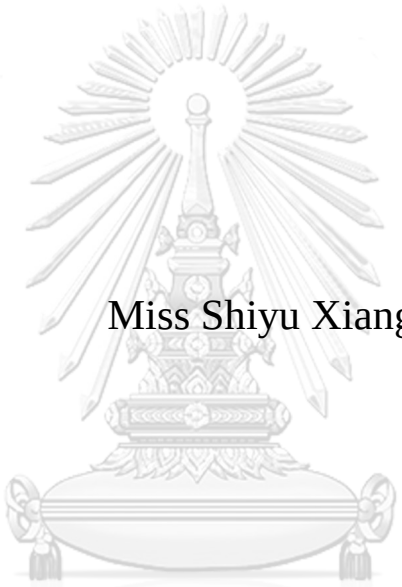
WAGE PREMIUMS FOR MASTER'S DEGREES IN THAI PRIVATE FIRMS

Miss Shiyu Xiang



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ส่วนต่างค่าจ้างของวุฒิการศึกษาระดับปริญญาโทในบริษัทเอกชนไทย

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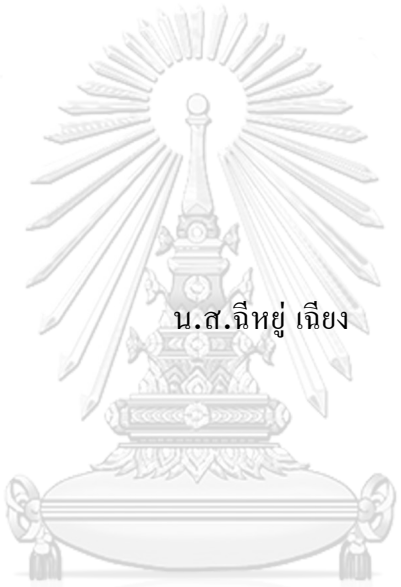

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
สาขาวิชาเศรษฐศาสตร์แรงงานและการจัดการทรัพยากรมนุษย์ สาขาวิชาเศรษฐศาสตร์แรงงานและ
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By	Miss Shiyu Xiang
Field of Study	Labour Economics and Human Resource Management
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ฉีหยู่ เฉียง : ส่วนต่างค่าจ้างของวุฒิการศึกษาระดับปริญญาโทในบริษัทเอกชนไทย. (WAGE PREMIUMS FOR MASTER'S DEGREES IN THAI PRIVATE FIRMS) อ. ที่ปรึกษาหลัก : เจสสิกา แมรี่ เวชบรรยงรัตน์

การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาเบี้ยประกันภัยค่าจ้างของผู้สำเร็จการศึกษาระดับปริญญาโทที่ทำงานในบริษัทเอกชนในประเทศไทย เปรียบเทียบกับผู้สำเร็จการศึกษาระดับปริญญาตรี การศึกษานี้ใช้ไมโครดาต้าการสำรวจกำลังแรงงานจากสำนักงานสถิติแห่งชาติของประเทศไทยในช่วงปี พ.ศ. 2551 ถึง พ.ศ. 2561 ใช้วิธี augmented Mincer regression ในการวิเคราะห์ ผลการศึกษาระบุว่าบุคคลที่จบปริญญาโทในบริษัทเอกชนมีความได้เปรียบด้านรายได้เฉลี่ย 55% เมื่อเทียบกับผู้ที่จบปริญญาตรีระหว่างปี 2551-2561 ภายในขอบเขตของปริญญาโท ความแตกต่างของค่าจ้างระหว่างชายและหญิงไม่มีผลทางสถิติสำคัญ อย่างไรก็ตาม สิ่งสำคัญคือต้องสังเกตว่าการเลือกความเชี่ยวชาญในระดับปริญญาโทนั้นมีอิทธิพลอย่างมากต่อค่าจ้างพิเศษ ผลการวิจัยระบุว่าภายในบริษัทเอกชนของไทย บุคคลที่จบปริญญาโทด้านมนุษยศาสตร์และศิลปศาสตร์ วิทยาศาสตร์ สังคมศาสตร์ ธุรกิจ และกฎหมาย มีรายได้สูงกว่าผู้ที่จบปริญญาตรีอย่างเห็นได้ชัด นอกจากนี้ เมื่อทำการวิเคราะห์เปรียบเทียบระหว่างปริญญาการศึกษาทั้งสองนี้ จะสังเกตได้ว่าบุคคลที่เรียนวิชาเอกจะไม่ได้รับผลตอบแทนค่าจ้างที่สูงกว่าวิชาเอกใด ๆ ข้างต้น

สาขาวิชา	เศรษฐศาสตร์แรงงานและการจัดการทรัพยากรมนุษย์	ลายมือชื่อนิสิต .....
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Shiyu Xiang : WAGE PREMIUMS FOR MASTER'S DEGREES IN THAI PRIVATE FIRMS. Advisor: Assoc. Prof. JESSICA MARY VECHBANYONGRATANA, Ph.D.

