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Research Article

FACTORS INFLUENCING WORKING SECTOR CHOICE: AN APPROACH BASED ON MNL MODEL WITH ENDOGENEITY CONTROL

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ABSTRACT

This study investigates the factors influencing workers' decisions regarding the choice of employment sector in Vietnam, against the backdrop of a significant labor force transition from the state sector to the private and foreign direct investment (FDI) sectors. In addition to identifying these determinants, the research aims to examine and address the issue of endogeneity that arises in the relationship between sector choice and workers' education level, thereby ensuring the accuracy and reliability of the estimation results. Using data from the 2020 Vietnam Household Living Standards Survey (VHLSS), the study applies the Multinomial Logit (MNL) model and compares three estimation approaches: the conventional MNL, the Control Function approach, and the Two-Stage (2S) method. The results reveal that ``education level'' is an endogenous variable, and among the tested approaches, the Two-Stage (2S) method is the most effective in addressing this endogeneity issue. After properly controlling for endogeneity, the findings show that factors such as gender, age, marital status, education level, income, and working hours significantly influence the decision to choose a specific employment sector, with the magnitude and direction of these effects varying across different sectors. From an academic perspective, this study underscores the importance of controlling for endogeneity when modeling individual choice behavior in labor economics. Practically, the empirical results provide valuable policy implications for optimizing human resource allocation and workforce planning. By tailoring policies to the specific characteristics and requirements of each sector, policymakers can enhance labor market efficiency and better respond to ongoing structural changes in Vietnam's economy. These findings are particularly relevant in the current context of rapid economic transformation and labor market restructuring, offering insights that can support sustainable and inclusive growth.

Key words: employment sector choice, labor, endogeneity, MNL model, Two-Stage (2S) method, Control Function (CF) method, labor market

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INTRODUCTION

Over the past decade, Vietnam's labor market has witnessed a profound transformation in the structure of its workforce across economic sectors. In 2008, the state sector employed more than 62% of the workforce; however, Figure 1 had dropped dramatically to around 30% by 2020. In contrast, the private and foreign direct investment (FDI) sectors have experienced consistent growth in labor participation. These shifts reflect a broader change in workers' career orientations and employment expectations in a rapidly evolving socio-economic landscape.

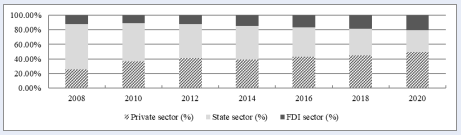

Figure 1: Trends in choosing working sector, period 2010 - 2023 (*Source: Authors calculated from VHLSS 2008 - 2020*)

This transition comes at a critical time as Vietnam sets its sights on becoming a high-income country by 2045. In this context, **the private sector** has emerged as a vital growth engine. It offers a dynamic work environment and competitive salaries, yet often lacks the long-term stability associated with public employment. Empirical evidence shows that over 80% of the national workforce is now employed in the private sector, underscoring its critical role in shaping labor market outcomes and social welfare[1]. However, most private enterprises remain small or medium in size, resulting in limited capacity for workplace investment, professional training, and long-term career development[1]. Furthermore, the sector continues to face a shortage of skilled labor, which has been exacerbated by ongoing digital transformation, innova-

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tion demands, and global competitiveness pressures [1]. On the employee side, persistent issues such as job insecurity, labor rights violations (related to wages, insurance, and working hours), also diminish worker satisfaction and productivity [2]. In contrast, **the state sector** still appeals to workers due to the promise of job stability. However, it faces growing calls for reform, particularly regarding organizational structure and operational efficiency. Resolution 68/NQ-CP explicitly acknowledges significant limitations in this sector, especially the inadequate quality of human resources and innovation capacity [3]. Moreover, with the government's ongoing implementation of Plan 141/KH-BCĐTKNQ18 – focused on streamlining the public apparatus and improving effectiveness – understanding how to attract and retain talent in the state sector becomes essential to ensuring the success of this restructuring process [4]. **The FDI sector,** while offering higher incomes, primarily attracts low-skilled workers and struggles to appeal to highly qualified professionals. Sustainable growth and enhanced global competitiveness require a shift toward human capital-driven strategies, focusing on skill development and value-added capabilities rather than cost-based competition alone [5,6]. Although Vietnam's low labor cost remains an investment advantage, continued reliance on this factor risks trapping the country in the "middle-income" dilemma [7].

In this context, the study focuses on analyzing the factors affecting workers' decisions to choose a working sector, and at the same time solving the endogeneity problem of educational level using the 2S method to ensure the stability of the estimation results. The research results show that personal factors, qualifications, abilities and working conditions all affect workers' choices, but the level of influence varies between areas. Specifically, the private sector attracts female workers and married people; the state sector attracts older workers with high education levels; the FDI sector attracts female workers and people with high incomes. From an academic perspective, the study deepens the importance of controlling for endogeneity in econometric models studying choice behavior. The empirical findings from the study also provide valuable policy implications, helping to allocate and develop human resources optimally, in accordance with the characteristics and specific needs of each working sector, thereby improving labor efficiency in the current context.

