

“Determinants of education–job mismatch in Vietnam: Evidence from the Labor Force Survey and provincial institutional indicators”

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DETERMINANTS OF EDUCATION–JOB MISMATCH IN VIETNAM: EVIDENCE FROM THE LABOR FORCE SURVEY AND PROVINCIAL INSTITUTIONAL INDICATORS

Abstract

Education–job mismatch is a critical challenge in Vietnam, as rapid educational expansion and changing labor demand have intensified concerns regarding efficient human capital allocation. Despite growing attention to mismatch, there is limited evidence on how labor market structures and provincial institutional conditions jointly shape mismatch outcomes.

This study investigates the determinants of education–job mismatch using data from the 2022 Vietnam Labor Force Survey (LFS) and provincial institutional indicators from the 2022 Provincial Competitiveness Index (PCI). Education–job mismatch is measured by comparing workers' educational attainment with occupational skill requirements. A multinomial logit model is employed to estimate the likelihood of under- and overeducation relative to adequately matched employment, based on data from 411,173 workers.

The results show that educational attainment is systematically associated with observed mismatch outcomes. Compared with workers with upper secondary education, college graduates exhibit a relative risk ratio (RRR) of 39.87 and university graduates an RRR of 10.63 for overeducation. Workers employed in foreign-invested enterprises are 3.42 times more likely to be overeducated than workers in the state sector. Provincial institutional conditions are also associated with a mismatch. The Labor Training Index is associated with a lower likelihood of overeducation (RRR = 0.89), whereas the Informal Charges Index is positively associated with overeducation (RRR = 1.19).

The findings suggest that education–job mismatch in Vietnam reflects broader structural and institutional conditions in addition to individual characteristics. Strengthening workforce training systems and improving alignment between education and labor demand may contribute to more efficient human capital allocation.

Keywords

mismatch, overeducation, institutions, labor, skills, Vietnam

JEL Classification

J24, J21, I25, O15

INTRODUCTION

Education–job mismatch has emerged as a persistent challenge in modern labor markets, particularly in developing and transition economies undergoing rapid structural transformation. Although the expansion of education systems has substantially increased the supply of skilled labor, labor market demand has not adjusted at the same pace, leading to growing discrepancies between workers' educational qualifications and job requirements. This imbalance has become increasingly important in the context of technological change, globalization, and labor market restructuring, where economies face mounting pressure to improve the efficiency of human capital allocation and labor productivity.



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In many developing economies, education–job mismatch reflects not only differences in individual characteristics and labor market conditions but also broader institutional and structural constraints. Existing studies suggest that mismatch reduces returns to education, lowers job satisfaction, constrains productivity, and weakens overall economic performance (Cedefop, 2009; WEF, 2014). Persistent mismatch may therefore indicate structural inefficiencies in labor market allocation, particularly in economies where education systems, workforce training mechanisms, and labor market institutions fail to respond effectively to changing skill demands. Recent evidence also shows that mismatch affects graduates' expectations, career mobility, and broader employment outcomes (Allen & van der Velden, 2013; Jones et al., 2024).

Vietnam provides a particularly relevant context for examining education–job mismatch. Over the past two decades, the country has experienced rapid economic growth, industrialization, and international integration, accompanied by a substantial expansion of higher education and vocational training. However, labor demand has not always kept pace with educational expansion, raising concerns about the alignment between workers' qualifications and occupational requirements. Previous assessments of Vietnam's labor market have highlighted persistent challenges in aligning educational attainment with labor demand and improving the utilization of human capital (World Bank, 2014; ILO, 2020). Official labor market reports have also pointed to substantial qualification mismatches among tertiary-educated workers and the coexistence of both overqualification and underqualification across occupations and regions. These patterns suggest persistent inefficiencies in labor allocation and highlight challenges in the utilization of human capital in Vietnam.

The persistence of education–job mismatch in Vietnam reflects not only labor market dynamics but also broader structural and institutional conditions. Rapid educational expansion has increased the supply of educated workers, while the creation of high-skilled employment opportunities has progressed more unevenly across sectors and regions. At the same time, substantial differences in provincial governance quality, workforce training systems, and labor market conditions may influence how effectively workers are matched to jobs. Consequently, understanding education–job mismatch requires consideration of both labor market structures and institutional environments rather than focusing exclusively on individual worker characteristics.

Despite growing interest in education–job mismatch, empirical evidence for Vietnam remains limited in several respects. Existing studies primarily examine individual characteristics, educational attainment, and job-related factors, while relatively little attention has been devoted to the role of subnational institutional conditions and regional heterogeneity. This limitation is particularly important in Vietnam because labor market opportunities, workforce development systems, and governance quality vary considerably across provinces. By combining large-scale Labor Force Survey data covering all provinces of Vietnam with provincial institutional indicators from the Provincial Competitiveness Index, this study provides new evidence on how individual characteristics, labor market structures, regional disparities, and institutional conditions are associated with education–job mismatch outcomes in Vietnam.

1. LITERATURE REVIEW AND HYPOTHESES

Education–job mismatch is commonly understood as a discrepancy between workers' educational attainment and the qualification requirements of their jobs. It is usually examined as a form of vertical mismatch, including overeducation and undereducation, while horizontal mismatch refers to employment outside one's field of study (Robst, 2007; Quintini,

2011; Leuven & Oosterbeek, 2011; McGuinness et al., 2018). In broader labor market terms, mismatch reflects an imbalance between skill supply and skill demand and indicates inefficiencies in the allocation and utilization of human capital.

