

The Role of Education in Young Household Income in Rural Vietnam

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Abstract

The purpose of the research is to evaluate how education influences the income of household heads, who are young adult in rural Vietnam. In order to examine the impact of education on the households where their heads are young adults, in this paper, the authors employ two research methods. First, ordinary least squares (OLS) regression is used to study the impact of education on different groups of income; second, quantile regression is applied to find out how education influences the income of households. The dataset includes a survey of 800 young households aged between 18 and 35 who are the head of agricultural farms in rural areas. The findings indicate that education has a positive impact on income of young households. Furthermore, the results prove that the longer schooling years, the higher income youth can attain. The results showed that, at the survey time (Sep 2019), the average monthly income of rural young adults who are joining the production process shows a big gap between low and high incomes. Moreover, the study has revealed that other factors positively affect the incomes, namely, joining job-related associations, land resource, hired labour, hi-tech application as well as extension of producing unit.

Keywords: Education, Young Household, Income, OLS Regression, Rural Vietnam

JEL Classification Code: E44, F31, F37, G15

1. Introduction

In any country, youth employment is usually a critical labor force for the national development. A country that has young labor resource can be better off in improving its competitive advantage and sustainable development. As a result, youth has been considered as one of main labor resources and a motivation for development. Vietnam is a country that has a young population, with the median age of 32.5 years in 2020.

Education has played an important role in the successful story of developments during the last two decades in

Vietnam. Recent high economic growth has been mainly achieved by an improvement of productivity resulted from the labor transfer from agriculture with low productivity to non-agriculture with higher productivity. Poverty rate has considerably dwindled and education has been a push factor creating a stable basis for the development. Vietnam has made a great effort to expand the access to education to everyone and ensure the quality of education by developing the minimum quality standards at the national level. This has enabled to build up a good reputation for Vietnam as a young and well-educated labor force (World Bank, 2014). In other words, in order to encourage rural youth to apply new technical and technological advances to their business as well as strengthen their job-seeking abilities, it is necessary to enhance the knowledge of this labor force in rural areas (Pham, 2019).

2. Literature Review and Hypotheses

Becker (1962) is the pioneer in defining investing into education as an investment when he claimed that education is an investment into human resources. Other researchers also focus on estimating how much personal education can contribute to their wages. Education is essential to the development of an individual, an organization or a

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nation (Yang, 2004). Education creates an individual's advantage in earning income because high education will enable to acquire and apply new techniques and technologies in production and utilize other producing resources more effectively. Additionally, education helps to grasp and process more market information to create more opportunities to join non-agricultural activities, which are likely to increase total income. Notably, education brings, not only individual benefits, but also positive effects, e.g., improves household productivity and builds up the socio connections (Venniker, 2000).

On the other hand, recent studies highlighted the role of education in improving earning and reducing poverty through research with different methods and datasets in various countries. These studies claims positive relationship and meaning between education and income increase in both groups of developed and developing countries (Yardimcioglu et al., 2014). Education level of household heads in rural area is found to have a positive impact on household income and reduce poverty in Turkey (Bilenkisi et al., 2015), Vietnam (Tran, 2015; Hung, 2020), and Nigeria (Okojie, 2002).

In a research on farm production efficiency, Dean (1980) showed the crucial impact of education on production efficiency. Butt et al. (2011) used a random marginal profit equation to examine the production efficiency in rice farms in Pakistan. Their findings confirm that the average efficiency is 0.72 and there is a difference among surveyed farms. The authors claimed that production efficiency can be affected by socio-economic factors, which might be explained by knowledge level of which education of the head of producing unit is vital; non-farm activity (diversifying source of income) and credit limitation/barrier (due to impact of information asymmetry, transaction cost, limited liability).