This study aims to examine the wage premiums experienced by individuals with a master's degree employed in private firms in Thailand in comparison to those with a bachelor's degree. This study utilizes labor force survey microdata from the National Statistical Office of Thailand covering 2008 to 2018. The augmented Mincer wage regression method is used in the analysis. The study's findings indicate that individuals with a master's degree in private firms experienced an average earnings advantage of 55% compared to those with a bachelor's degree between 2008 and 2018. Within the scope of master's degrees, the wage differences between men and women were not statistically significant. However, it is important to note that the choice of specialization in master's degrees notably influenced the wage premium. The research findings indicate that within Thailand's private firms, individuals with master's degrees in humanities and arts, science, social sciences, business, and law exhibit notably higher income levels than those with bachelor's degrees. Furthermore, when conducting a comparative analysis between these two educational degrees, it is observed that individuals majoring in education do not experience a higher wage return than any of the majors above.

Field of Study:	Labour Economics and Human Resource Management	Student's Signature .....
Academic Year:	2023	Advisor's Signature .....

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Shiyu Xiang

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

Chapter 1 Introduction

1.1 Introduction

Education is an essential driving force for the development of every society. People believe that, as described in human capital theory (Beaker 1964), investment in their own education, especially higher education, can help improve people's intelligence, physical strength, and moral quality to form higher productivity, thereby increasing their income. Education is an economic product that is not easy to obtain, so it can be called a consumer and capital goods, because those who consume it could get utility or satisfaction, but also promotes economic development and provides a labor force for society transformation (Almendarez, 2013). Increased access to higher education, the development of a knowledge economy, and shifting labor market conditions all contribute to the rise of graduate education on national and global scales (Lee et al., 2020). In many regions, the spread of master's degree programs is correlated with economic development (Jung & Li, 2021). Currently, many entry-level positions require a master's degree as a prerequisite. This has led to a shift in the way master's degree programs are designed, with greater consideration given to how they align with job opportunities in the labor market. Graduates are now encouraged to pursue a master's degree to enhance their competitiveness in the job market, rather than immediately entering the workforce after completing their undergraduate studies.

Many studies on the development of higher education demonstrate that more people are choosing to pursue master's degrees as a result of the steady rise in undergraduate enrollment. Expanding higher education in the UK has led to an increase in master's degree graduate and undergraduate students (Lenton, 2016). Facing the

increasing demand for teaching staff with increasing undergraduate admission requirements, many middle-income countries in Southeast Asia are investing heavily to expand the scope of their graduate education (Chien & Chapman, 2015). According to Becker's human capital theory (Becker, 1975), one factor that may help explain this growth is people's expectations of increased labor productivity and higher income in the labor market.

In addition, following the signaling model of Spence (1978), graduates may think that obtaining a master's degree will enable them to be perceived more positively on job applications than those with undergraduate degrees. Earning social credentials, improving resumes, improving reputations among university alumni, enhancing promotion prospects, and receiving incentives from future employers are reasons people chose to invest in a master's degree (Jung et al.,2021).

1.2 Background for Master's Education in Thailand

Thailand as an emerging industrialized country, attaches great importance to the development of higher education. Thailand has attained an upper-middle income position among Southeast Asian countries, since the late 1990s, factors such as internal politics, global economic shocks, natural disasters, and reduced investment have hindered Thailand's economic growth (Buasuwan, 2018). Economic growth rates decreased from 7.2 of GDP in 2012 to 0.9 percent in 2014. It is believed that the fundamental changes in the education system are essential to Thailand's economy long-term recovery and competitiveness. In such an environment, the 15-year plan on higher education (2008-2022) places emphasis on the improvement of higher education quality and the facilitation of lifelong learning.

The government's emphasis on higher education will greatly affect the expansion of higher education. The Office of the National Education Commission (ONEC) in 2002 created the National Educational Standards and Quality Assessment Office (ONESQA) with the purpose of assessing both public and private educational institutions, ranging from pre-school to postgraduate levels. Moreover, the primary initiative is the creation of the Ministry of Higher Education, Science, Research and Innovation, which aims to lead the nation's economic and social progress by focusing on the development of human capital, enhancing research capabilities, and fostering innovation (UNESCO Higher Education Report, 2022).