The measurement of education–job mismatch is an important methodological issue. Existing studies generally use three approaches: job analysis, worker self-assessment, and realized matches (Duncan &

Hoffman, 1981; Quintini, 2011; McGuinness et al., 2018). Because different measurement approaches may generate different estimates of mismatch incidence and cross-country comparisons, measurement choice remains an important consideration in mismatch research (Capsada-Munsech, 2019; Flisi et al., 2017). Job-analysis approaches compare workers' qualifications with the education or skill requirements assigned to occupations. Worker self-assessment relies on individuals' own evaluation of whether their education or skills match job requirements. Realized-match approaches infer required education from the observed educational distribution of workers within occupations. For large-scale labor force surveys, occupation-based measures are widely used because they allow systematic and reproducible comparisons across workers and jobs. This study follows this logic by comparing workers' educational attainment, representing skill supply, with occupational skill requirements, representing skill demand. This approach is consistent with the classification logic used in Vietnamese labor market research, where occupational groups are linked to corresponding skill levels and equivalent educational qualifications.

Theoretically, education-job mismatch can be explained through human capital theory, assignment theory, and search and matching models. Human capital theory argues that education increases productivity and improves labor market outcomes through skill accumulation (Becker, 1964). However, if labor demand does not generate enough jobs that match workers' qualifications, educational expansion may not automatically lead to efficient matching. Assignment theory emphasizes that workers are allocated across heterogeneous jobs, and that similar levels of education may lead to different outcomes depending on job availability and labor market structures (Sattinger, 1993, 2012). Search and matching models further suggest that imperfect information, recruitment costs, and labor market frictions may prevent workers and firms from achieving efficient matches (Pissarides, 2000). These perspectives jointly suggest that mismatch is shaped not only by individual qualifications but also by the structure and functioning of labor markets.

Empirical studies show that mismatch is associated with lower earnings, weaker job satisfaction, lower productivity, and inefficient human capital

utilization (Allen & van der Velden, 2001; Green & McIntosh, 2007; Hartog, 2000; McGuinness et al., 2018). Earlier contributions also argued that persistent overeducation may signal inefficient labor allocation and underutilization of human capital within labor markets (Freeman, 1976; Sicherman, 1991). At the individual level, age, gender, marital status, experience, and education influence mismatch through job mobility, career stage, occupational access, and labor market attachment (Alba-Ramírez, 1993; Addison & Portugal, 2002; Allen & van der Velden, 2013). Younger workers may face overeducation at the beginning of their careers, while older workers may rely more on experience as a substitute for formal qualifications. Educational attainment is particularly relevant because it defines workers' position in the skill supply structure. However, because educational attainment is also used to construct mismatch measures, its estimated relationship with mismatch should be interpreted as an association reflecting the alignment between qualifications and occupational requirements rather than as a purely independent causal effect.

Educational attainment represents another central determinant of mismatch. Although higher education generally improves labor market opportunities, the rapid expansion of tertiary education may generate graduate oversupply when labor demand for high-skilled jobs grows more slowly than the supply of educated workers (McGuinness, 2006; Dolton & Vignoles, 2000). Previous studies consistently show that tertiary-educated workers are more likely to experience overeducation, particularly in labor markets where the expansion of educational attainment outpaces structural transformation (Chevalier, 2003; Verhaest & Omeij, 2006). Evidence from developing economies also suggests that persistent skill mismatch may weaken the contribution of human capital to productivity growth and labor market efficiency (Atiq-ur-Rehman et al., 2021).

Technological change may further intensify mismatch by altering occupational skill requirements and changing the composition of labor demand across sectors and occupations (Di Pietro, 2002; Acemoglu & Autor, 2011; Autor, 2014; Sparreboom & Tarvid, 2016; OECD, 2023). As economies undergo digital transformation and industrial up-

