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Determinants of income diversification and its effects on rural household income in Vietnam

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ABSTRACT

This article is aimed at examining determinants of income diversification among rural households in Vietnam and the impacts of diversification on household income. The Poisson and Tobit regression methods were applied. The data for this empirical study was detached from Vietnam Household Living Standard Surveys (VHLSS) conducted from 2002 to 2010. The regression results showed that socio-economic factors have strong influence on household income diversification in the rural areas, and, in turn, income diversification has positive impact on household income growth. It implied that income diversification is an important strategy to improve househo

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1 INTRODUCTION

Income diversification among rural households in developing countries has been grown to become a common phenomenon. There are several motives for households to diversify their income: to manage risks, to secure a smooth flow of income, to allocate the surplus labor or to respond to different kinds of market failures such as insurance and credit market imperfection (Ellis, 1998). Hence, it has become a critical topic which is paid substantial attention by development economists and policy makers.

Given the potential role of income diversification in stabilizing and improving household income as well as alleviating rural poverty, governments in developing countries have increasingly been interested in promoting diversification. Vietnam with 70% of the population lives in rural areas is not an exception. Since 1986, the Government launched economic reform with an aim of promoting eco-

nomical development. For rural development, some specific objectives of policy are to create more jobs, to raise agricultural and rural industry-related income, and to develop services and off-farm activities. In other words, the policy was designed to both directly and indirectly stimulate the process of income diversification in Vietnam and in rural areas in particular. As a result, Vietnam has gained remarkable achievements in economic development and poverty reduction, with the annual economic growth rate of 6-8% since the early 1990s and the poverty rate fell from 58% in 1993 to 14.23% in 2010 (GSO-General Statistics Office of Vietnam). Income growth and poverty reduction is undoubtedly due to income diversification.

Despite, it is well recognized that income diversification plays such an important role in the early stage of rural transformation and income growth, patterns and determinants of income diversification may vary across countries, regions and social groups (Ellis, 1998). This paper is aimed at inves-

ting factors determining the ability to carry out household income diversification and to measure the impacts of diversification on household income so as to draw some policy recommendations to support the development of rural areas in Vietnam.

2 METHODOLOGY

2.1 Conceptual framework

This study was based on Sustainable Livelihood Framework (SLF) (Figure 1) in which people are put at the centre of a variety of factors with inter-relationship that influence them to create livelihoods. Among these factors, the livelihood assets that they can access to and use play a very

important role. These assets include natural capital, physical capital, human capital, social capital and financial capital. However, the extent to which they can access these assets is strongly determined by their contexts in the form of trends (e.g., economy, politics) or shocks (e.g., natural disasters). Moreover, other social, institutional and political environments all have certain effects on the ways people access and use their assets to achieve their goals, which are known as *livelihood strategies*. Livelihood diversification is one of the strategies that enable households to increase their income, minimize the income fluctuations, and hence, improve their livelihood.