1.3 Background on the categories for sectors in Thailand

Organizations in Thailand can be divided into two types: public sector organizations, including government agencies and state-owned enterprises, and private sector organizations (Jaturanonda et al., 2006). This study chooses the private sector as the primary research scope. First of all, the private sector covers all walks of life in Thailand. When studying the issue of wage returns to higher education, some researchers use the private sector as the essential category of the occupational variable sector (Tangtipongkul, 2015). Secondly, when hiring bachelor’s degree graduates or master’s degree graduates, the public sector can meet the starting salary level of different academic qualifications in accordance with government regulations. Still, the private sector may not guarantee this. The monetary return of a master’s degree in the government department is determined, and the salary and academic qualification correspond (Vivatsurakit & Vechbanyongratana, 2020). Other significant factors that affect the master’s degree wage premium, among others, are

the disciplinary distinctions in the field of specialization. The impact of different disciplines in different majors on the wage premium is undoubtedly considered in this study.

Despite the extensive research on various aspects of Thai higher education, including the expansion of higher education, university funding, return on academic qualifications, wage returns, and income inequality, there remains a dearth of literature on the wage premiums associated with obtaining a master's degree in the private sector in Thailand. The existing literature on wage premiums or returns to higher education is largely focused on undergraduate or vocational education, with some discussion of wage premiums for master's education. Studying the wage premium of master's degree students in the private sector in Thailand may have some new contributions to the previous research gap. Also, through an analysis of the master's wage premium across a decade, people can comprehend the benefits of pursuing master's degrees during this timeframe. Furthermore, the advancement of higher education may potentially exert a significant influence on the economic progress of the private sector in Thailand.

1.4 This study will pose the following research questions:

1. What is the overall rate of return to a master's degree for individuals in Thai private firms?

2. Do differences exist in Thailand's private firms' wage premiums based on majors and gender for master's and bachelor's degrees?

1.5 Structure of the Study

The paper is organized in the following structure. In order to provide context and establish a foundation for the upcoming empirical study, the next chapter is the literature review. Chapter 3 of this study presents the theoretical framework. Chapter 4 is about methodology and data source. The empirical design is presented in Chapter 5, while the results are discussed in Chapter 6. The last chapter of this study provides a discussion of the policy implications and limitations of the research.

Chapter 2 Literature Review

Since the creation of the human capital theory in the 1960s, estimating the rate of return to education has always been a major concern in labor economics and income distribution research. Education investment can bring private benefits to the educated, and it can also bring social benefits to society, so the literature on the rate of return to education in various countries is extensive. However, the rate of return to education is affected by many factors, such as the level of economic development, education policies, and different disciplines. Therefore, the rate of return to education in each country will change in different periods, and these changes will have other effects, such as the labor market and wages premium.

The human capital theory proposed by Schultz (1961) and Becker (1975) argues that investment in human capital is a long-term strategy for individuals to improve their earnings potential over time. As reaching a Bachelor's degree grew to become extra frequent globally at some stage in the 20th century, enrolment in master's programs improved correspondingly (Judith, 2005).

Several studies have considered the private benefits of pursuing a master's degree in other country contexts. According to a study by Stark (2007), the returns to pursuing a master's degree in Canada are 4.1 percent for men and. 8.6 percent for women. Torpey and Terrell (2015) suggest that obtaining a master's degree can provide career advancement opportunities and higher earnings potential. Individuals with a master's degree in securities, commodities, and financial services sales agents earned a salary almost 90% greater than those with a bachelor's degree in the USA (Torpey & Terrel, 2015). Still, the authors also emphasize the importance of carefully weighing

the costs and benefits. Raudenská and Mysíková (2020) studied the rate of return to higher education, the authors use the European Union Statistics on Income and Living Conditions (EU-SILC, 2010–2017) and Programme for the International Assessment of Adult Competencies (PIAAC, 2011/12) data to analyze the effect of Bachelor's degree and Master's degree on labor's wage and socioeconomic status. Similarly, Masayuki (2015) describe the rate of return to postgraduate education more specifically. The author uses a lot of micro-data from the Employment Status Survey of Japan in 2007 to research on the relationship between postgraduate education and labor-market outcomes. The author found that female and elder people hold Master degree more than a bachelor degree, and the wage premium between Masters and Bachelors is about 30 to 40 percent, which is similar between female and male; For those with a Master degree, after 60 years of age, the reduction in salary is relatively small; The private rate is more than 10%.

Lenton (2016) estimates the rate of return to graduate degrees on wages from 1993 to 2014 between traditional masters' degrees, vocational graduate degrees, and PhDs. The author also compares the wage returns for male and female master's degree graduates. The study results show that the salaries of undergraduates and all types of graduate degrees have increased over time (Lenton, 2016). Lindley and Machin (2016) additionally discover that graduate degrees have an advantageous impact on wages. The increase in the demand for graduates is a key behind rising wage inequality.