BACKGROUND THEORY, LITERATURE REVIEW AND PROPOSED MODEL

Background theory

Rational choice theory

Rational choice theory is an analytical framework in economics and sociology that explains individuals' decisions based on the assumption that they act "rationally" to maximize their own utility [8]. In this theory, "rational" does not necessarily mean being perfectly informed or not making mistakes, but rather making choices that are consistent with the decision maker's preferences [8]. Decisions are made based on weighing costs and benefits, aiming to achieve the best outcome (highest utility) possible, given the constraints they face (e.g. budget, time) [8].

Random utility theory

Random utility theory, developed by McFadden [9], explains how individuals make decisions under conditions of uncertainty. The core assumption is that individuals make choices based on the utility they receive from each option, which consists of an observed component based on observable characteristics of the choice and a random component that helps researchers explain the discrepancy between theory and observed actual choice behavior [10]. Specifically, the random component can arise from two main sources: (1) randomness in respondents' preferences (each individual may have unique preferences that are not completely consistent or elusive) and (2) researcher information gaps (because of incomplete information, the model will miss some important factors that influence choice) [10].

Literature review

(1) Studies on the influence of personal factors

Previous studies have analyzed the role of personal factors in the decision to choose a working sector, the results show that demographic characteristics have an important influence on these decisions. Blank [11] used probit models to analyze the choice between job levels in the public and private sectors, thereby finding that people of color and women tend to prioritize jobs in the government sector. Kolvereid [12] argued that demographic characteristics do not directly affect but only indirectly affect the intention to choose a work status through their influence on attitudes, subjective norms and perceived behavioral control. In Vietnam, Danh [13] used VHLSS data in 2012 to assess the relationship between educational level and the decision to choose a working sector among the three sectors of

the state, private and FDI. The results show that factors such as age, gender and marital status all have significant effects, but the magnitude of the effects is not uniform across sectors.

H1: Female workers tend to choose the state and FDI sectors over the private sector.

H2: Older workers tend to choose the state sector over the private sector and FDI.

H3: Married workers tend to choose the state sector over the private sector and FDI.

(2) Studies on the influence of qualifications and abilities

Studies on the impact of qualifications and competence on the decision to choose a working area show that education, skills and experience are also important factors. Blank[11] shows that workers with higher education and longer working experience tend to choose the public sector more, even though the private sector is often more attractive in terms of salary. Rizzica[14] adds that highly educated people often choose the public sector not for financial reasons but for "non-financial" factors such as stability or professional prestige. In the context of globalization, foreign investors also favor localities with a high-quality workforce, reflecting the central role of qualifications in attracting FDI[15]. In Vietnam, Huy[16] points out that age, skills and education are important factors in the trend of job switching. Huy and Dung[17] also see that students choose their workplace based on career development prospects, learning, and income. Nyaga[18] used the MNL model to show that education not only affects the choice of working sector but also affects the income level, people with higher education often working in the formal sector and having higher income. Similarly, Danh[13], using VHLSS data combined with the MNL model, found that education level affects each employment sector differently, An and Phuong[19] also affirmed that education helps young people access the formal sector, while vocational training is especially necessary in difficult economic conditions.

H4: The higher the education level, the greater the likelihood of choosing the state and FDI sectors.

(3) Studies on the influence of working conditions

Working conditions, especially wages, benefits and working environment, have also been identified as significant factors influencing workers' decisions on their choice of working sector. Blank[11] pointed out that the difference in wages between the public and private sectors plays a role in workers' career orientation. Research by Lokshin and Jovanovic[20] in Yugoslavia, using an extended regression model approach, warned that the wage gap between the public and private sectors could widen, making it difficult for the public sector to attract quality workers. Rizzica[14] also argues that although the public sector is limited in terms of salary and promotion opportunities, it stands out for its stability, work-life balance, and job content that is linked to social values. From a global perspective, Kang and Lee[21] emphasize the importance of human resources costs in the strategies of multinational organizations, while according to Javorcik[22], workers in developing countries are attracted to the FDI sector due to expectations of high salaries and better training opportunities. In Vietnam, Thao and Long[23] explore the concept of "public service motivation" (PSM), showing that community commitment and sacrifice are two key factors that motivate students to choose the public sector, although barriers such as low salaries and bureaucracy reduce the attractiveness. Similarly, Hien[24]'s study with students in Hanoi shows that expected income, career opportunities, and preferential policies are the main factors that drive the decision to work long-term in the city. In addition, Danh[13] also showed that factors such as overtime and working hours have different levels of influence on the choice of working area.

