Job Mismatches and Influencers in Emerging Markets: Evidence from Vietnam

My Tran Ngo [1*], Truong Huy Huynh [2]
[1] Can Tho University, [2] Can Tho University
** Corresponding author: nnmtran@ctu.edu.vn*

Abstract
Previous studies suggest that job mismatch is a common but context-dependent phenomenon. The incidence of job mismatch occurring in Vietnam could threaten the sustainability of its emerging economy, but there is a paucity of studies to examine it. This article fills that research gap by reporting a study that analyzes the current situation and factors affecting types of job mismatch among Business and Management graduates in the Mekong River Delta of Vietnam. This study uses surveyed data from 13 provinces and cities of the Mekong River Delta in Vietnam. Multinomial logistics regression is used to identify the influencers of job mismatches. The analysis shows the severe job mismatches among employees working in the region. Based on participants' self-reporting, approximately one-third of the employees encountered education mismatches, almost half-faced field-of-study mismatches, and more than three-quarters experienced skills mismatches. In addition, multinomial logit regression results show that both employee's characteristics (mainly education) and socio-economic and cultural aspects of the country are important factors affecting the likelihood of job mismatches. The survey data on employees employed in this study is rare in Vietnam, where the available information on this respondent is hardly found. Hence, the causes of job mismatches identified in this study are important and unique sources that benefit Vietnam in modifying its workforce development strategic plans and provide further empirical evidence about job mismatch and its influencers across different labor markets.
Keywords: Education mismatch; field-of-study mismatch; job mismatch; skill mismatch.
Tob Regul Sci.™ 2021;7(6-1): 7517-7533
DOI: doi.org/10.18001/TRS.7.6.1.71

Introduction

Developing a workforce that can support national socio-economic development is central to many countries' strategic development policies. There may be some undesired outcomes, such as job mismatches between the trained human resources and the labor market's actual needs despite careful planning. Job mismatches need to be urgently addressed because of their negative socio-economic impact at the individual, organizational and national levels, such as low job satisfaction, low labor productivity, and labor market degradation (Song et al., 2021, Li and Wang, 2020, Badillo-Amador and Vila, 2013, McGuinness, 2006, Sloane et al., 1999).

Vietnam is a fast-growing economy in Southeast Asia. Since implementing the Doi Moi (renovation) policies, it has experienced impressive economic growth with a rapid shift from low productivity agriculture into higher productivity non-farm jobs. From 2002 to 2018, GDP per capita increased 2.7 times, reaching approximately $ 2,700 in 2019 (WorldBank, 2020). However, its economic growth has recently slowed down. The main reason is that Vietnam's economic development relied predominantly on capital investments, not productivity, which may fail to sustain economic growth in the long run. In fact, Vietnam is classified among the countries with the lowest labor productivity (Vnexpress, 2019). As reported in Vietnam Development Report (2014), many employers in several sectors experienced hiring difficulties due to job applicants' lack of skills or irrelevant qualifications and work experience. Likewise, recent research indicates a job mismatch in the labor market. Surveying Vietnamese youth aged 15-29 education-to-work transition, the International Labor Organization (ILO) showed that 26% of

the youth have a higher educational level than their current job requirements; and approximately 23.5% of them do jobs that require higher technical requirements than their levels (BaoMoi, 2017). A study by Tran (2018) revealed a considerable skill gap among final-year university students and graduates, with the gap ranging from 0.5 to 0.9 on a 5-point Likert scale for information skills, literacy skills, intellectual skills, interpersonal and communication skills, learning and personal development skills and career development skills. As such, existing studies indicate that there is both a skill gap and a skill shortage in the Vietnamese labor market.

The Mekong River Delta of Vietnam covers more than 4 million hectares and hosts about 20 million people (approximately 1/5 of the national population). The region contributes about 20% of the country's GDP, reaching 7.8% in 2018, higher than the national average of 7.08%. Data from the General Statistics Office showed that the region's labor force (15+ years of age) was about 10 million people for 2015-2018. The unemployment rate fluctuated between 2.67% and 2.89% during this period, while the underemployment rate was around 3%, almost twice the nation's average rate. The labor force receiving professional training ranged from 11.4% to 13.3% in the same period, which is lower than the average rate for the nation (19.9% to 21.9%). Therefore, this region is expected to provide an appropriate case that examines job mismatch in the Vietnamese labor market, which can generate insights to develop better and utilize the human resources to sustain its socio-economic development.

There have been studies about job mismatches in the US (Robst, 2008), the Netherlands (Allen and Van der Velden, 2001), Australia (Fleming and Kler, 2014), Spain (Alba-Ramirez, 1993), Pakistan (Farooq, 2011) and China (Zhu, 2014) among others. To explain these phenomena, many related theories have been developed, such as human capital theory (Becker, 1964), career mobility theory (Sicherman and Galor, 1990), job assignment theory (Hartog, 2000)… Generally, previous studies reveal that job mismatch is a common phenomenon influenced by several contextual factors. In Vietnam, a fast-growing economy, producing a workforce that matches the market needs importantly sustains its socio-economic growth rate and efficient use of its scarce resources. However, a limited body of research indicates a skills gap, a dimension of job mismatch, in the country in the past decades, threatening its socio-economic prospects (Man Power Group, 2014, Tran, 2018, Tran and Swierczek, 2009). The questions are job mismatch occurs in what dimensions, how severe it is currently in the country, and what factors affect such mismatches. Answering these questions benefits Vietnam in modifying its workforce development strategic plans and further provides empirical evidence on job mismatches and influencers across different labor markets. Thus, it could expand our understanding of this phenomenon and provide implications for effectively producing, using, and upskilling the workforce in Vietnam and other emerging countries. Specifically, in the context of Vietnam, the research results will be an important scientific basis to propose policy implications for managers in related agencies such as the Ministry of Education and Training, the Ministry of Labor - Invalids and Social Affairs, Departments of Education and Training of provinces/cities, Departments of Labor - Invalids and Social Affairs of provinces/cities, universities, colleges ... in order to improve the status of job mismatches in Vietnam in general and the Mekong Delta in particular.

Literature review

Job mismatches: perspectives, classification, and consequences

Job mismatch research has received much attention in recent years. Generally, existing research has gained consensus on three forms of mismatches.

