

Does Income Diversification Improve Household Consumption Expenditure? Evidence from Rural Central Vietnam

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Abstract: This study examined the determinants of income diversification and its effect on household consumption expenditure in rural Central Vietnam. The data were drawn from the Vietnam Household Living Standards Survey 2016 (VHLSS 2016), covering 1,445 rural households across 14 provinces in the region. The Simpson Index of Diversity (SID) was used as the measure of diversification, while a Tobit specification accounted for the corner solutions inherent in the data. A two-stage least squares procedure, using the number of non-farm workers per household as an instrument, addressed the endogeneity concern when modelling per capita consumption. The empirical results suggested that the typical rural household was only modestly diversified, with no marked gap between income quintiles. Ethnicity, household size, age of the household head, access to electricity, access to information, access to financial services, and the participation of household members in non-farm work emerged as the strongest predictors of diversification. More importantly, diversification raised per capita consumption. The findings reinforced the view that broadening the income base of rural households did more than smooth shocks; it lifted welfare.

Keywords: income diversification, rural households, consumption expenditure, Central Vietnam, Simpson index, Tobit model, 2SLS

1. Introduction

Agriculture has long been a major sector of Vietnam's economy. It plays an important role in socio-economic development and creating the foundation for industrialization and modernization process from an agricultural country. Agriculture is also a staple livelihood and helps to maintain the lives of most rural people. In Vietnam, almost half of 92 million inhabitants are engaged in the agriculture sector. However, productivity in the agricultural sector, which accounts for approximately one-fifth of GDP (18%), remains at low level compared to other sectors (FAO, 2019). It shows that agriculture in Vietnam still faces challenges in production and requires excessive use of inputs.

In addition, although agriculture has contributed to poverty reduction, food security, and social stability over the past decades, rural households are still more likely to fall back into poverty (Fao, 2019). The country is the 15th most populous in the world, with 65% of the population living in rural areas. The GDP per capita is only 2715,3 USD (about 67 million VND) (World Bank, 2019). About 6.7% of the population live under impoverished conditions with an income of 3.2 USD/day (80,000 VND/day) (World Bank, 2018). Poor people in Vietnam are typically characterized as large family size, low educational background, agriculture reliance, and rural and mountainous habitats (UNDP, 2018). According to Barrett et al. (2001), income diversification

has been seen as a popular strategy by rural households to stabilize income flows and consumption. Especially, it is significant to those who are limited in risk-bearing capacity due to labor and land constraints, and climatic uncertainty.

Since 2007, Vietnam has participated in WTO and free trade agreements, such as the Trans-Pacific Partnership and Comprehensive Agreement and the Vietnam-EU Free Trade Agreement. This has special significance for Vietnam in the field of the labor sector. The increase in foreign investment flows to the country improves competitiveness among firms, thus enhancing labor productivity and attracting more skilled workers. Local workers have opportunities to get more jobs, especially those living in urban areas where the labor market is vibrant. However, rural workers, who are unskilled and mainly rely on farm activities, deal with the challenges of joining the labor market. Lack of skills needed for the job might be one of the main barriers.

The literature has shown that income diversification strengthens rural livelihoods and lessens income-related risks. Few studies have yet been made regarding the effect of income diversification on households' consumption expenditure in rural areas. According to Minot et al. (2006), consumption needs is a driving force for income diversification. However, Xu (2017) found that income diversification has a considerable effect on households' consumption. It can also be argued that if income diversification is expected to increase household income, it is likely to affect households' consumption.

Therefore, the objective of this paper is to examine income diversification and its consumption implications among rural households in Central Vietnam, a region underexplored in the literature despite its exposure to climatic and market risk. Specifically, the study seeks to answer two questions: (i) what determines income diversification among these households, and (ii) whether, and to what extent, diversification affects their consumption expenditure.

The analysis draws on the 2016 round of the Vietnam Household Living Standards Survey (VHLSS), restricting attention to rural households in the fourteen provinces of the North and South Central Coast. The Simpson Index of Diversity is the measure of choice, and the empirical strategy combines a Tobit model, appropriate when a fraction of households report only one income source, with a 2SLS specification that treats SID as endogenous in the consumption equation. The instrument is the number of household members engaged in non-farm work, motivated by a long tradition of similar choices in the literature (Babatunde & Qaim, 2009; Danh & Khai, 2014).

The remainder of the paper proceeds as follows. Section 2 reviews the theoretical and empirical literature. Section 3 describes the data. Section 4 presents the empirical strategy. Section 5 discusses the results, and Section 6 concludes.

2. Literature Review

2.1. Conceptualizing Income Diversification

Definitions of income diversification vary across the literature, but two strands are useful for organizing them. Firstly, in a basic way, income diversification can be defined as an active social process in which income-generating activities increase over time (Ellis, 1998). The second emphasizes the balance among existing sources rather than their number. A household with two income streams that contribute roughly equally is, in this view, more diversified than a household with two streams in which one dominates (Minot et al., 2006).

Both ideas are captured by the Simpson Index of Diversity, which penalizes unbalanced contributions even when several sources are present.

Why do households diversify? Researchers have generally grouped the motivations into two broad categories. For some households, diversification reflects a deliberate choice, what Ellis (1998) called the pursuit of an optimal portfolio—weighing expected returns against exposure to risk. For others, it is less a strategy than a necessity, a response to the point where farming alone can no longer meet basic household needs. Barrett et al. (2001) found that the distinction matters, indicating that the first kind of diversification is more often associated with wealthier households who can afford to invest in new ventures, while the second is the more familiar story of poor households scraping together livelihoods at the margin.