In a similar vein, Dung et al. (2014) affirmed that education of the head in producing unit is one of the most decisive factors in agricultural producing in Mekong Delta, Vietnam. Better education of the heads enables them to grasp more quickly new cultivation techniques and be more aware of changes in natural conditions and weather; hence, they can choose more suitable techniques, which can help to increase productivity and product efficiency. This implies that the unit heads, which have bachelor or higher degrees, can maximize their capabilities. Furthermore, in the pilot research on rice farms in Hanoi, Hai et al (2019) studied the lack of technical efficiency in rice cultivation and revealed that the technical efficiency shortage matched with limitation in education of the unit heads. The study has applied Data Envelopment Analysis (DEA) to estimate producing efficiency. Bachelor degree will enable the farm heads to approach and grasp more rapidly new producing techniques and recent trend of natural environment, thus, they can use producing inputs more appropriately to improve their farms' producing efficiency (Tai, 2018).

To estimate the impact of education on the household income in rural Vietnam, Hung et al (2019) used the DEA method to calculate production efficiency, and regressive Tobit to calculate how education influences rural farms; whereas Alves (2012) estimated the impact of education on household income in rural Portugal by using the quantile regression estimator. The other research in Vietnam focused on analyzing the impact of education on income of rural households (Tran, 2018); or wages (Doan, 2018). Most of these studies applied a mean regression approach (e.g., Ordinary Least Squares, Random of fixed effect estimators), which only estimated the response of household income or wages influenced by independent variables.

Assuming that the following factors, namely, education, age, gender, married status, family size, hired labor, non-farm income, hi-tech application, and land might influence the income of rural youth, the authors apply OLS to examine the impact of education on different groups of income in rural Vietnam. Then, the authors use quantile regression to evaluate how education influences the income of household heads, which are young adults in rural Vietnam.

3. Data and methods

3.1. Data

The study used data from the survey of 800 rural young adults aged between 18 and 35¹ who are heads of agricultural farms in rural areas (suburban district or commune) from four provinces or cities (Nam Dinh, Thai Nguyen, Lam Dong and Ho Chi Minh City). Youth is internationally commonly defined as below 24 years old (WHO, 2008); however, in this study, youth is defined as old as 35 based on Vietnamese Youth Law, 2005; therefore, the term of "young household head" and "youth" are used interchangeably. The studied areas are good representations where young people are more actively setting up agricultural farms or producing units.

The sample is selected based on the layer division method, by which in each province, four suburban districts are chosen, then, in each district, two or three communes with a larger number of youth who are heads of their households as well as producing units. The data collection has been done via in-person interview with respondents. The interviewers have done conducted orally by asking structured, semi-structured and open questions. In addition, the selection process for studied area and the number of samples are based on the systematic random sampling; however, the sample has a highly consistent characteristics (function, features, location, traditions) in the information collection including education, income, associations membership status as well the socio-economic characteristics. Furthermore, authors have collected secondary data from local governmental agencies (Department of Agriculture and Rural Development,

Department of Industry and Trade), The Vietnam Chamber of Commerce and Industry, State Institutions, Associations, General Statistics Office of Vietnam).

3.2. Methods

Some other studies have used OLS to analyze the role of education of the head of producing units, mainly focusing on North West region (Nguyen & Tran, 2018) or Central Northern region (Nguyen & Tran, 2018). Besides, Hung (2020) has applied both mean and quantile regression analyzes to estimate the impacts of education on the household income in Rural Vietnam. However, there is no research using quantile method to estimate the inconsistent impact of education to income of household heads, which are young adults in rural Vietnam. The most important issue here is to examine the inconsistent impact of education to household income on different percentages of income distribution rather than at an average level. The quantile analysis will allow us to generate a better results related to how education influences to each group of income for young households in rural Vietnam. Therefore, the quantile method is chosen to supplement the OLS in this study.

First, the surveyed sample is divided into the groups of income, namely, low income, medium income and high income. Second, cross comparison among households. Both regressive analysis methods, which are OLS (Equation 1) and quantile (Equation 2), are applied to examine the impact of education on household income and control other variables in the models.