An educational mismatch, also known as a vertical mismatch, is an imperfect match between an employee's qualifications and the job requirements. It is caused by a lack of conformity between the level of qualifications gained by the employees and the ones required for a job (Senarath and Patabendige, 2014). The vertical mismatch is usually expressed in two forms: over-education and under-education. The former occurs when the employee's qualifications are higher than the job requirements; contrarily, the latter is when the job requires a degree higher than the one the employee attained (Farooq, 2011).

Field-of-study mismatch, or horizontal mismatch, is defined as a discrepancy between the discipline studying by an individual and the discipline required to perform a job well (Sellami et al., 2018). This type of mismatch can occur as unrelated field-of-study or slightly-related field-of-study mismatch (Robst, 2007).

Skill mismatch exists when employees' skills do not match the skills required by the job (Allen and Van der Velden, 2001). It is often caused by formal education failing to make their students job-ready (Sellami et al., 2018). Even when graduates successfully attained all learning outcomes provided by a training program, they may experience skill mismatch due to a lack of soft skills mostly accruing from participating in extra-curricular activities. The over-skilled mismatch occurs when employees are more skilled than the general skill level required for their job; the under-skilled mismatch occurs when the accumulated skills do not meet the skill set needed.

Previous studies documented some negative impacts of job mismatches. At the micro or individual level, over-education is associated with lower wages, reduction of labor productivity, decrease in employees' job satisfaction (Badillo-Amador and Vila, 2013, Pholphirul, 2017, Veselinović et al., 2020), increase in the rate of turnover and job mobility (Farooq, 2011, Sloane et al., 1999). For instance, Badillo-Amador and Vila (2013) empirically evidence that over-education negatively impacts employees' returns and overall job satisfaction in the Spanish labor market. At the meso or organizational level, job mismatches may result in a decline in labor productivity and an increase in costs in recruiting and training new employees (Mahy et al., 2015, Sloane et al., 1999). For example, in Belgium, Mahy et al. (2015) find that firm productivity was hampered by the increase in employees' under-education since under-educated employees are less productive than those with the job's adequate education. At a macro level, job mismatches are related to a waste of social resources in training the workforce and labor market degradation (Farooq, 2011, Ghignoni and Verashchagina, 2014, Iriondo and Pérez-Amaral, 2016, McGuinness, 2006). This can be illustrated by Iriondo and Pérez-Amaral (2016)'s study that found a wage penalty of 7.7% for each year of over-education, using a sample of more than 66,000 full-time employees across 11 European countries. They estimated that over-education causes a waste of resources between 0.12% and 0.15% of European GDP, and between 10.8% and 14% of public spending on tertiary education in these European countries.

Causes of job mismatches

Numerous studies attempt to identify the causes of job mismatches, mostly using perspectives from the supply side (e.g., Caroleo and Pastore (2018), Robst (2007) or Senarath and Patabendige (2014)). The analysis in these studies is framed within labor supply factors, expanding our insights into this phenomenon in different labor markets. Existent literature shows that job mismatches can result from personal, education, and labor market factors.

Personal factors

Recent studies reveal that several personal factors directly contribute to job mismatches in the workforce. In terms of age, young employees are often more over-educated than older ones (Alba-Ramirez, 1993, Ghignoni and Verashchagina, 2014, Sevilla and Farías, 2020, Sutherland, 2012). This might be because young employees are

still in the testing phase of the job. They tend to invest more in education, which signals their productivity to be promoted or land in a position suitable with their educational level and degree.

Gender effect on education mismatches has found mixed results. While Kucel and Vilalta-Bufí (2012) and Sharma and Sharma (2017) found some evidence of a lower probability of over-education for female employees compared with male counterparts in Poland and India, respectively, Senkrua (2015) found it higher in the Thai labor market. Concerning under-education, the relationships in these studies are reversed: A higher probability of under-education is found for females than males in Poland and a lower likelihood of under-education in Thailand. This contradiction can be that female employees in Thailand have lower job opportunities, and males are often favored in the labor market (Senkrua, 2015). Also, females are expected to bear ~~the~~ caring responsibilities; therefore, they prioritize career options that balance work and family time instead of investing time to look for jobs corresponding to their attained qualifications (Sharma and Sharma, 2017).

In terms of marital status, married employees are more likely to be over-educated than unmarried employees (Pholphirul, 2017, Sharma and Sharma, 2017). This might be explained that married people are tied to the spouses' occupations and other family responsibilities; so they may accept jobs that require a lower qualification than their acquired level or allow them flexible time to fulfill their caring obligations (Sharma and Sharma, 2017, Robst and VanGilder, 2016).

Education-related factors

Educational level is a strong influencer of employees' job mismatches, either overqualified or under-qualified for job requirements (Alba-Ramirez, 1993, Klein, 2011, Quinn and Rubb, 2006, Sevilla and Farías, 2020, Sharma and Sharma, 2017, Robst, 2007). For example, Robst (2007) and Klein (2011) provide statistical evidence that employees with in-depth expertise (with Master's and Ph.D. degrees) have a lower likelihood of facing field-of-study mismatches than employees with university degrees. This phenomenon can be explained by occupational mobility theory. When entering the labor market, employees often choose a job that requires lower qualifications than the qualifications they gain to acquire more work experience while preparing for future employment or promotion opportunities (Farooq, 2011, Sicherman and Galor, 1990). Job competition theory can also explain that those with higher qualifications will be preferred by employers who believe that training costs for these prospective employees can be saved (Iriondo and Pérez-Amaral, 2016, Thurow, 1975). Through the lens of signal theory (Rohrbach-Schmidt and Tiemann, 2016), an employee's qualification is an essential indicator of the employee's potential productivity, so highly qualified people often have better access to well-paid jobs.

In addition, the impact of educational levels on job mismatches appears to be confounded by employees' fields of study. Klein (2011)'s study showed that graduates in Germany from all disciplines (except for law) are at greater risk of over-education than health and welfare graduates. When other variables remain constant, humanities, arts, and agriculture graduates are at the highest risk of under-education for their first job. This could be explained by the fact that social sciences and arts disciplines often equip students with general skills instead of specific professional skills, as argued by Robst (2007) and Sellami et al. (2018). Employees studying science and math have a lower probability of being under-educated in Poland (Kucel and Vilalta-Bufí, 2012); still, it is found higher for employees studying engineering in Italy (Caroleo and Pastore, 2018). This could be explained by the fact that social sciences and arts disciplines often equip students with general skills instead of specific professional skills, as argued by Robst (2007) and Sellami et al. (2018).

