous northernmost border province in the Central Highlands of Vietnam, is one of the poorest provinces in Vietnam. Many studies recently identified that the diversification of incomes is a critical livelihood strategy for rural households in developing countries. Thus, this study analyzes the factors influencing income diversification decision for off-farm work of rural households. The binary logit model will be employed to investigate the determinants of income diversification decision of rural households for off-farm work. Through 200 households selected using multi-stage sampling technique, this study showed that participation in off-farm employment was influenced by gender, age, education of household head, family size, number of children attending school, farm size, access to credit, and access to tarred roads. The findings suggested that it is important to support both agricultural and non-agricultural sectors to succeed in terms of poverty reduction and food security.

Keywords: income diversification, off-farm work, rural household, poverty, Kon Tum

1 Introduction

Kon Tum is a mountainous northernmost-bordered province in the Central Highlands of Vietnam with an area of 9,650.5 km^2 and population of 462,394 people. It is home to a large number of ethnic minorities, which make up 53 % of the total province's population, but 91.77 % of the total poor households (with less than US$11.90 per person per month). Kon Tum is still one of the poorest provinces of Vietnam. In fact, its poverty rate was 22.77 % in 2014, much higher than the overall national poverty rate of around 10 %. Poverty reduction, therefore, remains one of the greatest challenges facing Komtum Government, especially in the rural areas where the large ethnic minority reside.

In recent years, diversification is considered as a livelihood strategy for the rural household in developing countries (Ellis, 1998). Additionally, the studies of Matshe and Young (2004); Kijima *et al.* (2006) reported that livelihood concept and diversification of income help in minimizing household income variability, providing an additional source of income and even employment which have implications for rural poverty reduction and contribute substantially towards improving households' welfare. In Vietnam, there have been several studies on income

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diversification and poverty reduction (Henin, 2002; Truong *et al.*; 2003). However, these studies only concentrate on the role of agriculture diversification and almost were conducted in the northern uplands and the southern region of Vietnam. Thus, there is still the lack of information about income diversification in the Central Highlands, where there are the poorest provinces of Vietnam, including Kon Tum. In spite of the importance of income diversification, very little is known about the issue, or about its role in the strategies of income generation in the rural households in Kon Tum province. This study aims to identify the determinants of income diversification among the rural households in the province. The results of the study would hopefully contribute to the design of anti-poverty initiatives for this province.

2 Literature reviews

Concerning income diversification, a number of researchers have identified main reasons for households to diversify their income sources: first, to increase income when the sources needed for the main activity are very limited to provide a sufficient livelihood (Minot et al., 2006); second, to reduce income risks in the face of missing insurance markets (Reardon, 1997); third, to exploit strategic complementaries 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 (Rubben and Van Den Berg, 2001). In addition, there are numerous factors that affect the farmer's household choice to go into the off-farm job market.

Abdulai and CroleRees (2011) examined determinants of income diversification among the rural households in Southern Mali. By applying the conditional fixed effects logit model to examine the effect of different factors on diversification decision, the authors of the study showed that poorer households have fewer opportunities in cash-crop production as well as non-crop activities, and hence less diversified incomes. A major reason why poorer households have less diversified portfolios is the lack of capital since an average of 42 % of the households indicated that lack of access to credit was a major constraint to their participation in the non-crop sector. In addition, the estimates also showed that land holding was a significant and positive determinant of non-farm activities. The results also indicated that households in remote areas were less likely to participate in the non-cropping sector than their counterparts closer to the local markets, while households with educated heads were more likely to participate in the non-farm sector than those with illiterate heads. Thus, the study recommended that the role of government was essential in promoting income diversification by acquiring and sharing information and making assets as well as improved infrastructure available to the poorer household.

Based on the review of the literature, Escobal (2001) pointed out that the changes in the composition of rural incomes varied with wealth when analyzing at the individual, household, or regional level, which was conditioned by credit constraints as well as access to infrastructure.