In developing countries, shifting labor out of own-farm production into off-farm activities represents the most common pathway through which households diversify their livelihoods. Reardon (1997) pointed to four main channels through which this occurs: wage employment in the rural non-farm sector, labor migration, hired agricultural labor markets, and local non-farm self-employment. Each channel responds to different incentives and barriers, which is one reason cross-country comparisons can yield seemingly contradictory results.

The evidence base on the scale of non-farm income is now substantial. Babatunde and Qaim (2009) reported that fifty percent of total income in north-central Nigeria comes from off-farm activities and that wealthier households are more diversified than poorer ones. Minot et al. (2006), drawing on a wider sample, placed the global average for the non-farm share of rural income at thirty to forty-five percent. The implication is that the agricultural sector, while still dominant in many countries, is no longer the sole determinant of rural welfare.

2.2. Determinants of Income Diversification

A reasonably consistent picture emerges from the empirical literature on what drives diversification, although the magnitudes and signs of particular variables differ by region.

Household and head characteristics matter. Agyeman, Asuming-Brempong, and Onumah (2014) and Khan et al. (2020) found that age, education, and household size are significant predictors. Larger households have more hands available to spread across different activities. A head with more years of experience tends to bring useful contacts and accumulated know-how, resulting in an educated household that can move into skill-demanding occupations. Besides, the literature is not unanimous on the direction of the age effect. Agyeman et al. (2014) reported that older heads diversify less, perhaps because of declining health, whereas other studies find the opposite, with experience outweighing physical limitations.

Location and infrastructure play similar important roles. Abdulai and CroleRees (2001) found in Southern Mali that households far from town centers struggled to diversify into non-farm activities. Aloba Loison and Bignebat (2017) qualified this finding: the disadvantage of distance shrinks in well-developed regions with good infrastructure, suggesting that the effect of remoteness is mediated by complementary investments in roads, power, and markets.

Access to credit and information has been repeatedly identified as important. Schwarze and Zeller (2005) found that households which had obtained a formal loan in the five years prior were substantially more likely to have moved into non-agricultural work. Dagunga et al. (2018) reached a similar conclusion. On

information, Khan et al. (2020) documented that in Uttar Pradesh, India, households with access to formal information channels are roughly three times more diversified than their counterparts who lack such access.

Farm size, for its part, does not lend itself to easy generalization. Households with little land may have no choice but to seek income elsewhere (Le & Le, 2020), yet those farming larger plots are often better placed to accumulate the surplus that makes investment in non-farm activities possible in the first place. The direction of the net effect ultimately depends on which of these forces dominates in a given context—something theory alone cannot settle.

Table 1 described these determinants, together with their expected or observed directions of impact, as identified in the studies reviewed above.

Table 1. Summary of determinants of income diversification identified in prior studies

Factors	Study	Direction
Age of household head	Agyeman, Asuming-Brempong, & Onumah (2014)	-
	Khan et al. (2020)	-
Education	Agyeman et al. (2014); Khan et al. (2020)	+
Household size	Khan et al. (2020)	+
Location	Abdulai & CroleRees (2001)	-
	Alobo Loison & Bignebat (2017)	Mixed / Varies by region
Access to credit	Schwarze & Zeller (2005); Dagunga et al. (2018)	+
Access to information	Khan et al. (2020)	+
Farm size	Le & Le (2020)	-

Note: "+" indicates a positive association with income diversification; "-" indicates a negative association.

Source: Author's compilation

In general, most studies use cross-sectional data to examine the determinants of income diversification in developing countries. The main factors include farmer's characteristics, household's characteristics, housing location, farm size, access to information sources, access to financial services.

2.3. Income Diversification and Household Consumption Expenditure

The relationship between income diversification and household consumption has received comparatively less attention than the determinants of income diversification. Nevertheless, existing studies provide relatively consistent evidence regarding this relationship.

According to Minot et al. (2006), meeting consumption needs is a motive for households to diversify their income. Barret et al. (2001) reviewed the previous studies and indicated that households living in remote areas could face additional costs in physical access to markets. These barriers force them to participate in various economic activities to satisfy their needs for diversity in consumption. Prowse (2015) examined non-farm income diversification in rural Ethiopia over the period 1994-2009 and found that household consumption is a determinant of income diversification reflecting a strategy by wealthier households.

However, income diversification is also considered an efficient means to improve households' welfare (Sime Kidane & Wale Zegeye, 2020). In addition, one of the popular welfare indicators is the measure of consumption (Moratti & Natali, 2012). Therefore, it can be understood that income diversification has effects on household consumption. Several researchers have focused on investigating the effect of income diversification on consumption.

Sultana et al. (2015), studying rural Bangladesh with cross-sectional data, found that diversification significantly improves household well-being even when the average degree of diversification is low. Ersado (2005), using two waves of Zimbabwean household data before and after drought and structural adjustment, reported that diversification correlates positively with consumption expenditure and that its importance grew after the shocks—consistent with both the wealth-accumulation and shock-protection interpretations.