Besides, graduates can reduce the risk of job mismatch if they invest in the quality of their education. Kucel and Vilalta-Bufí (2012) and McGuinness and Byrne (2015) found that field-of-study job mismatch is less likely to occur for employees who graduate from prestigious institutions familiar with employers. Graduates of public institutions obtain a job relevant to their field of study more often than their counterparts in private institutions (Robst and VanGilder, 2016). Graduates with good academic records, via the proxy of the average grade point or academic awards, are less likely to experience level-of-education job mismatch, i.e., overqualified or underqualified, when entering the labor market (Kucel and Vilalta-Bufí, 2012, Verhaest and Omey, 2010). Those graduating with distinction or high academic scores are also less likely to suffer from field-of-study or over-education job mismatches (Sellami et al., 2018, Kucel and Vilalta-Bufí, 2012).

Labor market factors

Job mismatch can occur due to employers' demands. Unlike earlier, when a university degree could help graduates secure a lifetime job, employers now demand that prospective employees obtain qualifications and relevant work experience for an advertised vacancy. Such a demand appears to influence job (mis)matches of fresh graduates as not all of them can afford work experience, mostly in internship or placement experience. Contrarily, several employees, usually aged individuals, with an educational level lower than the requirement of a job have more work experience than those with an educational level that matches the job (Alba-Ramirez, 1993, Quinn and Rubb, 2006, Sharma and Sharma, 2017). Due to employers' demands, both groups may be disadvantaged in the labor market.

In addition, job sectors can also cause job (mis)matches. Klein (2011) finds that in the public sector, graduates are more likely to have a job relevant to their level of education and field of study than those choosing to work in the private sector. Research results of Sharma and Sharma (2017) also found that the probability of over-education is lower for people working in the public sector.

Moreover, as career mobility increases, job change regularly happens and results in level-of-education job mismatch. McGuinness and Byrne (2015) found that over-education is more likely to occur when employees change their jobs. According to occupational mobility theory (Farooq, 2011, Sicherman and Galor, 1990), employees often choose a job that requires lower qualifications to have a better advantage for securing an employment position or promotion. As such, over-education can result from employees' intentional decision to gain more work experience and receive more practical training, elevating their profile in the increasingly competitive labor market.

Finally, job markets are not static but continually changing. Researchers also find that rapid development of science and technology requires organizations to innovate their work practices and needs of new skills set to fit in well with such practices (de Oliveira et al., 2000, Di Pietro, 2002). Therefore, even when graduates with enough expertise are employed to undertake a job, they may suffer skills mismatch related to new technologies or new requirements of a production process if they do not update their expertise frequently.

Method

Research questions and research approach

This study examines the current situation of job mismatches and their causes basing upon the survey of employees who work in the Mekong River Delta region and simultaneously graduated from the Business and Management disciplines. Key variables must be gathered as follows educational level, field-of-study and skill mismatches. The

focus on a certain discipline also allowed us to examine the job mismatch phenomenon more in-depth. It is also because this discipline constitutes a high percentage of job demand in the country in general and the Mekong River Delta of Vietnam in particular (LaoDong, 2021). The research questions are:

What are the current job mismatches among Business and Management employees in the Mekong River Delta of Vietnam?

What are the determinants of the job mismatches among the target employees in this region?

Based on the field survey from Business and Management employees working in 13 provinces, city of the Mekong River Delta region of Vietnam, a quantitative research approach is attempted to measure the level of job mismatches. It also allows us to seek determinants of job mismatches throughout an application of the multinomial logistics analysis in corresponding underlying types of job mismatches.

Instrument

A survey was developed based on the literature review of job mismatches, following the method of worker self-assessment (WSA) (Farooq, 2011, Robst and VanGilder, 2016). The first draft of the survey was got professional contributions from eight senior economics lecturers from six universities in the south of Vietnam. The expert feedback was used to revise the structure and wording of questions to make them more consistent and unambiguous for the official survey later. The questionnaire's final version consists of four sections, including demographic information, education characteristics, job characteristics, and questions to measure job mismatch. Most expected responses in the questionnaire are measured or transformed into nominal and ratio scales. In the survey, each participant was invited to self-assess whether her/his educational attainment was consistent with the level needed for the job. He/she was also asked to indicate whether their jobs were closely related, slightly related or unrelated to their field of study and whether their current skills level was higher, adequate, or lower than the skills level required for the job.

Participants and sample size

According to the General Statistics Office of Vietnam, in 2017, the number of employees in aged 15 and above in 13 provinces/cities in the Mekong River Delta region was approximately 10,596.5 thousand people. For a confidence interval of 95%, following the formula to calculate the sample size in Israel (1992), $n = N / (1 + N * e^2)$, where N is the total number of the target population and e is the error, the minimum sample size for this study should be 400. The number of the target employees to be surveyed in each province/city was proportional to the relative number of employees in each province/city. Target participants were those aged between 18 and 60 years, graduated from Business and Management programs and are currently employed for government agencies or businesses in the Mekong River Delta of Vietnam.

Data collection

A pilot study was conducted with 65 target participants in Can Tho City before the official survey was administered to the target participants. The pilot test showed that the survey questions were clear to participants and could generate the needed data. To increase the number of responses within a restricted time allowed for the research project, the data were collected by a paper-based and an equivalent online survey. The participants were recruited by the snowball sampling method (Blackstone, 2018), but with some specific recruitment criteria as mentioned earlier. This sampling method is employed to reach the target participants more quickly, ensuring time efficiency for the project. The paper-based and online surveys were conducted in each of the 13 provinces of the Mekong River Delta of Vietnam. The interviewers contacted with accquaintances working in businesses such as

commercial, hotel, bank… as well as government agencies to meet the potential respondents. After completing the interview, they further introduced other respondents and distributed questionnaires to other employees that satisfying the recruitment criteria. The data collection process was conducted from September to December 2019. In total, 622 responses were received (The sample distribution by provinces is displayed in Table A in Appendix). With this sample size, the confidence interval is 96%.

