RATES OF RETURN TO SCHOOLING IN THAILAND

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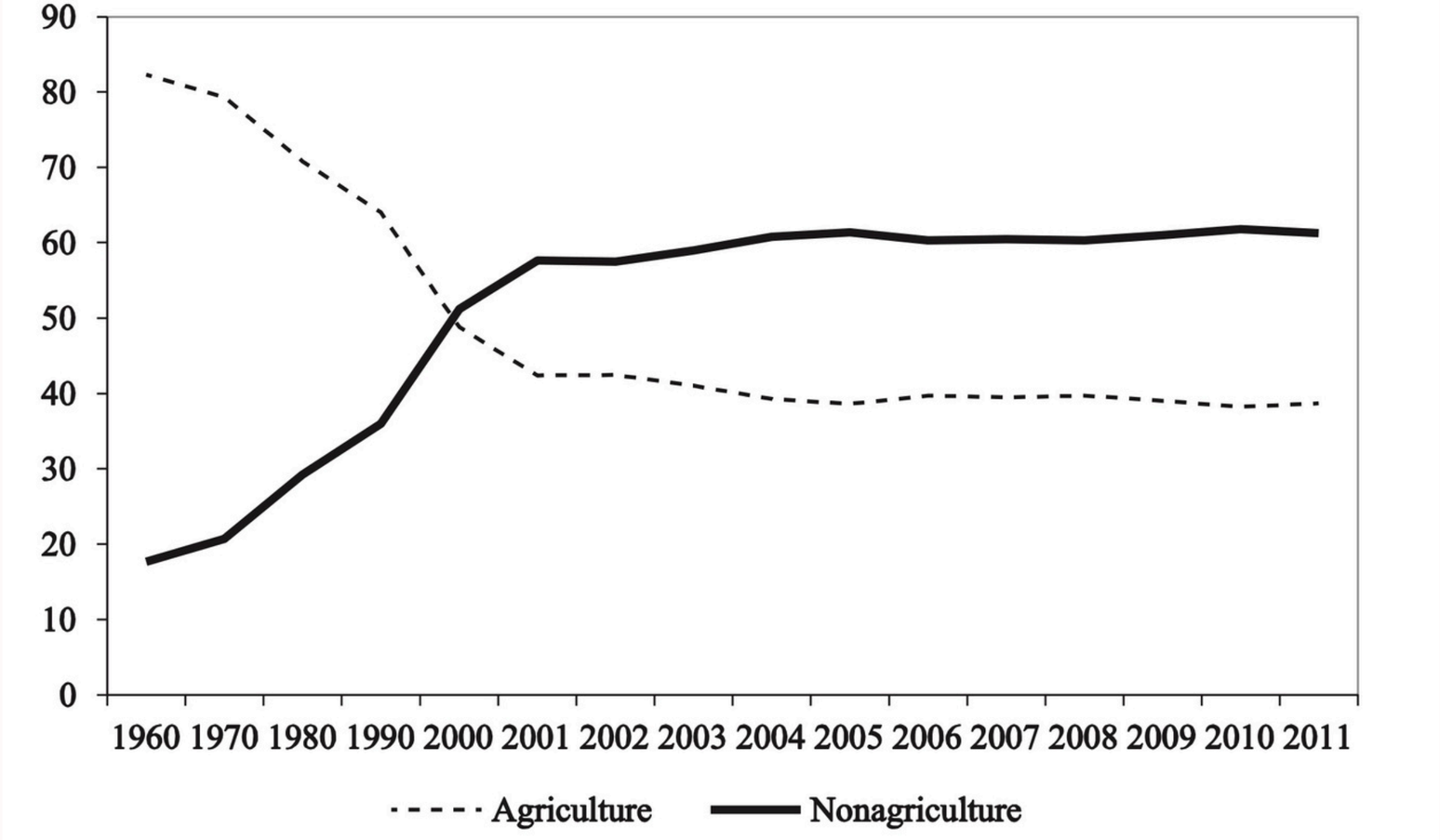
EE489 SECTION 3

INTRODUCTION

- Human capital investment is essential to turn technical change and physical capital investment into productivity gains (Schultz 1975, Rosenzweig 1995, McMahon 1999).

- Economic growth and restructuring have fundamentally changed the Thai labor force. The increasing demand for labor in the manufacturing and services sectors will require workers to gain more human capital.

Figure 1. **Sectoral Shares of Employment**



PROGRESS IN THE THAI ECONOMY HAS SHIFTED FROM AGRICULTURE TO MANUFACTURING AND SERVICES (KRONGKAEW 1995; KRONGKAEW, CHAMNIVICKORN, AND NITITHANPRAPAS 2006). IN 1960, 82.3% OF THE THAI POPULATION WAS ENGAGED IN AGRICULTURE, WHILE ONLY 17.7% WERE ENGAGED IN NONAGRICULTURE ACTIVITIES IN THE MANUFACTURING AND SERVICES SECTOR. IN CONTRAST, MORE THAN 50% OF THE LABOR FORCE HAS BEEN EMPLOYED OUTSIDE AGRICULTURE SINCE 2000.