The topic of wage premiums for different fields has been widely discussed in academic literature. Carnevale, Cheah, and Strohl (2012) find that individuals with science, technology, engineering, and mathematics (STEM) degrees earn 26% more than those with non-STEM degrees (Carnevale et al., 2012). Similarly, Okahana and

Hao (2019) focused on master's degrees in STEM fields and find that they do provide a wage premium. Still, the premium varies significantly across fields, with computer science and engineering having the highest premium. Finally, Rajecki and Borden (2011) found that psychology degrees have lower wage premiums compared to STEM fields. Thus, the evidence suggests that wage premiums vary across different fields and degrees, and several factors, such as gender, race, and specific occupations, should be considered when evaluating wage premiums for different majors.

In the Thailand context, Chapman and Chien's (2015) paper examines the challenges faced by Malaysia and Thailand in expanding their graduate education systems. The authors report that both countries have significantly increased the number of graduate students in recent years, with Thailand seeing a growth rate of 31% from 2005 to 2012. The paper concludes that the successful expansion of graduate education in Malaysia and Thailand will require policy reforms, institutional innovations, and partnerships with international stakeholders (Chien & Chapman, 2015).

Teowkul (2009) studied the motivational factors of Thai students pursuing master's degrees and Doctoral degrees in business. The authors find that both intrinsic and extrinsic factors motivate students to pursue graduate education. Intrinsic factors include personal interest and academic curiosity, while extrinsic factors include career advancement and higher salaries (Teokul et al., 2009).

There are several studies on the returns to higher education in Thailand. However, the returns to a particular degree are still dominated by bachelor's and doctoral degrees, or they outline the individual returns to higher education, income imbalance due to gender, etc. Pinitjitsamut's (2012) paper estimates lifetime earnings and returns to undergraduate educational investments for different fields in Thailand

(Pinitjitsamut, 2012).

Warunsiri and McNown (2010) use pseudo-panel approach for estimating returns to education in Thailand, while treating the endogeneity bias common to estimates from data on individuals, using Cohorts are defined for birth years from 1946 to 1967 using data from surveys for 1986 through 2005. The experimental results show that the total return rate of education in Thailand is between 14% and 16%. The rate return to women is higher than that of men, and the rate of return to labor in urban areas is higher than that in rural areas. Finally, the author suggests that the government can improve education in many ways: compulsory education, public funding for school construction and operating costs, teacher training subsidies, and economic stimulus for parents who send their children to school, such as the Progressa plan in Mexico and the Borsa Familia in Brazil. Tangtipongkul (2015) estimated the rate of return to schooling in Thailand by using cross-sectional data from the Thai Labor Force Survey and the result of the study showed that education has a positive effect on earnings. The author comprehensively studied the rates of return to schooling from multiple factors. For example, work experience, region of residence, provincial product per-capita, industry type and etc. The author compares the private and social returns between vocational secondary and general secondary education, and also compares the private rate of return to university for male and female. According to research, individuals with a master's degree or higher tend to have the highest average monthly earnings compared to those with other degrees (Tangtipongkul, 2015). In other words, there are limited studies on the wage premiums for master’s degree holders in Thailand.

Fuwa and Korwatanasakul (2015) use the regression discontinuity method applicable to the changes in the compulsory education law in 1978 to estimate

Thailand's educational benefits. The authors estimated the total rate of return in terms of population and geographic location. They found that the Compulsory Education Law played a role in increasing human capital investment on the eve of the rapid structural transformation in the 1980s. The experimental results show that the rate of return for men and women is similar to 8%, and the rate of return for non-agricultural sectors is higher than that for agricultural sectors. According to Vivatsurakit & Vechbanyongratana (2020) in developing countries, formal education has a considerable rate of return for individuals. The author mainly studies the return of formal education investment among informal workers. Using individual data from the 2011, 2013, and 2015 Thailand Household Socio-economic Surveys, the authors use the instrumental variable (IV) approach to correct the ability bias. The result is opposed expectations, the authors found that Thailand's informal employee has received considerable returns on formal education investments, and the return rate of return to informal workers is 11-12%, while the return rate of workers in private companies who are officially employed is close to 15%.

This study aims to fill this research gap by analyzing the returns to master's degree education in the private sector in Thailand.

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Chapter 3 Theoretical Framework

Contemporary mainstream economics has analyzed education, especially higher education, as a human capital investment behavior. This research assumes that in accordance with the human capital theory by Becker (1975), individuals who invest in master's degrees education hope to increase productivity and obtain higher wage returns than the first degree. Lenton (2016) mentions that some graduates may show employers that they have a higher value by obtaining a master's degree. As an increasing number of graduates with master's degrees with high academic achievements enter their respective job markets, disparities in academic qualifications will likely arise.

The second theory was on the signaling model of Spence, a widely used theoretical framework for understanding the labor market and the role of education in determining wages (Spence, 1978). The model suggests that education serves as a signal of an individual's productive abilities to employers. By attaining higher levels of education, individuals can signal to potential employers that they possess these desirable characteristics, and are, therefore, more attractive job candidates.