H5: Wage has a positive influence on the choice of private sector and FDI, and a negative influence on the state sector.

H6: Working hours have a negative influence on the ability to choose the state sector, and a positive influence on the private sector and FDI.

(4) Studies on the effects of endogeneity

The endogeneity problem in econometric models has been of interest since early times, especially in the analysis of occupational choice behavior and individual income, with the foundation laid by Heckman[25] through the construction of simultaneous equation models that incorporate both discrete and continuous endogenous variables. McFadden[26] also made an important contribution by applying logit and probit models to occupational choice research, laying the foundation for Hausman and McFadden[27] to develop the Hausman test to assess the assumption of "Independence of Irrelevant Alternatives" (IIA). Following these approaches, Dustmann and van Soest[28] studied the wage gap between male workers in the public and private sectors in Germany through an extended standard switching regression model, allowing for the

consideration of the endogeneity of variables such as education, experience, and working time. Dustmann and van Soest[28] argue that failure to control for endogeneity can significantly bias the estimates of the impact of education, which is not an exogenous variable in the occupational choice equation. At the same time, their results show that the income gap between two regions is very sensitive to model identification assumptions. Similarly, Card[29] also uses an instrumental variable approach to control for endogeneity when studying the relationship between education and income, emphasizing that endogeneity needs to be treated carefully to ensure the reliability of the results in studies of labor behavior.

Proposed model

The model for analyzing the factors affecting the decision of employees to choose the working sector is presented as follows, in which the private sector is selected as the base group.

For the state sector : $\text{In}\frac{y=1i}{y=0} = \beta_{10} + \beta_{11} \times \text{female} + \beta_{12} \times \text{age} + \beta_{13} \times \text{married} + \beta_{14} \times \text{education} + \beta_{15} \times \text{wage} + \beta_{16} \times \text{working}_t\text{ime}$

For the FDI sector: $\text{In}\frac{y=2i}{y=0} = \beta_{20} + \beta_{21} \times \text{female} + \beta_{22} \times \text{age} + \beta_{23} \times \text{married} + \beta_{24} \times \text{education} + \beta_{24} \times \text{wage} + \beta_{26} \times \text{working}_t\text{ime}$

The variables are explained in Table 1 below.

METHODOLOGY AND DATA

Methodology

The study uses a quantitative method with the MNL regression model to analyze the factors affecting the decision to choose a working area of Vietnamese workers. To control the endogeneity problem, the study applies two correction methods, CF and 2S. Control Function (CF) method solves the endogeneity problem by using an ordered logit model to predict the value of the endogenous variable and adding the residual to the MNL model. Two-Stages (2S) method determines the relationship between the endogenous variable and the instrumental variable, then replaces the endogenous variable in the MNL model with the predicted value. Finally, the most effective method is selected based on the accuracy and consistency of the estimates[30–32].

Data

Data used are from the 2020 "Vietnam Household Living Standards Survey" (VHLSS). After processing and removing missing values using Stata 17 software, the remaining dataset has 21.451 observations.

IDENTIFYING AND CONTROLLING ENDOGENEITY PROBLEM

Identification result

The "education" variable in the MNL model may encounter an endogeneity problem for three main reasons. First, simultaneity appears in the research model when education level not only affects the decision to choose the employment sector but is also affected by this decision, for example in the state sector, where workers can receive better treatment when they improve their education level[23]. Second, the problem of self-selection bias appears when workers with a high education level often actively choose to work in places with high salary policies, good benefits and favorable working environment, which makes the research sample not random[24]. Finally, the lack of explanatory variables is also another important reason, when factors such as individual intrinsic capacity, education quality... affect education level and the decision to choose the employment sector, but are not included in the model, the results will be biased and inconsistent[25]. Before testing the endogeneity of the variable "education", the most important thing is to select and test the validity of the instrumental variables. ecause the variable "household_income" has a large deviation, authors will take the logarithmic value to smooth the research data and it will be denoted by the team as "ln_ household_income" (the same as variable "wage", "ln_wage"). The authors test the validity by regressing the endogenous variable "education" on the instrumental variables, the results are presented in Table 2.

After checking whether the instrumental variable is strongly correlated with "education" by regressing the endogenous variable on the instrumental variables, we find that most of the instrumental variables are statistically significant, except for the variable "Kinh". Therefore, we accept these instrumental variables as appropriate, except for the variable "Kinh". To identify the endogeneity problem of the variable "education", we regress the endogenous variables corresponding to each outcome of the variable "education". Then, we perform MNL regression with the independent variables, the residual variables and test the statistical significance of the residuals (Table 3). If the coefficients of the residual variables are statistically significant, this proves that the variable "education" is endogenous.

