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The impact of higher education on workers' income: The moderating role of employment type

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Abstract: This paper investigates the moderating role of employment type in the effect of university education on individuals' income in Vietnam. The study demonstrates that both education level and employment type significantly affect workers' income. Workers with a university degree earn approximately 31% more than those with only a high school diploma, while self-employed workers earn about 20% less than wage earners. When combining employment type and education level, wage earners with a university degree earn around 16.7% more than self-employed workers with the same degree. Similarly, wage earners with a university degree in the private sector have, on average, 4.8% higher income than those in the public sector with the same level of education. Furthermore, marital status, gender, and geographic location also influence income, with married individuals, men, and urban workers earning higher incomes. The study recommends policies that encourage education, support private sector development, reduce regional income inequality, and promote gender equality.

Keywords: University education, employment type, employment sector, incomes, Vietnam.

1. Introduction

Education plays a crucial role in an individual's income potential and overall earnings. Extensive empirical evidence has confirmed that higher levels of education are closely associated with higher wages or earnings for workers (Becker, 1964; Doan et al., 2018; Vu et al., 2024). For example, recent statistical data show that individuals with a bachelor's degree tend to earn more than those with only a high school diploma in both the United States (U.S. Bureau of Labor Statistics, 2023) and Vietnam (General Statistics Office, 2021). This income disparity can be explained by the specialized skills and knowledge acquired through higher education, which enhance labor productivity and improve workers' competitiveness in the job market (Becker, 1964; Doan et al., 2018). Beyond its impact on personal income, education also has a significant influence on economic growth and social progress in most countries (Benos & Zotou, 2014; Le & Tran, 2024). Therefore, education is not only a key

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factor in increasing individual earnings but also plays an essential role in reducing income inequality and promoting economic development.

There is extensive econometric evidence on the positive impact of education on workers' earnings in several countries (Psacharopoulos & Patrinos, 2018) and Vietnam (Doan et al., 2018). Higher education significantly enhances workers' wages through several key mechanisms. Firstly, it increases human capital, equipping individuals with advanced skills and knowledge that boost productivity and enable them to undertake complex tasks. This aligns with human capital theory (Becker, 1694), which posits that investment in education leads to higher earnings due to increased productivity. Findings consistently confirm that additional years of schooling or higher educational attainment (e.g., a university degree compared to completing high school) have a positive effect on workers' income or wages (Doan et al., 2018; Tran et al., 2020; Tran & Vu, 2020). Secondly, according to job market signaling theory by Spence (1973), higher education serves as a signal to employers, indicating a candidate's competence and dedication. Employers often view educational credentials as proxies for a worker's potential, leading to better job offers and higher wages for those with advanced degrees. Research in Vietnam has shown that university graduates earn a wage premium compared to those without higher education (Doan et al., 2018). Thirdly, higher education opens doors to better employment opportunities in high-paying sectors. Empirical studies have found that individuals with better education are more likely to secure positions in these lucrative industries, thereby increasing their earnings (Verhofstadt et al., 2007).

Beyond education, employment is another crucial factor influencing workers' earnings. Non-agricultural jobs tend to offer higher incomes than agricultural jobs in China (Shi et al., 2010), Vietnam (Tran et al., 2020), and many other developing countries (Tran, 2014). This is primarily because non-agricultural sectors often require more specialized skills, have higher capital investments, and are associated with greater productivity, all of which contribute to higher wages. Jobs that align with workers' educational qualifications generally provide higher wages than jobs that do not match their education (Vu et al., 2024). When workers are employed in roles that match their field of study or skill level, they tend to be more productive, leading to higher wages. Notably, university graduates in Vietnam tend to earn lower salaries in the public sector compared to the private sector (Tran & Vu, 2020). This difference can be attributed to the public sector's more rigid pay scales and budget constraints, whereas the private sector offers greater flexibility in compensation based on market forces and individual performance. As a result, sector choice can significantly impact a worker's earning potential, even with the same level of education.