In this study, the signaling model of Spence can provide insight into the factors influencing wage premiums. Since a master's degree can be viewed as an additional signal of skills, abilities, and productivity, employers may be willing to offer a wage premium to individuals holding such a degree. Employers may be more likely to offer higher wages to individuals with a master's degree if they perceive that they possess desirable characteristics that are not readily observable, such as independent research skills, depth of knowledge in a particular field, and strong analytical abilities.

Chapter 4 Methodology and Data Source

4.1 Methodology

The basic characteristics of the age income chart drawn by Mincer based on empirical data are: education years and income are linear. The higher the education years, the more income. There is a quadratic relationship between age and income. Income will increase with age and go through three stages rapid increase, increase at a decreasing rate, and finally decrease. The Mincer model is widely used because of its simplicity. Its biggest feature is that it assumes a constant rate of return on education, and believes that every year of formal education received by an individual provides the same rate of return.

To estimate the rate of return to the master's degree education, this study uses a Mincerian wage regression applied to individual-level data from the 2008 and 2018 Thai Labor Force Survey (LFS) collected by Thailand's National Statistical Office (NSO).

Many past studies indicate the presence of endogeneity, i.e., unobservable individual characteristics, such as ability or motivation, of the education variable in the Mincerian equation, which may bias the estimated rate of return to education. Titus (2007) argues that endogeneity and self-selection bias are key problems for research in the field of higher education. For this paper, endogeneity can be interpreted as a reciprocal feedback effect of master's degree selection and wages, i.e., if wage compensation increases with education, then people will choose to invest more actively in education. Wages reflect different levels of investment in human capital. From this perspective, completing a master's degree program will increase competence and productivity, compensated by higher wages. This situation may lead to endogenous

problems because macroeconomic variables may significantly correlate with wages. Therefore, the employment sector in this study has to be the private sector. The use of bias-adjusted regressions (i.e., OLS regressions) in this paper is based on the fact that Bachelor's and Master's degree graduates are similar before they pursue a higher education degree. The two groups must be identical based on all characteristics until an individual decides to pursue a master's degree.

4.2 Data Source

This study utilizes secondary microdata from the Labor Force Survey (LFS) conducted by the National Statistical Office (NSO) of Thailand for the years 2008 to 2018. The data includes information on the qualifications obtained (bachelor’s and master’s degrees) as well as the degree field. Additionally, the dataset contains information on marriage status, gender, and region. The survey uses a stratified random sampling design.

Table 1, Explanation of key variables

Variable	**Explanation**
IN(WAGE)	This is the dependent variable. It is measured as the log of monthly salary.
GRAD	This dummy variable captures respondents with degree levels which will take the value of 1 if it is a master's degree and 0 if it is a bachelor's degree.
major	This dummy variable captures respondents with major which will take the value of 1 if they graduated from the major and 0 if they are not, and the majors include Social Sciences, Business, and Law Engineering, manufacturing and construction Humanities and Arts Science Education Services Health and welfare Agriculture
EXP	An employee with more work experience should also have greater knowledge and skills, and should get a higher wage. This is measured as years of working experience since finishing university. EXP for Bachelor= Age – 6 – 16 years of schooling. EXP for Master graduates = Age – 6 – 18 years of schooling (assume a master's education takes 2 years to complete).
EXP^2	Experience-squared denotes the squared experience term.
SEX	This is a dummy variable equal to 1 for men and 0 for women. In line with previous research.
MARRIED	This is a dummy variable equal to 1 for people who are married and 0 for people who are Single.
δ	This variable represents a vector of dummy variables for the regions.

Chapter 5 Empirical Design

5.1 Data analysis

This study begins the analysis by using the basic Mincer model to estimate the average return to a master's degree compared to a bachelor's degree as shown in regression (1)

$$\ln(wage)=\beta_0+\beta_1 grad+\beta_3 exp+\beta_4 exp2+\beta_5 sex+\beta_6 married+\beta_7 urban+\delta+\varepsilon \quad (1)$$

The dependent variable, In (wage), is the log of the monthly labor income. The independent variable of interest, grad, is dummy variable, and exp and exp2 control for labor market experience. Controls for sex, marital status, urban area, and region (denoted by the vector δ) are also included.