With p-value < 0.01, we reject the null hypothesis that the residuals are 0. In other words, the "education" variable is endogenous in the model. Including the residuals in the model improves the explana-

Table 1: Description of research variables (*Source: Authors synthesis*)

No.	Variable name	Variable code	Variable description
1	Working sector	type_of _enterprise	Categorical variable, taking one of the following values: 0 = Private sector; 1 = State sector; 2 = FDI sector
2	Education level	education	Categorical variable, taking one of the following values: 0 = No degree; 1 = Primary; 2 = Lower secondary; 3 = Upper secondary; 4 = College; 5: University ; 6 = Postgraduate
3	Gender	female	Binary variable, taking one of the following values: 0 = Male; 1 = Female
4	Age	age	Continuous variable indicating the age of the worker
5	Marital status	married	Binary variable, taking one of the following values: 0 = Single; 1 = Married
6	Wage	ln_wage	Continuous variable indicating the income of the worker (Unit: thousand VND)
7	Working time	working _time	Continuous variable indicating the number of hours worked by the worker (Unit: hours)
8	Household income	ln_household _income	Continuous variable representing household income (Unit: thousand VND)
9	Total household members	household _total	Continuous variable representing total number of household members (Unit: person)
10	Living area	rural	Binary variable, taking one of the following values: 0 = Urban area; 1 = Rural area
11	Ethnicity	Kinh	Binary variable, taking one of the following values: 0 = Non-Kinh ethnicity; 1 = Kinh ethnicity

Note: The analysis assumes individual-level factors are the main determinants of job choice. The living area, while important, is assumed to be a contextual factor beyond the study's scope.

Table 2: Result stest the validity of instrumental variables (*Source: Authors analyzed from Stata 17*)

Variable	Coefficient	Standard Error	z	P>|z|
household_tt	0.0148	0,009	1.69	0.091
ln_household_income	4.09×10^{-06}	1.37×10^{-07}	29.78	0.000
Kinh	0.012	0.044	0,26	0.794
rural	-0.726	0.026	-27.62	0.000

Table 3: Results of statistical significance testing of residual variables (*Source: Authors analyzed from Stata 17*)

chi2(12)	246.96
Prob > chi2	0.000

tory power, showing that the error from the education equation is correlated with the error in the work area choice equation. This is a violation of the exogenous assumption, so education cannot be considered a purely exogenous explanatory variable.

CONTROLLING RESULT

With p-value < 0.01, we reject the null hypothesis that the residuals are 0. In other words, the "educa-

tion" variable is endogenous in the model. Including the residuals in the model improves the explanatory power, showing that the error from the education equation is correlated with the error in the work area choice equation. This is a violation of the exogenous assumption, so education cannot be considered a purely exogenous explanatory variable.

Table 4 compares the marginal effects among the three methods MNL, CF and 2S, showing the heterogeneity in the signs of the variables, especially with the variable "education", with no consistency among the methods. However, the 2S method gives consistent results, indicating that this is the appropriate method. Table 5 shows that the mean values among the methods are quite similar, but the standard deviation of the 2S method is the lowest, indicating high stability. The bias of the 2S method is also the smallest, indicating high accuracy in prediction. Overall, the 2S method is the optimal choice because it is effective in controlling the endogeneity problem, optimizing the marginal effects coefficient value, providing high stability and minimizing bias best. This result is also consistent with the study of de Grange et al. [33].

RESULTS OF ANALYSIS OF FACTORS AFFECTING WORKERS' DECISION TO CHOOSE WORKING SECTOR AND DISCUSSION

Results of analysis of factors affecting workers' decision to choose working sector

Based on Table 6, the regression results using the 2S method give the following equations for the probability of workers choosing their working sector:

For the state sector: $\text{In}\frac{y=1}{y=0} = 0,478 \times \text{female} + 0,038 \times \text{age} + 0,711 \times \text{married} + 0,384 \times \text{education} - 0,476 \times \ln_w\text{age} - 0,262 \times \text{working}_t\text{ime}$

For the FDI sector: $\text{In}\frac{y=2}{y=0} = -5,554 + 1,002 \times \text{female} - 0,050 \times \text{age} + 0,211 \times \text{married} - 0,620 \times \text{education} + 1,272 \times \ln_w\text{age} - 0,035 \times \text{working}_t\text{ime}$

The following results of the marginal effect analysis were obtained in Table 7:

H1: Female workers tend to choose the state and FDI sectors over the private sector. The results show that the variable "female" has a positive and statistically significant impact on the the private sector (-0,133; p < 0,01) and FDI sector (0,139; p < 0,01) but has no significant impact on the state sector (p = 0,283). Therefore, H1 is not fully accepted.

H2: Older workers tend to choose the state sector over the private sector and FDI. The variable "age" has a positive and statistically significant effect on the state sector (0,010; p < 0,01) but a negative effect on the FDI sector (-0,010; p < 0,01) while having no significant impact on the private sector (p = 0,527). Therefore, H2 is accepted.