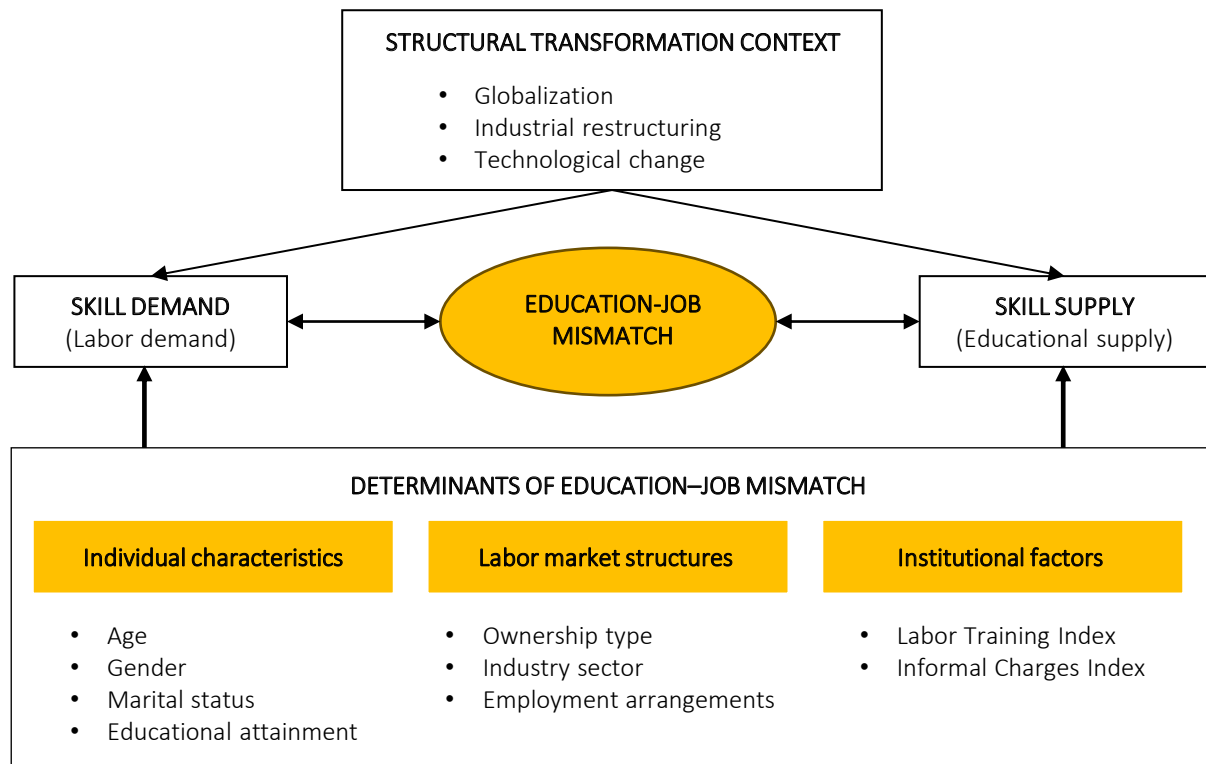


Figure 1. Conceptual framework of education–job mismatch

grading, demand for certain skills may increase while others become less relevant, potentially creating temporary imbalances between workers' qualifications and occupational requirements.

Labor market structures provide a second explanation for the mismatch. Sectoral composition, ownership type, and employment arrangements affect how firms recruit, screen, train, and allocate workers. In some sectors, practical experience and on-the-job learning may allow workers with lower formal qualifications to perform jobs requiring higher skill levels. In other contexts, firms may use educational credentials as screening devices, contributing to credential inflation and overqualification (Oyer & Schaefer, 2011; Goos et al., 2014). Labor market segmentation may therefore create systematic differences in mismatch risks across industries, ownership types, and employment statuses (McGuinness et al., 2017).

A third strand of literature emphasizes regional and institutional conditions. Workforce training systems, labor market information, governance quality, and institutional transparency influence how effectively education systems respond to la-

bor demand and how efficiently workers are allocated to jobs (Brunello et al., 2007; OECD, 2012; World Bank, 2023). These factors are particularly important in developing and transition economies, where labor market opportunities and institutional quality vary substantially across regions. In Vietnam, evidence shows that skill and education mismatches remain substantial, with workers employed in jobs requiring either lower or higher qualifications than those they possess. Existing studies on Vietnam indicate that qualification mismatch remains an important labor market issue and is associated with labor market outcomes and earnings (Le Quang & Tran-Nam, 2019; Pham, 2021). Vietnamese labor market assessments also emphasize the importance of improving training quality and strengthening linkages between education providers and employers (World Bank, 2014).

Despite this growing literature, several gaps remain. First, many studies focus mainly on individual characteristics or returns to mismatch, while less attention is given to how labor market structures and institutional conditions jointly shape mismatch outcomes. Second, evidence on

Vietnam remains limited, particularly regarding the role of provincial institutional conditions. Third, few studies combine nationally representative labor force data with subnational institutional indicators. Addressing these gaps is important because Vietnam is characterized by rapid educational expansion, structural transformation, regional disparities, and heterogeneous provincial governance conditions.

The purpose of this study is to examine how individual characteristics, labor market structures, regional disparities, and provincial institutional conditions are associated with education–job mismatch among employed workers in Vietnam. These hypotheses provide the empirical foundation for the multinomial logit model:

- H1: Educational attainment is systematically related to observed education–job mismatch outcomes.*
- H2: Labor market structures, including ownership type, industry sector, and employment arrangement, are significantly associated with education–job mismatch outcomes.*
- H3: Regional disparities are significantly associated with differences in education–job mismatch outcomes.*
- H4: Provincial institutional conditions are significantly associated with education–job mismatch outcomes.*

Figure 1 presents the conceptual framework linking structural transformation, skill demand, skill supply, individual characteristics, labor market structures, and institutional factors to education–job mismatch in Vietnam.

2. METHODOLOGY

This study examines the determinants of education–job mismatch in Vietnam by combining individual-level labor market information with provincial institutional indicators. The analysis uses data from the 2022 Vietnam Labor Force Survey (LFS) and the 2022 Provincial Competitiveness Index (PCI) to examine how individual character-

istics, labor market structures, regional disparities, and institutional conditions are associated with mismatch outcomes.

Provincial institutional variables are included to capture contextual conditions that may influence labor market matching efficiency. Provincial competitiveness indicators may affect mismatch through multiple channels. Provinces characterized by stronger governance, more supportive business environments, better workforce training systems, and lower administrative barriers are generally more likely to attract investment and facilitate business development. A larger and more diversified economic structure may in turn generate broader employment opportunities and improve the alignment between workers' qualifications and job requirements. Accordingly, provincial institutional conditions are expected to influence education–job mismatch not only through workforce training policies but also through their broader effects on labor demand and employment opportunities.

The Labor Training Index reflects the quality of provincial workforce training systems and labor development policies. The Informal Charges Index reflects the extent to which firms operate without unofficial payment burdens; higher scores indicate lower informal charges and a more transparent local business environment.