Xu (2017) used provincial data to analyze income diversification and rural consumption in China. She concluded that income diversification has a significant influence on rural consumption. Additionally, that influence depends on the level of income. The findings indicate that income diversification plays an important role in both the low-income regions and the high-income regions. She found two reasons behind that. Firstly, households in low-income regions are easily affected by income risks and receive a higher transfer from their government. Secondly, high income can supply enough precautionary assets to households in high-income regions. In both cases, income diversification leads to a higher increase in consumption.

The relevant literature has shown that non-farm earnings result in more rapid growth in consumption (Barret et al., 2001). This possibly implies that households relying on the agricultural sector could increase consumption by diversifying into non-farm activities.

Taken together, the literature gives reason to expect that diversification will boost consumption in rural Central Vietnam. What it does not provide is a Vietnam-specific estimate of the effect or a clear picture of the channels at work. The present paper addresses this gap.

3. Methodology

3.1. Data

The study used the dataset from the Vietnam Household Living Standards Survey (VHLSS), conducted biennially by the General Statistics Office of Vietnam (GSO) with technical support from the World Bank and the United Nations Development Programme. The survey has been administered since 1993 and provided nationally representative information on demographics, income, consumption, employment, education, health, housing, and access to infrastructure and financial services. The present study drew on the 2016 round with the full set of variables needed for the analysis. In addition, after merging the relevant modules of the VHLSS 2016, restricting the sample to rural households located in Central Vietnam, the final working sample consisted of 1,445 households.

The geographic scope was restricted to rural households in the fourteen provinces of North and South Central Vietnam, which combined coastal lowlands with steep uplands and was regularly exposed to typhoons and flooding. The region's population stood at roughly 20.2 million, of whom about 71.8% lived in rural areas (GSO, 2019). Average per capita monthly income was about VND 3.01 million, equivalent to 76.3% of the national figure, and inequality was pronounced: the ratio between the richest and poorest quintiles in 2018 stood at 7.9 (GSO, 2018).

About the geographic aggregation of the sample, the North Central Coast relies on rice-based farming and faces cold spells and storms, while the South Central Coast has a more marine-based economy and is more exposed to drought. Despite the internal variation, Central Vietnam is commonly treated as a coherent macro-region distinct from the North and the South, on the basis of structural features shared across its entire coastline rather than confined to either sub-region. In addition, Central Vietnam as a whole shares a common exposure to both flood and drought risk. The 2015–2016 drought, the most severe in 90 years, affected about 2 million people region-wide (World Bank, 2022), and the region has historically recorded higher poverty rates than most other regions in the country (MOLISA, 2023). Therefore, this study examined Central Vietnam, treating the fourteen provinces as a single, integrated area of analysis. In the future, research using more detailed datasets that retain provincial identifiers should examine whether the welfare effects of income diversification differ systematically between the two sub-regions.

3.2. Measuring Diversification

Several indices have been used to measure income diversification, including the simple count of income sources, the non-farm income share, the Herfindahl-Hirschman index, the Shannon entropy index, and the Simpson Index of Diversity (SID). According to Minot et al. (2006), the Simpson Index of Diversity captures both the number of income sources and the extent to which income is evenly distributed among them. Therefore, this study employed the Simpson Index of Diversity to measure the degree of income diversification. The index is expressed in the following general form:

$$SID = 1 - \sum_{i=1}^n P_i^2$$

Where SID is the income diversification index; SID ranges from 0 to 1; P_i is the portion of income coming from the source i ; If there is one source of income, SID is 0 as $P_i = 1$.

In this study, it was interpreted as:

$$SID = 1 - \left[\left(\frac{i_1}{TI} \right)^2 + \left(\frac{i_2}{TI} \right)^2 + \left(\frac{i_3}{TI} \right)^2 + \left(\frac{i_4}{TI} \right)^2 + \left(\frac{i_5}{TI} \right)^2 \right]$$

Where i_1 : Farm income; i_2 : Self-employment income; i_3 : Wage and salaries; i_4 : Transfers; i_5 : Other income; TI : Total income of household i .

In the present application, total income was categorized into five categories: farm income (crops, livestock, fisheries, forestry), self-employment income (non-farm), wages and salaries, transfers, and other income.

3.3. Determinants of Income Diversification

As a non-trivial fraction of households in the sample reports only one income source, SID could be censored from below at zero. Ordinary least squares estimation would produce biased and inconsistent estimates and could yield negative predictions (Gujarati & Porter, 2009; Wooldridge, 2016). In this case, the Tobit could be seen as the optimal model, as it takes into account a large number of zeros in the dependent variable (Agyeman et al., 2014). Schwarze & Zeller (2005) also suggested that although the model was originally designed for censored data, it can work well for corner solutions. Therefore, in order to investigate the determinants of income diversification, the Tobit model was used in this study. A number of recent studies

of diversification have used the similar approach (Babatunde & Qaim, 2009; Agyeman et al., 2014; Alobo Loison & Bignebat, 2017).

The latent variable specification is:

$$SID_i^* = \alpha x_i + \varepsilon_i \quad (1)$$

In the model, SID^* is the latent variable that is unobserved. It linearly depends on a set of explanatory variables x via a vector α . The latent variable SID^* takes the values as following:

$$\begin{cases} SID = 0 & \text{if } SID^* \leq 0 \\ SID = SID^* & \text{if } SID^* > 0 \end{cases}$$

Where SID is the observed value of the dependent variable; α is the vector of estimated parameters; x is the vector of explanatory variables; ε is the error term.

