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Vocational and general secondary education: the rate of return across regions in Thailand

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Abstract

The purpose of this study is to find the difference in rate of return to upper secondary vocational education and upper secondary general education in each region in Thailand by applying the concept of a Mincerian earning function. The results show that the returns to schooling for upper secondary vocational school graduates are higher than for secondary general school graduates. The region that has the highest return gap between the two different tracks of education is the Northeast, while Bangkok has the lowest return gap. It can be interpreted that in Bangkok the different education attainment of individuals has less impact on earnings comparing to other regions. In contrast, the results from the Northeast show that the difference in type of education attainment has a significant influence on income. The findings also call into question the belief that people need to further their study in the general school track rather than the vocational track.

Keywords: Education, School, Earnings

1. Introduction

The high return for certain level of education can be an incentive for individuals to pursue study in higher level. This paper, therefore, aims to identify the difference in return to schooling between individuals who graduated with the upper secondary vocational education and upper secondary general education, in order to emphasize the impact of different education track on earning. To estimate the returns, there are many methods used by economists such as cost-benefit analysis or regression analysis basing on Mincerian earning function, which the latter is the one that been applied in the research. The return to education, according to the result of regression of Mincerian earning function, is the percentage change in income from completing a particular level of education.

The conventional measure to estimate the rate of return in education is the Standard Mincerian earnings function; this approach requires the ordinary least square (OLS) method to describe the average private rate of return to an additional year of education (Mincer,1974). There are controversies about the biasness of the result estimated using Mincerian earning function; the self-selection bias occurs when the individual's abilities and backgrounds influenced education attainment of individuals (Griliches, 1977).

The recent result from the global scale estimation of the rate of return to education shows that the average return is 10% (Psacharopoulos & Patrinos, 2010). The same type of survey was conducted in 2004; the results show that the rate of return in Asian countries is 9.9%, while the return in OECD countries is 7.5%. The difference in the average level of education is the main contribution to such difference between Asian countries and OECD countries; the returns diminish as the level of education increases. The survey also found that the trend of the return to schooling for females is higher than males as females have lower base of level of education compared to males in developing countries (Psacharopoulos & Patrinos, 2004).There are significant findings from various papers suggesting the validity of the diminishing return to education. The empirical results from Teulings & van Rens (2008) provide strong evidence for the negative relation between the supply of human capital and its return. A one-year increase in the stock of human capital reduces the rate of return by about 2 per cent.

The prior findings also provide information about difference in private earning return affected by individual characteristics. Marital status of individuals has been observed and it reflects some significant results. Married workers seem to have higher earning returns than single workers, regardless the education attainment of individuals (Tangtipongkul, 2013). The finding contradicts to prior research by Warunsiri & McNown (2010). The authors suggest that returns are higher for non-married workers than for married workers.

Regarding the sector of organization that individuals employed, the result from global estimation shows that the returns in the private or competitive sector of the economy are higher than for those who work in the public or non-competitive sector (Psacharopoulos, 1994). The same finding appears in the study by Tangtipongkul (2013), individuals who complete either the higher vocational certificate or the bachelor degree who work as employee in the public sector have lower rate of return than private sector or state-enterprise employees. However, the result can vary if individuals complete the secondary education as the highest education. Individuals who work as employees in public sector on average have higher rate of return than private sector employees.

Various authors question about the rate of return to different type of school curriculum. The type of curriculum in this literature generally means the type of the school that individual attends either general education school or vocational education school. The return to schooling can be a measurement of the economic profitability of vocational education (Psacharopoulos, 1994). The result from Psacharopoulos (1994) shows that comparing to the general secondary school, the returns to vocational school is lower. This finding contradicts to the paper of Moenjak & Worswick (2003). The authors suggest that the vocational education provide higher earning returns than general education does, which consistent with the paper of Hawley (2004) and Tangtipongkul (2013). This result obtains from a comparison between the upper secondary general schools, i.e. finishing 12^{th} grade in general school, and secondary vocational schools. These two types of school are rather similar in year of study but differ in knowledge attained from class. When comparing the private return to higher education and higher vocational education, the

result deviates from the prior finding. Tangtipongkul (2013) finds that individuals with the bachelor degree have higher earning than those of higher vocation certificates, which consistent with the belief that aggregate demand for the college educated increases more rapidly than the demand for vocational educated does.