Evidence also showed that rural households in developing countries earned more from own farming than other income sources. It was only in a few countries that the importance of non-farm incomes was greater than own farm income. The result from the study indicated that location and ownership of private and public assets were key determinants of the households income diversification in rural Peru. The finding showed that in poor agricultural zones, there tended to be lower shares in the total income of non-farm income and skilled own-farming incomes. In fact, the higher the land productivity of the district, the stronger the agricultural sector, the greater were nonfarm income shares in overall incomes. In addition, credit accesswas also a key determinant of self-employment. In addition, the effect of education was very clear: the higher the education level, the lower the incentive to obtain income from own-farming, and the greater the incentive to commit time to non-farm self-employment activities as well as non-farm wage employment. The result also showed the role of public assets such as rural electrification and roads. Access to these public assets allowed them to undertake non-farm wage employment.

The study on the determinants of income diversification strategies amongst the rural households in maize-based farming systems of Kenya by Wanyama et al. (2010) also revealed that poorer households tended to have less access to non-farm activities than better-off households that did not only own more productive assets, but also had a better access to markets, especially the financial markets. Lack of capital made it difficult for the farmer to diversify from subsistence agriculture to commercial farming. Furthermore, they found that distance of good roads to the input and output market positively and significantly affected the probability of farmer to participate in all the farm enterprises.

The review of studies on non-farm income diversification and livelihood strategies in rural Africa by Barrett et al. (2001) identified that skills and educational attainment, greater physical access to market, public services, ex-ante endowment of financial capital and other assets (livestock, cash cropping, migration), family size and structure are key determinants of household participation in off-farm business and non-farm earnings.

According to the literature reviews, the factors affecting income diversification of households include: personal characteristic of household head (age, gender, education, ethnicity), household composition (family size, number of children, etc.), and outside factors (access to credit, access to tarred roads, distance to the nearest market, etc.). Depending on the specific characteristics of each region and research purposes, the factors also influence income diversification decision for off-farm work of rural households. Hence, this study tests the hypothesis that the factors including age, gender, education, ethnicity of household head, family size, number of children, access to credit, access to tarred roads and distance to the nearest market have an insignificant impact on income diversification decision for off-farm work.

3 Data and sampling design

To compare the level of income diversification, two districts, namely Dakha and Sathay, were selected purposively based on the district poverty rate in Kon Tum province. The former represents a more developed region and the latter less developed region. In addition, these districts have the largest achievement in alleviating poverty in Kon Tum province. Our sample consisted of 200 household heads that were chosen using a multi-stage random sampling technique. In the first stage, two districts were purposively selected. In the second stage, from each district, we randomly selected three communes according to three criteria: the proximity of commune to the town of the district, the highest population density, and the largest ethnic minority. The main reason for choosing this procedure was to ensure catching the large differences in agro-ecological and socio-economic conditions. Finally, we randomly opted respondents from the chosen commune for the interview. Sampling is the process of selecting a few observations from a larger set. The total number of households in two chosen districts was 6,635. However, time and also funding for the study were limited, hence, 200 respondents were selected from the two districts.

4 Economic Analysis Model

This study intended to identify the determinants of households' participation decision for off-farm activities by using the binary logistic regression model. Participation in off-farm work was measured by a binary variable which was zero if the household did not participate in the activity. The binary variable took on value 1 if the household generated income from this activity. The underlying equation for the logit model is

$$Y_i = \beta_0 + X_{ij}\beta_{ij} + u_i \quad (1)$$

where Y_i is th ith unobservable latent variable for participation in off-farm work by household i with

$$Y = \begin{cases} 1 & if\ household\ participates\ in\ the\ off-farm\ work \\ 0 & otherwise \end{cases},$$

β_0 is the constant term, β_{ij} is the vector of coefficients, X_{ij} is the vector of explanatory variables, and u_i is the error term.