Data analysis

First, descriptive statistics are used to describe the data and examine the incidences of job mismatch in the Mekong River Delta. In addition, cross-tabulation is also used to explore the relationship between job mismatch categories and some demographic characters of employees: gender, age group, and educational level. Next, multinomial logistics analysis was used to identify the influencers of job mismatches. The estimation equation is specified as follows:

$$MM = \alpha + \sum_{i=1}^{4} \beta_i D_i + \sum_{j=1}^{3} \delta_j R_j + \sum_{k=1}^{3} \varphi_k J_k + \varepsilon \qquad (1)$$

Where MM represents each type of job mismatch and D, R, and J represent variables on employees' demographic, educational, and job-related features. Model (1) was estimated three times respectively for each type of three kinds of mismatches: education mismatch, skill mismatch, and field-of-study mismatch. Education mismatch was measured by over-education, adequate-education (reference group), and under-education, while skill mismatch was determined at three levels: over-skill, adequate-skill (reference group), and under-skill. It was measured in three states concerning field-of-study mismatch: unrelated, slightly related, and closely related to the field-of-study (reference group).

Results and discussion

Demographic results

Among the 622 participants, male and female participants have slightly different, 55.14% and 44.86%, respectively. They age from 21 to 59 years, with an average of 29.32 years. The average work experience was 5.31 years, in which some participants had just started their job for less than a year, whereas others had been 30 years in their positions.

In terms of education level, participants with university degrees accounted for 78.46% of the sample, with a master or doctorate program accounted for 5.63%, and the remaining 15.92% completed vocational or college education. The results also indicated that most of them (87.30%) completed their study as full-time students. Approximately 2% graduated with excellent grades; 20% completed their studies with very good grades; nearly 60% achieved good grades, and roughly 18% got a fair result for their studies (see Table 1).

Table 1. Participants' demographic results (n=622)

	Frequency	%
Educational level		
Vocational education/ college	99	15.92
Bachelor	488	78.46
Master/Doctorate	35	5.63

Mode of study				
Full time	543	87.30		
Part time	68	10.93		
Distance learning	11	1.77		
Academic results				
Excellent	14	2.25		
Very good	27	20.42		
Good	70	59.49		
Fair	11	17.85		
Gender				
Male	343	55.14		
Female	279	44.86		
	Obs	Mean	Min	Max
Age (Year)	622	29.32	21	59
Working experience (Year)	622	5.31	0	30

Job mismatches in the Mekong River Delta of Vietnam

The statistical results (Table 2) show that Business and Management employees in the survey experienced a severe level of job mismatches. More than one-third of the participants reported that they experienced education mismatch, in which more participants experienced over-education (29.58%) than under-education (4.50%). This result is consistent with a study conducted by Chua and Chun (2016), who reported that over-education is a big problem in Vietnam now. This finding also indicated that the percentage of employees experiencing over-education in the Mekong River Delta is higher than that of the whole country (24.3%) as reported by Sparreboom and Staneva (2014), while the percentage of those experiencing under-education in this region is much lower than that for the whole country (22.0%) (see Sparreboom and Staneva (2014)). Compared with neighboring countries, the over-education mismatch in Vietnam is less serious than in Thailand (35.97% overeducation, see Pholphirul (2017)) and China (33.67% over-education, see Wu and Wang (2018)).

Table 2. Job mismatches in the Mekong River Delta (n = 622)

	Total		Gender (Feq/percentage)		Education level (Feq/percentage)			Age (Feq/percentage)		
Job mismatches	*Frequency*	*%*	*Female*	*Male*	*Below bachelor*	*Bachelor*	*Post-graduate*	*< 30*	*30-45*	*>45*
Education mismatch										
Under-education	28	4.50	19 (67.86)	9 (32.14)	12 (42.86)	14 (50.00)	2 (7.14)	11 (39.29)	13 (46.43)	4 (14.29)
Adequate education	410	65.92	219 (53.41)	191 (46.59)	22 (5.37)	383 (93.41)	5 (1.22)	256 (62.44)	147 (35.85)	7 (1.71)
Over-education	184	29.58	105 (57.07)	79 (42.93)	65 (35.33)	91 (49.46)	28 (15.22)	133 (72.28)	45 (24.46)	6 (3.26)
Total	622	100.00	343 (55.14)	279 (44.86)	99 (15.92)	488 (78.46)	35 (5.63)	400 (64.31)	205 (32.96)	17 (2.73)
Skill mismatch										
Under-skill	26	4.18	19 (73.08)	7 (26.92)	4 (15.38)	16 (61.54)	6 (23.08)	9 (34.62)	14 (53.85)	3 (11.54)
Adequate skill	104	16.72	68 (61.54)	40 (38.46)	37 (35.58)	65 (62.50)	2 (1.92)	75 (72.12)	24 (23.08)	5 (4.81)
Over-skill	492	79.10	260 (52.85)	232 (47.15)	58 (11.79)	407 (82.72)	27 (5.49)	316 (64.23)	167 (33.94)	9 (1.83)
Total	622	100.00	343 (55.14)	279 (44.86)	99 (15.92)	488 (78.46)	35 (5.63)	400 (64.31)	205 (32.96)	17 (2.73)
Field of study mismatch										
Unrelated to the field of study	110	17.68	61 (55.45)	49 (44.55)	56 (50.91)	51 (46.36)	3 (2.73)	97 (88.18)	11 (10.00)	2 (1.82)
Slightly related to the field of study	174	27.97	108 (62.07)	66 (37.93)	27 (15.52)	142 (81.61)	5 (2.87)	102 (58.62)	64 (36.78)	8 (4.60)
Closely related to the field of study	338	54.34	174 (51.48)	164 (48.52)	16 (4.73)	295 (87.28)	27 (7.99)	201 (59.47)	130 (38.46)	7 (2.07)

Total	622	100.00	343 (55.14)	279 (44.86)	99 (15.92)	488 (78.46)	35 (5.63)	400 (64.31)	205 (32.96)	17 (2.73)

Field-of-study mismatch appeared to be more serious when nearly half of the participants found that their current positions were unrelated or slightly related to their field of study, 17.68% and 27.97%, respectively. The rate of horizontal mismatch in the Mekong River Delta in Vietnam is rather higher than those documented in the Thailand market (40.03% horizontal mismatch, see Pholphirul (2017)). Skill mismatch was reported to be the most serious form of job mismatch reported by participants, with 83.28% of the participants experienced either under-skill (4.18%) or over-skill (79.10%).