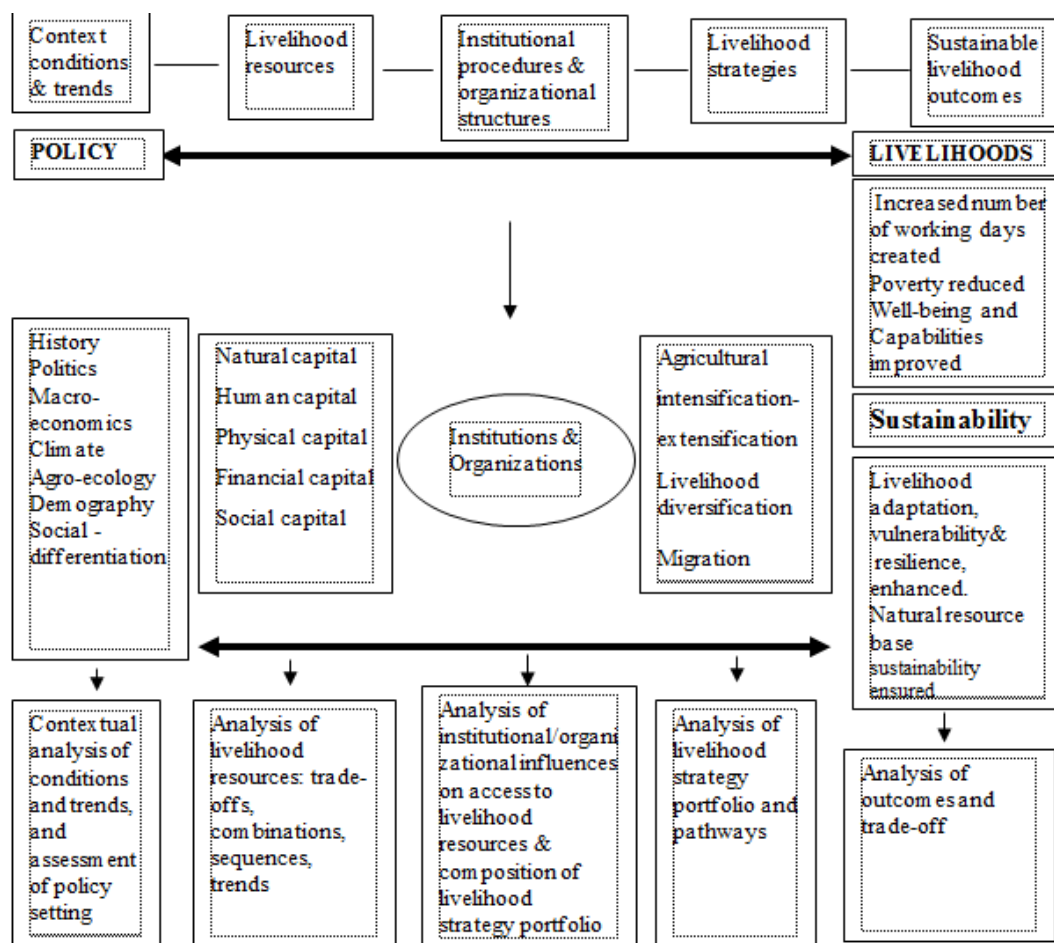


Fig. 1: The Sustainable Livelihood Framework (Scoones, 1998:4)

The impacts of the mentioned assets on household income diversification have been reflected in empirical studies across countries. Barrett and Reardon (2001) pointed out in most of studies on income diversification that better education has important effects on non-farm earnings. Studies in Tanzania, Lanjouw and Feder (2001) found that a

better physical access to markets increases non-farm earnings. In their study on the determinants of income diversification among rural households in Southern Mali, Abdulai and Crole-Rees (2001) claimed that poorer households have fewer opportunities in cash - crop production and non - crop activities, leading to their less diversified incomes in which lack of capital is the major reason. Studies

in other developing economies also proved for the significance of these factors. For instance, access to public assets (e.g., roads, electricity, water), private assets (e.g., education) and access to credit were also pointed out as factors that affect the households' ability and their extent to participate into income diversification (Escobal, 2001; Babatunde and Qaim, 2009).

Regarding to the influence of diversification on household income, the positive relationship between income diversification and household welfare has been found by a variety of empirical studies. Babatunde and Qaim (2009) pointed out in a study in Nigeria that income diversification has positive and significant impact on household income regardless of the diversification measures used. In Zimbabwe, Ersado (2003) employed the number of income sources, the share of nonfarm income, and the Simpson index as measures of income diversification to study the relationship between diversification and household welfare. The author found that in rural areas, richer households are more diversified in income sources, while the result is in the opposite way in urban areas. Ersado (2003) also figured out in rural areas with high variability in rainfall, households tend to have more number of income sources.

Based on the relevant literature and empirical studies, this work would empirically examine the determinants that significantly influence the income diversification among households in rural Vietnam and then impacts of income diversification on household income.

2.2 Data sources

The data was derived from a set of Vietnam Household Living Standard Surveys (VHLSS) carried out in 2002, 2004, 2008 and 2010 with an aim of examining the changes in income sources and the contribution of each income source to household income.

In order to identify the factors influencing the income diversification of households and study the relationship between income diversification and the household income, the study used the cross - sectional data set of the VHLSS 2008. It was conducted nation-wide with a sample size of 45,945 households (36,756 households in the income survey and 9,189 households surveyed on both income and expenditure). As the research focusing on examination of the income diversification in rural Vietnam, only the surveys of 6,837 households in rural areas were selected.