We were interested in how the vector of the explanatory variables X_j' influenced the possibility that the binary dependent variable Y took on value 1. In this model, explanatory variables consisted of the personal characteristics of household head (age, gender, education, ethnicity), household composition (family size, number of children), and outside factors (access to credit, access to tarred roads, distance to the nearest market). Particularly, equation (1) is written again as follows

$$Y_i = \beta_0 + X_{i1}\beta_{i1} + X_{i2}\beta_{i2} + X_{i3}\beta_{i3} + X_{i4}\beta_{i4} + X_{i5}\beta_{i5} + X_{6i}\beta_{i6} + X_{i7}\beta_{i7} + X_{i8}\beta_{i8} + X_{i9}\beta_{i9} + X_{i10}\beta_{i10} + X_{i11}\beta_{i11} + u_i$$

where X_{i1} is the gender of household head, X_{i2} is the age of household head, X_{i3} is the education of household head, X_{i4} is the family size, X_{i5} is the number of children, X_{i6} is the farm size, X_{i7} is the distance to tarred roads, X_{i8} is the distance to the nearest market, X_{i9} is the access to credit, X_{i10} is the ethnicity of household head, X_{i11} is the regional location. The description of the variables is given in Table 1.

Table 1. Description of Variables used in Regression Analysis

Variable name	Nature of variable	Unit	Definition
Participation in off-farm work	Binary		Dummy for participation decision of household in off-farm work
Total household income	Continuous	1000 VND	Amount of income that household earned from all sources
Level of income diversification	Continuous		It is measured by Simpsom Diversify Index
Age	Continuous	year	Age of household head can be a proxy to experience
Gender	Binary		Dummy for gender of household head (Male = 1, Female = 0)
Education	Continuous	year	Education level of household head in year
Ethnicity	Binary		Dummy for minority ethnic group of household head (minority ethenic=1, otherwise =0)
Family size	Continuous	No.	Number of members in household
Number of Children	Continuous	No.	Number of children under 15 ages
Farm size	Continuous	ha	Area cultivated by household in survey year
Access to credit	Binary		Dummy for access to credit (yes=1, no=0)
Access to tarred roads	Binary		Dummy for tarred roads in the village (yes = 1, no = 0)
Distance to market	Continuous	km	Distance from household to the nearest market place
Regional Location	Binary		The dummy assumes the value '1' if the households belong to a more developed region (i.e., Dak Ha) and '0' otherwise (i.e., Sa Thay).

5 Results and discussions

5.1 Activities and income

According to the data from this study, on average, households earned a total income of around VND 51 million (US$2,405) from agricultural activities as the most important source. Specifically, nearly 97.5 % of households participated in agricultural self-employment activities

that contributed to 77.2 % of the total household income. While almost all households in the sample had cultivated land, about 19 % received income from supplying agricultural wage labor, which accounted for 6.8 % of the total income. Only 24 households (12 %) participated in non-agricultural wage labour activities, but this source contributed 7.8 % to the total income. In the case of self-enterprise activities, just 50 households, which was equivalent to 15 %, earned income from this activity, however, it generated 8.8 % of the total income. Other income sources were of minor importance.

Further, the composition of income was disaggregated by income quartiles which were formed based on the total household income. Table 2 shows incomes and activities differentiated by income quartiles from the poorest income quartile to the richest income quartile. According to the situation across the income quartiles, farming was the most important income source for the poorest households, accounting for 94.2 % of overall income. Though the richest households derived income from farming, they also obtained a larger income share from off-farm activities, especially self-employment. While self-employment income accounted for 13.6 % of the total income in the richest quartile, the share was only 1.2 % in the poorest quartile. Establishing an own business often required capital, and without proper functioning credit markets, poorer households faced difficulties to start a lucrative self-employed business. This suggested that poorer households might face entry problems to diversify into higher-paying self-employment activities.