The model was then identified in detail as:

$$\begin{aligned} SID^* = & \alpha_0 + \alpha_1 ethnicity + \alpha_2 gender + \alpha_3 age + \alpha_4 education + \alpha_5 householdsize + \alpha_6 housingarea \\ & + \alpha_7 accesstotapwater + \alpha_8 accesstoelectricity + \alpha_9 accesstoinformation \\ & + \alpha_{10} accesstofinancialservices + \alpha_{11} farmsize + \alpha_{12} nonfarmlabor + \varepsilon \end{aligned}$$

This study used three groups of explanatory variables. Household head's characteristics included ethnicity, gender, and age. Household characteristics were household size, housing area, farm size, average education level, and non-farm labor. The household's access to infrastructure and financial services consisted of access to electricity, water, information, and financial services. The variables with their expected signs are described in Table 2.

Table 2. Description and measurement of variables used in the model 1

Variables	Description	Measurement	Expected sign
SID	Income diversification of the household	Simpson Index of Diversity	
Ethnicity	Ethnicity majority	1 = Kinh, 0 = otherwise	+/-
Gender	Gender of household head	1 = male head, 0 = female	+/-
Age	Age of household head	Years	+/-
Education	Average educational level of the household	Average years of schooling	+
Household size	Number of members in the household	Number of members	+
Housing area	Housing area	Square metres	+
Access to tap water	Access to tap water of the household	1 = yes, 0 = no	+
Access to electricity	Access to electricity of the household	1 = yes, 0 = no	+
Access to information	Access to information of the household	1 = yes, 0 = no	+

Variables	Description	Measurement	Expected sign
Access to financial services	Access to financial services of the household	1 = yes, 0 = no	+
Farm size	Farm area	Square metres	+
Non-farm labor	Number of household's members who work in non-farm sector	Number of non-farm workers	+

Source: Author's compilation based on VHLSS 2016

Ethnicity was coded as one for Kinh-headed households, the majority group, and zero otherwise. The expected sign was positive on the prior that Kinh households were more integrated into wage markets, although it was not theoretically determined. Age could pull in either direction, reflecting a tension between accumulated experience and declining health, and education was expected to support entry into higher-skilled non-farm activities. Access to electricity was the closest available proxy for productive infrastructure and was expected to facilitate small home-based manufacturing and services. Access to information, captured by household exposure to the public loudspeaker system, proxied awareness of agricultural extension and local business opportunities. Access to financial services covered bank accounts, credit, and stock or securities holdings.

3.4. Effect of Income diversification on Consumption Expenditure

To investigate the effect of income diversification on households' consumption expenditure, the regression model is set up as follows:

$$\ln(Consumption_i) = \beta SID_i + \gamma x_i + u_i \quad (2)$$

Where β, γ are the vectors of estimated parameters; SID_i is the Simpson index of diversity of household; x_i is the vector of other explanatory variables; u is the error term; $Consumption_i$ is the consumption expenditure per capita of household i .

The household consumption expenditure consisted of food expenditure, expenditure on non-food items (expenditure on clothes, transportation, etc.), education expenditure, healthcare expenditure, housing expenditure (electricity, water, etc.), expenditure on durable goods, and other expenditure.

The explanatory variables with their expected signs are shown in Table 3. In this section, the focus was the effect of income diversification on households' consumption expenditure. The dependent variable was measured by the log of the household's per capita consumption expenditure. SID as the explanatory in the model was expected to have a positive sign.

Sultana and Islam (2015) applied a multiple regression model to examine how income diversification affects household well-being, which they proxied through a consumption expenditure index. Danh and Khai (2014) argued that the diversification index might be endogenous; where such endogeneity is present, the resulting estimates are biased and inconsistent. Confronting the same difficulty, Babatunde and Qaim (2009) adopted a two-stage least squares (2SLS) estimator in their analysis of the effect of diversification on household income drawn from cross-sectional data.

The present study proceeded along similar lines. The reliability of the 2SLS method, however, rested on the quality of the instruments selected. Danh and Khai (2014) restated the two standard requirements: a valid instrument must be correlated with the endogenous regressor yet remain uncorrelated with the disturbance term. Earlier studies have drawn on a comparatively broad set of candidates, including household productive assets, education, and access to credit (Babatunde and Qaim, 2009), together with non-farm labour (Danh and Khai, 2014).

Given the scarcity of suitable instruments in the available data, this study employed the number of household members engaged in work outside the farm sector as its instrument. This variable was assumed to be correlated to income diversification and uncorrelated with the error term u . In other words, the variable affected households' consumption expenditure indirectly through income diversification.

Regarding validity of the instrument variable, two features of the model partially addressed this concern. First, the outcome variable was consumption per capita, while the instrument counted the number of household members working off-farm. When a household shifts one worker from farm to non-farm work, that changed the composition of household income more than it changed the resources available to each person, since the worker's labor was already contributing to the household before the move. Hence, the direct income channel could be weaker than it might first appear. Second, housing area and farm size, meanwhile, were already in the model as controls, standing in for household wealth; part of the direct wage effect was therefore plausibly absorbed by these controls rather than left in the error term.