Regarding area of residents, the return to schooling of upper vocational and general education in term of cross-region comparison has not been observed yet. The previous researched focused only on the difference in income across regions in Thailand. As in the updated finding by Tangtipongkul (2013), it shows that people in Bangkok have higher income than people living in other provinces in central region. Moreover, residents in the north, northeast, and south earn less than in the central.

From all the points mentioned in the related literature, this study uses the concept of rate of return to education to estimate the returns of upper secondary vocational school graduates and upper secondary general school graduates. The study aims at finding the cross-region result. In addition, this paper provides comparative result that demonstrates the efficiency of vocational education in different regions of Thailand.

1.1 Background of the education system in Thailand

The background of education system in Thailand is required in this study. The system of formal education in Thailand is classified into two levels: basic and higher education. The basic education includes pre-elementary level, elementary level, lower secondary level, and upper secondary level. For the higher education, it includes diploma and degree level. Table 1 presents the broad definitions and purpose of each level of education. The certain level emphasized in this study is the upper secondary level as it focuses on the difference in the returns to schooling of individuals between one who attained general track and another who attained vocational track. As in table 2, the number of students in upper secondary level is about 15% of all students in academic institutions. Therefore, it is important to emphasize the return of individuals who graduated with this particular level of education.

Table 1: Definitions of Thai Education System

Level of education	Duration	Description
Pre-elementary Level	2-3 years	Aim to nurture and prepare physical, mental, intellectual and emotional skills for students for their further movement no to the elementary education.
Elementary Level (Grade 1 to Grade 6)	6 years	Puts emphasis on basic literacy and numeracy skills and cultivates desirable behavior in student.
Lower Secondary Level (Grade 7 to Grade 9)	3 years	Gears toward developing the students' ethics, knowledge and abilities. Allows the students to explore their needs, areas of interests and aptitudes and enables them to meet their appropriate careers.
Upper Secondary Level (Grade 10 to Grade 12)	3 years	Aims to prepare student to meet the labor market and to promote their entrepreneurship skills. At this stage students can choose to further study between two tracks 1) vocational-oriented provided in vocational and technical colleges for the student who are good at skills 2) academic track is offered in general education schools for the students who are academically inclined.
Diploma Level	4 years	School offer course for the students who have completed upper secondary education. Aims to develop the learners' knowledge and vocational skills at the semi-skills level and to enable them to initiate their entrepreneurships.
Undergraduate Level	4-6 years	The students, who have completed upper secondary education, take entrance examination and attend course for their Bachelor's degree. As for the students who have been given diploma, after passing entrance examination can take a two-year course to pursue their first degree in higher technological and educational institutions. Aims to develop the students' abilities and encourages them to apply theories to a reality of the nation's development so that they can bring their country up to the international challenges.
Graduate Level	1-3 years	Graduate degree offers courses to the learners at the graduate diploma, master degree and doctoral degree levels. Aims at stimulating students to specialize and bring theories to practices. The learning process focuses on the learners' broader vision and better perspectives for looking at the world and bringing the nation to the international competition.

Source: Ministry of Education, Thailand

Table 2: Number of students in public and private institutions by level of education: academic year 2011

Level of education	Number of student
Pre-elementary education	1,813,538
Elementary education	4,991,835
Lower secondary education	2,662,270
Upper secondary education	2,109,873
Undergraduate degree and lower	2,156,730
Graduate degree	220,489
Total	13,954,735

Source: Statistical Forecasting Bureau, National Statistical Office

2. Data and Sample

The data used in this study comes from Thailand's Labor Force Survey (LFS) for the year 2001 and 2011 conducted by Thai National Statistical Office (NSO). The data from two different years reflects the change that occurred between decades. The surveys were conducted quarterly; this paper combines the data in each quarter to represent annual result. The sample was collected randomly from the households throughout the country. The Labor Force information was obtained through interviewing method. The data used includes only individuals who graduated with vocational or general secondary degree and individuals who were employed at the time of survey and reported monthly earning. The analysis also limits the age of individuals to be in the range of 15 to 60 years at the time of the survey. Moreover, it includes individuals who classified as employees of public, private, and state-owned organization. The descriptive statistics of the sample are as in table 3. The classification of the region in the research follows the format of NSO, which divided regions into five parts: Bangkok, Central, North, Northeast, and South.