Since both education and employment affect income, there may be an interaction between these two factors in determining workers' earnings. In other words, employment could moderate the impact of education on income. Therefore, this study is the first to analyze the moderating role of employment in the income effect of higher education in Vietnam. Understanding the moderating influence of employment on the income impact of higher education benefits both individual workers and policymakers, ultimately helping people achieve better earnings through employment choices in Vietnam's labor market.

The article is structured as follows. Section 2 discusses the data and research methodology. Section 3 presents and analyzes the results from the econometric model. Section 4 provides conclusions and policy implications based on the study's findings.

2. Data and analytical model

2.1. Data

The study utilizes secondary data from the Labour Force Survey (LFS) for the period 2018 to 2022. This dataset is collected annually by the General Statistics Office with the objective to gather detailed information on individuals participating in Vietnam's labor market. The dataset includes comprehensive details on demographics, education, occupation, income, employment status, and other relevant information. The selected sample ensures representativeness at the national, regional, and provincial levels.

This study focuses on individuals whose highest educational attainment is either a

university degree or a high school diploma and who are engaged in wage employment or self-employment, working in the public or private sectors. After selecting the relevant variables and removing observations with missing values, the final sample consists of 584,764 individuals for the period 2018-2022.

2.2. Analytical model

Since the dependent variable represents income from various types of employment, including wage employment in different organizations and self-employment, this study employs the Ordinary Least Squares (OLS) regression model to analyze the factors influencing income. The extended Mincer model is applied, incorporating independent variables to assess the impact of education on workers' earnings (Björklund & Kjellström, 2002; Doan et al., 2018; Patrinos, 2024).

The selection of independent variables is guided by previous studies conducted in Vietnam (Doan et al., 2018) and other countries (Patrinos, 2024; Purnastuti et al., 2013). Specifically, in the following model (1), the study first estimates the determinants of income, where Log_Y represents the natural logarithm of workers' monthly income. The explanatory variables include age, marital status, gender, household size, dependency ratio, and university education (with high school education as the reference group). Additionally, employment type is accounted for, distinguishing between self-employment (with wage employment as the reference group), public sector employment (with private sector employment as the reference group), urban residence (with rural residence as the reference group), and five regional dummy variables (with the Northern mountainous region as the reference group).

$$Log_Y = \beta_{o+}\beta_1 age_{it} + \beta_2 marital_{it} + \beta_3 gender_{it} + \beta_4 hhsize_{it} + \beta_5 dependency_{it} + \beta_6 Edu_{it} + \beta_7 self_{it} + \beta_8 Public_{it} + \beta_9 urban_{it} + \beta_{10} region_{it} + \beta_{11} year_t + u_{it} \quad (1)$$

To examine the moderating role of employment in the income effect of a university degree (compared to a high school diploma), the study specifies an interaction between the two dummy variables: university degree and self-employment (with wage employment as the reference group) in model (2).

$$Log_Y = \beta_{o+}\beta_1 age_{it} + \beta_2 marital_{it} + \beta_3 gender_{it} + \beta_4 hhsize_{it} + \beta_5 dependency_{it} + + \beta_6 self_{it} \times Edu_{it} + \beta_7 Public_{it} + \beta_8 urban_{it} + \beta_9 region_{it} + \beta_{10} year_t + u_{it} \quad (2)$$

Similarly, the study introduces an interaction between the university degree variable and public sector employment (with private sector employment as the reference group) in model (3).

$$Log_Y = \beta_{o+}\beta_1 age_{it} + \beta_2 marital_{it} + \beta_3 gender_{it} + \beta_4 hhsize_{it} + \beta_5 dependency_{it} + + \beta_6 public_{it} \times Edu_{it} + \beta_7 self_{it} + \beta_8 urban_{it} + \beta_9 region_{it} + \beta_{10} year_t + u_{it} \quad (3)$$

3. Results and discussion

3.1. Characteristics of workers

Table 1 presents the characteristics of the research sample, which includes workers whose highest educational attainment is either a university degree or a high school diploma, categorized by gender. The average age of the entire group is 38.5 years, with men being slightly older than women on average.

Approximately 17% of workers are unmarried, with a higher proportion among men (19%) than women (16%). The marriage rate is also slightly higher for men (78%) than for women (76%). Meanwhile, the proportions of widowed and divorced/separated individuals are higher among women than men.