2.3 Data analysis methods

A variety of methods used to analyze the data, including the descriptive statistics and the econometric method. Firstly, the descriptive statistics tool was used to portrait the income diversification patterns over time as well as its patterns across different types of households and geographical regions by comparing the measures of diversification from the surveys of different years. Secondly, the econometric method was deployed to identify the determinants of income diversification among households and examine its effects on household income based on the data of the VHLSS 2008. For the analysis of determinants, the regression of three measures of diversification was applied, including number of income sources (NIS), the Simpson index of diversity (SID) and non-farm income share (NFS) on a set of independent variables representing for household assets. As the dependent variable was in form of count data in the NIS model, the Poisson regression was used. For SID and NFS measures, the data was censored between zero and one, hence, the Tobit regression employed, which was similarly employed by Escobal (2001) to examine the determinants of income diversification in rural Peru. Schwarze and Zeller (2005) is another example to use the Tobit model in similar settings.

In order to analyze the impacts of income diversification on household income, the three models were used, in which the household income was the dependent variable, and the diversification measures were added to the set of explanatory variables. In order to avoid the problem of endogeneity, the instrumental variables (IV) method - two stage least squares (2SLS) was used in the analysis of the impacts of income diversification on household income. The three models are summarized as follows:

$$Y_1 = f(\text{NIS, ethnicity, age, gender, dep_ratio, electric, tapwater, market_dis, road_dis, road_pass}^1)$$

$$Y_2 = f(\text{NFS, ethnicity, age, gender, dep_ratio, electric, tapwater, market_dis, road_dis, road_pass})$$

$$Y_3 = f(\text{SID, ethnicity, age, gender, dep_ratio, electric, tapwater, market_dis, road_dis, road_pass})$$

In which:

¹ *Ethnicity: Kinh household head; age: Age of household head; gender: Male household head; dep-ratio: Dependency ratio; electric: Access to electricity; tapwater: Access to tap water; market_dis: Distance to daily market; road: Distance to a car road; and road_pass: Period is accessible to road.*

Y_1 , Y_2 , Y_3 are household's total income in model 1, model 2, model 3, respectively

NIS, NFS, SID are income diversification measures, which are considered endogenous variables with the instrumental variables: education, credit and household size. The other variables in the three equations are all exogenous variables.

3 RESULTS

3.1 Patterns and trends in income diversification

3.1.1 Diversity of income sources

According to VHLSS, household income is divided in 8 categories: wage, crop, livestock, fishery, forestry, enterprise, transfer and other income. Table 1 shows the trends in income diversity among rural households across regions by two measures: NIS and SID. Households in rural areas tend to obtain their income from a variety of sources. These figures reflect a modest increase in the number of income sources between 2004 and 2002 before a gradual decline in the next two periods in 2006 and 2008. The level of diversity increases again, with

an average number of income sources go up from 3.57 in 2008 to 4.36 in 2010. This trend happens to all geographical and economic regions.

Among different regions, Northeast and Northwest are found to be most diverse while Southeast is least diverse in income sources, as shown by most of indicators in almost of all years of surveys. As Northeast and Northwest are the poorest regions in Vietnam and Southeast is most urbanized and least poor, the phenomenon may be explained that the poorest households tend to have higher level of diversity in income. Similarly, both indicators NIS and SID increasing along with the level of poverty of households in every single year showing that poorer households have a tendency to diversify their income sources more than the richer ones. While this contradicts the results by Abdulai and Crole-Rees (2001) for Mali, it is in consistent with the findings by Schwarze and Zeller (2005) for rural Indonesia. The fact that the income diversification is higher among poorer than richer households supports the idea that diversification is a mean to reduce risks related to the variation in income from each source.

Table 1: Diversity of income sources by regions across years

Region	Number of income sources (NIS)					Simpson index of diversity (SID)				
	2002	2004	2006	2008	2010	2002	2004	2006	2008	2010
Red River Delta	3.91	4.30	4.05	3.30	4.18	0.51	0.53	0.51	0.43	0.47
North East	4.60	4.86	4.79	3.81	4.80	0.58	0.59	0.58	0.47	0.51
North West	4.80	5.16	4.84	4.44	5.18	0.53	0.56	0.56	0.44	0.49
North Central Coast	4.11	4.45	4.26	3.41	4.62	0.53	0.54	0.53	0.46	0.50
South Central Coast	3.99	4.32	3.99	3.48	4.38	0.49	0.50	0.47	0.41	0.47
Central Highlands	4.65	4.69	4.32	3.57	4.39	0.48	0.46	0.44	0.38	0.40
Southeast	3.60	3.53	3.30	3.03	3.30	0.40	0.40	0.37	0.34	0.31
Mekong River Delta	3.87	4.08	3.80	3.51	4.02	0.42	0.43	0.42	0.37	0.39
Average²	4.19	4.42	4.17	3.57	4.36	0.49	0.50	0.49	0.41	0.44

(Source: Statistical analysis of VHLSS 2002, 2004, 2006, 2008 and 2010)

² NIS, NFS, SID are income diversification measures, which are considered endogenous variables with the instrumental variables: education, credit and household size

Considering not only the number of income sources, but also the balance among them, the SID shows the similar result in portraying the tendency of income diversification among rural households in Vietnam as well as most of its different regions (Table 1).