The analysis results (Table 2) also show that the female faces a slightly higher job mismatch compared with the male counterpart. Specifically, they experienced a higher rate of under-education (67.86% vs. 32.14%) and over-education (57.07% vs. 42.93%) compared with male employees. They also experience a higher percentage of skill mismatch than males do (70.08% vs. 26.92% for under-skill and 52.85% vs. 47.15% for over-skill). Moreover, they also encounter a higher level of unrelated field-of-study (55.45% vs. 44.55%) and slightly related field-of-study mismatch (62.07% vs. 37.93%) than male employees.

In addition, concerning education levels in business and management, most cases of under-education mismatch occur for employees with a bachelor's degree (50,00%), followed by those with vocational or college degrees (42.86%). Similarly, 49.46% of cases of over-education take place for bachelors, while 35.33% of cases of over-education appear for employees with vocational or college degrees. Besides, the highest percentage of under-skill and over-skill appears for those with bachelor majors in business and management (61.54% and 82.72%, respectively). Moreover, the statistics in Table 2 show that 50.91% of unrelated field-of-study cases occur for employees who completed vocational or college education, while 81.61% cases of slightly related field-of-study occur for those with bachelors. This situation indicates that employees with bachelor's degrees have faced all kinds of job mismatches. This result has raised the need for a policy implication of bachelor education to improve the job match in business and management.

Regarding the age, over 70% of cases of over-education happen to those having the age below 30 years old with a major in business and management. This result indicates that young employees in the Mekong River Delta tend to invest more in education and could accept the job requiring a lower level of degrees. This result seems to support the signal theory (Battu and Bender, 2020). This age group also faces most over-skill cases. Moreover, most cases of unrelated field-of-study (88.18%) and slightly related field-of-study (58.62%) also occur for those of this age group.

When examing the job mismatches by provinces, the statistical results in Table 3 show that with respect to employees studying the majors of Business and Management the job mismatch is relatively common in almost all provinces in the Mekong River Delta. Regarding on education mismatch, some provinces have shown a worse situation than other when facing a much higher rate of overeducation than the average rate of the region such as Vinh Long, Long An and Ben Tre. These provinces have also experienced roundly the double rate of unrelated field of study mismatch than the region average. In addition, the rate of overskill mismatch has been highly present in most of provinces. As a result, it is necessary for all provinces in the region to find appropriate causes and solutions to improve this situation.

Table 3: Percentage of job mismatches in the Mekong River Delta by provinces

Unit: %

	An Giang	Bac Lieu	Ben Tre	Ca Mau	Can Tho	Đong Thap	Hau Giang	Kien Giang	Long An	Soc Trang	Tien Giang	Tra Vinh	Vinh Long	Mekong River Delta
Education mismatch														
Undereducation	5.77	3.45	2.13	0.00	15.94	6.06	2.17	9.62	2.33	2.04	0.00	0.00	0.00	4.50
Overeducation	32.69	27.59	40.00	7.14	28.99	12.12	34.78	15.38	46.51	24.49	31.91	31.91	50.00	29.58
Skill mismatch														
Underskill	5.77	3.45	0.00	6.45	11.59	7.58	6.52	0.00	2.33	0.00	4.26	0.00	2.27	4.18
Overskill	80.77	79.31	55.32	61.29	78.26	86.36	80.43	84.62	95.35	85.71	70.21	72.34	90.91	79.10
Field-of-study														
Unrelated	15.38	10.34	36.17	6.45	10.14	6.06	6.52	11.54	23.26	10.20	34.04	27.66	36.36	17.68
Slightly related	55.77	44.83	14.89	0.00	28.99	24.24	41.30	44.23	37.21	20.41	17.02	21.28	6.82	27.97

Table 4. Marginal effects (dy/dx) for each covariate calculated from the estimated results by multinomial logistics[a]

Variables	Education mismatch		Skill mismatch		Field-of-study mismatch	
	Under-education	Over-education	Under-skill	Over-skill	Unrelated	Slightly related
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.0019	-0.0080	0.0019	0.0006	-0.0127**	0.0073
Male	-0.0108	-0.0052	-0.0248	0.0651**	0.0086	-0.0485
Married	0.0049	0.0343	-0.0346	0.0315	-0.0780	-0.0064
Caring responsibilities	0.0023	-0.0739	0.0119	-0.0022	0.0324	-0.1549***
Working experience	0.0038*	-0.0054	0.0027	-0.0111**	-0.0018	0.0025
Job change	0.0012	-0.0290	0.0209	0.0681*	0.0374	0.1151***
Public services	0.0712***	-0.1514**	-0.0161	0.1377**	0.0111	0.0988*
Education						
Bachelor	-0.0987***	-0.3111***	-0.0209	0.1877***	-0.2518***	-0.0816
Master/Doctorate	-0.1303***	0.3120***	0.0218	0.2686***	-0.1649**	-0.3194***
Training system						
Full time	0.5347	-0.4063*	0.4554	-0.4743	0.0155	-0.0492
Part time	0.5354	-0.3327	0.4790	-0.5279	0.0015	-0.0759
Academic results						
Excellent	-0.4512	0.0393	0.0787**	0.0577	-0.0230	-0.2729
Very good	0.0470	-0.0318	0.0129	0.1373**	-0.0887**	0.0193
Good	0.0301	-0.0187	-0.0031	0.0709*	-0.0760**	0.0672
N	622	622	622	622	622	622

*Note: ***, ** and * represent for significant levels of 1%, 5% and 10%, respectively;*

Reference groups are women, unmarried employees, people who do not raise young children, do not change jobs, do not work in public sector, people with vocational education or college diploma, fair academic results and distance training system. The reference groups in estimating model (1) by multinomial logistics are adequate-education (education mismatch), adequate-skill (skill mismatch) and closely-related field of study (field of study mismatch);

[a] *The test of the assumption of independence of irrelevant alternatives (IIA) when using mlogit has been conducted by suest command in STATA. The results show that the assumption of IIA is hold for all 6 models in Table 3.*

Factors influencing education mismatches

In general, the marginal values estimated from the multinomial logistic regression in Table 4 show that education level, academic results, work experience, and the public sector are significant determinants of job mismatches related to the level of education.