Table 3. Description and measurement of variables used in the model 2

Variables	Description	Measurement	Expected sign
LnConsumption	Log (Consumption expenditure per capita of the household)		
SID	Income diversification of the household	Simpson Index of Diversity	+
Ethnicity (Kinh)	Ethnicity majority	1 = Kinh, 0 = otherwise	+
Gender	Gender of household head	1 = male head, 0 = female	+/-
Age	Age of household head	Years	+/-
Education	Average educational level of household	Average years of schooling	+
Household size	Number of members in the household	Number of members	-
Housing area	Housing area	Square metres	+
Access to tap water	Access to tap water of the household	1 = yes, 0 = no	+
Access to electricity	Access to electricity of the household	1 = yes, 0 = no	+
Access to information	Access to information of the household	1 = yes, 0 = no	+/-

Variables	Description	Measurement	Expected sign
Access to financial services	Access to credit of the household	1 = yes, 0 = no	+
Farm size	Farm area	Square metres	+

Source: Author's compilation based on VHLSS 2016

Besides, due to the dataset limitations leading to limit choice of instrument variables, the specification was just-identified, one instrument for one endogenous regressor, so a formal overidentification test (e.g., Sargan–Hansen) was not available here. However, the necessary diagnostic tests for instrument validity and relevance, namely the Durbin and Wu–Hausman tests for endogeneity and the first-stage F-statistic for instrument strength, had been carried out and were reported in Table 10.

4. Results and Discussion

4.1. Descriptive Statistics

Table 4 reports summary statistics for the 1,445 sample households. The mean SID was 0.370, well below the theoretical maximum and indicative of a sample in which one or two income sources tend to dominate. The standard deviation was moderate (0.201), suggesting genuine heterogeneity around the mean rather than a tight clustering. Several features of the sample are worth highlighting. In the study area, the majority of householders were Kinh people, up to 86.20%; ethnic minorities accounted for only 13.80%. In Vietnam, most ethnic minorities live in rural areas, gather in mountainous areas, mainly live on agriculture, and have low income.

Table 4. Descriptive Statistics

Variable	Min	Max	Mean	SD
SID (Simpson Index of Diversity)	0	0.7469	0.3702	0.2006
Log consumption expenditure (per capita)	0.2685	5.6120	2.8226	0.5702
Ethnicity (Kinh = 1)	0	1	0.8620	0.3450
Gender (male = 1)	0	1	0.7695	0.4213
Age (years)	20	104	53.467	14.755
Education (years)	0	12	7.4046	2.9496
Household size (persons)	1	11	3.7046	1.5984
Housing area (m ²)	8	450	73.848	42.301
Access to tap water (1 = yes, 0 = no)	0	1	0.2084	0.4063
Access to electricity (1 = yes, 0 = no)	0	1	0.9869	0.1138

Access to information (1 = yes, 0 = no)	0	1	0.8095	0.3928
Access to financial services (1 = yes, 0 = no)	0	1	0.2146	0.4107
Farm size (m ²)	0	272,000	6,464.9	13,670.8
Non-farm labor (persons)	0	4	0.3602	0.6792

Source: Author's calculations based on VHLSS 2016

Of the 1445 household heads, about 76.95% were male. This was consistent with the reality of Vietnam, especially in the rural areas. Traditionally, men played an important role in the family and were often seen to be experienced enough to make decisions in the family, especially issues related to income. The average age of household heads in the Central region was 53.47 years old, with the youngest age of 20 and the oldest age of 104. At this average age, the household heads accumulated much experience in productions and businesses. Education levels were modest: the household average was 7.40 years of schooling, just past primary school but well short of upper secondary.

Household size averaged 3.70 members, slightly below the national average and consistent with the gradual demographic transition underway in rural Vietnam (GSO, 2018). Housing area varied widely (from 8 to 450 square metres), as did farm size (from zero to 272,000 square metres), which reflected the heterogeneity of the region. Coastal smallholders, upland mixed farmers, and the occasional plantation operator all appeared in the data.

Access to electricity was virtually universal (98.69%), but access to tap water remained limited (20.84%). The contrast was telling: rural electrification had been a sustained policy success, while clean water delivery still relied heavily on dug wells and other informal sources. Access to information was high (80.95%), reflecting the prevalence of village loudspeaker systems, but only 21.46% of households used formal financial services, a constraint that had obvious implications for entrepreneurship.

4.2. The Structure of Households' Income in Rural Central Vietnam

Table 5 summarizes the composition of household income by source, highlighting two key findings. First, wages and salaries accounted for the largest share of household income (43.68%), more than farm income (26.37%). It could be seen that although rural households had labor and land sources available for farm production, the farm income was much lower than income from wages and salaries. The wage component reflected a combination of factory employment, construction work, and seasonal migration to urban areas. Self-employment in non-farm activities added another 16.88%. Taken together, non-farm sources, such as wages, self-employment, and transfers, delivered more than 70% of total household income. Farming continued to matter, but it was increasingly part of a broader portfolio rather than the center of gravity.

Table 5. Mean Income and Income Shares of Rural Households, Central Vietnam

Income source	Mean income (million VND)	Income share (%)
Wages and salaries	37.679	43.68
Farm income	22.744	26.37
Crops	11.642	13.50

Income source	Mean income (million VND)	Income share (%)
Livestock	6.662	7.72
Fisheries	2.832	3.28
Forestry	1.609	1.87
Self-employment income	14.561	16.88
Transfers	9.439	10.94
Other income	1.840	2.13
Total	86.263	100.00

Source: Author's calculations based on VHLSS 2016

Second, within the farm category, crops and livestock dominated (combined 21.22% of total income), while fisheries and forestry contributed only marginally. The pattern was consistent with the region's terrain: coastal fisheries were seasonal and exposed to typhoon risk, and forestry was concentrated in upland provinces with relatively small populations.