Although the analysis relies on 2022 cross-sectional data, the use of these datasets remains appropriate for two reasons. First, education–job mismatch is a structural labor market phenomenon that evolves gradually over time rather than responding only to short-term fluctuations. Second, the 2022 LFS provides nationally representative microdata with sufficient detail to identify education–job mismatch and to link worker-level information with provincial institutional indicators. Using LFS and PCI indicators from the same year also ensures temporal consistency between worker-level and institutional-level variables.

The 2022 LFS, conducted by the General Statistics Office of Vietnam (GSO), provides information on employment status, occupation, educational attainment, demographic characteristics, residence, social insurance participation, industry sector,

Table 1. Occupational skill levels and benchmark qualification requirements used to measure education–job mismatch

Source: Adapted from ILO (2018), ISCO-08 skill-level framework.

Skill level	Occupational groups	Benchmark qualification
4	Managers, Professionals	University degree or higher
3	Technicians and Associate Professionals	College or post-secondary vocational education
2	Clerical Support Workers, Service and Sales Workers, Skilled Agricultural Workers, Craft and Related Trades Workers, Plant and Machine Operators	Upper secondary education or vocational training
1	Elementary occupations	Primary or lower secondary education

Note: Benchmark qualification levels are analytical reference categories aligned with Labor Force Survey educational classifications. Managers are grouped within the highest skill category following common practice in mismatch research.

ownership type, and employment arrangement. The 2022 PCI provides province-level indicators reflecting local governance quality and business environments. The two datasets were merged using province identifiers. The analysis focuses on employed workers of working age with valid information on education, occupation, employment characteristics, region, and province. After data cleaning, the final analytical sample consists of 411,173 employed workers. Because an education–job mismatch is defined by comparing workers' educational attainment with the requirements of their current occupation, unemployed individuals were excluded from the analysis.

Education–job mismatch is measured by comparing workers' educational attainment, representing skill supply, with the qualification requirements associated with their occupations, representing skill demand. This approach follows the vertical mismatch literature and occupation-based measurement methods widely used in labor market research. Occupational information in the Labor Force Survey (LFS) is recorded according to the Vietnamese Standard Occupational Classification (VSCO), which is harmonized with the International Standard Classification of Occupations (ISCO-08). Occupational categories were linked to the corresponding ISCO-08 major groups and assigned benchmark qualification requirements based on the ISCO skill-level framework (International Labour Office, 2012) and the classification approach adopted by ILO (2018) and Vietnamese labor market studies. Given the absence of direct information on job-specific qualification requirements in the LFS, this occupation-based benchmark approach provides a practical and reproducible method for identifying broad

patterns of educational mismatch at the labor market level.

The benchmark qualification levels should be interpreted as standardized analytical reference points rather than as formal educational requirements that apply uniformly to every occupation, particularly because occupational groups may encompass workers with diverse educational backgrounds. Workers' attained qualifications are compared with the benchmark qualification associated with their occupational skill level to determine whether they are undereducated, adequately matched, or overeducated.

Table 1 summarizes the occupational skill levels and benchmark qualification requirements used to classify workers as undereducated, adequately matched, or overeducated.

Workers whose educational attainment exceeds the benchmark qualification associated with their occupation are classified as overeducated. Workers whose educational attainment falls below the occupational benchmark are classified as undereducated. Workers whose educational attainment corresponds to the benchmark requirement are classified as adequately matched. Accordingly, the dependent variable consists of three mutually exclusive categories: undereducated, adequately matched, and overeducated. Adequately matched workers constitute the reference category in the empirical model.

The explanatory variables are selected based on the theoretical framework and prior empirical studies on education–job mismatch. Individual characteristics include age, age squared, gender, marital

status, educational attainment, urban residence, and social insurance participation. Labor market structures include industry sector, ownership type, and employment arrangement. Regional variables capture differences across Vietnam's major socio-economic regions. Provincial institutional variables are obtained from the PCI and include the Labor Training Index and the Informal Charges Index. Detailed definitions of all variables are presented in Table 2.

To estimate the determinants of education–job mismatch, this study employs a multinomial logit (MNL) model. The MNL specification is appropriate because the dependent variable consists of three mutually exclusive but non-ordinal outcomes: undereducation, adequate matching, and overeducation. Undereducation and overeducation represent conceptually distinct forms of mismatch rather than increasing levels along a single ordered continuum. Consequently, an ordered response model would impose restrictive assumptions regarding proportionality and outcome or-

dering that may not hold empirically. The MNL model is employed as a parsimonious framework for modeling mutually exclusive mismatch outcomes. The estimated coefficients should therefore be interpreted as associations between explanatory variables and relative mismatch risks rather than strict structural parameters. This interpretation is particularly appropriate given the cross-sectional nature of the data and the study's focus on identifying correlates of mismatch rather than estimating causal effects.