Regionally, the Northeast and Northwest are found to be most diverse while Southeast is least diverse in income sources, as shown by most of indicators across surveys. As the Northeast and Northwest are the poorest regions in Vietnam while the Southeast is the richest, the phenomenon may be explained that the poorest households tend to have higher level of diversity in income. Similarly, both indicators NIS and SID increasing along with the level of poverty of households in every single year showing that poorer households have a tendency to diversify their income sources more than the richer ones. While this contradicts the results by Abdulai and

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3.1.2 Diversification as a shift to non-farm activities

Despite the dominant importance of agriculture (including crop, livestock, fishery, forestry), Figure 2 shows that there is a marked increase in the share of income deriving from non-farm activities in household income over time, from 27.40% in 2002 to 30.90%, 33.00%, 35.60% and 37.10% in 2004, 2006, 2008 and 2010, respectively. This indicates the growing importance of non-agricultural sector, in line with the gradual structural transformation of the economy.

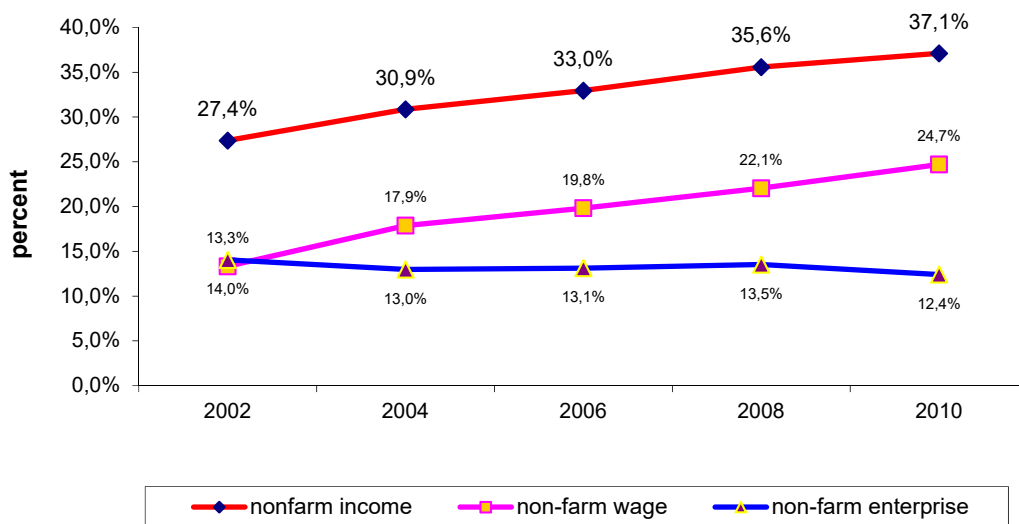


Fig. 2: Share of nonfarm income in rural household income

(Source: Statistical analysis of VHLSS 2002, 2004, 2006, 2008 and 2010)

The growing importance of income generating from non-agricultural or non-farm activities to household income occurs to all groups of households from different income quintiles, though it varies in level and speed. As shown in Table 2, the share of non-farm income in household income is lower for the poorer than the richer. According to the VHLSS 2002, the non-farm income share of the fifth quintile (the richest) is 40.80% while this number is only 15.40% among the first quintile

(the poorest). During the period from 2002 to 2008, all income groups experience the increase in the share of income from outside agriculture to reach 23.10%, 35.00%, 38.90%, 42.60% and 44.80%, respectively for the five groups of income from the poorest to the richest. However, in 2010, the poorest group decreased 5.70% in non-farm income share to 17.40%. Similarly, there is a slight decline of 1.90% in the amount for the second quintile. Whereas, this share among the other three groups goes up sharply at 4.80%, 8.70% and 10.10% to

reach 43.70%, 51.30%, 54.90% for the third, the fourth and the fifth group respectively.