H3: Married workers tend to choose the state sector over the private sector and FDI. The variable "married" has a positive and statistically significant effect on the state sector (0,124; p < 0,01) but a negative effect on the private sector (-0,120; p < 0,01) and no significant effect on the FDI sector (p = 0,541). Therefore, H3 is fully accepted.

H4: The higher the education level, the greater the likelihood of choosing the state and FDI sectors. The variable "education" has a positive impact on the state sector (0,084; p < 0,01) but a negative impact on the FDI sector (-0,113; p < 0,01). Both have a statistical significance. In contrast, "education" has no statistically significant effect on the private sector (p = 0,773). Therefore, hypothesis H4 is not fully accepted.

H5: Wage has a positive influence on the choice of private and FDI sector, and a negative influence on the state sector. The variable "ln_wage" has a negative impact on the state sector (-0,155; p < 0,01) and private sector (-0,061; p < 0,01), but a positive impact on the FDI sector (0,216; p < 0,01). Therefore, H5 is not fully accepted.

H6: Working hours have a negative influence on the ability to choose the state sector, and a positive influence on the private sector and FDI. The variable "working_time" has a negative effect on the state sector (-0,048; p < 0,01) and a positive effect on the private (0,040; p < 0,01) and FDI sector (0,028; p < 0,01). Therefore, hypothesis H6 is accepted.

Discussion

For personal factors

Women tend to choose the public and FDI sectors more than men, while men tend to choose the private sector. This is mainly because women prioritize stability, flexible working hours and the ability to balance work and personal life – characteristics that the public sectors can better meet. Many studies also show that women often seek jobs with less risk and clear benefits rather than chasing high income but less stability like the private sector [11,14,34]. This is clearly reflected in Figure 2, where the proportion of women working for wages (50%) is lower than that of men (57%), while the proportion of women working as family workers (16%) is twice as high as that of men (7%). The proportion of women who own establishments and are self-employed is also lower than that of men. These figures show that women tend to be less involved in self-employed or self-employed businesses, and often

Table 4: Results of the analysis of marginal effects between methods (*Source: Authors analyzed from Stata 17*)

Variable		Sectors								
		Private sector			State sector			FDI sector		
		MNL	CF	2S	MNL	CF	2S	MNL	CF	2S
female		-	-	-	-	+	+	+	+	+
age		-	-	-	-	+	+	-	-	-
married		-	-	-	+	+	+	+	-	+
educatio	No degree	-	-	+	+	+	+	+	+	-
	Primary	-	-		+	+		+	+	
	Secondary	-	-		+	-		-	+	
	High	-	-		+	-		-	+	
	College	-	-		+	-		-	+	
	Graduate									
	Postgradu	-	-		+	+		-	-	
ln_wage		+	-	-	-	-	-	+	+	+
working_time		+	+	+	-	-	-	+	+	+

Table 5: The mean, standard deviation, bias and RMSE of the predicted values for each method (*Source: Authors analyzed from Stata 17*)

Criteria	Private sector			State sector			FDI sector		
	MNL	CF	2S	MNL	CF	2S	MNL	CF	2S
Mean	0.478	0.478	0.478	0.310	0.310	0.310	0.212	0.212	0.212
Std.dev.	0.177	0.182	0.103	0.278	0.279	0.155	0.166	0.170	0.123
Bias	-3.05×10^{-06}	-3.20×10^{-06}	1.11×10^{-09}	1.50×10^{-06}	1.57×10^{-06}	5.76×10^{-10}	1.55×10^{-06}	1.63×10^{-06}	-1.66×10^{-06}
RMSE	0.219	0.218	0.241	0.135	0.134	0.189	0.138	0.137	0.151

Table 6: Results of the regression using the 2S method (*Source: Authors analyzed from Stata 17*)

Variable	Sectors		
	Private sector	State sector	FDI sector
female	(base outcome)	0.234*** (0.000)	1.002*** (0.000)
age		0.038*** (0.000)	-0.050*** (0.000)
married		0.711*** (0.000)	0.211*** (0.000)
education		0.384*** (0.000)	-0.620*** (0.000)
ln_wage		-0.476*** (0.000)	1.272*** (0.000)
working_time		-0.262*** (0.000)	-0.035*** (0.093)
_cons		0.478 (0.135)	-5.554*** (0.000)

Note: p < 0,01**; p < 0,05**; p < 0,1*

Table 7: Results of the analysis of marginal effects of 2S method (Source:Authors analyzed from Stata 17)

Variable	Sectors		
	Private sector	State sector	FDI sector
female	-0.133*** (0.000)	-0.007 (0.283)	0.139*** (0.000)
age	-0.00024 (0.527)	0.010*** (0.000)	-0.010*** (0.000)
married	-0.120*** (0.000)	0.124*** (0.000)	-0.004 (0.541)
education	0.009 (0.325)	0.105*** (0.000)	-0.113*** (0.000)
ln_wage	-0.061*** (0.000)	-0.155*** (0.000)	0.216*** (0.000)
working_time	0.040*** (0.000)	-0.048*** (0.000)	0.008*** (0.009)

Note: p < 0,01**; p < 0,05**; p < 0,1*

choose stable positions that are associated with family responsibilities. This fact further reinforces the view that the state and FDI sectors – which provide highly stable jobs – are the preferred choice of female workers. In addition, the FDI sector, especially in manufacturing industries such as textiles and footwear, also plays an important role in creating employment opportunities for women thanks to its policy of recruiting a large number of female workers in its production lines[35].