For the second analysis, the returns to a master's degree and the returns to each field of study and given by regression (2).

$$\ln(wage)=\beta_0+\beta_1 grad+\sum_{i=1}^{7}\gamma_i major_i+\beta_3 exp+\beta_4 exp2+\beta_5 sex+\beta_6 married+\beta_7 urban+\delta+\varepsilon \quad (2)$$

The third analysis considers the rate of return to a master's degree within a degree field.

$$\ln(wage)=\beta_0+\beta_1 grad+\sum_{i=1}^{16}\gamma_i major_i+\sum_{i=1}^{7}\theta_i (grad*major)_i+\beta_3 exp+\beta_4 exp2+ \quad (3)$$

$$\beta_5 sex+\beta_6 married+\beta_7 urban+\delta+\varepsilon$$

5.2 Descriptive Statistics

Table 2 displays the descriptive statistics derived from the dataset including 16,625 graduates in 2008 and 18,399 graduates in 2018. In the year 2008, a total of 1415 individuals, accounting for 8.71% of the sample, possessed master's degrees, while 15210 individuals, constituting 91.29% of the sample, held bachelor's degrees. In contrast, in the year 2018, there were 1334 individuals with master's degrees, representing 8.15% of the sample, and 17065 individuals with bachelor's degrees, making up 91.85% of the sample. Regarding the demographic composition, it was observed that in 2008, 6506 respondents, accounting for 39.05% of the total, identified as male, whilst 10155 respondents, constituting 60.95% of the total, identified as female. In 2018, the male respondents numbered 7048, representing 38.31% of the total, while the female respondents numbered 11351, accounting for 61.69% of the total. In 2008, the mean age was recorded as 33.70 years, whereas in 2018, it increased to 36.09 years. In 2008, the proportion of married graduates was 48.12%, with a total count of 7945 individuals. Comparatively, in 2018, the proportion of married graduates decreased to 47.31%, with a total count of 8629 individuals.

In 2008, the distribution of graduates by major was as follows: agriculture accounted for 2.26% of graduates, education accounted for 11.17% of graduates, and Engineering, Manufacturing, and Construction accounted for... The distribution of funding allocation across various sectors in 2018 was as follows: 10.07% for agriculture, 1.94% for health and welfare, 7.09% for Humanities and Arts, 8.41% for science, 2.43% for services, and 56.63% for social sciences, business, and law. Additionally, the allocation in 2018 included 8.78% for education, 12.37% for Engineering, Manufacturing, and Construction, 5.18% for Humanities and Arts, 9.04%

for science, 3.82% for services, and 56.70% for social sciences, business, and law.

In both 2008 and 2018, the Central area of Thailand had the highest number of graduates, with 6,375 individuals accounting for 38.26% of the total graduates in 2008, and 6,561 individuals representing 35.66% of the total graduates in 2018. In the year 2018, there were 4,790 graduates residing in Bangkok, Thailand, accounting for 28.75% of the total. Similarly, in the same year, there were 4,874 graduates in Bangkok, representing 26.49% of the whole sample.

Table 2, Descriptive statistics of the discrete variable

Variables	**Value**	**2008**	**2018**
Master's graduate	Yes	1,451(8.71%)	1,334(8.15%)
	No	15,210(91.29%)	17,065 (91.85%)
Gender	Male	6,506(39.05%)	7,048(38.31%)
	Female	10,155(60.95%)	11,351 (61.69)
marital	Marriage Yes	7,945 (48.12%)	8,629 (47.31%)
	Marriage No	8,565 (51.88%)	9,087(52.69%)
Major	Agriculture	365(2.26%)	350(1.97%)
	Education	1,804(11.17%)	1,563(8.78%)
	Engineering, manufacturing and construction	1,626(10.07%)	2,201(12.37%)
	Health and welfare	314(1.94%)	383(2.15%)
	Humanities and Arts	1,145(7.09%)	921(5.18%)
	Science	1,358(8.41%)	1,608(9.04%)
	Services	392(2.43%)	679(3.82%)
	Social Sciences, Business, and Law	9,146(56.63%)	10,090(56.70%)
region	Bangkok	4,790(28.75%)	4,874(26.49%)
	Central	6,375(38.26%)	6,561(35.66%)
	North	1,919(11.52%)	2,271(12.34%)
	Northeast	1,474(8.85%)	1,557(8.46%)
	South	2,103(12.62%)	3,136(17.04%)

Source: 2008-2018 Labor Force Survey, National Statistical Office of Thailand

Table 3, Descriptive statistics of continuous variable

Year	Variable	Obs	Mean	Std.Dev.	Min	Max
2008	age	16,661	33.6978	8.52956	15	95
	approx	16,661	18069.21	27324.98	500	999998
	lnwage	16,661	9.515815	0.683967	6.214608	13.81551
	exp	16,661	11.52776	8.474616	0	73
	exp2	16,661	204.7153	290.4192	0	5329
2018	age	18,399	36.09	9.290	21	93
	approx	18,399	33501	104961	1200	999999
	lnwage	18,399	9.887	0.697	7.090	13.82
	exp	18,399	13.95	9.241	0	71
	exp2	18,399	279.9	334.3	0	5041