LITERATURE REVIEW

LITERATURE REVIEW

- Hawley (2004) finds that completing an additional year of schooling provides an additional 11%–12% of monthly log earnings for both men and women.
- Hawley (2003) and Moenjak and Worswick (2003) find that vocational secondary education provides higher earnings returns than general secondary education.
- Mehta et al. (2011) find little evidence of overeducation in unskilled jobs in Thailand.
- Mehta et al. (2013) reveal that high-skilled services helped to lift college returns moderately in Thailand.
- The impact of an additional year of schooling for urban residents is higher than for rural residents (Warunsiri and McNown 2010, Hawley 2004).

OBJECTIVE

This study's objective is to investigate the rates of return to schooling in Thailand based on a Mincerian earnings function.

BACKGROUND ON THAILAND'S EDUCATION SYSTEM, POLICIES, AND PLANNING

THAILAND'S EDUCATION SYSTEM

Table 2. **Level of Education—Description and Goal**

Level of Education	Description
Pre-elementary	• A 2- or 3-year course in public or private pre-elementary school • Aims to nurture and prepare physical, mental, intellectual, and emotional skills of students for their elementary education
Elementary	• Grades 1–6 • Emphasizes basic literacy, numerical skills, and the cultivation of desirable behavior
Lower secondary	• Grades 7–9 • Allows students to explore their needs, areas of interests, and aptitudes; enables them to meet the demands of appropriate careers
Upper secondary	• Grades 10–12 • Aims to prepare students to meet labor market needs and promote their entrepreneurial skills through ➢ vocational and technical colleges for students with such skills, or ➢ academic colleges offering a general education
Diploma	• 1–4 years of study for students who have completed upper-secondary education • Aims to develop learners' knowledge and vocational skills at the semiskilled level, and enable them to initiate entrepreneurial activities
Undergraduate	• A 4-year course with some exceptions (e.g., architecture and medical science require 5–6 years of study; students who have received a diploma and passed an entrance examination can take a 2-year course to pursue at higher technological and educational institutions) • Aims to develop students' abilities to apply theories toward the country's development and capacity to meet international challenges
Graduate	• 1–3 years of study at the graduate diploma, master's degree, or doctoral degree levels • stimulates specialization and bringing theories into practice; focuses on the learners' perspective in looking at the world and improving the country's international competitiveness

Source: Government of Thailand, Ministry of Education. http://www.moe.go.th/moe.html

THE NUMBER OF STUDENTS ENROLLING IN EACH LEVEL OF EDUCATION IN 2007-2009.