Age does not significantly influence the choice of the private sector, as this sector evaluates capacity based on work efficiency rather than age (with the mean age calculated from the VHLSS is approximately 35 years old). In contrast, older workers tend to stick with the state sector because of its stability and seniority-based remuneration (~ 40 years). Meanwhile, the FDI sector prefers younger workers due to health requirements, the ability to adapt quickly and work at high intensity (~ 32 years). In contrast, more than 70% of FDI employees are under 35, reflecting the sector's demand for physically fit, adaptable workers capable of high-intensity labor. Married people tend to choose the state sector because they prioritize stability, fixed working hours and less pressure. They are afraid of risks from the private sector, which is often unstable and does not fully guarantee welfare policies. For the FDI sector, marital status does not make a clear difference, but financial pressure after marriage may make some people accept a stressful working environment in exchange for higher income.

For qualifications and abilities

Highly educated workers tend to prefer working in the state sector, as this sector has a clear recruitment and promotion system based on qualifications and seniority. Stability, good remuneration, fixed working hours and moderate pressure are factors that suit the wishes of highly skilled workers. Meanwhile, the private sector does not show a significant relationship between education and employment choice, as private enterprises often value practical skills more than formal qualifications. In addition, the lack of a clear career path also makes this sector less attractive to highly educated people, despite flexible salary and bonus policies. In contrast, in the FDI sector, education has a negative impact on the probability of employment choice. Although it is widely believed that FDI workers are highly qualified, the reality is that most of them are production workers, requiring only general education or vocational training.

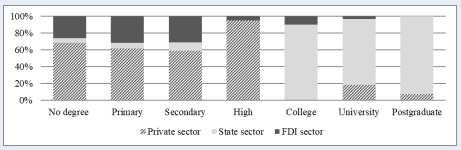

Figure 3: Workers by sectors in 2020 (*Source: Authors calculated from VHLSS 2020*)

Figure 3 shows a clear segmentation by education. Over 60% of workers with no degree, primary or secondary education are in the private sector, while the FDI sector absorbs around 30%. The state sector employs only 6 – 10% of these groups. In contrast, from college level upward, the pattern reverses: nearly 60% of college graduates, 78% of university graduates, and 93% of postgraduates work in the state sector, while the FDI share falls below 7% and almost disappears at the postgraduate level. There are several reasons behind this pattern that the initial explanation did not fully account for. First, the FDI sector in Vietnam is heavily concentrated in labor-intensive manufacturing, particularly in garments, electronics assembly, and food processing – industries that primarily

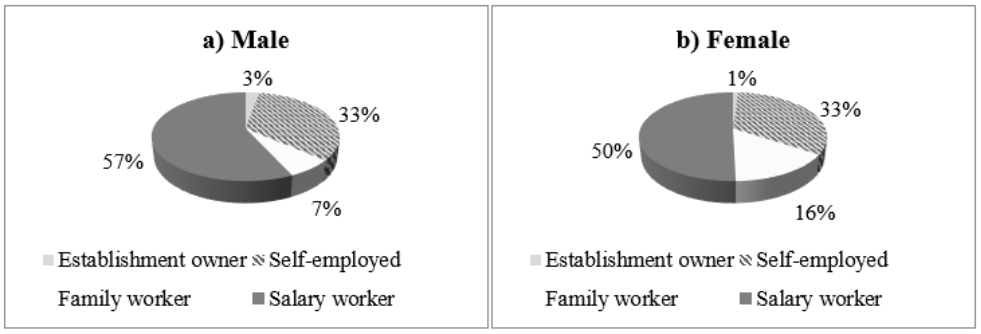

Figure 2: Employment status structure by gender in 2022 (*Source: Statistical Yearbook 2022*)

require basic education or vocational skills, not academic degrees. Positions demanding university-level qualifications are present but represent a small proportion of the total workforce, often in administrative or technical support roles. Moreover, harsh working environments, repetitive tasks, limited career progression, and poor work-life balance may deter highly educated workers who are seeking more intellectually engaging or stable jobs.