In the first step, the authors use OLS to evaluate the impact of education on income of rural young household via applying equation (1) to each group of income, i.e., low, medium and high. The equation is presented as follows:

$$\text{Ln}Y_i = \beta_0 + \beta_1 X_i + \beta_2 E_i + \beta_3 L_i + \varepsilon_i \quad (1)$$

In equation (1), it is noted that:

$\text{Ln}Y_i$: is log average income of rural household i

X_i : is a vector of household characteristic, rate depended on age, gender and ethnic group of household head

E_i : is education level of household head

L_i : is representation for a type of land

β_1 : is parameter needs to be estimated

ε_i : is variance

In the second step, the authors used the quantile regression model to evaluate how the number of schooling years influences to income of rural young households. The equation is presents as below:

$$QY_i = \beta_0 + \beta_1 X_i + \beta_2 E_i + \beta_3 L_i + \varepsilon_i \quad (2)$$

As mentioned earlier, quantile regression enables researchers to examine the linear relationship between independent variable and dependent variable in the context of dataset values with a big gap of high skewness and inconsistency of data. This is a method to estimate any n% of dataset, if what is the distribution of values in n% when all values are sorted from smallest to biggest in order to evaluate the dispersal of data and at the quantile number n, what is the value of variable.

Basically, this approach will enable researchers to check if education will increase the income inequality (Alves, 2012). If efficiency of education increase along with quantile levels (10th quantile, 25th quantile, 50th quantile, 75th quantile, 90th quantile), it tends to bring more benefits for the rich rather than the poor. This reflect implies that education is more likely to increase income inequality.

4. Results

4.1. Descriptive Analysis

The results from a survey of 800 rural young adults, who are heads of production units showed that in Vietnam, at the survey time (Sep 2019), the average monthly income of rural young adults who are joining production process has a big gap between the low and high incomes, are from VND0.6 millions to 17 millions. Most rural young adults have a low income (49%) and medium income (33%), while only 18% of them have a high income.

In the group of rural young adults, low monthly income is in the range 0.1–2.9 million dong, with the majority in the range 0.6–2.0 million dong.

In the meantime, the monthly income of the medium group is in the range 3.0–6.0 million dong with the majority in the range 3.7–4.7 million dong.

In the high-income group, the monthly income is in the range 6.2–17.0 million dong, with the majority in the range 7.8–12.0 million.

As can be seen from Table 1, three groups of household income are generated by STATA `xtile` command; on average, each rural household can earn about 2.74 million dong per person per month in 2019. The figures are for low, medium and high incomes, 1.319, 4.076 and 10.427 million dong, respectively.

The results show that the formal number of schooling years is likely higher in the higher income group. Additionally, the number of household heads who have not participated in official training is higher in the group of low-income (3.1%), comparing with those in medium and high income (2.1% and 0.1%, respectively). In Vietnam, in the recent decades, ,

the government has conducted the policy of free education for primary and lower secondary education, as a result, most children are schooled and the rate of non-school education is remarkably low.

Table 1 shows that the rate of young adults who acquire a higher education can get higher income, whereas the rate of young people who get vocational training is low in rural households. However, the young adults who are vocationally trained are from the group of household with higher income. Table 1 also indicates that education has a positive impact on income levels.

Table 2 compares the differences between characteristics of household groups. There is not much difference in ethnicity among the groups; the income of households in the Kinh ethnicity is slightly higher than that of minority ethnicity group. The rate of non-farm jobs for young adults in low-income group is lower than that of medium- and high-income group.

In general, the low-income group own more annual cropland than the other two groups of medium-income and high-income. Essentially, the studied results found out that some characteristics of rural youth influence positively their income.

4.2. Impacts of Education on Youth Income

The impact of education on monthly average income of rural youth is described in Table 3.

Model 1 evaluates the impact of number of formal schooling years, model 2 evaluates impact of the highest degrees, while model 3 presents impact of vocational education.

In all models, the coefficient of education variable has statistical meaning and positive impact. For example, an increase of one formal school year will push the income of youth by 23% when all other factors in Model 1 unchanged.

In model 2, the results show that the higher education, the higher income for rural youth. Especially, the average income per person is about 34% higher for those who have finished high school than those have not. The similar results are observed 39%, 54% and 67% with those have finished apprenticeship vocational & technical training (2 years), apprenticeship vocational & technical training (3 years), undergraduate and master degree, respectively.