Table 3: Descriptive statistics Sample means and standard deviations (standard deviations in parenthesis)

Variables	2001					2011				
	Bangkok	**Central**	**North**	**Northeast**	**South**	**Bangkok**	**Central**	**North**	**Northeast**	**South**
Sample size (N)	2626	10054	4617	5059	4702	2675	13705	5234	5486	5178
Log earnings	8.9909 (0.6525)	8.7352 (0.5579)	8.5804 (0.6568)	8.5706 (0.6921)	8.6177 (0.6352)	9.1790 (0.5330)	8.9667 (0.5935)	8.8423 (0.7222)	8.8607 (0.6972)	8.9299 (0.6262)
Upper secondary vocational	0.4379 (0.4962)	0.4185 (0.4933)	0.4003 (0.4900)	0.4363 (0.4960)	0.4445 (0.4970)	0.3368 (0.4727)	0.3027 (0.4595)	0.2711 (0.4446)	0.2528 (0.4347)	0.2912 (0.4544)
Year experience	14.4474 (9.9943)	12.4331 (8.4341)	14.1202 (8.8450)	14.6509 (9.1204)	14.0396 (8.9646)	17.8015 (10.7026)	15.7251 (9.4514)	17.9692 (10.4953)	18.0233 (10.5138)	17.0597 (9.8396)
Year experience squared	308.576 (387.409)	225.707 (290.912)	277.596 (310.713)	297.814 (348.779)	277.456 (325.653)	431.397 (460.119)	336.600 (362.093)	433.023 (427.696)	435.360 (424.143)	387.831 (387.548)
Married	0.5228 (0.4996)	0.5878 (0.4923)	0.6231 (0.4847)	0.6650 (0.4721)	0.6008 (0.4898)	0.5753 (0.4944)	0.6372 (0.4808)	0.6580 (0.4744)	0.6825 (0.4656)	0.6518 (0.4764)
Divorced, widowed, separated	0.0434 (0.2038)	0.0408 (0.1978)	0.0431 (0.2031)	0.0352 (0.1843)	0.0438 (0.2047)	0.0624 (0.2420)	0.0689 (0.2533)	0.0768 (0.2663)	0.0696 (0.2545)	0.0657 (0.2477)
Public	0.1188 (0.3236)	0.2194 (0.4139)	0.4135 (0.4925)	0.5013 (0.5000)	0.3413 (0.4742)	0.0890 (0.2848)	0.1669 (0.3729)	0.3447 (0.4753)	0.4143 (0.4927)	0.2984 (0.4576)
State enterprise	0.0731 (0.2604)	0.0492 (0.2164)	0.0539 (0.2259)	0.0478 (0.2134)	0.0532 (0.2244)	0.0348 (0.1832)	0.0169 (0.1290)	0.0374 (0.1899)	0.0303 (0.1713)	0.0263 (0.1599)
Municipal	1.0000 (0.0000)	0.7059 (0.4557)	0.7661 (0.4234)	0.8207 (0.3836)	0.7388 (0.4393)	1.0000 (0.0000)	0.6227 (0.4847)	0.6974 (0.4594)	0.7140 (0.4519)	0.6375 (0.4808)
Male	0.5510 (0.4975)	0.5600 (0.4964)	0.6303 (0.4828)	0.6365 (0.4811)	0.6240 (0.4844)	0.5413 (0.4984)	0.5575 (0.4967)	0.6141 (0.4869)	0.6396 (0.4802)	0.6396 (0.4802)

3. Conceptual framework

From the core question of the study, the return to education for vocational and general school graduates, the conventional human capital earning equation has been applied. According to (Mincer, 1974), factors contributing earning can be expressed in functional form as follows:

$$\ln w_i = \beta_1 + \beta_2 E_i + \beta_3 X_i + \beta_4 X_i^2 + u_i$$

where is the natural log of monthly wage of individual i, E_i is the vector of completion of education attainment level of individual i, X_i is the potential year of working experience of individual i, X_i^2 is the potential year of working experience squared, and u_i is the random disturbance term. The inclusion of experience reflects an adjustment of the education coefficients for the influence of work experience in the labor market (Griliches, 1977). This concept is applied with some modifications; there are new variables added into the basic function. From the regression, the return to education can be interpreted as the percentage difference in monthly earning between individuals who attain the particular level of education which dummy takes value of one while the base case takes value of zero.