In addition, the number of households in the sample was also statistically different between the income quartiles for all activities. Particularly, the rate of households with better income participating in non-agricultural self-employment and non-agricultural wage employment was 36 % and 30 %, respectively. In contrast, only 4 % of the poorest households were engaged in non-agricultural self-employment and only 2 % participated in non-agricultural wage labour activities. Nonetheless, the results demonstrated that the majority of households in rural Kon Tum maintained a diversified income portfolio.

Table 2. Income and participation by income quartiles

	Income quartiles			
	First	**Second**	**Third**	**Fourth**
Income composition (%)				
Total farm income	94.2	79.7	80.4	67.5
Crop income	88.5	73.1	72.6	58.2
Livestock income	1.6	4.2	3.8	5.3
Fishery income	0.6	0.0	2.4	2.2
Forestry income	1.6	2.3	0.6	0.0
Total off-farm income	5.8	20.3	19.6	32.5

	Income quartiles			
	First	**Second**	**Third**	**Fourth**
Income composition (%)				
Agricultural wage labor income	2.5	10.8	10.8	4.9
Non-agricultural wage labor income	0.9	2.3	3.4	13.4
Self-enterprise income	1.2	6.8	5.4	13.6
Other income	1.3	0.4	0.0	0.4
Participation rate (%)				
Total farm income	100	100	100	90
Crop income	100	96	100	90
Livestock income	22	28	28	48
Fishery income	4	0	10	14
Forestry income	6	16	8	0
Total off-farm income	18	36	48	66
Agricultural wage labor income	6	22	28	24
Non-agricultural wage labor income	2	4	8	36
Self-enterprise income	4	10	16	30
Other income	8	4	0	4

5.2 Determinants of income diversification decision for off-farm work

From the binary logit estimation (Table 3), it is possible to draw conclusions about the direction of each variable on the probability of working off-farm. The log likelihood ratio statistic was significant at the 1 % level, suggesting that the independent variables taken together influenced the participation decision.

According to the results, gender of household head positively and significantly influenced the probability of diversifying income into off-farm work. The positive coefficient of gender showed that the male-headed households had a greater probability of working off-farm than female-headed households. This might be due to the influence of the head and cultural factors that female are naturally assigned to household activities. However, in Honduras, wealthier women were found to participate highly in self-employment activities (Ruben and Berg, 2001). In Ethiopia, Berg and Kumbi (2006) found no significant connection between sex and participation. Whereas, Lemi (2006) found a significant positive relationship between a household headed by male and participation in 1994, but no significant relationship was found in 1997.

Table 3. Determinants of participation decision for off-farm work

Variables	Coefficients	Std. Error	*p*-value
Gender	0.946	0.572	0.098*
Age	-0.039	0.023	0.095*
Education	0.145	0.087	0.095*
Ethnicity	0.194	0.626	0.757
Family size	0.527	0.292	0.071*
Number of children	-0.669	0.309	0.030**
Farm size	-0.884	0.249	0.000***
Access to credit	0.772	0.431	0.073*
Access to tarred roads	2.449	0.852	0.004***
Distance to nearest market	0.068	0.172	0.693
Regional location	-0.598	0.389	0.124
Constant	-1.233	1.737	0.478
Number of observations = 200 Log likelihood = 180.036 Chi-square = 87.463			

Note: *, **, *** Coefficients are significant at 10 %, 5 %, and 1 % level, respectively

On the other hand, the result of the analysis also indicated that age of the household head had the expected sign. The effect of age on participation decision was statistically significant and negative at the 10 % level. Such a result reflected that a younger head tended to diversify into off-farm work. This could be interpreted as Goodwin and Mishra (2004), suggesting that the old farmers often combined their agricultural activities with retirement pensions and they were not likely to start off-farm employment as it was more difficult to get a job at the older age.