Table 1: Youth heads' education by income group

Unit: thousand VND

Education	Low income		Middle income		High income		Whole sample	
	Mean/ share	SD	Mean/ share	SD	Mean/ share	SD	Mean/ share	SD
Schooling years (number years of formal schooling)	9.25	1.436	11.81	1.365	12.01	1.421	11.02	1.401
No education	3.1%		2.1%		0.1%		1.73%	
Elementary	1.0%		5.6%		0.5%		2.37%	
Middle School	0.8%		0.3%		0.3%		0.47%	
High school	9.3%		8.3%		2.1%		6.57%	
Apprenticeship vocational & technical training (2 years)	8.5%		8.6%		8.3%		8.47%	
Apprenticeship vocational & technical training (3 years)	25.8%		41.1%		61.1%		42.67%	
Undergraduate and Master degree	25.1%		7.8%		7.6%		13.5%	
High school diploma	13.4%		14.5%		16.8%		14.9%	
Vocational training	1.6%		1.7%		0.6%		1.3%	
Junior college	10.1%		16.7%		18.1%		14.97%	
Per capita income (Sd)	1,319,833		4,076,182		10,427,800		5,274,605	
Observations	387		269		144		800	

Table 2: Youth characteristics by income group

Characteristics	Low income		Middle income		High income		Whole sample	
	Mean/ share	SD	Mean/ share	SD	Mean/ share	SD	Mean/ share	SD
Ethnicity (1 = major; 0 = minor)	50.1%		53.9%		61.13%		55.04%	
Age (years)	28.34	4.26	28.94	4.161	47.0	3.21	34.76	4.02
Marital status (1 = married, 0 = otherwise)	45.5%		48.3%		51.8%		48.53%	
Gender (1 = male; 0 = female)	51%		50.9%		53.5%		51.8%	
Dependency ratio	21%		16%		12%		16%	
Household size (total members)	4.09	1.97	3.76		3.43	2.27	3.76%	
Wage employment (1 = yes; 0 = not)	45.5%		44.2%		50.0%		46.57%	
Non-farm self- employment (1 = yes; 0 = not)	38.7%		45.4%		51.1%		51.73%	
Migration (1 = yes; 0 = not)	12%		15%		17%		14.67%	
Farmer association (1 = yes; 0 = not)	47.7%		64.7%		65.3%		65.9%	
Hi – tech application (1 = yes; 0 = not)	20.7%		24.0%		26.7%		23.8%	
Annual cropland (ha)	1.42	0.735	1.25	0.806	2.01	0.112	1.56	0.215
Perennial cropland (ha)	1.65	0.186	1.86	0.551	1.73	0.187	1.84	0.173
Forestland (ha)	2.12	0.141	1.41	0.648	1.64	0.124	1.168	0.867
Aquaculture land-based farm (ha)	3.02	0.197	1.97	0.521	1.62	1.223	1.202	1.782
Garden land(ha)	1.55	0.327	3.27	1.002	1.26	0.826	1.474	0.421

In model 3, vocational education has affected significantly to the income of rural youth. The monthly average income of rural youth is higher by 19%, 28% and 35% with household head education of high school diploma, vocational training, junior college. Consequently, the authors conclude that even if education is measured by any parameters, it still has a positive impact on the income of young household in rural Vietnam.

Table 4 shows how the number of schooling years influences the income at different quantile levels by using quantile regressive model. Calculation results reveal that there is a big gap in the income effect of education among percentage levels. In addition, results indicate that adding one more formal schooling years will increase the monthly

average income per person by 84,000 dongs for those who are at the lowest quantiles (10th). However, this effect is likely to increase with the higher quantiles, VND 97,000 and VND 144,000 for those are at quantiles 75 and quantiles 90, respectively. This implies that, education tends not to be better-off for the poor; therefore, our study gives new evidence to prove that education measured by schooling years of rural youth raises the income inequality in rural Vietnam.

It can be seen that some characteristics of rural youth can affect to their income. The similar findings were found from previous studies (Nguyen & Tran, 2018; Tran & Vu, 2018). Our research findings confirm that, if the scale of farm and rate of independence are greater, the income of household is more likely to be owner.