Overall, rural households tend to be more diversified in terms of non-farm income share in household income over time. The level of diversity is

varied among different groups of income quintile, which is much lower for the poor compared to the rich. This may be explained by the fact that the poor face more constraints in participating in non-farm activities than the rich.

Table 2: Share of non-farm income in household income by income quintiles across years

Income quintile	Share of non-farm income (%)				
	2002	2004	2006	2008	2010
Quintile 1 (Poorest)	15.40	17.90	21.20	23.10	17.40
Quintile 2	23.90	30.00	32.00	35.00	33.10
Quintile 3	30.10	34.90	36.10	38.90	43.70
Quintile 4	36.00	38.50	40.40	42.60	51.30
Quintile 5 (Richest)	40.80	41.50	42.50	44.80	54.90
Average	27.40	30.90	33.00	35.60	37.10

(Source: Statistical analysis of VHLSS 2002, 2004, 2006, 2008 and 2010)

3.1.3 Diversification as commercialization of production

Generally, the degree of commercialization among rural households increases gradually over time. The

share of crop output that is marketed of rural households in the country as a whole rises from 61.7% in 2002 to 67.60% in 2010 (Table 3).

Table 3: Measure of commercialization by income quintile across years

Income quintile	Share of crop output sold (%)					Share of agri. output sold (%)				
	2002	2004	2006	2008	2010	2002	2004	2006	2008	2010
Quintile 1 (Poorest)	43.00	45.40	42.50	45.50	41.70	54.30	55.20	51.40	53.40	47.90
Quintile 2	54.00	56.90	53.60	58.60	59.10	65.20	67.30	63.30	66.20	64.70
Quintile 3	62.60	66.40	66.20	67.50	65.90	72.30	74.80	72.90	74.30	71.50
Quintile 4	71.20	72.10	73.10	77.60	74.70	79.50	80.80	80.70	82.60	81.00
Quintile 5 (Richest)	80.20	85.30	86.00	82.40	87.80	86.60	88.50	89.60	86.50	80.50
Average	61.70	65.00	65.00	67.30	67.60	71.80	73.80	73.30	74.10	71.80

(Source: Statistical analysis of VHLSS 2002, 2004, 2006, 2008 and 2010)

As shown in Figure 3, among different geographical regions, the Northeast has a very small share of crop output that is sold or bartered, accounting for only 30.60% in 2002 and 24.90% in 2010. The other areas having relatively low commercial share of crop production include the North Central Coast, the Northwest and the Red River Delta, with just 38.70%, 40.20% and 41.40%, respectively. In contrast, the marketed proportion of crop products is more than 80.00% for the Central Highlands, the Mekong Delta and the Southeast regions. This consequence is strongly influenced by market accessibility, economic development and local conditions.

Considering the agricultural commercialization across different income categories, it is clear that the richer are more commercialized than the poor-

er. According to VHLSS 2010, the share of crop output and agricultural output that is marketed of the highest income level is 87.80% and 80.50% while this figure for the lowest income level is just 41.70% and 47.90% (Table 3).

During the 2002 - 2010 period, the commercialization in crop output increases for all income levels, except for the lowest income group with a slight decline of 1.3%. The fifth quintile - household has the greatest increase of 7.6%, followed by the second quintile with a rise of 5.1%. However, the commercialization in terms of agricultural output decreases a little bit for all income levels in 2010 compared to 2002. This may be due to the decrease in the price of animal or fishing products.