Source: 2008-2018 Labor Force Survey, National Statistical Office of Thailand

Chapter 6 Result

6.1 The Effects of Degrees on Wage Premiums

We conducted an OLS regression test using eight models to determine the wage premium of holding a master's degree relative to holding a bachelor's degree in Thailand. The first model is an overall regression model for all data, and its results tell us that the aggregated rate of return to the master's degree education compared to undergraduate education for individuals in the private sector of Thailand is 55.7%. To understand whether these impacts have changed over time or vary by gender, the analysis is run for the years 2008 and 2018 separately. The results are shown in Table 4. From the coefficient on grad in the table, the coefficient in 2008 was 0.654, indicating that the average salary of people holding master's degrees was 65.4% higher than that of people holding bachelor's degrees. However, this value decreased to 49.1% in 2018, This indicates that the salary premium for master's degrees decreases over time. Compared to 2008, the proportion of master's students did not increase in 2018, but slightly decreased, which further demonstrates that the reduction in graduate salary premiums is real.

Table 4, Returns to Graduate Education in Thailand, 2008 and 2018

VARIABLES	(1) Total lnwage	(2) 2008 lnwage	(4) 2018 lnwage
Grad	0.557***	0.654***	0.491***
	(0.0118)	(0.0148)	(0.0171)
Married	0.143***	0.175***	0.122***
	(0.00652)	(0.00850)	(0.00907)
Gender	0.0319***	0.0366***	0.0363***
	(0.00696)	(0.00913)	(0.00963)
Exp	0.0398***	0.0419***	0.0281***
	(0.00112)	(0.00141)	(0.00161)
exp2	-0.000383***	-0.0004***	-0.000199***
	(0.000031)	(0.00004)	(0.000044)
Constant	9.181***	8.980***	9.451***
	(0.00806)	(0.00986)	(0.0120)
Observations	34,748	16,510	18,238
R-squared	0.324	0.406	0.278

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

Source: 2008-2018 Labor Force Survey, National Statistical Office of Thailand

6.2 Wage premiums between gender

Table 5 reports the results for the differences in graduate salary premiums between men and women. Only male workers were included in the first model, while in the second model, only female workers were included. The regression results show that there is almost no difference in master's degrees wage premiums between men and women. Similarly, according to the findings of Jaeram and Junjoon (2020), there is no significant difference between male and female categories in the wage increase resulting from master's degrees. There may be other incentives for women to pursue master's degrees, despite the fact that women in firms receive a modest wage premium. Although Warunsiri and McNown (2010) found that despite the fact that women have higher returns on education than men, this is not the case for graduate education.

Table 5, Returns to Master's Degrees by Gender

	(1) Man	(2) Woman
VARIABLES	lnwage	Lnwage
Grad	0.566***	0.568***
	(0.0187)	(0.0153)
Married	0.0758***	0.000725
	(0.0126)	(0.00832)
Exp	0.0453***	0.0373***
	(0.00197)	(0.00136)
exp2	-0.000486***	-0.000357***
	(0.0000514)	(0.0000394)
Constant	9.269***	9.210***
	(0.0142)	(0.00928)
Observations	13,509	21,239
R-squared	0.316	0.302

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

Source: 2008-2018 Labor Force Survey, National Statistical Office of Thailand

6.3 Rate of return to degrees by major

In order to analyze the wage premium rate of a professional degree, we estimate two models. The first regression added dummy variables for each major based on the above regression with education as the foundation group; The second regression increases the interaction between whether each major and individual holds a graduate degree to test whether certain graduate degrees have greater returns than other graduate degrees. The results are shown in Table 6. In the first and second columns, the graduation coefficient is significantly positive, indicating that regardless of the individual's major, the salary premium is significantly positive. In the first column, we can see that the regression coefficients for all majors are significant, indicating significant differences in wage returns among different majors. Specifically, for the seven areas mentioned in the regression model, namely Agriculture, Engineering, Manufacturing, and Construction. The coefficients for Health and Welfare, Humanities and Arts, Science, and Services are significantly positive, indicating that wages in these majors are significantly higher than those in education. The second column mainly examines the role of interaction terms. In the second column, we can see the interaction coefficient of grad × Humanities and Arts, grad × Science, grad × Social Sciences, Business, and Law is significantly positive, this indicates that the salary levels of graduate students majoring in Humanities and Arts, Science, Social Sciences, Business, and Law are significantly higher than undergraduate students. The interaction coefficient of grad× Services, grad × Engineering, Manufacturing and Construction, grad × Health and Welfare is not significant, which indicates that the salary level of graduate students in these three majors is similar to that of undergraduate students.