Regarding overeducation, the statistical results show that having a bachelor's degree in Business and Management decreases the average probability of over-education for employees by 31.11% compared to those who completed vocational or college education. Those with a master's or doctoral degree may experience over-education, approximately 31.20% higher than employees with vocational or college degrees. This suggests that in the Mekong River Delta, obtaining a higher degree does not always guarantee the graduates a job corresponding to their level of education, but it can signal a potential employer. This result is consistent with the finding of Alba-Ramirez (1993) in the Spanish labor market and Quinn and Rubb (2006) in Mexico. It also supports the signal theory in that if employers look at educational credentials as a determinant of prospective employees' productivity, they may invest in more education, leading to over-education (Battu and Bender, 2020). However, if the employees get a deeper specialization, it is easier for them to be over-educated.

In addition, the average probabilities of over-education are 15.14% lower for those working in the public sector. This can be explained by the fact that in Vietnam, despite recent changes, most people who work for public sectors are treated as civil servants and employed permanently by the government under a tenure track system called 'biên chế'. Under this system, competitive exams are used to recruit new employees with appropriate qualifications, but their permanent employment status may fail to encourage them to study further as it is unnecessary to secure their employment (LuatVietnam). Finally, employees completing a full-time study program could reduce the probability of over-education by 40.63% compared to those completing their study part-time or distance learning. This finding well reflects the fact that the full-time training system in Vietnam, called "he chinh quy", are offered by prestigiously educational institutions and recruit best high school graduate applicants. Distance learning or part-time learning is often offered as in-service training for those who have already received a first degree or equivalent work experience. As a result, they may become over-educated in terms of the degree they get.

Regarding the case of under-education, the probabilities of experiencing under-education were found to be 9.87% and 13.03% lower for individuals with university or post-graduate degrees, respectively, than those with only vocational education or college diploma (column 1, Table 3). Besides, the analysis results indicate that one more year of work experience increases the probability of under-education for employees by 0.38%. Similarly, the probability of under-education is 7.12% higher for employees working in the public sector, which may also be related to the biên chế system, as explained earlier.

Factors influencing skill mismatch

Skill mismatch was measured by both over and under-skill. In terms of over-skill (column 4, Table 4), it is found that the probabilities of being over-skilled are 18.77% and 26.86% higher for employees holding a bachelor's and master/doctorate degrees, respectively than those only with vocational education or college diploma. In addition, it is evident that employees with very good or good academic results are 13.73% or 7.09%, respectively, more likely to experience over-skill higher than those graduating with a fair result. These results suggest that a higher level of education and better academic results contribute to the over-skill experienced by the employees.

Also, gender can influence over-skills experienced by employees in the Mekong River Delta of Vietnam. The results indicate that male employees' likelihood of being over-skilled is 6.51% higher than that of female employees. This result is in line with the result in McGuinness and Byrne (2015) conducted in 11 European countries. Moreover, people with more work experience have a lower likelihood of facing over-skill. Having one more year of work experience decreases the probability of over-skill by 1.11%. Our analysis also pointed out that those ~~who work~~ in the public service sector may experience a higher likelihood of being over-skilled than those who work outside (13.77% higher). In addition, employees who have changed their job tend to have a 6.81% higher probability of being over-skill than those not changing their jobs.

Regarding under-skill (column 3, Table 4), academic results are the only determinant to be found to increase the probability of employees' under-skill positively. Specifically, people who graduated with excellent academic results have a lower probability of being under-skilled by 7.87% than those with fair academic results. This result suggests that academic results are informative during recruitment practices and can be a good indicator of the employee's skill set.

Factors influencing field-of-study mismatch

Statistical results (column 5, Table 4) show that people possessing undergraduate and post-graduate degrees reduce their chances of working in a field unrelated to their studies by 25.18% and 16.49%, respectively. Consistently, in terms of slightly related to the field-of-study mismatch, the statistical results (column 6, Table 4) show that people possessing a master or doctoral degree have a 31.94% lower probability of doing jobs that are less relevant to their field-of-study than those finishing vocational education or college levels. This result reinforces the statistical evidence found in Robst (2007) or Klein (2011). In the US labor market, by using a sample of 124,063 individuals having at least a bachelor's degree with 23 categories of college majors, Robst (2007) found that the likelihood of job mismatch was lower for individuals having master, professional or doctoral degrees than those only receiving bachelor degree. It could be argued that higher levels of professional learning can help learners find jobs more relevant to their major.

Academic results are also found to play an essential role in reducing the probability of employees' unrelated field-of-study mismatch. The likelihood of unrelated field-of-study mismatch is 8.87% and 7.60% lower for people graduating with very good and good academic results than those graduating with fair results, respectively. These results align with the fact that Vietnamese society favors academic achievements, but it makes sense as good academic results signify that graduate has a better grasp of learning outcomes regarding knowledge, skills, and attitudes (Eber and Parker, 2007), so they are more likely to be recruited into the right field-of-study. Besides, this study reinforces the evidence on the influence of academic performance on landing a job outside one's field of the study found by Sellami et al. (2018) or Kucel and Vilalta-Bufí (2012) conducted in Belgium and Poland, respectively.

Some personal factors are also found to influence unrelated field-of-study mismatch. First, people with caring responsibilities are 15.49% lower in the average probability of having jobs slightly related to their field of study. This finding is consistent with Robst and VanGilder (2016), where the author found that employees with caring responsibilities tend to accept jobs that mismatch their skills set as long as they can conveniently fulfill their caring obligations. Second, this study shows that one more year of age decreases the likelihood of unrelated field-of-study mismatch by 1.27% than those have closely related field of study. Third, people who have changed jobs respectively have an 11.51% higher probability of facing slightly related field-of-study mismatch than those never changing their careers. While this study does not determine the reasons that cause these job mismatch tendencies, it is possibly related to the fact that it was uncommon for generations before 2000 to change jobs in Vietnam. Most people stayed in one professional sector and one organization throughout their lives, especially in the public sector where the biên chế tenure track system, favoring seniority, is applied (LuatVietnam).