Let Y_i denote the mismatch status of worker i , where $Y_i = 0$ (adequately matched), $Y_i = 1$ (undereducated), and $Y_i = 2$ (overeducated). The probability that worker i falls into outcome j is defined as:

$$P(Y_i = j) = \frac{\exp(X_i \beta_j)}{\sum_{k=0}^J \exp(X_i \beta_k)}, \quad (1)$$

where X_i is a vector of explanatory variables, and β_j represents the parameters associated with out-

Table 2. Definition of variables used in the empirical analysis

Variable	Definition	Type	Source
Age	Age of the worker (in years).	Continuous	LFS
Age squared	Square of age, included to capture the potential non-linear effect of age on education–job mismatch.	Continuous	LFS
Male	Dummy variable equal to 1 if the worker is male, 0 otherwise.	Dummy	LFS
Married	Dummy variable equal to 1 if the worker is married, 0 otherwise.	Dummy	LFS
Urban residence	Dummy variable equal to 1 if the worker resides in an urban area, 0 if rural.	Dummy	LFS
Without social insurance	Dummy variable equal to 1 if the worker does not participate in social insurance, 0 otherwise.	Dummy	LFS
No formal education	Dummy variable equal to 1 if the worker has no formal schooling.	Dummy	LFS
Primary education	Dummy variable equal to 1 if the highest completed level is primary education.	Dummy	LFS
Lower secondary education	Dummy variable equal to 1 if the highest completed level is lower secondary education.	Dummy	LFS
College degree	Dummy variable equal to 1 if the worker holds a college degree.	Dummy	LFS
University degree or higher	Dummy variable equal to 1 if the worker has a university degree or postgraduate qualification.	Dummy	LFS
Northern Midlands and Mountain Areas	Dummy variable equal to 1 if the worker resides in the Northern Midlands and Mountain Areas region.	Dummy	LFS
North Central and Central Coastal Areas	Dummy variable equal to 1 if the worker resides in the North Central and Central Coastal Areas region.	Dummy	LFS
Central Highlands	Dummy variable equal to 1 if the worker resides in the Central Highlands region.	Dummy	LFS
Southeast	Dummy variable equal to 1 if the worker resides in the Southeast region.	Dummy	LFS
Mekong River Delta	Dummy variable equal to 1 if the worker resides in the Mekong River Delta region.	Dummy	LFS
Manufacturing and construction	Dummy variable equal to 1 if the worker is employed in the manufacturing or construction sector.	Dummy	LFS
Trade	Dummy variable equal to 1 if the worker is employed in the trade sector.	Dummy	LFS
Services	Dummy variable equal to 1 if the worker works in the service sector.	Dummy	LFS

Table 2 (cont.). Definition of variables used in the empirical analysis

Variable	Definition	Type	Source
Foreign-invested enterprises (FDI)	Dummy variable equal to 1 if the worker is employed in a foreign-invested enterprise.	Dummy	LFS
Private enterprises	Dummy variable equal to 1 if the worker is employed in a private enterprise.	Dummy	LFS
Household businesses	Dummy variable equal to 1 if the worker is employed in a household business.	Dummy	LFS
Individual/household agriculture, forestry, and fishery activities	Dummy variable equal to 1 if the worker is engaged in household-based agriculture, forestry, or fishery activities.	Dummy	LFS
Self-employed	Dummy variable equal to 1 if the worker is self-employed.	Dummy	LFS
Contributing family worker	Dummy variable equal to 1 if the worker is a contributing family worker.	Dummy	LFS
Cooperative member	Dummy variable equal to 1 if the worker is a member of a cooperative.	Dummy	LFS
Wage employee	Dummy variable equal to 1 if the worker is a wage employee.	Dummy	LFS
Labor Training Index (PCI)	The provincial Labor Training Index from the Provincial Competitiveness Index reflecting the quality of provincial workforce training systems and labor development policies.	Continuous	PCI
Informal Charges Index (PCI)	Provincial index measuring unofficial business costs and institutional transparency in the local business environment.	Continuous	PCI

Note: Upper secondary education, the Red River Delta, agriculture, the state sector, and employer are omitted reference categories in the regression model.

come j . The adequately matched category is treated as the reference group. The estimated coefficients are reported as relative risk ratios (RRRs), obtained by exponentiating the estimated parameters:

$$RRR_j = \exp(\beta_j). \quad (2)$$

The RRR indicates how a change in an explanatory variable is associated with the relative likelihood of undereducation or overeducation compared with adequately matched employment.

Several limitations should be noted. First, educational attainment forms part of the conceptual framework used to identify mismatch outcomes. Consequently, the estimated coefficients for educational attainment should be interpreted as indicators of the degree of alignment between workers' qualifications and occupational requirements rather than as fully independent causal effects. Second, provincial institutional indicators are measured at the province level and assigned to workers according to their province of residence. The estimated institutional coefficients should therefore be interpreted as contextual associations rather than direct individual-level effects. Third, although the Labor Force Survey provides nationwide coverage, the empirical analysis does not explicitly account for the full complex survey design, including sampling weights, strata, and primary sampling units. As a result, the findings should be interpreted as associations observed within

a large nationwide sample and may not fully reflect population-weighted estimates. Nevertheless, the exceptionally large sample size (411,173 employed workers) provides substantial statistical power and broad coverage across regions, occupations, and employment categories. Future research could incorporate sampling weights and complex survey design features to assess the robustness of the reported associations.

3. RESULTS

The estimated coefficients and relative risk ratios (RRRs) are reported in Table 3.

Table 3 reports the multinomial logit estimates for the determinants of education–job mismatch among employed workers in Vietnam. The results are presented for undereducation and overeducation relative to adequately matched employment, with relative risk ratios (RRRs) reported to facilitate interpretation.