Regarding employment status, around 30% of workers are self-employed, while 70% are wage earners. This proportion is slightly higher for men (31%) than for women (29%). In terms of education levels, approximately 36% of the sample hold a university degree, while 64% have completed high school. However, this distribution varies significantly by gender: 40% of women have a university degree, compared to only 32% of men.

Additionally, about 57% of workers reside in urban areas, with a higher proportion among women (59%) than men (55%). Finally, the average monthly income of male workers is also higher than that of female workers.

Table 2 describes the characteristics of workers by education level and employment status for the entire sample and each group of males and females. In general, the proportion of self-employed workers with a university degree is quite low compared to those employed in wage jobs. This result is similar for both male and

female groups. The female group has a significantly higher proportion of wage workers with a university degree compared to the male group, while the proportion of self-employed workers with a university or high school diploma is quite similar between the two groups. Finally, the proportion of wage workers with a high school diploma is higher among males than females. Around 18% of the total sample is employed in the public sector with a university degree. However, this proportion is much higher for females than males (22% compared to 14%). The proportion of workers in the private sector with a university degree is similar between males and females (both 18%). The proportion of workers in the private sector with a high school diploma is significantly higher among males than females.

Table 1: Characteristics of workers by gender (2018-2022)

Gender	Female		Male		All	
Characteristics	Mean	Sd	Mean	Sd	Mean	Sd
Age	37.40	11.32	39.41	11.76	38.49	11.60
Single	0.16	0.36	0.19	0.39	0.17	0.38
Married	0.76	0.43	0.78	0.41	0.77	0.42
Widowed	0.05	0.21	0.01	0.08	0.02	0.15
Separated/divorced	0.04	0.19	0.02	0.14	0.03	0.16
Self-employed	0.29	0.45	0.31	0.46	0.30	0.46
University degree	0.40	0.49	0.32	0.47	0.36	0.48
Household size	4.13	1.62	4.13	1.61	4.13	1.62
Dependency (%)	37.01	24.45	35.26	24.37	36.07	24.42
Urban	0.59	0.49	0.55	0.50	0.57	0.50
Monthly income (1000 VND)	6293.69	3809.28	7450.74	5509.82	6917.97	4836.69
Observations	269257		315506		584763	

Source: Author's own calculation from the LFS 2018-2020.

Table 2: Characteristics of workers by education and employment status by gender (2018-2022)

Gender	Female		Male		All	
	Sd	Mean	Sd	Sd	Mean	Sd
Self-employed with a university degree	0.02	0.15	0.03	0.16	0.03	0.16
Self-employed with a high school diploma	0.27	0.44	0.28	0.45	0.27	0.45
Wage employment with a university degree	0.38	0.49	0.29	0.45	0.33	0.47
Wage employment with a high school diploma	0.33	0.47	0.40	0.49	0.37	0.48
Public sector employment with a university degree	0.22	0.41	0.14	0.35	0.18	0.38
Public sector employment with a high school diploma	0.06	0.23	0.05	0.22	0.05	0.22
Private sector employment with a university degree	0.18	0.39	0.18	0.38	0.18	0.39
Private sector employment with a high school diploma	0.54	0.50	0.63	0.48	0.59	0.49
Observation	269257		315506		584763	

Source: Author's own calculation from the LFS 2018-2020.

3.2. Results and discussion

Table 3 presents the results of the regression analysis on the impact of individual and regional factors on the income of workers. Since the dependent variable has been transformed into its natural logarithm, the effects of the independent variables on income will be interpreted as approximate percentages (Wooldridge, 2013).

The two key variables of interest in this study are education level, measured by the dummy variable for having a university degree compared to having a high school diploma, and employment status, measured by the dummy variable for self-employment compared to wage employment. The regression coefficient for the university education variable is 0.3107, which is highly statistically significant. This implies that, holding other individual and regional characteristics constant, the average income of workers with a university degree is approximately 31% higher than those with only a high school diploma. The regression coefficient for the self-employment variable is -0.2024, which is also highly statistically significant. This result suggests that, holding individual and context characteristics constant, the average income of self-employed workers is approximately 20% lower than that of wage workers.