Conclusions and policy implications

This study revealed a severe job mismatch situation among employees studying Business and Management in the Mekong River Delta of Vietnam, manifested in the form of education mismatch, skill mismatch, and field-of-study mismatch. The study also identified that job mismatch is a real phenomenon in the Viet Nam job market and particularly to the Mekong River Delta region caused by both employee's characteristics (mainly education) and socio-economic and cultural aspects of the country.

Following these findings, we will discuss some implications from the supply side to help reduce the possibility of job mismatches that the employees may face. First, students/employees need to look for opportunities to upgrade their qualifications to match the need in the labor market. Qualification improvement will reduce the probabilities of a field-of-study mismatch, but it can result in over-education and over-skill. Hence, institutions teaching business and management need to closely collaborate with employers, other stakeholders such as alumni and lecturers who have the industry experience to develop and deliver training programs to equip students with skills set aligned with labor market needs. This can help reduce the risk of over-investment in degrees.

Second, students/employees also need to focus on improving their learning experience to obtain both skills and high results as it appears that employers still rely on academic transcripts to make hiring decisions. Institutions perhaps should design the transcript in a way that better communicate graduates' capability than just subject names and scores. Third, once employed, they should build and maintain lifelong learning attitudes to get themselves updated with skills necessary for the workplace. That will help them sustain employability instead of experiencing skills gaps due to personal, organizational, or social circumstances and the rapid development of knowledge and technologies. Finally, job mismatch can be reduced if employers can collaborate with institutions in providing internships, participating in teaching where relevant, and periodically offer professional development activities for their employees.

Funding: This research was funded by the National Foundation for Science and Technology Development (NAFOSTED), grant number 502.02-2018.302.

Acknowledgement: We thank Emeritus Professor Walter Nonneman, University of Antwerp, Belgium for his review on the first draft of our manuscript. His professional contribution is meaningful to help improve the quality

of our work. We also deeply thank for Dr. Nghia Tran, College of Business and Economics, Australian National University, for his constructed review on the second draft of this manuscript.

References

[1]. ALBA-RAMIREZ, A. 1993. Mismatch in the Spanish labor market: overeducation? *Journal of Human Resources,* 28**,** 259-278.

[2]. ALLEN, J. & VAN DER VELDEN, R. 2001. Educational mismatches versus skill mismatches: Effects on wages, job satisfaction, and on-the-job search. *Oxford Economic Papers,* 53**,** 434-452.

[3]. BADILLO-AMADOR, L. & VILA, L. E. 2013. Education and skill mismatches: Wage and job satisfaction consequences. *International Journal of Manpower,* 34**,** 416-428.

[4]. BAOMOI. 2017. *Training one side, 'make a rice' another* [Online]. Available: <http://www.baomoi.com/dao-tao-mot-dang-kiem-com-mot-neo/c/21574124.epi> [Accessed on 29 March 2017].

[5]. BATTU, H. & BENDER, K. 2020. Educational mismatch in developing countries: A review of the existing evidence. *In:* BRADLEY, S. & GREEN, C. (eds.) *The Economics of Education.* Elsevier.

[6]. BECKER, G. 1964. Human capital. A theoretical and empirical analysis with special reference to education. New York: Columbia university press for The NBER.

[7]. BLACKSTONE, A. 2018. *Principles of sociological inquiry: Qualitative and quantitative methods* [Online]. Available: <https://openlibrary-repo.ecampusontario.ca/xmlui/bitstream/handle/123456789/296/Principles%20of%20Sociological%20Inquiry.pdf?sequence=1&isAllowed=y> [Accessed on 25 June 2021].

[8]. CAROLEO, F. E. & PASTORE, F. 2018. Overeducation at a glance. Determinants and wage effects of the educational mismatch based on AlmaLaurea data. *Social Indicators Research,* 137**,** 999-1032.

[9]. CHUA, K. & CHUN, N. 2016. In search of a better match: Qualification mismatches in developing Asia. *Asian Development Bank Economics Working Paper Series***,** No 476.

[10]. DE OLIVEIRA, M. M., SANTOS, M. C. & KIKER, B. F. 2000. The role of human capital and technological change in overeducation. *Economics of Education Review,* 19**,** 199-206.

[11]. DI PIETRO, G. 2002. Technological change, labor markets, and 'low-skill, low-technology traps'. *Technological Forecasting and Social Change,* 69**,** 885-895.

[12]. EBER, P. A. & PARKER, T. S. 2007. Assessing Student Learning: Applying Bloom's Taxonomy. *Human Service Education,* 27**,** 45-53.

[13]. FAROOQ, S. 2011. The utilisation of education and skills: Incidence and determinants among Pakistani graduates. *The Pakistan Development Review,* 50**,** 219-244.

[14]. FLEMING, C. M. & KLER, P. 2014. Female overeducation, job satisfaction and the impact of children at home in Australia. *Economic Analysis and Policy,* 44**,** 143-155.

[15]. GHIGNONI, E. & VERASHCHAGINA, A. 2014. Educational qualifications mismatch in Europe. Is it demand or supply driven? *Journal of Comparative Economics,* 42**,** 670-692.

[16]. HARTOG, J. 2000. Over-education and earnings: where are we, where should we go? *Economics of education review,* 19**,** 131-147.

[17]. IRIONDO, I. & PÉREZ-AMARAL, T. 2016. The effect of educational mismatch on wages in Europe. *Journal of Policy Modeling,* 38**,** 304-323.

[18]. ISRAEL, G. D. 1992. *Determining sample size* [Online]. Available: < https://bit.ly/3qybUTl> [Accessed on 12 December 2020.

[19]. KLEIN, M. 2011. Higher education and non-pecuniary returns in Germany: Tracing the mechanisms behind field of study effects at the start of the career. *Irish Educational Studies,* 30**,** 253-270.

[20]. KUCEL, A. & VILALTA-BUFÍ, M. 2012. Graduate labor mismatch in Poland. *Polish Sociological Review*, 413-429.

[21]. LAODONG. 2021. *"Flocking" to study Business and Management, will the grade benchmarks increase?* [Online]. Available: < https://laodong.vn/giao-duc/do-xo-di-hoc-nganh-kinh-doanh-va-quan-ly-diem-chuan-co-tang-cao-khong-910848.ldo> [Accessed on 11 June 2021].

[22]. LI, F. & WANG, L. 2020. An empirical study on distance education and job match. *Sustainability,* 12, 619.