Educational attainment is systematically associated with observed mismatch outcomes. Compared with workers with upper secondary education, workers with tertiary qualifications exhibit substantially higher relative likelihoods of overeducation. College graduates have an RRR of 39.87, while workers with university degrees or higher have an RRR of 10.63. These findings suggest a

Table 3. Determinants of education–job mismatch among employed workers in Vietnam

Source: Authors' calculations based on microdata from the 2022 Vietnam Labor Force Survey (GSO, 2024).

Variables	Estimated Coefficients (β)		Relative Risk Ratios (RRRs)	
	Undereducated	Overeducated	Undereducated	Overeducated
Individual characteristics				
Age	0.02*** (9.07)	−0.04*** (14.59)	1.02***	0.96***
Age squared	−0.00*** (8.66)	<0.01*** (14.99)	1.00***	1.00***
Male	0.17*** (12.87)	−0.12*** (11.73)	1.18***	0.89***
Married	0.12*** (7.51)	−0.15*** (10.78)	1.13***	0.86***
Urban residence	0.07*** (5.17)	0.01 (0.49)	1.08***	1.01
Without social insurance	−1.04*** (22.90)	1.49*** (47.34)	0.35***	4.45***
Education level (Upper secondary education = reference)				
No formal education	5.96*** (126.79)	−6.73*** (37.15)	389.02***	<0.01***
Primary education	6.08*** (132.56)	−4.97*** (72.82)	435.98***	<0.01***
Lower secondary education	−0.92*** (11.97)	0.19*** (14.62)	0.40***	1.21***
College degree	−19.41*** (319.89)	3.69*** (170.06)	<0.01***	39.87***
University degree or higher	−19.53*** (276.29)	2.36*** (103.25)	<0.01***	10.63***
Regional factors (Red River Delta = reference)				
Northern Midlands and Mountain Areas	−0.12*** (3.72)	0.20*** (12.76)	0.89***	1.22***
North Central and Central Coastal Areas	0.41*** (12.64)	−0.25*** (15.26)	1.51***	0.78***
Central Highlands	1.10*** (28.53)	−0.78*** (31.83)	2.99***	0.46***
Southeast	0.39*** (11.31)	−0.60*** (29.20)	1.47***	0.55***
Mekong River Delta	0.44*** (13.15)	−0.22*** (10.49)	1.55***	0.81***
Industry sector (Agriculture = reference)				
Manufacturing and Construction	0.68*** (20.89)	−1.05*** (39.31)	1.96***	0.35***
Trade	0.65*** (20.56)	−1.24*** (47.00)	1.91***	0.29***
Services	0.53*** (17.14)	−1.65*** (60.32)	1.71***	0.19***
Ownership type (State sector = reference)				
Foreign-invested enterprises (FDI)	0.01 (0.06)	1.23*** (38.72)	1.01	3.42***
Private enterprises	−0.56*** (6.34)	1.13*** (45.58)	0.57***	3.10***
Household businesses	−0.23** (2.68)	1.30*** (35.31)	0.79***	3.68***
Individual/household agriculture, forestry, and fishery activities	−1.06*** (12.11)	2.19*** (52.85)	0.35***	8.92***

Table 3 (cont.). Determinants of education–job mismatch among employed workers in Vietnam

Variables	Estimated Coefficients (β)		Relative Risk Ratios (RRRs)	
	Undereducated	Overeducated	Undereducated	Overeducated
Employment arrangements (Employer = reference)				
Self-employed	−0.66*** (7.50)	0.16*** (4.62)	0.52***	1.17***
Contributing family worker	−1.75*** (19.56)	1.02*** (28.44)	0.17***	2.76***
Cooperative member	−0.60 (0.42)	1.82*** (4.67)	0.55	6.16***
Wage employee	−2.35*** (25.99)	1.25*** (36.63)	0.10***	3.48***
Institutional factors				
Labor Training Index (PCI)	0.14*** (13.3)	−0.11*** (15.07)	1.15***	0.89***
Informal Charges Index (PCI)	−0.12*** (8.92)	0.17*** (16.09)	0.88***	1.19***
Constant	−3.95*** (23.39)	−3.60*** (35.51)	0.02***	0.03***
Pseudo R-squared	0.45			
Number of observations	411,173	411,173	411,173	411,173

Note: RRRs represent relative risk ratios, calculated as $\exp(\beta)$ from the multinomial logit model. The reference category is workers whose education matches job requirements. Robust z-statistics are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

substantial imbalance between tertiary educational expansion and the availability of jobs requiring advanced qualifications in the Vietnamese labor market. However, the coefficients for educational attainment should be interpreted with caution because educational qualifications form part of the conceptual basis used to identify mismatch outcomes. Consequently, the estimated associations reflect differences in the alignment between workers' qualifications and occupational requirements rather than fully independent causal effects.

Regional differences are statistically significant. Compared with the Red River Delta, workers in the Central Highlands have the highest likelihood of undereducation (RRR = 2.99), followed by the Mekong River Delta (RRR = 1.55), North Central and Central Coastal Areas (RRR = 1.51), and the Southeast (RRR = 1.47). For overeducation, workers in the Northern Midlands and Mountain Areas are more likely to be overeducated (RRR = 1.22), while those in the Central Highlands, Southeast, North Central and Central Coastal Areas, and Mekong River Delta are less likely to be overeducated. These patterns indicate substantial regional heterogeneity in labor market structures and skill allocation across Vietnam.