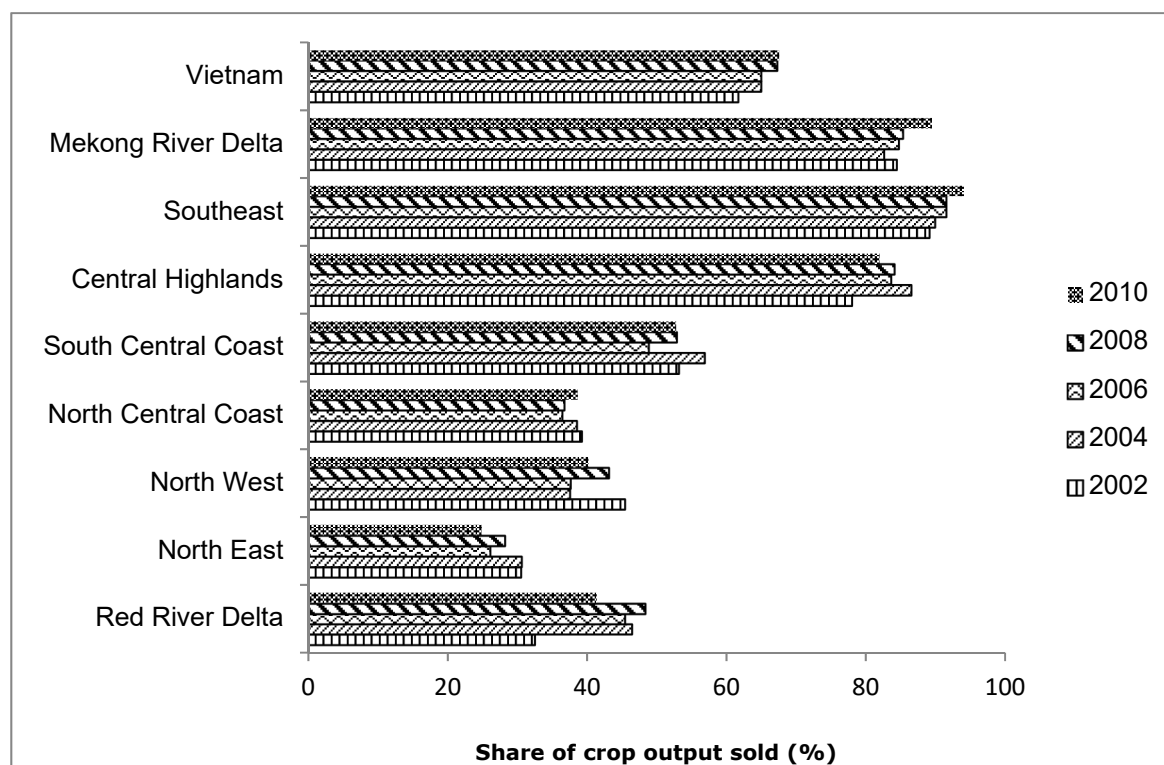


Fig. 3: Share of output sold or bartered by region and year

(Source: Statistical analysis of VHLSS 2002, 2004, 2006, 2008 and 2010)

3.1.4 Determinants of income diversification

Table 4 shows the analysis results regarding to determinants of different indicators of income diversification. Independent variables, education, household size, farm size and access to electricity have the consistent positive influence on all of the three measures of diversification in question. Education is the proxy of human capital which is very important in taking up complicated wage-earning jobs as well as self-managing business. Education also broadens the opportunity of households in pursuing various activities to earn income, hence, having the positive impact on the number of income sources and also helps to gain the balance among different income sources. Household size is an indicator of labor available for production and taking part in non-farm activities such as non-farm wage job. Households headed by Kinh people tend to specialize more in non-farm activities while households headed by minority people are likely to stretch to more activities for income earning and to maintain the balance among these income sources. Age of household head which stands for experience and management skills is positively correlated with the number of income sources and the SID, and

therefore not much concentrating on the non-farm activities. The location such as the distance to a car road and the period that a road is passable significantly affect the level of diversity into non-farm activities. The distance of the settlement from a car road has negative effect on a number of income sources as well as SID due to higher transaction cost and transportation cost. Access to formal credit enables households to diversify their income sources and gain the balance among these sources. Nevertheless, it has negative relation with the share of non-farm income, which suggests that rural household tend to use the credit investing into agricultural production like livestock, fishing and forestry, etc. rather than into non-farm business.

Considering the income diversification across different groups of income, it is found that the rich have higher share of their income generating from non-farm activities than the poor. The richest group of households earns 21.60 percent points more from non-farm activities than the poorest group, holding other variables constant. This means that household economic transformation is closely linked with income growth and economic development.