Table 3: Factors affecting income

Explanatory variables	Coefficient	Standard error
Married	0.2158**	(0.005)
Widowed	-0.0914**	(0.015)
Separated/Divorced	0.2265**	(0.009)
University degree	0.3107**	(0.005)
Self-employed	-0.2024**	(0.008)
Gender	0.2188**	(0.004)
Age	-0.0070**	(0.000)
Household size	0.0081**	(0.001)
Dependency ratio	-0.0017**	(0.000)
Year 2019	0.1404**	(0.007)
Year 2020	0.1377**	(0.008)
Year 2021	0.1954**	(0.008)
Year 2022	0.3221**	(0.008)
Urban	0.2108**	(0.007)
Red River Delta Region	0.3443**	(0.014)
Central Coastal Region	0.0688**	(0.014)
Central Highlands	0.1213**	(0.022)
Southeast Region	0.4619**	(0.015)
Mekong Delta Region	0.1621**	(0.014)
Intercept	8.1439**	(0.017)
Observations	584,764	
R^2	0.300	
F-test	0.000	

Note: Standard errors in parentheses. **p < 0.01, *p < 0.05, +p < 0.1.

Source: Author's calculation from the LFS 2018-2020.

Table 4 presents the results of the analysis of the moderating role of employment type on the income effect of university education. As mentioned in model 2, this study uses the interaction variable between the two dummy variables for university education and employment type. Therefore, there are four groups of workers: (i) self-employed with a university degree (the base group); (ii) self-employed with a high school diploma; (iii) wage workers with a university degree; and (iv) wage workers with a high school diploma. The regression coefficients for the interaction variables are all highly statistically significant, confirming the income differences between these variables in the study. Specifically, the regression coefficient for self-employed workers with a high school diploma is -0.3477, indicating that, with similar individual characteristics and circumstances, the average income of self-employed workers with a high school diploma is approximately 35% lower than that of self-employed workers with a university degree. The results also show that the average income of wage workers with a high school diploma is approximately 14% lower than that of self-employed workers with a university degree. However, the group of wage workers with a university degree has an average income that is approximately 16.7% higher than that of self-employed workers with a university degree.

Table 4: The impact of higher education on income: The moderating role of employment type

Explanatory variables	Coefficient	Standard error
Married	0.2160**	(0.005)
Widowed	-0.0908**	(0.015)
Separated/Divorced	0.2263**	(0.009)
Self-employed with a high school diploma	-0.3477**	(0.014)
Wage employment with a university degree	0.1666**	(0.013)
Wage employment with a high school diploma	-0.1394**	(0.014)
Gender	0.2182**	(0.004)
Age	-0.0069**	(0.000)
Household size	0.0082**	(0.001)
Dependency ratio	-0.0017**	(0.000)
Year 2019	0.1402**	(0.007)
Year 2020	0.1377**	(0.008)
Year 2021	0.1952**	(0.008)
Year 2022	0.3217**	(0.008)
Urban	0.2107**	(0.007)
Red River Delta Region	0.3436**	(0.014)
Central Coastal Region	0.0683**	(0.014)
Central Highlands	0.1213**	(0.022)
Southeast Region	0.4611**	(0.015)
Mekong Delta Region	0.1616**	(0.014)
Constant	8.2847**	(0.021)
Observations	584,764	
R^2	0.303	
F-test	0.000	

Note: Standard errors in parentheses. **p < 0.01, *p < 0.05, +p < 0.1.

Source: Author's calculation from the LFS 2018-2020.

Table 5 presents the estimated results of the moderating effect of the employment sector variable on the income effect of higher education. As described in Model 3, the study uses an interaction variable between two dummy variables: university degree and employment sector. Thus, there will be four groups of workers to compare. Specifically: (i) the base group consists of those working in the public sector with a university degree; (ii) the group working in the public sector with a high school diploma; (iii) the group working in the private sector with a university degree; (iv) the group working in the private sector with a high school diploma. The regression coefficients for these group variables are all statistically significant with a p-value less than 1%, confirming that there are differences in the average income of the groups. The results show that the group working in the public sector with a high school diploma has an average income approximately 39% lower than the base group (those working in the public sector with a university degree). The group working in the private sector with a university degree has an average income of approximately 4.8% higher than the group working in the public sector with a university degree. The group working in the private sector with a high school diploma has an average income approximately 27% lower than the group working in the public sector with a university degree.