As expected, the education of household head, measured by years of schooling, had a significant positive impact on the participation in off-farm work at the 10 % level. The strong positive effect of the education implied that more educated households were more likely to diversify into off-farm work than their less educated counterparts. On the contrary, Mishra and Goodwin (1997) found a negative effect of education on off-farm employment, while Woldehanna et al. (2000) found no significant relationship between the educational status of the household head and off-farm participation. However, the finding from the study was in line with previous studies that education improved prospects of finding non-farm employment (Lanjouw and Shariff, 2002; Chaplin et al., 2004, and Alasia et al., 2009).

Since it is directly linked to the supply of labour, family size was expected to affect the participation decision for off-farm work. The fact is that the effect of family size was positive and significant at the 10 % level, indicating that households with more members were more

likely to participate in off-farm employment. This means that a larger household could divide the on-farm work more easily, and some members were able to choose to fully work off-farm.

In addition, with respect to the composition, households with fewer children tended to choose the off-farm job. Although this result is not our expectation, it is consistent with the finding of Goodwin and Mishra (2004), suggesting that the presence of children in the household significantly reduced the supply of off-farm labour. The fact is that the number of children in a rural household in Kon Tum is often large, especially in the case of the ethnic minority household. This is one of the reasons that hinder them to diversify into off-farm work and make them poor.

The size of the farm had the expected sign and was statistically significantly different from zero. More specifically, farm size had a negative impact on the participation decision for off-farm work. The result means that households with a larger farm would rarely be involved in off-farm employment. This could be because farming could not provide sufficient means of survival for households with a small farm. While this finding contradicted the results by Demissie and Legesse (2013), it was in line with findings by Fernandez-Cornejo (2007), suggesting that operators of smaller farms typically participated more in off-farm employment, worked more hours off-the-farm, and had a higher off-farm income than those with larger farms.

In addition, the result testified that finance was a determinant factor for the off-farm participation decision. It indicated that a household that had access to credit had a greater chance of participation in off-farm activities. Access to loans and financial assistance might relax financial constraints, allowing households to make the investments into self-enterprise employment. This result was consistent with the finding of Berdegué et al. (2001) in Chile, indicating that farm households that had access to more funds use them (or other funds freed by having the farm credit) at least partly to diversify their incomes.

Finally, access to tarred roads was statistically significant and negative at the 10 % level. The results of the analysis showed that access to tarred roads raised the profitability of off-farm employment. In line with the descriptive results, this reflected the fact that the rural non-agricultural self-employment sector was dominated by small enterprises that were near tarred roads. A similar result was registered in Ethiopia by Berg and Kumbi (2006), Bewene (2008). There was a significant positive relationship between an increase in distance to main roads and to the market place with off-farm participation.

6 Conclusions and recommendations

This study investigated the determinants of income diversification decision for off-farm work of the rural households in Kon Tum. The results showed that only 39 % of rural households diversified income into off-farm work, implying that there was a potential for more diversification to take place. The study also identified a number of factors influencing income diversification, of which gender, age education of the household head, family size, number of children, farm size, access to credit, and access to tarred roads were the key indicators.

While further investigation is probably needed to draw out the implication of the low level of diversification among poorer households, the results presented here provide support for public attention to income diversification in rural households. The specific goal should be to provide the incentives and capacity for rural households to overcome entry barriers and to create linkage farm and rural off-farm activities. In particular, efforts should be made in improving skills and knowledge of farmers through the provision of training. In addition, the improvement of the level of education, especially of junior and senior high schools for ethnic minority people, is a prerequisite for wage labour employment outside the agricultural sector. Credits enable households to change their stock in the physical capital within a short time to take advantage of income opportunities outside agriculture. Hence, a possible policy measure is to improve the participation of poor households in credits, which directly target towards off-farm activities. Finally, the policy should give due emphasis for the development of rural infrastructure and also improve transport services in the area.

Although the study has reached its aims, there are some unavoidable limitations. First, because of the time and cost limit, this study was conducted only with a small number of participants. The second limitation concerns the factors influencing income diversification of rural households. There might be other relevant factors which significantly influence income diversification. Dealing with other relevant factors and effect of income diversification is the subject of future research.

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