Table 4: Determinants of income diversification

	NIS		SID ⁽¹⁾		NFS ⁽²⁾	
	Marginal effect	Std. Err.	Marginal effect	Std. Err.	Marginal effect	Std. Err.
Kinh household head (Ethnicity)	-0.4431***	0.0492	-0.0520***	0.009	0.1578***	0.0214
Age of household head (Age)	0.0040***	0.0011	0.0017***	0.0002	-0.0044***	0.0005
Male household head (gender)	0.1599***	0.0377	0.0256***	0.007	-0.0519***	0.0159
Average education of members in household (education)	0.0121*	0.0067	0.0021*	0.0013	0.0210***	0.0029
Household size (hhsz)	0.0884***	0.0095	0.0027	0.0018	0.0521***	0.0042
Dependency ratio (dep_ratio)	-0.0371	0.0231	-0.0013	0.0042	-0.0017	0.0099
Farm_size	0.0000	0.0000	0.0000**	0	0.0000***	0
Access to electricity (electric)	0.0308	0.0748	0.0230*	0.0125	0.0802**	0.0324
Access to tap water (tapwater)	-0.1900***	0.0484	-0.0279***	0.0092	0.1010***	0.0192
Distance to a daily market (market_dis)	0.0137***	0.0021	0.0002	0.0004	-0.0037***	0.001
Distance to a car road (road_dis)	-0.0126*	0.0065	-0.0023*	0.0013	-0.0102**	0.0043
Period that a road is passable (road_pass)	0.0071	0.0074	0.0014	0.0012	0.0065**	0.0031
Access to formal credit (credit)	0.1817***	0.0279	0.0278***	0.0052	-0.0264**	0.0116
Geographical regions						
North East	0.0810	0.0516	0.0059	0.0091	-0.0857***	0.0201
North West	0.3207***	0.0798	-0.0354**	0.014	-0.0921***	0.0311
North Central Coast	0.0498	0.0460	0.0189**	0.0085	-0.2062***	0.0194
South Central Coast	0.1397***	0.0524	-0.0202**	0.0103	-0.0422**	0.0214
Central Highlands	-0.1381**	0.0638	-0.0792***	0.0125	-0.3267***	0.0303
Southeast	-0.3993***	0.0501	-0.0958***	0.0106	-0.0684***	0.023
Mekong River Delta	0.1347***	0.0474	-0.0590***	0.0089	-0.1497***	0.0201
Income quintile 2008						
Income quintile 2	0.0764*	0.0405	0.0027	0.0074	0.0926***	0.0177
Income quintile 3	0.0098	0.0443	-0.0035	0.0082	0.1393***	0.0191
Income quintile 4	-0.0319	0.0473	-0.0175*	0.0091	0.1688***	0.0207
Income quintile 5	-0.0597	0.0588	-0.0101	0.011	0.2160***	0.0237
_cons	2.3453	0.0000	0.3284	0.0253	-0.0295	0.0601
N	6058		6058		6058	
R ²	0.0138		0.2416		0.1672	
F – statistics	973.22		19.69		68.15	

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

(1) 91 left-censored observations at SID≤0; 5967 uncensored observations; 0 right-censored observations at SID>=1;

(2) 1826 left-censored observations at NFS≤0; 4182 uncensored observations; 50 right-censored observations at NFS>=1

(Source: Statistical analysis of VHLSS 2008)

3.2 Impacts of income diversification on household income

The regression results in Table 5 show that all of the three diversification measures have significant and positive impact on household income. Specifically, each additional source of income increases household income by 32,977,000 VND on average, holding other variables constant (column 1). Column (2) and (3) show that an increase of 10 percent in the share of non-farm income will bring house-

hold an average rise of 13,020,000 VND in total income while the same percent increase in the Simpson index of diversity helps to increase the household's total income by 20,333,700 VND, after controlling other variables. In short, regardless of indicators, income diversification has a significant and positive influence on household's total income. This supports the fact that diversification is a strategy chosen by household to increase their income.