Table 6, Returns to Master's Degrees by Major

VARIABLES	(1) lnwage	(2) lnwage
Grad	0.574***	0.399***
	(0.0113)	(0.0392)
Agriculture	0.246***	0.237***
	(0.0230)	(0.0235)
Engineering, Manufacturing, and Construction	0.476***	0.474***
	(0.0139)	(0.0143)
Health and welfare	0.561***	0.568***
	(0.0231)	(0.0240)
Humanities and Arts	0.250***	0.241***
	(0.0158)	(0.0162)
Science	0.295***	0.288***
	(0.0143)	(0.0147)
Services	0.243***	0.239***
	(0.0196)	(0.0202)
Social Sciences, Business, and Law	0.221***	0.205***
	(0.0106)	(0.0109)
grad×Agriculture		0.150
		(0.117)
grad×Engineering, Manufacturing and Construction		0.0671
		(0.0526)
grad×Health and welfare		-0.0558
		(0.0881)
grad×Humanities and Arts		0.133**
		(0.0674)
grad×Science		0.108*
		(0.0576)
grad×Services		0.0502
		(0.0842)
grad×Social Sciences, Business, and Law		0.234***
		(0.0415)
Gender	0.0840***	0.0827***
	(0.00672)	(0.00672)
Married	0.0341***	0.0340***
	(0.00666)	(0.00666)
Exp	0.0406***	0.0406***

VARIABLES	(1) lnwage	(2) lnwage
	(0.00107)	(0.00107)
exp2	-0.000370***	-0.000369***
	(2.96e-05)	(2.96e-05)
Constant	8.937***	8.948***
	(0.0122)	(0.0125)
Observations	33,643	33,643
R-squared	0.371	0.372

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

Source: 2008-2018 Labor Force Survey, National Statistical Office of Thailand

Chapter 7 Discussion and Conclusion

As Thailand enters the 4.0 era, the question arises whether the expansion of higher education represents a higher standard of development achieved in Thai education. Scholarly research on various issues, such as providing more valuable education to the new generation of students and the returns on investment in higher education, has gained significant interest. Numerous studies on the expansion of higher education have demonstrated that the rise in undergraduate enrollment has resulted in a greater number of individuals pursuing graduate education. As indicated in the extant research, Buasuwan (2018) suggests the necessity for greater flexibility in the confines of higher education, urging for increased engagement and cooperation between higher education institutions and various stakeholders such as industries, public organizations, professional communities, and local communities.

The primary aim of this research is to examine the wage premium of individuals with a master's degree within private firms in Thailand. In the past, there has been significant and insightful literature on the returns to education in Thailand. Nonetheless, there has not been a lot of research on the returns to master's degrees and wage premiums in particular. Consequently, this study addresses a significant gap in the literature.

This study applied the Mincer wage regression method to estimate the wage premiums to master's degrees in Thai private firms and used the microdata from the Labor Force Survey from 2008 to 2018 to examine and evaluate the overall individual returns associated with obtaining a master's degree against a bachelor's degree is 55%. Over the course of time, there has been a decline in the income differential associated with the attainment of master's degrees. The findings of the study pertaining to the wage

differential associated with graduate degrees in the private sector in Thailand indicate a minimal disparity in wage premiums between male and female individuals holding master's degrees. This discovery exhibits a divergence from several prior study investigations. While the majority of the findings of the same kind of study concur, that women have better returns to education than males, however, certain studies imply that gender disparities are not particularly prominent when it comes to the returns to graduate education. Additional reference factors, such as the wage structure of male and female master's degree recipients in different industries, the rate of wage increase in years of employment, and individual competencies, all of which influence the gender wage premium for graduate degrees, are required to analyze this result in greater depth. The salary levels of graduates from all seven majors examined surpass those of graduates from education majors. Additionally, the salary level of master's students specializing in Humanities and Arts, Science, Social Sciences, Business, and Law exceeds that of bachelor's degree majors. In accordance with prior study findings.

In order to augment the importance of analyzing the return rate and wage premiums of master's education, it is advisable to integrate a more extensive dataset on wages associated with different majors, as well as income data of graduates. Additionally, it is crucial to consider the influence of changes in majors, professional settings within higher education, and the dynamics of policies. This will offer a more extensive point of reference for the examination of the outcomes.

Several other limitations should be acknowledged in the current study. Initially, it is worth noting that the remuneration associated with various educational degrees may exhibit more variability subsequent to a few years of professional experience. This may be attributed to factors such as the duration of employment and the impact of career

advancement on one's credentials. Second, this study examined only wage differences by gender, and there are no additional data to examine the household situation, such as the effect of the wage premium on gender for the same degree after having children. Additionally, it is recommended that future studies use a broader range of labor market indicators, including examining degree requirements and wage levels across established and emerging sectors.

Thailand's higher education system still faces significant challenges, including low levels of funding for research, limited collaboration with major, and an over-reliance on rote learning and memorization. There is also a need to strengthen the link between higher education and the labor market and to produce graduates who are equipped with the skills and knowledge needed to succeed in the dynamic workplace.

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