4. Econometric specification

This study applies regression analysis in order to estimate the return to schooling.. The ordinary least square (OLS) method is used to estimate the determinants of associated with the rate of return to education. Following the concept of Mincer earning function, the model used adds some new variables to reflect individual characteristics. The dependent variable for this estimation is the natural log of monthly earnings. The independent variables include education attainment level, years of experience, years of experience squared, marital status, sector of employment, status of municipality, and gender. The education level is generated as dummy variable; it takes one if individual has completed upper secondary vocational education and a value of zero if individual has completed upper secondary general education. Potential years of working experiences are not directly given by the survey; thus, the study uses the difference in ages reported at the time of survey and aged left school as a proxy of potential experience. The marital status is generated as dummy

variable divided into two groups: married and divorced, separated, or widowed. Sector of employment dummy variable are also divided into two groups: public and state enterprise. The area of living is generated as dummy variable and it takes value of one for municipal area. The gender dummy variable takes value of one if an individual is male. The potential experience squared variable is included in the model to capture any possible chance of non-linear relationship between earning and experience. The detail of each variable is presented in Table 4. In order to reflect the cross-region result, the study divided the data into five regions: Bangkok, Central, North, Northeast, and South. The estimations are conducted separately. The hypothesis for this relationship is that the level of education and job experience should have some significant impact on earnings.

Table 4: Description of variables used

Variables	Description
Dependent variable	
Log earnings	Natural logarithm of monthly income
Independent variables	
Upper secondary vocational	Education attainment (Graduated with upper secondary vocational education = 1, otherwise = 0)
Year experience	Years of working experience
Year experience squared	Years of working experience squared
Married	Marital status (Married = 1, otherwise = 0)
Divorced, widowed, separated	Marital status (Divorced, widowed, separated = 1, otherwise = 0)
Public	Sector of employment (Working in public sector = 1, otherwise = 0)
State enterprise	Sector of employment (Working in state enterprise = 1, otherwise = 0)
Municipal	Living in municipal district (Yes = 1, No = 0)
Male	Gender (Male = 1, otherwise = 0)

5. Empirical results

The estimated returns to education in each region for 2001 and 2011 are expressed in Table 5. The regression adopted the concept of Mincerian earning function and added some vectors of individual characteristics dummies. In this study, the returns to schooling are represented in term of the coefficient of the education attainment variable. It supposed that individuals did not further study once they finish upper secondary education; therefore, the comparison between the returns to vocational school graduates and general school graduates is feasible. The result shows that for every region and in both years, the coefficients of education dummy are all positive number meaning that there are positive margins between the return of vocational track graduates and general track graduates. These findings support the result of Moenjak & Worswick (2003), Hawley (2004), and Tangtipongkul (2013). Approximately, the upper secondary technical education has higher earning than upper secondary general education by 11 per cent for individuals in Bangkok, 14 per cent for individuals in central region, 24 per cent for individuals in northern region, 29 per cent for individuals in northeastern region, and 21 per cent for individuals in southern region. The region that has the highest positive margin is Northeast and one with the lowest is Bangkok. In term of the time dimension, the gap in returns between graduates with different education track rises in every region except North. For the result of other individual characteristics variables, residents of district of municipal have higher income than non-municipal districts. Married individuals receive higher income than single individuals. Men have higher return than women. Workers of state enterprise earn higher than workers of private sector. In some variables, the results in 2 years are different. In 2001, divorced, widowed, or separated individuals earn lower than single individuals in all regions except South, while in 2011 the exception appears in Bangkok and Northeast. In 2001, workers of public sector earn higher than private sector workers in every region except Bangkok and Central, while there is no exception in 2011.