The study also identifies several other factors affecting workers' income. For example, marital status has a significant impact on income level. Table 3 shows that, with similar characteristics, the group of married workers has an average income about 21.6% higher than the unmarried group. The group of male workers has an average income about 22% higher than the female group. This result is somewhat similar to previous studies in Vietnam, which show that the average income of male workers is always higher than that of female workers, and married workers tend to have higher average incomes than other groups (Trinh et al., 2022). The study also shows that urban workers have higher average incomes than rural workers. Workers in the Northern mountainous regions have lower average incomes than all other groups in different geo graphical regions of Vietnam. This result is also found in the study by Trinh et al. (2022).

Table 5: The impact of higher education on income: The moderating role of job sector

Explanatory variables	Coefficient	Standard error
Married	0.2202**	(0.005)
Widowed	-0.0909**	(0.015)
Separated/Divorced	0.2289**	(0.009)
Public sector employment with a university degree	-0.3876**	(0.009)
Public sector employment with a high school diploma	0.0482**	(0.006)
Private sector employment with a high school diploma	-0.2710**	(0.006)
Self-employed	-0.2196**	(0.008)
Gender	0.2155**	(0.004)
Age	-0.0067**	(0.000)
Household size	0.0078**	(0.001)
Dependency ratio	-0.0017**	(0.000)
Year 2019	0.1368**	(0.007)
Year 2020	0.1320**	(0.008)
Year 2021	0.1894**	(0.008)
Year 2022	0.3273**	(0.008)
Urban	0.2086**	(0.007)
Red River Delta Region	0.3390**	(0.014)
Central Coastal Region	0.0658**	(0.014)
Central Highlands	0.1211**	(0.022)
Southeast Region	0.4556**	(0.015)
Mekong Delta Region	0.1611**	(0.014)
Constant	8.4273**	(0.017)
Observations	584,763	
R^2	0.304	
F-test	0.000	
Note: Standard errors in parentheses. **p < 0.01, *p < 0.05, +p < 0.1.		

Source: Author's own calculation from the LFS 2018-2020.

4. Conclusion and policy implications

This is the first study analyzing the moderating role of employment in the income effect of higher education on labor in Vietnam. The research results indicate that the level of higher education and the type of employment significantly affect workers' income. Specifically, workers with a university degree have an average income about 31% higher than those with a high school diploma, while self-employed workers have income about 20% lower than salaried workers with the same level of education. Furthermore, the combination of employment type and education level shows that self-employed workers with a university degree earn more than self-employed workers with only a high school diploma, while salaried workers with a university degree earn about 16.7% more than self-employed workers with a university degree.

The results from the analysis of the employment sector's impact show that workers in the public sector with a university degree earn more than those in the private sector, but self-employed workers with a university degree earn about 4.8% more than public sector workers with only a high school diploma. Additionally, the study highlights other factors such as marital status, gender, and geographic location that significantly affect income. Married workers and male workers have higher incomes than unmarried and female workers, while workers in urban areas and other regions have higher incomes than those in the Northern mountainous regions.

The study provides some policy implications as follows. First, the government should encourage investment in higher education by creating conditions for workers to access learning opportunities and improve their professional skills, as higher education positively impacts workers' income. Additionally, policies that promote the development of the private sector by creating a favorable environment for employment in the private sector are essential, as workers in this sector may earn more if they have the same level of education as workers in the public sector. Policies aimed at regional equality should focus

on reducing income disparities between regions, particularly between urban and rural areas, as well as between the Northern mountainous regions and other areas. Finally, to create development opportunities for self-employed workers, the government should implement policies to support self-employed workers in increasing their income, such as facilitating entrepreneurship, improving the business environment, and reducing legal barriers.

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