Table 6 disaggregates by income quintile. The mean SID was essentially flat across quintiles, ranging only from 0.344 to 0.385, which was a notable finding in itself. Wealthier households in Q5 were not substantially more diversified than those in Q1; what distinguished them was the composition of their income portfolio rather than its degree of diversification. Q1 households drew 44.52% of their income from farming and 17.86% from transfers, the highest shares in the sample. Q5 households earned a substantial share from self-employment (22.71%) and relied much less on transfers (8.86%).

Table 6. Income Diversification and Income Shares by Income Quintile

Quintile	Mean SID	Income share (%)				
		Wages and salaries	Farm income	Self-employment income	Transfers	Other income
Q1 (lowest)	0.368	30.75	44.52	3.82	17.86	3.05
Q2	0.385	45.62	32.10	7.30	13.40	1.58
Q3	0.376	48.28	25.89	13.24	11.81	0.78
Q4	0.378	47.98	21.53	18.47	10.58	1.44
Q5 (highest)	0.344	40.48	24.76	22.71	8.86	3.19

Source: Author's calculations based on VHLSS 2016

4.3. Households' Consumption Expenditure in Rural Central Vietnam

To examine the consumption side, households were sorted into three roughly equal groups based on per capita consumption expenditure. Table 7 reports the composition of consumption within each group.

Table 7. Household Consumption Composition by Consumption Group (million VND, share %)

Category	Consumption expenditure groups					
	Low		Medium		High	
	Million VND	%	Million VND	%	Million VND	%
Food	23.34	60.58	34.95	55.07	49.85	46.09
Non-food items	8.32	21.61	13.08	20.61	18.31	16.92
Education	1.20	3.12	2.64	4.16	5.47	5.05
Healthcare	1.24	3.23	2.83	4.45	5.85	5.41
Durable goods	0.71	1.83	2.75	4.34	11.54	10.67
Housing utilities	1.42	3.67	2.77	4.36	8.32	7.70
Other	2.30	5.96	4.45	7.01	8.83	8.16
Total	38.52	100.00	63.47	100.00	108.16	100.00

Source: Author's calculations based on VHLSS 2016

The classic Engel pattern showed up clearly. Food accounted for 60.58% of expenditure in the lowest group but fell to 46.09% in the highest. Spending on durable goods rose sharply with income—from 1.83% of consumption in the low group to 10.67% in the high group—as did spending on housing utilities, education, and healthcare. The numbers reinforced a point that was often obscured by aggregate figures: rising rural incomes changed not just the level but the structure of consumption.

Table 8. Mean Income and Income Shares by Consumption Group

Income source	Consumption expenditure groups					
	Low		Medium		High	
	Million VND	%	Million VND	%	Million VND	%
Wages and salaries	25.38	46.98	39.21	46.13	48.41	40.45
Farm income	15.69	29.03	21.32	25.08	31.21	26.07
Self-employment	4.21	7.79	13.96	16.43	25.49	21.30
Transfers	7.53	13.94	9.17	10.78	11.62	9.71
Other	1.22	2.26	1.34	1.58	2.95	2.47
Total	54.03	100.00	85.01	100.00	119.68	100.00

Source: Author's calculations based on VHLSS 2016

Table 8 shows the income side of the same partition. High-spending households drew 21.30% of their income from self-employment, against only 7.79% for low-spending households. The wage share, by contrast, showed relatively little variation across groups, ranging from 40.45% to 46.98%, suggesting that wage employment supported household consumption at all income levels. The incremental gains in consumption observed at higher quintiles appeared to derive primarily from self-employment income. This was a plausible mechanism through which diversification translated into welfare gains: households that could supplement wage income with their own small enterprises were also the ones that moved into the higher consumption bracket.

4.4. Determinants of Households' Income Diversification in Rural Central Vietnam

Table 9 reports the Tobit estimates of the determinants of SID. Most coefficients accord with priors. Household size was positively correlated with SID, indicating that households with a large number of members had more diversified income sources. This was in line with the prior results of Khan et al. (2020). Age of the household head was positively related to the income diversification index, implying that households with older household heads were more diversified in income sources. This, however, disagreed with the results of Agyeman et al. (2014), it could be the case that older household heads accumulated experience over the years, so they had more opportunities in participating in various jobs. Although ethnicity was highly significant, it had an unexpected sign. Households with Kinh heads had less diversified income-generating activities.

Gender was marginally significant: male-headed households diversified slightly more than female-headed ones. This was not a large effect, and given that female heads in rural Vietnam were often widows managing smaller farms, the result probably reflected life-cycle and household-structure differences rather than gender per se.

Ethnicity had a significant but negative coefficient, contrary to the prior. Kinh-headed households were, all else equal, less diversified than ethnic minority households. The result was not unintuitive on reflection. Ethnic minorities in Central Vietnam tended to live in upland areas where any single activity yields a small return, so multiple activities were a necessity. Kinh households in the coastal lowlands, by contrast, might be able to specialize in one well-developed line of work (rice cultivation, fisheries, factory employment) and earn enough to live on. Diversification, in this reading, was not an unambiguous marker of welfare.

Education did not reach significance. This was consistent with Alogo Loison and Bigneat (2017), who reported no education effect at the regional level in rural Senegal and Kenya. One interpretation was that the variation in educational attainment in the sample was too narrow; nearly all households clustered between four and twelve years of schooling to detect an effect.