Table 3: The effect of education on youth income

Explanatory variables	Schooling years Model 1		Highest Degrees Model 2		Vocational education Model 3	
	Coefficients	SE	Coefficients	SE	Coefficients	SE
Ethnicity	0.23**	0.176	0.24**	0.164	0.61**	0.258
Age	0.01**	0.020	0.02**	0.019	0.00**	0.030
Marital status	-0.14**	0.175	-0.24**	0.163	-0.23**	0.257
Gender	-0.28**	0.171	-0.30**	0.160	-0.62*	0.251
Dependency ratio	-0.10**	0.042	-0.06**	0.040	-0.03*	0.062
Household size	0.21**	0.178	0.11**	0.166	0.42**	0.260
Wage employment	0.04**	0.175	0.02**	0.163	0.45***	0.256
Non-farm self-employment	0.14***	0.185	0.21**	0.173	0.19**	0.272
Farmer association	0.70***	0.186	0.71**	0.174	0.78**	0.274
Communist party	-0.23**	0.171	-0.23**	0.160	-0.19***	0.252
Migration	0.23**	0.033	0.24**	0.164	0.61*	0.258
Hi-tech application	1.21***	0.189	1.8***	0.084	3.12***	0.477
Schooling years	0.23***	0.176				
Elementary			0.14**	0.522		
Middle School			0.29**	1.297		
High school			0.34**	0.314		
Apprenticeship vocational & technical training (2 years)			0.39**	0.297		
Apprenticeship vocational & technical training (3 years)			0.54**	0.210		
Undergraduate, Master degree			0.67***	0.522		
High school diploma					0.19***	1.430
Vocational training					0.28***	0.346
Junior college					0.35***	0.392
Annual cropland	-0.21***	0.552	-0.10**	0.515	-0.35**	0.371
Perennial cropland	0.66**	0.550	0.52**	0.513	0.15**	0.810
Forestland	0.25**	0.543	0.16**	0.507	0.16*	0.807
Aquaculture land	0.40**	0.553	0.33**	0.502	0.48**	0.797
Garden land	0.40**	0.553	0.26**	0.517	0.37**	0.788
Constant	7.24***	0.970	9.42***	0.929	0.23***	0.812
Observations	800		800		800	
R-squared	0.241		0.1885		0.0231	

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Quantile effects of schooling years on youth income

Explanatory variables	Quantile regression									
	the 10 th quantile		the 25 th quantile		the 50 th quantile		the 75 th quantile		the 90 th quantile	
	Coef	SD	Coef	SD	Coef	SD	Coef	SD	Coef	SD
Age	0.17**	0.02	0.00**	0.01	-0.01**	0.02	0.01**	0.03	0.02**	0.06
Ethnicity	0.03**	0.14	0.22**	0.11	0.19**	0.19	0.21**	0.26	0.41**	0.51
Marital status	0.04*	0.14	-0.02*	0.11	-0.13**	0.19	-0.19	0.26	0.48	0.51
Gender	0.05**	0.14	-0.16**	0.11	-0.05*	0.18	-0.23*	0.25	-0.38**	0.50
Farm size	-0.02**	0.03	-0.01**	0.03	-0.11**	0.05	-0.17	0.06	0.02*	0.12
Dependency ratio	-0.04*	0.06	-0.03*	0.12	-0.04*	0.17	-0.04**	0.12	0.05*	0.16
Wage employment	0.02**	0.14	0.05**	0.11	0.25**	0.19	0.41*	0.26	0.60**	0.52
Nonfarm self-employment	0.05**	0.14	0.06**	0.11	-0.02*	0.19	-0.16**	0.26	-0.17**	0.51
Migration	-0.24**	0.14	0.06**	0.11	-0.19**	0.19	-0.17*	0.25	-0.07**	0.50
Schooling years	0.84**	0.03	0.87**	0.02	0.91**	0.18	0.97**	0.05	1.44***	0.50
Hig-tech application	1.70***	0.23	1.60***	0.15	2.5***	0.31	5.30***	0.39	5.50***	0.63
Annual cropland	0.22**	0.45	0.37**	0.34	0.84**	0.59	0.94***	0.82	-0.41**	0.82
Perennial cropland	0.55*	0.45	0.83**	0.34	0.65*	0.59	1.11**	0.81	0.93*	0.83
Forestland	0.07**	0.44	0.44**	0.34	0.15**	0.58	0.82**	0.79	0.93**	0.70
Aquaculture land	0.23**	0.43	0.70**	0.35	0.25**	0.57	0.96**	0.82	0.27**	0.83
Garden land	0.09**	0.45	0.70**	0.12	0.14***	0.20	0.10*	0.82	0.06*	0.54
Farmer associations	0.15**	0.15	0.26***	0.12	0.44***	0.20	0.61**	0.27	0.96**	0.54
Constant	7.542***	0.787	6.72***	0.61	5.38***	1.04	6.43***	1.44	9.15***	2.30
Observations	800		800		800		800		800	
Pseudo R2	0.247		0.3547		0.3547		0.4134		0.4564	