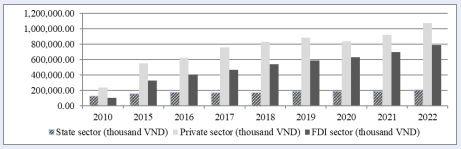

Figure 4: Totalin come of employees in operating enterprises with production and business results classified by type of enterprise (*Source: General Statistics Office*)

For working conditions

Income has a negative impact on the ability to choose to work in the private and public sectors. As income increases, workers tend to seek a more stable working environment with better benefits, instead of continuing to stay in the private sector, which is unstable and has little long-term security. In the state sector, salaries increase slowly with seniority, do not reflect productivity, and are therefore not attractive to workers with high income expectations, especially young workers. However, this sector is still chosen by many people thanks to its stability and non-financial values such as work-life balance and meaning [11,14,23]. In contrast, the FDI sector has attractive salaries, accompanied by training and promotion opportunities, suitable for capable people who want to be paid a salary commensurate with their actual contributions [21,22]. Therefore, high income often goes hand in hand with the trend of choosing to work in the FDI sector. In Figure 4, between 2010 and 2022, both the private and FDI sectors consistently outperformed the state sector in average income. By 2022, the average income in the FDI sector was nearly 3.87 times higher than in the state sector, while the private sector exceeded the state sector by a large margin.

According to Figure 4 , working hours in the public sector are around 7.8 hours, while in the private and FDI sectors they are 8.2 and 8.4 hours, respectively. Employees tend to avoid the state sector when it comes to working long hours, as this sector is inherently attractive due to its office hours, low overtime and stable rest regime – suitable for those who have families or want to balance their lives. In contrast, the private and FDI sectors often require longer working hours, but also open up opportunities for increased income. Especially in the manufacturing, trade and service sectors, workers are willing to work overtime to maximize their income. In the FDI sector, working in shifts or overtime is common to meet the requirements of the parent company, and this is suitable for people with good health, high adaptability and strong motivation to earn money.

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusion

The study found that most of the individual factors such as gender, marital status, education level, income and working time have a certain influence on the decision of workers to choose the working sector, however, the impact is not uniform across sectors. Some factors such as age and education level in the private sector, gender in the state sector and marital status in

the FDI sector do not show a significant impact on the probability of choice. Specifically, the private sector becomes less attractive for female workers, those who are married or have high income, but is suitable for those who are willing to work long hours. In contrast, the public sector is more attractive to older, married and highly educated workers, due to its stability and long-term value alignment, but less suitable for those with high income expectations and low willingness to work long hours. Meanwhile, the FDI sector attracts female workers and those who want to increase their income, but is less suitable for the group of highly educated workers who prioritize stability. Overall, the differences in the impact of factors suggest that workers do not rely on a single criterion when making decisions about choosing a working area, but tend to consider comprehensively between personal factors and the specific characteristics of each working area. This emphasizes the role of building appropriate labor policies, aiming at improving the working environment and remuneration conditions, to attract and retain workers more effectively.

Policy implications

Based on the research results on how personal factors influence the probability of choosing a working sector, several targeted policy implications as follows:

For the private sector, enterprises should enhance non-financial benefits to complement their income advantage. In particular, maternity and childcare support, transparent career progression frameworks, and supplementary health insurance would help attract women, married employees, and highly educated workers. Promoting work - life balance – through measures such as regulated overtime or hybrid working models for skilled staff – can also broaden the appeal of private firms beyond short-term productivity. **For the state sector,** reform of the wage system is essential. Salaries should be partly linked to job performance instead of relying solely on seniority and qualifications. To appeal to younger and highly skilled workers, flexible arrangements such as remote work or part-time contracts can be piloted. Alongside administrative reform and organizational streamlining, the state sector should also establish "fast-track" promotion tracks for high-performing civil servants, ensuring that talented individuals remain motivated to contribute long-term. **For the FDI sector,** labor attraction should be stratified by skill level. For unskilled and semi-skilled workers, firms should continue competitive wages and productivity-based bonuses. For highly educated workers, however, FDI enterprises need to provide structured career paths, professional training, and opportunities to access supervisory or management positions. Localization of middle-management roles would also improve retention of skilled Vietnamese staff, reducing dependence on expatriates. **For the government ,** policies should enhance labor market flexibility and transparency. Retraining and reskilling programs can support workers in career transitions across sectors and life stages. In addition, building a regularly updated labor market information system will enable both policymakers and enterprises to design timely strategies for recruitment and retention.

Limitations of the study

The study analyzed the factors affecting workers' decisions to choose a working sector, but there are still some limitations that need to be overcome.