Table 9. Results of Tobit Estimates: Determinants of Income Diversification

Variable	Coefficient	Std. Error	p-value
Ethnicity (Kinh)	-0.0497***	0.0177	0.005
Household size	0.0157***	0.0038	0.000
Gender (male)	0.0264*	0.0136	0.053

Variable	Coefficient	Std. Error	p-value
Age	0.0015***	0.0004	0.000
Education	0.0022	0.0021	0.294
Housing area	0.00001	0.0001	0.941
Access to tap water	-0.0313**	0.0133	0.019
Access to electricity	0.1327***	0.0478	0.006
Access to information	0.0379***	0.0141	0.007
Access to financial services	-0.0433***	0.0140	0.002
Non-farm labor	0.0604***	0.0082	0.000
Farm size	1.56e-07	4.03e-07	0.698
Constant	0.0660	0.0578	0.253

Notes: $N = 1,445$. $Prob > \chi^2 = 0.0000$. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's estimation based on VHLSS 2016

Access variables behaved largely as expected. Electricity had the largest coefficient of any access variable (0.133), suggesting that the small share of households without grid connection faced a real constraint on non-farm activity. Access to information also entered positively, in line with Khan et al. (2020), although the magnitude was smaller. Access to tap water and access to financial services both entered negatively, which was at first surprising. The result for tap water was most plausibly a selection effect: households who paid for tap water tended to be the better-off specialists who did not need to diversify. The financial services result was more interesting. Rather than enabling diversification, formal financial access here seemed to support specialization, perhaps because credit facilitated the scaling up of a single profitable enterprise rather than the launching of new ones. The same pattern had been observed in other settings where financial deepening encouraged concentration into the most productive activity.

Non-farm labor, finally, was positive and strongly significant, suggesting that households with a higher amount of non-farm labor had a higher degree of income diversification. The result found in this study agreed with the findings of Danh & Khai (2014). This confirmed the central mechanism: diversification in rural Central Vietnam was fundamentally a labor-allocation story.

4.5. Effect of Income Diversification on Households' Consumption Expenditure in Rural Central Vietnam

Before examining the results, two diagnostic tests were worth noting. For the test of endogeneity, both Durbin and Wu-Hausman tests were highly significant ($p = 0.0002$ and $p = 0.0002$, respectively), meaning that the tests rejected the null hypothesis that SID was exogenous at 1% level of significance. As a result, SID could be treated as the endogenous variable in the model. In addition, the first-stage F-statistics of the instrument was greater than 10 ($F(1, 1432) = 55.9265 > 10$), indicating that the instrument was relevant and valid in explaining the variation in SID. The results of the regression analysis were presented in Table 10.

Table 10. Results of 2SLS Estimates: Effect of Income Diversification on Households' Consumption Expenditure

Variable	Coefficient	Std. Error	p-value
SID	1.0493***	0.3380	0.002
Ethnicity (Kinh)	0.5562***	0.0438	0.000
Household size	-0.1275***	0.0109	0.000
Gender (male)	0.0505	0.0341	0.139
Age	-0.0043***	0.0011	0.000
Education	0.0346***	0.0052	0.000
Housing area	0.00228***	0.00033	0.000
Access to tap water	0.2479***	0.0329	0.000
Access to electricity	-0.0390	0.1260	0.757
Access to information	-0.0623*	0.0363	0.086
Access to financial services	0.2817***	0.0363	0.000
Farm size	3.74e-06***	9.85e-07	0.000
Constant	2.1469***	0.1424	0.000

Notes: $N = 1,445$. $R^2 = 0.2626$. First-stage $F(1, 1432) = 55.9265$. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's estimation based on VHLSS 2016

As can be seen from Table 8, SID as an income diversification index had a statistically significant and positive influence on the household's consumption expenditure per capita. Holding all the other variables constant, 0.1 increase in SID led to 10.49 percent increase in the household's per capital consumption expenditure. This implied that households with a higher degree of income diversification tended to have a higher consumption per capita. The results were in line with the previous findings of Sultana & Islam (2015) and Xu (2017) described in the literature review. Therefore, in rural Central Vietnam, income diversification had a positive effect on household consumption expenditure.

Several control variables reinforced the picture. Ethnicity was strongly positive in the consumption equation: Kinh households consumed more per capita than ethnic minority households, conditional on other observed characteristics. Combined with the finding that Kinh households were less diversified, this suggested that ethnic minorities diversified out of necessity but still consumed less. It could be the case that the relatively weak consumption response among ethnic minority households might partly stem from where these communities tended to live, predominantly in mountainous and hard-to-reach areas where farming for one's own household remained a everyday reality. Since much of what these households ate came from their

own fields rather than from shops or markets, broader income diversification did not always translate into higher recorded consumption expenditure.

Household size had a negative sign, which was expected given that consumption was measured per capita — adding one more member spread the same resources across more people. Education exhibited a strong positive effect, yielding approximately a 3.46% increase in consumption per additional year of schooling. The negative sign of the estimated age coefficient was in line with theory: older heads tended to head households with heavier dependency burdens, and that dragged per capita consumption downward.

Both housing area and farm size were positively and significantly associated with consumption. The likely reason was that these variables were picking up wealth effects on top of whatever they contributed productively. Tap water and financial-services access, by contrast, pushed consumption up by a fair margin, which lent support to the view that infrastructure and financial inclusion shaped household welfare through their own channels, not just by way of diversification.