Labor market structures also play an important role. Relative to agriculture, employment in manufacturing and construction, trade, and services is associated with higher probabilities of undereducation and lower probabilities of overeducation. For example, workers in manufacturing and construction are nearly twice as likely to be undereducated (RRR = 1.96) but less likely to be overeducated (RRR = 0.35). Ownership type shows a different pattern. Compared with the state sector, workers in foreign-invested enterprises are more than three times more likely to be overeducated (RRR = 3.42), while private-sector workers and household-business workers also face higher risks of overeducation, with RRRs of 3.10 and 3.68, respectively.

Employment arrangements further affect mismatch outcomes. Compared with employers, wage employees are much less likely to be undereducated (RRR = 0.10) but more likely to be overeducated (RRR = 3.48). Contributing family workers and cooperative members also exhibit substantially higher probabilities of overeducation, with RRRs of 2.76 and 6.16, respectively. These results suggest that employment arrangements are closely associated with the allocation and utilization of workers' educational qualifications.

Institutional factors are also statistically significant. The Labor Training Index is positively associated with undereducation (RRR = 1.15) and negatively associated with overeducation (RRR = 0.89), suggesting that provinces with stronger workforce training systems tend to exhibit lower relative likelihoods of overeducation. In contrast, the Informal Charges Index is negatively associated with undereducation (RRR = 0.88) and positively associated with overeducation (RRR = 1.19). Because higher scores on this PCI sub-index indicate a more favorable institutional environment and lower unofficial payment burdens, this result should not be interpreted as evidence that higher informal costs increase mismatch. Rather, it indicates that provinces with higher Informal Charges Index scores are associated with a greater relative likelihood of overeducation in the observed sample.

Taken together, the findings provide support for the proposed hypotheses. The evidence is broadly consistent with H1, indicating that educational attainment is systematically associated with observed mismatch outcomes. However, because educational attainment also forms part of the mismatch classification framework, these associations should be interpreted cautiously. The results are consistent with H2 because labor market structures, including ownership type and employment arrangements, are systematically associated with mismatch outcomes. The results are consistent with H3 because substantial regional differences in mismatch outcomes are observed across Vietnam's major regions. The results are consistent with H4 because provincial institutional indicators are significantly associated with both undereducation and overeducation outcomes.

Overall, the findings indicate that education–job mismatch in Vietnam is systematically associated with individual characteristics, labor market structures, regional disparities, and institutional conditions.

4. DISCUSSION

The findings indicate that education–job mismatch in Vietnam is not merely an individual-level labor market outcome but a structural phenomenon shaped by the interaction between educational expansion, labor market segmentation,

regional disparities, and institutional conditions. This interpretation is consistent with assignment theory, which emphasizes that labor market outcomes depend not only on workers' human capital but also on how workers are allocated across heterogeneous jobs (Sattinger, 1993, 2012). It also extends the human capital perspective by showing that educational attainment alone does not guarantee efficient job matching when labor demand and institutional conditions are uneven. The findings therefore support the conceptual framework proposed in Figure 1, where mismatch outcomes emerge from the interaction between labor supply, labor demand, and institutional conditions.

The strong association between tertiary education and overeducation is one of the most important findings of this study. College and university graduates are substantially more likely to experience overeducation than workers with upper secondary education. The substantially higher relative risk ratio observed among college graduates compared with university graduates may reflect differences in occupational placement patterns within Vietnam's labor market. College graduates may be relatively more concentrated in intermediate technical and administrative occupations where the supply of graduates exceeds the number of positions requiring corresponding qualifications. However, because educational attainment forms part of the mismatch classification framework, these estimates should primarily be interpreted as indicators of qualification–occupation alignment rather than precise measures of causal effects. This result is consistent with evidence suggesting that rapid educational expansion may generate graduate oversupply when the creation of high-skilled jobs does not keep pace with the increasing supply of educated labor (McGuinness, 2006; Leuven & Oosterbeek, 2011; Adalet McGowan & Andrews, 2015). In the Vietnamese context, labor market assessments have documented substantial qualification mismatch among tertiary-educated workers, indicating that a considerable proportion of graduates are employed in jobs requiring lower qualification levels. This interpretation is also consistent with recent assessments of the Vietnamese labor market, which report high rates of qualification mismatch among tertiary-educated workers and persistent discrepancies between skill supply and skill demand across occupations and re-

gions. These findings suggest that the expansion of higher education has not been fully matched by corresponding growth in occupations requiring tertiary-level qualifications and support concerns regarding the efficient utilization of human capital in Vietnam.

The results also show that demographic characteristics are systematically associated with mismatch outcomes. Older workers are more likely to be undereducated and less likely to be overeducated, suggesting that accumulated work experience may partly substitute for formal educational credentials. This finding is consistent with earlier studies indicating that mismatch varies across the life cycle and career stage (Alba-Ramírez, 1993; Addison & Portugal, 2002). The lower likelihood of overeducation among male and married workers may also reflect differences in occupational mobility, career stability, and labor market attachment. These patterns suggest that mismatch should not be interpreted solely as a problem of educational supply but also as a process shaped by workers' career trajectories and labor market transitions.

At the same time, workers in foreign-invested enterprises, private enterprises, and household businesses are significantly more likely to experience overeducation than workers in the state sector. One possible explanation is that firms operating in competitive market environments may recruit workers whose educational qualifications exceed the minimum requirements of available positions in order to enhance productivity, adaptability, and workforce quality. This interpretation is consistent with screening and credential inflation arguments in personnel economics, where educational qualifications serve as signals of productivity when direct information on worker skills is incomplete (Oyer & Schaefer, 2011). It also aligns with broader evidence that labor market segmentation contributes to unequal skill utilization and mismatch outcomes (McGuinness et al., 2018).