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

On the other hand, the results from Table 4 show that these negative impacts tend to be greater to those who have higher incomes. The household heads whose ethnicity is Kinh earn a larger income (23% higher, see Table 3, model 1) than those of ethnic minorities. Nevertheless, Table 4 reveals that the gap in income is likely to be expanding with larger quantiles. This implies that the ethnicity can be a factor to widen the inequality of income.

The OLS estimation in Table 3 indicates that wage employment and non-farm self-employment, hi-tech application can affect positively the income of rural youth. In particular, the head of young households, who earn both wage employment and non-farm self-employment, will have greater total income around 0.04, 0.14, respectively, than those can only earn either of the two incomes. And hi-tech application affects positively the income of rural youth with correlation coefficients of 1.21 (Schooling years Model 1), 1.8 (Highest Degrees Model 2), 3.21 (Vocational education Model 3).

Notably, five levels of quantiles in Table 4 demonstrate that impacts of wage employment on income tend to go up along with the increase of quantiles; however, the opposite trajectory of impact is observed with the factor of non-farm self-employment. These findings affirm that wage employment can create more income inequality, whereas income from nonfarm self-employment can improve the income equality.

Hi-tech application in farming creates a positive impact on income of rural youth with the clearer correlations at higher quantiles, e.g., from 1.7 at the 10th quantile to 5.3 at the 75th quantile or 5.5 at the 90th quantile. The reason is that application of hi-tech in agriculture enables to create products with a better design, higher quality, meets the food safety standards, and is more likely to be easier to sell in the market. Consequently, hi-tech application can bring about higher economic efficiency for rural youth.

Migration is found to have a negative impact on the income of rural youth at all five levels of quantiles. Young household heads, which are member of farmer association, can earn higher income than those who are non-member. The effect is larger to those who are richer. This supposes that membership can create a positive impact on rural youth, hence, via membership, household head can gain access to support services provided by farmer associations, e.g., information, credit schemes, technology, selling markets connection, and training courses.

Furthermore, the study found that annual cropland area can affect positively the income of rural youth, whereas perennial cropland area and aquaculture land-based area influence negatively the income. This finding implies that the usage of land for various purposes can have different roles in the income of young rural household in Vietnam. Our

findings partly agreed with findings from previous studies in developing countries where the more cultivated areas the household own, the less income they can earn (Tran, 2014).

4. Discussions and Implications

This paper has examined how education influences income of rural youth in Vietnam by using two regressive methods of OLS and quantile. Dataset includes a sample of 800 young households in rural areas from four provinces and cities. The research findings including:

First, the quantity calculation proves that education level of young household heads influence positively their income measured at any quantiles. Moreover, by using quantile regressive at various quantiles, the results indicate that the number of schooling year is likely to generate the larger income for those who are in the high-income group. This finding suggests that education expands the inequality in rural Vietnam. As explained earlier, more effect of education on high-income can be resulted from the fact that young heads, who are in the high-income group, are more likely to be provided a higher quality of education or acquired better working skills; nevertheless, this is not observed in the models. So, some solutions to enhance quality of Vietnamese education in the coming years should be considered, namely:

- To primary education: Strengthen the ability to get ready for school by enhancing quality of early childhood education and universalize semi-boarding preschool education; advanced education curriculum should put children at the center of schooling activities with the actual high quality of educational service at all classrooms by promoting teachers' capabilities.