[23]. LUATVIETNAM. *What if "lifelong" payroll? why do everyone want to be on the "lifelong" payroll?* [Online]. Available: <https://luatvietnam.vn/tin-phap-luat/bien-che-la-gi-ma-sao-ai-cung-muon-vao-bien-che-230-17980-article.html> [Accessed on 11 November 2020].

[24]. MAHY, B., RYCX, F. & VERMEYLEN, G. 2015. Educational mismatch and firm productivity: Do skills, technology and uncertainty matter? *De Economist,* 163, 233-262.

[25]. MAN POWER GROUP. 2014. *Building a high-skilled economy: A new Vietnam* [Online]. Available: <https://silo.tips/download/building-a-high-skilled-economy-the-new-vietnam> [Accessed on 22 July 2021]

[26]. MCGUINNESS, S. 2006. Overeducation in the labour market. *Journal of Economic Surveys,* 20, 387-418.

[27]. MCGUINNESS, S. & BYRNE, D. 2015. Born abroad and educated here: Examining the impacts of education and skill mismatch among immigrant graduates in Europe. *IZA Journal of Migration,* 4, 17.

[28]. PHOLPHIRUL, P. 2017. Educational mismatches and labor market outcomes. *Education+ Training.*

[29]. QUINN, M. A. & RUBB, S. 2006. Mexico's labor market: The importance of education-occupation matching on wages and productivity in developing countries. *Economics of Education Review,* 25, 147-156.

[30]. ROBST, J. 2007. Education and job match: The relatedness of college major and work. *Economics of Education Review,* 26, 397-407.

[31]. ROBST, J. 2008. Overeducation and college major: Expanding the definition of mismatch between schooling and jobs. *The Manchester School,* 76, 349-368.

[32]. ROBST, J. & VANGILDER, J. 2016. Salary and job satisfaction among economics and business graduates: The effect of match between degree field and job. *International Review of Economics Education,* 21, 30-40.

[33]. ROHRBACH-SCHMIDT, D. & TIEMANN, M. 2016. Educational (Mis) match and skill utilization in Germany: Assessing the role of worker and job characteristics. *Journal for Labour Market Research,* 49, 99-119.

[34]. SELLAMI, S., VERHAEST, D. & VAN TRIER, W. 2018. How to Measure Field-of-Study Mismatch? A Comparative Analysis of the Different Methods. *Labour,* 32, 141-173.

[35]. SENARATH, S. & PATABENDIGE, S. 2014. Job-education mismatch among the graduates: A Sri Lankan Perspective. *Ruhuna Journal of Management and Finance,* 1, 1-16.

[36]. SENKRUA, A. 2015. The mismatch in Thai labor market: Overeducation. *Chiang Mai University Journal of Economics,* 19, 92-116.

[37]. SEVILLA, M.-P. & FARÍAS, M. 2020. Labour market mismatch in emerging countries: The case of Chile. *Compare: A Journal of Comparative and International Education,* 50, 276-293.

[38]. SHARMA, S. & SHARMA, P. 2017. Educational mismatch and its impact on earnings: evidence from Indian labour market. *International Journal of Social Economics,* 44, 1778-1795.

[39]. SICHERMAN, N. & GALOR, O. 1990. A theory of career mobility. *Journal of Political Economy,* 98, 169-192.

[40]. SLOANE, P. J., BATTU, H. & SEAMAN, P. T. 1999. Overeducation, undereducation and the British labour market. *Applied Economics,* 31, 1437-1453.

[41]. SONG, K., KIM, H., CHA, J. & LEE, T. 2021. Matching and Mismatching of Green Jobs: A Big Data Analysis of Job Recruiting and Searching. *Sustainability,* 13, 4074.

[42]. SPARREBOOM, T. & STANEVA, A. 2014. Is education the solution to decent work for youth in developing economies. *Work4Youth Publication Series,* 23, 1-60.

[43]. SUTHERLAND, J. 2012. Qualifications mismatch and skills mismatch. *Education + Training,* 54**,** 619-632.

[44]. THUROW, L. C. 1975. *Generating inequality.,* New York, Inc. Publishers.

[45]. TRAN, L. H. N. 2018. The skills gap of Vietnamese graduates and final-year university students. *Journal of Education and Work,* 31**,** 579-594.

[46]. TRAN, Q. T. & SWIERCZEK, F. W. 2009. Skills development in higher education in Vietnam. *Asia Pacific Business Review,* 15**,** 565-586.

[47]. VERHAEST, D. & OMEY, E. 2010. The determinants of overeducation: Different measures, different outcomes? *International Journal of Manpower,* 31**,** 608-625.

[48]. VESELINOVIĆ, L., MANGAFIĆ, J. & TURULJA, L. 2020. The effect of education-job mismatch on net income: Evidence from a developing country. *Economic Research-Ekonomska Istraživanja,* 33**,** 2648-2669.

[49]. VIETNAM DEVELOPMENT REPORT 2014. *Preparing the work force for a modern market economy: Main report* Washington, D.C. , World Bank Group.

[50]. VNEXPRESS. 2019. *Vietnam labor productivity remains far below regional level: Study* [Online]. Available: <https://e.vnexpress.net/news/business/economy/vietnam-labor-productivity-remains-far-below-regional-level-study-3898243.html> [Accessed on 7 September 2019].

[51]. WORLDBANK. 2020. *Vietnam Overview* [Online]. Available: <https://www.worldbank.org/vi/country/vietnam/overview#1> [Accessed on 24 Octorber 2020].

[52]. WU, N. & WANG, Q. 2018. Wage penalty of overeducation: New micro-evidence from China. *China Economic Review,* 50**,** 206-217.

[53]. ZHU, R. 2014. The impact of major–job mismatch on college graduates' early career earnings: Evidence from China. *Education Economics,* 22**,** 511-528.

Appendix

Table A: The sample distribution by provinces in Mekong River Delta

Provinces	Frequency	%
An Giang	52	8.36
Bac Liêu	29	4.66
Ben Tre	47	7.56
Ca Mau	31	4.98
Can Tho	69	11.09
Đong Thap	66	10.61
Hau Giang	46	7.40
Kien Giang	52	8.36
Long An	43	6.91
Soc Trang	49	7.88
Tien Giang	47	7.56
Tra Vinh	47	7.56
Vinh Long	44	7.07