Table 5: Empirical result from estimations of earning function

Variables	Bangkok		Central		North		Northeast		South	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Constant	8.3798***	8.7680***	8.2330***	8.4827***	7.9155***	8.1653***	7.7425***	8.2130***	7.9339***	8.3061***
	(0.0243)	(0.0259)	(0.0138)	(0.0158)	(0.0249)	(0.0324)	(0.0362)	(0.0307)	(0.0258)	(0.0268)
Upper secondary vocational	0.1065***	0.1245***	0.1373***	0.1435***	0.2402***	0.2353***	0.2465***	0.3292***	0.2027***	0.2204***
	(0.0216)	(0.0208)	(0.0095)	(0.0102)	(0.0169)	(0.0192)	(0.0159)	(0.0190)	(0.0153)	(0.0161)
Year experience	0.0388***	0.0122***	0.0269***	0.0176***	0.0099***	0.0100***	0.0251***	0.0042	0.0149***	0.0095***
	(0.0040)	(0.0033)	(0.0021)	(0.0020)	(0.0036)	(0.0036)	(0.0044)	(0.0031)	(0.0036)	(0.0031)
Year experience squared	0.0000	0.0002*	0.0002***	0.0000	0.0006***	0.0003***	0.0000	0.0003***	0.0004***	0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Municipal	-	-	0.0232**	0.0407***	0.1040***	0.0981***	0.1743***	0.1341***	0.1207***	0.1269***
			(0.0101)	(0.0097)	(0.0185)	(0.0175)	(0.0264)	(0.0196)	(0.0176)	(0.0157)
Married	0.0407*	0.0125	0.0383***	0.0673***	0.0835***	0.0690***	0.0641***	0.0916***	0.1008***	0.0932***
	(0.0219)	(0.0194)	(0.0100)	(0.0102)	(0.0193)	(0.0203)	(0.0208)	(0.0199)	(0.0182)	(0.0182)
Divorced, widowed, separated	-0.1270**	0.0636	-0.1029***	-0.0636***	-0.0721*	-0.0707*	-0.0056	0.0659*	0.0071	-0.0078
	(0.0635)	(0.0427)	(0.0262)	(0.0200)	(0.0420)	(0.0362)	(0.0512)	(0.0389)	(0.0378)	(0.0301)
Public	-0.2449***	0.0341	-0.0451***	0.0988***	0.1801***	0.3045***	0.2586***	0.2881***	0.1850***	0.2475***
	(0.0266)	(0.0300)	(0.0119)	(0.0142)	(0.0170)	(0.0196)	(0.0196)	(0.0194)	(0.0162)	(0.0172)
State enterprise	0.2059***	0.4114***	0.3709***	0.4407***	0.6280***	0.7808***	0.6121***	0.5708***	0.5428***	0.5690***
	(0.0418)	(0.0550)	(0.0247)	(0.0429)	(0.0351)	(0.0609)	(0.0393)	(0.0562)	(0.0364)	(0.0523)
Male	0.0260	0.1043***	0.0379***	0.1113***	0.0483***	0.1176***	0.0120	0.0840***	0.0607***	0.1304***
	(0.0202)	(0.0184)	(0.0093)	(0.0095)	(0.0162)	(0.0177)	(0.0173)	(0.0175)	(0.0154)	(0.0162)

Bangkok has no non-municipal district.
Robust standard error in the parenthesis
*** Significant at 1% level
** Significant at 5% level
* Significant at 10% level

6. Conclusion

The finding challenges the belief that the demand for general school track increases in a faster rate than the technical school track as the statistical result shows that the return to secondary vocational education is, however, higher than the secondary general education. This implies an underinvestment in vocational education in Thailand. The suggestion for students who do not further study in higher education is to choose the technical track in their upper secondary level. The cross-region result presents that difference in income of individuals with vocational track and general track varies along region. The region that has the widest gap is Northeast meaning that individuals living in Northeastern region with upper secondary vocational education earn significantly higher than peers with upper secondary general education. Comparing with Bangkok that has the smallest gap, the return of individuals with secondary technical education does not differ much from the return of peers with secondary general education. Therefore, this recommends that workers with secondary vocational education will be more beneficial if working in Northeast, and will be less beneficial if working in Bangkok. The variation of return gap may be caused by the distribution system of income in Thailand. However, the size of the margin may be affected by the other factors; thus, the further study in this area will provide substantial evidence.

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