The results for employment arrangements further reinforce the role of labor market segmentation. Wage employees, contributing family workers, and cooperative members are more likely to experience overeducation than employers. These differences suggest that workers' position within the employment structure affects how their educa-

tional qualifications are used. In less secure or less autonomous employment arrangements, workers may have fewer opportunities to select jobs that fully correspond to their education. This interpretation is consistent with studies showing that mismatch is closely linked to job quality, employment stability, and career mobility (Allen & van der Velden, 2001; Mavromaras et al., 2013).

Regional disparities also matter. The results show substantial variation in undereducation and overeducation across regions, indicating that mismatch is shaped by spatial differences in labor demand, industrial structure, and employment opportunities. This finding is particularly relevant for Vietnam, where regional development remains uneven and labor markets differ considerably across provinces. It supports the argument that mismatch should be examined not only at the individual level but also in relation to local labor market conditions and regional economic structures (Arias Ortiz et al., 2020; World Bank, 2014).

The institutional findings represent one of the main contributions of this study. The Labor Training Index is associated with a lower likelihood of overeducation, suggesting that stronger provincial workforce training systems may improve the alignment between workers' qualifications and job requirements. At the same time, its positive association with undereducation may indicate that stronger workforce training systems facilitate access to occupations requiring higher skill levels among workers whose formal educational attainment falls below the benchmark qualification level. This asymmetric effect suggests that institutional quality may not uniformly reduce all forms of mismatch but may instead alter the composition of mismatch through improvements in practical skill formation and labor market mobility. This interpretation is consistent with evidence from Vietnam suggesting that provinces with stronger competitiveness and workforce development systems tend to provide more favorable business environments, attract greater investment, and generate more diverse employment opportunities. Through these mechanisms, provincial institutions may influence both the demand for skills and the ability of workers to access jobs corresponding to their qualifications. Consequently, institutional quality may affect mismatch not only

through training policies but also through broader labor market dynamics.

By contrast, the Informal Charges Index is positively associated with overeducation. Because higher values of this PCI sub-index indicate a more favorable business environment and lower unofficial payment burdens, the result should not be interpreted as evidence that higher informal costs increase mismatch. Instead, provinces with higher Informal Charges Index scores are associated with a greater relative likelihood of overeducation in the observed sample. One possible explanation is that more favorable business environments attract larger concentrations of educated workers, thereby intensifying competition for high-skilled positions in economically dynamic provinces. Nevertheless, because the present study cannot directly identify the underlying mechanisms, the positive association should be interpreted as an empirical relationship ob-

served in the data rather than evidence of a direct causal effect of institutional transparency on overeducation.

Overall, the findings suggest that education–job mismatch in Vietnam reflects the combined influence of educational expansion, labor market segmentation, regional disparities, and institutional heterogeneity. The results indicate that increasing educational attainment alone may not be sufficient to ensure efficient human capital utilization when labor demand, workforce training systems, and institutional conditions evolve unevenly. These findings highlight the importance of strengthening workforce development systems, improving labor market information, and enhancing coordination between education provision and labor demand. They also suggest that institutional conditions should be considered alongside individual and labor market factors when analyzing mismatch in transition economies.

CONCLUSION

This study examined how individual characteristics, labor market structures, regional disparities, and provincial institutional conditions are associated with education–job mismatch among employed workers in Vietnam. Using a large nationwide labor force survey combined with provincial institutional indicators, the study investigated the factors associated with undereducation and overeducation relative to adequately matched employment.

The results show that educational attainment is systematically associated with mismatch outcomes, with tertiary-educated workers exhibiting substantially higher relative likelihoods of overeducation. Mismatch outcomes also vary significantly across sectors, ownership types, employment arrangements, and regions, highlighting the importance of labor market segmentation and regional disparities in shaping labor allocation. In addition, provincial institutional indicators are significantly associated with mismatch outcomes. Provinces with stronger workforce training systems tend to exhibit lower relative likelihoods of overeducation, while the Informal Charges Index is positively associated with overeducation.

These findings suggest that education–job mismatch in Vietnam reflects broader structural and institutional conditions in addition to individual worker characteristics. The results highlight the importance of workforce development systems, labor market information, and the alignment between educational provision and labor demand for improving human capital utilization. More generally, the findings suggest that increasing educational attainment alone may not be sufficient to improve labor market matching when labor demand and institutional conditions evolve unevenly.

This study contributes to the literature in three ways. First, it provides new evidence on education–job mismatch using nationally representative labor force data for Vietnam. Second, it integrates individual characteristics, labor market structures, regional disparities, and institutional conditions within a unified analytical framework. Third, by linking worker-level labor market outcomes

to provincial competitiveness indicators, it extends the mismatch literature beyond conventional individual- and firm-level explanations and highlights the role of subnational institutional heterogeneity in shaping labor market matching outcomes.

Several limitations should be acknowledged. The analysis is based on cross-sectional data and therefore identifies statistical associations rather than causal relationships. In addition, provincial institutional indicators are measured at the provincial level and assigned to individual workers according to their province of residence. Future research could also examine the mechanisms through which provincial institutional environments influence mismatch outcomes and explore whether these relationships differ across industries, occupations, and worker groups.

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The study is based exclusively on anonymized secondary data and does not involve direct participation of human subjects or access to personally identifiable information. Therefore, formal ethical approval was not required.

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