Firstly, the study has not considered the impact of some other important factors such as occupational skills, technological changes, and the impact of education and labor policies. These factors can significantly affect workers' decisions but have not been fully analyzed in this study due to the limitations of VHLSS data. Moreover, the **variable** "rural" may interact with the dependent variable "sector". For instance, workers in rural areas might face limited access to state or FDI jobs, thereby affecting the observed employment patterns[13]. However, the current study treats it as **exogenous** due to data limitations and lack of sufficient instrumental variables that are available in VHLSS 2020. As a result, the study focuses primarily on **individual-level characteristics** and does not explore the impact of environmental factors. **Secondly,** the instrumental variables in the model are not really optimized. Education level can be affected by the learning process over time, while the data from VHLSS is limited to 2020 and the surveyed subjects are different from year to year, this variation in the sample makes it difficult for the group to assess the long-term impact. **Third,** due to limitations in data availability, the study only focused on data from 2020. Compared to the current time of 2025, the research results are not up-to-date. The inability to use the 2022 dataset is due to the fact that at the time of the study, the team had not yet accessed this data. Given the above limitations, future research needs to be expanded by using more updated data and time series analysis to increase the accuracy of the model. In addition, expanding the scope of the study by considering additional factors such as the impact of labor and education policies, changes in business skill requirements and the working environment will help to make policy recommendations that are more realistic to the socio-economic context of Vietnam.

LIST OF ABBREVIATIONS

2S: Two-Stages
CF: Control Function
FDI: Foreign direct investment
MNL: Multinomial Logit
RMSE: Root Mean Square Error
VHLSS: Vietnam Household Living Standards Survey

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in the publication of this article.

AUTHOR CONTRIBUTIONS

Nguyen Thanh Huyen: Guidance on the research process.
Nghiem Tuyet Anh: Research overview.
Chu Duong Thao Phuong: Theoretical basis.
Pham Nhat Quang: Research method and data analysis.
Hong Thanh Xuân: Policy implications.

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Bài nghiên cứu

CÁC YẾU TỐ ẢNH HƯỞNG ĐẾN QUYẾT ĐỊNH LỰA CHỌN KHU VỰC LÀM VIỆC: TIẾP CẬN DỰA TRÊN MÔ HÌNH MNL KIỂM SOÁT VẤN ĐỀ NỘI SINH

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TÓM TẮT

Nghiên cứu này phân tích các yếu tố ảnh hưởng đến quyết định lựa chọn khu vực làm việc của người lao động tại Việt Nam, trong bối cảnh lực lượng lao động đang có sự dịch chuyển đáng kể từ khu vực nhà nước sang khu vực tư nhân và khu vực có vốn đầu tư nước ngoài (FDI). Bên cạnh việc xác định các yếu tố tác động, nghiên cứu còn nhằm kiểm tra và xử lý vấn đề nội sinh phát sinh trong mối quan hệ giữa quyết định lựa chọn khu vực làm việc và trình độ học vấn của người lao động, từ đó đảm bảo tính chính xác và độ tin cậy của kết quả ước lượng. Dựa trên dữ liệu từ Điều tra Mức sống Hộ gia đình Việt Nam (VHLSS) năm 2020, nghiên cứu áp dụng mô hình Multinomial Logit (MNL) và so sánh ba phương pháp ước lượng: MNL thông thường, phương pháp Control Function, và phương pháp Two-Stage (2S). Kết quả chỉ ra rằng ``trình độ học vấn'' là một biến nội sinh, và trong số các phương pháp được kiểm tra, phương pháp Two-Stage (2S) cho thấy hiệu quả vượt trội trong việc kiểm soát vấn đề này. Sau khi đã xử lý vấn đề nội sinh, các phân tích cho thấy các yếu tố như giới tính, độ tuổi, tình trạng hôn nhân, trình độ học vấn, thu nhập và thời gian làm việc đều có ảnh hưởng đáng kể đến quyết định lựa chọn khu vực làm việc, với mức độ và hướng tác động khác nhau giữa các khu vực. Về mặt học thuật, nghiên cứu nhấn mạnh tầm quan trọng của việc kiểm soát nội sinh trong các mô hình kinh tế lượng phân tích hành vi lựa chọn của cá nhân trong kinh tế lao động. Về mặt thực tiễn, các kết quả thực nghiệm mang lại những hàm ý chính sách quan trọng, góp phần tối ưu hóa phân bổ nguồn nhân lực và hoạch định lao động. Việc thiết kế chính sách phù hợp với đặc thù và nhu cầu của từng khu vực có thể nâng cao hiệu quả thị trường lao động và phản ứng linh hoạt trước những biến động cơ cấu đang diễn ra trong nền kinh tế Việt Nam. Những phát hiện này đặc biệt có ý nghĩa trong bối cảnh chuyển đổi kinh tế nhanh chóng và tái cơ cấu thị trường lao động, đồng thời hỗ trợ mục tiêu tăng trưởng bền vững và bao trùm.

Từ khoá: lựa chọn khu vực làm việc, lao động, vấn đề nội sinh, mô hình MNL, phương pháp Two-Stages (2S), phương pháp Control Function (CF), thị trường lao động

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