Table 5: Impacts of income diversification on total income of household

Variable	Total income		
	(1)	(2)	(3)
NIS	47,877*** (5,422)		
NFS		1,763*** (162)	
SID			141,279*** (44,585)
Kinh ethnicity of household head (ethnicity)	28,904*** (3,583)	-14,636*** (3,494)	13,221*** (3,073)
Age of household head	-264*** (72)	407*** (82)	-260*** (85)
Male household head (gender)	-3,498 (2,360)	9,672*** (2,354)	3,484 (2,159)
Dependency ratio (dep_ratio)	2,637* (1,378)	2,749** (1,316)	1,582 (1,124)
Farm_size	0.34** (0.16)	0.95*** (0.16)	0.50*** (0.15)
Access to electricity (electric)	3,370 (4,388)	-5,918* (3,477)	1,231 (3,287)
Access to tap water (tapwater)	8,201*** (2,932)	-16,301*** (3,594)	4,615* (2,710)
Distance to a daily market (market_dis)	-767*** (222)	529** (208)	-31 (174)
Distance to a car road (road_dis)	1,039* (552)	1,408** (615)	708 (472)
Period that a road is passible (road_pass)	-56 (411)	-497 (371)	148 (292)
Geographical regions			
North East	-10,176*** (3,239)	9,260*** (3,316)	-6,742*** (2,487)
North West	-24,920*** (5,202)	10,168** (4,515)	-389 (3,914)
North Central Coast	-11,890*** (2,774)	19,576*** (3,869)	-11,427*** (2,275)
South Central Coast	-11,122*** (3,337)	1,120 (3,578)	-484 (3,041)
Central Highlands	432 (4,098)	37,155*** (5,761)	7,128 (5,149)
Southeast	28,052*** (3,829)	20,704*** (3,970)	24,650*** (5,530)
Mekong River Delta	-380*** (3,456)	31,908*** (4,622)	14,392*** (3,908)
Income quintile 2008			
Income quintile 2	2,983 (2,059)	-4,177* (2,246)	4,824*** (1,323)
Income quintile 3	13,823*** (2,207)	-2,559 (2,739)	12,843*** (1,453)
Income quintile 4	29,553*** (3,578)	5,668 (3,626)	27,849*** (3,002)

Variable	Total income		
	(1)	(2)	(3)
Income quintile 5	54,150*** (4,524)	22,319*** (4,281)	48,493*** (3,832)
_cons	-160,605*** (19,284)	-62,494*** (10,363)	-50,506*** (16,119)
Observations	6,058	6,058	6,058

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

(Source: VHLSS 2008)

4 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that pursuing multiple income source strategy and tends to increase in diversity level over time are very common among geographical and economic regions as well as among households across income quintiles. However, the diversity degree is varied depending on regions and income quintiles. The poorer have a tendency to be more diversified in terms of a number of income sources than the richer. This suggests that diversification is a mean to reduce risks of variation of a certain income source. In terms of non-farm income, the poor are much less diversified than the rich for the fact that the poor often face more constraints compared to the rich due to unequal ability - asset endowments to diversify income. The income diversification has significantly positive effect on the household income. In other words, rural households may increase their income by pursuing the diversification strategy. The diversification income sources are good in enabling households to increase income and reduce the risk of variation in income, but it is not always encouraged to take income diversification. Under some certain circumstances, it is better to specialize in specific activities, which household has the comparative advantages.

Several useful policy implications can be drawn from the research findings as follows (1) Improving education in order to help households in rural areas to gain knowledge and skills required for different income-generating activities; (2) Improving rural infrastructure, including roads, electricity, water, telecommunications, quantitatively and qualitatively; (3) Improving rural market conditions; (4) Improving extension services and providing the technical support to rural households; (5)

Paying special attention to the poor in remote and mountainous areas who encounter many constraints in all policies and programs to foster income diversification.

REFERENCES

- Abdulai, A., Crole-Rees, A., 2001. Determinants of Income Diversification amongst Rural Households in Southern Mali. *Food Policy Journal*. 26(4): 437-452.
- Babatunde, R.O., Qaim, M., 2009. Patterns of income diversification in rural Nigeria: determinants and impacts. *Quarterly Journal of International Agriculture*. 48(4): 305-320.
- Barrett, C.B., Reardon, T., 2001. Asset, Activity, and Income Diversification among African Agriculturalists: Some Practical Issues. *Food Policy Journal*. 26(4): 315-331.
- Ellis, F., 1998. Household Strategies and Rural Livelihood Diversification. *Journal of Development Studies*. 35(1): 1-38.
- Ersado, L., 2003. Income diversification in Zimbabwe: Welfare implications from urban and rural areas. FCND Discussion Paper. 152. International Food Policy Research Institute. Washington, DC.
- Escobal, J., 2001. The Determinants of Non-farm Income Diversification in Rural Peru. *World Development Journal*. 29(3): 497-508.
- GSO, General Statistics Office of Vietnam. 2008. Result of the Survey on Households Living Standards 2008. Statistical Publishing House. Hanoi.
- Lanjouw, P., G. Feder, 2001. Rural Non-farm Activities and Rural Development: From Experience towards Strategy. The World Bank Rural Development Strategy Background Paper. 4.
- Schwarze, S., Zeller, M., 2005. Income diversification of rural households in Central Sulawesi, Indonesia. *Quarterly Journal of International Agriculture*. 44(1): 61-73.
- Scoones, I., 1998. Sustainable Rural Livelihood: A framework for analysis. IDS Working Paper. 72.