The coefficient on access to information was small, negative, and only marginally significant. The point estimate was small enough that it should not be over-interpreted, but one possibility was that information access might be tied to remoteness in ways the model did not fully capture. The loudspeaker system tended to reach the more isolated communities, where consumption was held back less by what households knew than by how little market access they had.

4.6. Discussion

Main broader observations emerged from the results. First, the average degree of diversification in rural Central Vietnam ($SID = 0.37$) was moderate, not low. Households did hold multiple income sources, but typically one source contributes the lion's share. The income data showed that wages and salaries were this dominant source for most households, marking an important shift from the older characterization of rural Vietnamese livelihoods as primarily agricultural. The implication was that rural labor markets, more than farm productivity, were the proximate determinant of welfare for the typical household.

Second, the absence of a strong quintile gradient in SID was striking. The poorest and richest quintiles diversified at roughly the same level; what differed is the mix of activities. This was at odds with the global pattern in which wealthier households were more diversified (Babatunde & Qaim, 2009), but it fit the Vietnamese case if one accepted that rural wage opportunities were now broad-based and reached down into the lower quintiles. The earlier picture of poor households trapped in subsistence farming was not supported by these data.

Third, and most importantly, the positive effect of diversification on consumption was robust to instrumentation and substantial in magnitude. The result did not by itself prove that policies promoting diversification would improve welfare, since the underlying mechanisms (skills, networks, market access) might matter at least as much as diversification itself, but it did undermine the view that diversification was purely a distress response. Households that diversified consumed more, on average, than otherwise similar households that did not.

Fourth, the analysis relied on the 2016 round of the VHLSS, and rural Vietnam has since experienced further labor-market restructuring, accelerated digitalization, and the disruptions and adjustments associated with the COVID-19 pandemic. The structural pattern this study documents, however, is not a 2016 anomaly but the continuation of a long-running trend: the share of non-farm employment in rural Vietnamese

households rose steadily from close to 23% in 1993 to around 58% by 2006 (Pham, Tuan, & Le Thanh, 2010). This trajectory predates the present study's data and gives little reason to expect a reversal since. Consistent with this, the World Bank's most recent assessment of poverty and shared prosperity in Vietnam continues to frame expanded off-farm opportunity, through investment in physical, digital, and human capital and improved market access, as the central lever for rural welfare gains, rather than farm productivity growth (World Bank, 2022). This suggests that the wage-dominated income structure identified here has most likely intensified rather than weakened in the years since 2016. Nonetheless, the precise magnitude of the diversification–consumption relationship estimated in Section 4.5 should be interpreted as characteristic of the mid-2010s, and re-estimation with more recent VHLSS rounds, ideally in panel form, remains an important direction for future work, as noted in Section 5.

Finally, it was worth situating the magnitude of the effect against the regional context. About 10.49 percent increase in per capita consumption for a 0.1 increase in SID was large by the standards of policy interventions: most cash transfer programs in developing countries raised consumption by between five and fifteen percent at considerable fiscal cost. If diversification could deliver effects of similar magnitude through endogenous household decisions, the policy question became one of removing the barriers that prevented households from diversifying further. The estimates here pointed to electricity, information, and labor market access as the principal levers, with credit playing a more ambiguous role.

5. Conclusions

This study investigated the determinants of income diversification and its effect on household consumption expenditure among 1,445 rural households in Central Vietnam, using data from the VHLSS 2016. The Simpson Index of Diversity was used to measure diversification. A Tobit model was applied to identify the determinants of diversification, while a 2SLS estimator addressed the endogeneity of diversification in the consumption equation.

The descriptive results showed that wages and salaries were the dominant income source, accounting for 43.68% of total household income, while farm income contributed only 26.37%. The mean SID was 0.370, indicating a moderate level of diversification, with no significant difference across income quintiles. What differed across quintiles was the composition of income rather than its degree of diversification.

On the determinants side, ethnicity, household size, age of the household head, access to electricity, access to information, access to financial services, and the number of household members in non-farm work were the principal explanatory factors. Some coefficients carried unexpected signs: Kinh-headed households were less diversified than ethnic minority households, and access to financial services and access to tap water were both negatively associated with diversification. These results were discussed in Section 4.4.

On the consumption side, income diversification had a positive and statistically significant effect on household per capita consumption expenditure. A 0.1 increase in SID was associated with a 10.49 percent increase in per capita consumption, after controlling for endogeneity. This finding was consistent with prior evidence from Bangladesh (Sultana et al., 2015), Zimbabwe (Ersado, 2005), and China (Xu, 2017).

These findings carry several policy implications. Public investment in rural electrification and information access, both of which support diversification directly, appears to deliver more than their narrow effect on the targeted service. Financial inclusion programs may need a more careful design: in this sample, formal financial access supports specialization rather than the broadening of activities, and a policy that

simply expands credit may not by itself promote the kind of diversification associated with higher welfare. Programs to improve rural labor market access—especially for ethnic minority households, who diversify but still consume less—would address an equity dimension that the diversification literature has tended to underplay.

Future research could extend this analysis using panel data from successive VHLSS rounds to examine the dynamics of diversification over time, a broader instrument set to strengthen identification, and qualitative work to clarify which specific types of non-farm activity contribute most to household welfare in this region.

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