- To promote of awareness and attitudes in primary and secondary education, increase the numbers of children who have finished primary schools to attend secondary schools through school fee reduction and exemption and direct cash subsidies for children whose families face hardship; extend the formal schooling time to two sessions per day in order to reduce tutoring fees and ensure the formal educational curriculum is more diversified; advanced educational curriculum, teaching method and learners' assessments should focus on skills of critical thinking, problem solving and positive behaviors; provide teachers all necessary tools to conduct advanced curriculum through upskill training in in-service mode; delegate and encourage parents associations to join the making-decision process at schools; strengthen cooperation between schools and local communities, especially in the disadvantageous areas.

- Develop and update techniques and technologies in education and training for upper secondary and vocational courses; create initiative and motivate collaborations and formal and informal forums of skill trainings between

enterprises and educational providers; conduct more surveys on university alumni; uplift information barriers in rural and remote areas; improve the way of distributing available information on labor market; promote the self-management capability of educational providers; declare the transition from direct management into strategic management and focus on outputs rather than inputs; stop the quota on the number of enrolments, identify standards for professional skills and qualification, assess and grant certificates for graduated students; invest in teachers' training; invest in promoting leadership and management capabilities in order to apply self-managed by educational providers.

Second, not all type of lands affect positively the income of rural youth in Vietnam. Annual cropland does not have a positive impact on their income, while perennial cropland and aquacultural land do. This finding supports the argument of Rigg (2006) who suggests that the role of cropland in improving living standards for households in rural areas, has been replaced by the non-farm activities in some developing countries. As a result, improving income of rural youth based on land resources is no longer considered as a main solution in development strategies of new rural Vietnam.

Third, becoming a member of job-related associations can create a positive impact on income of rural youth who are heads of households. Therefore, there is a need to plan some policies to support youth to join associations in order to get supports from them, for instance, supports for farm credit, technology, sourcing material inputs, seeking selling products' markets.

Fourth, the study also argues that household heads whose income is less, often has a lower education level. The policy implied here is that increasing the possibility for rural youth who have low income might be an effective solution to enable rural youth to improve their income and contribute to the process of hunger elimination and poverty reduction in rural Vietnam.

Fifth, the positive impact of wage employment in our study implies that the creation of more opportunities for rural youth to have more works and extend producing activities should be considered as a solution to add up more income for rural youth.

Sixth, hi-tech applications in farming have a real impact on the income of rural youth whose production units deployed the hi-tech farming, which mostly produce good-looking design, good quality and food safety compliance. As a result, their products can be on sale at the modern retail channel (supermarkets or convenience stores) or export to overseas markets with higher prices than products made by producing units, which are not applied hi-tech farming.

5. Conclusion

The research findings based on the survey of 800 rural youths from representative areas indicate that education

could have significant impact on their income. Furthermore, the results prove that the longer schooling years, the higher income youth can attain. On the other hand, the findings point to the other factors that influence directly the income of rural households, namely, membership of the employment association, land, hi-tech application in farming, hired labour, and extension of producing size.

However, there are some limitations in this study. First, the study sample mainly focuses on evaluating the impact of education on rural youth due to the research sample taken from the ministerial level project titled "Solutions to develop high-tech application in young people's agriculture models in rural Vietnam" in 2019. In this project, the research sample is rural youths and their incomes. Second, the research areas are selected from some representative rural areas that meets characteristics of the designed research sample. The more detailed findings can be extrapolated from a larger scale survey, not only rural, but also urban areas in Vietnam.

In summary, we highly recommend the use of two models of OLS and quantile regression in evaluating the impact of education on income via the primary data collected from our own survey in Vietnamese rural areas. The use of primary data enables us to have an unbiased examination of the education impact on income along with other factors, which makes clear impacts on the income of rural youth. These factors are associations' membership, land, hi-tech application, and labor hire. The study has estimated how hi-tech application can influence the income of rural youth, nevertheless, further studies can focus on the role of subsidy policies and measures from government and associations on obtaining assistance for rural youth in accessing and applying hi-tech. Further studies can also recommend some practical solutions to rural youth to apply more hi-tech for farming in the context of international integration and Industry 4.0.

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