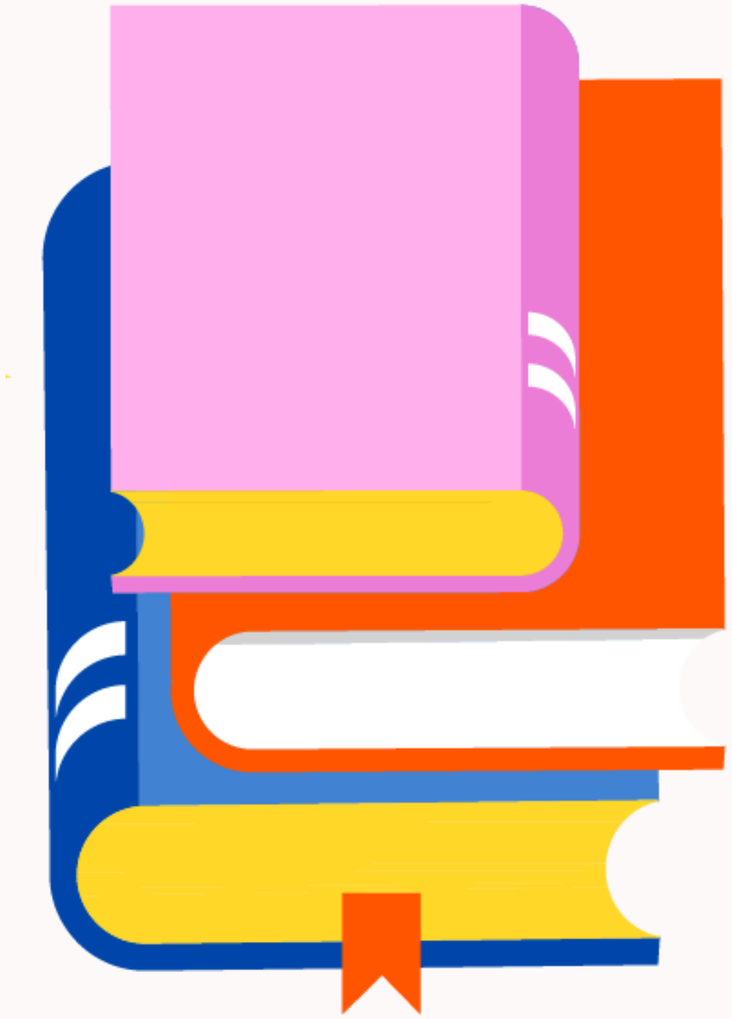


Table 3. **Number of Students Enrolled by Level of Education**

Level of Education	Number of Students		
	2007	2008	2009
Pre-elementary	1,754,371	1,772,439	1,771,351
Elementary	5,561,937	5,342,794	5,166,379
Lower secondary	2,790,837	2,786,819	2,786,067
Upper secondary general	1,176,484	1,204,321	1,256,572
Secondary vocational	772,305	766,925	750,646
Higher vocational certificate	346,880	360,774	364,679
Diploma	23,569	23,509	22,836
Undergraduate degree	1,802,672	1,827,044	1,831,141
Graduate diploma	18,036	20,168	20,168
Master's degree	181,634	178,309	178,471
Higher graduate diploma	764	2,364	2,364
Doctorate degree	16,202	16,247	16,247
Total	**14,447,698**	**14,303,721**	**14,168,930**

Note: Data as of 10 June each year.
Source: Government of Thailand, Ministry of Education. http://www.moe.go.th/moe.html

THAILAND'S EDUCATION POLICIES AND PLANNING

- Thailand's education reform started in 1999. The National Education Act, 1999 was implemented during the first phase of education reform, which mandated children aged 7 years old to enroll in primary and secondary education until they turn 16 years old or complete Grade 9.

- In 2009, implementation of the 15-Year Free Education with Quality Policy was initiated to lessen the financial burden of parents as well as to stimulate the economy.

- Students are provided with education from kindergarten through Grade 12, including general and vocational education.

- The policy covers tuition fees and expenses for books, utensils, uniforms, school equipment, and extracurricular activities.

DATA AND SAMPLE

- This study is based on 2007–2010 data from Thailand’s National Labor Force Survey conducted by the National Statistical Office. The sample is drawn randomly from different households throughout the country.

- Each year of the survey consists of four quarterly sets of data: (i) January–March (dry or nonagricultural season), (ii) April–June (the period in which a large group of new workers enter the labor force after graduation), (iii) July–September (rainy and agricultural season), and (iv) October–December. The measure of education collected in the data relates to the level of education the respondent has completed.

- Because of the focus on private returns to education in this paper, only individuals who studied in the general or vocational education system and reported their monthly salary are included in the analysis.

- Those who are in religious schools are excluded. The analysis is limited to individuals aged 16–60 years at the time of the survey.

- The sample is further restricted to individuals who work as employees in either the government, a state enterprise, or a private sector business; individuals classified as employers or self-employed, or those whose work is restricted to household work were excluded.

Table 4. **Descriptive Statistics of Dependent and Explanatory Variables**

Variable	Description	2007 Mean (Standard Deviation)	2008 Mean (Standard Deviation)	2009 Mean (Standard Deviation)	2010 Mean (Standard Deviation)
Sample size (N)		209,999	210,810	209,260	191,593
Dependent variables					
Log earnings	Natural logarithm of monthly earnings	8.86 (0.84)	8.92 (0.83)	8.92 (0.83)	8.97 (0.79)
Explanatory variables					
Bangkok$^{\psi}$	Living in Bangkok (yes = 1, no = 0)	0.08 (0.28)	0.09 (0.28)	0.09 (0.28)	0.08 (0.27)
North$^{\psi}$	Living in the northern region (yes = 1, no = 0)	0.18 (0.39)	0.18 (0.39)	0.18 (0.39)	0.18 (0.39)
Northeast$^{\psi}$	Living in the northeast region (yes = 1, no = 0)	0.18 (0.39)	0.18 (0.38)	0.18 (0.38)	0.18 (0.39)
South$^{\psi}$	Living in the southern region (yes = 1, no = 0)	0.16 (0.37)	0.16 (0.37)	0.16 (0.37)	0.17 (0.37)
Municipal$^{\psi}$	Living in a municipal area (yes = 1, no = 0)	0.66 (0.47)	0.65 (0.48)	0.65 (0.48)	0.65 (0.48)
Log gross provincial product per capita	Natural logarithm of gross provincial product per capita	11.49 (0.85)	11.57 (0.85)	11.59 (0.79)	11.69 (0.77)
Divorced, Widowed, or Separated$^{\psi}$	Marital status (divorced, widowed, or separated = 1, otherwise = 0)	0.07 (0.26)	0.08 (0.27)	0.08 (0.27)	0.08 (0.28)
Married$^{\psi}$	Marital status (married = 1, otherwise = 0)	0.68 (0.47)	0.67 (0.47)	0.67 (0.47)	0.66 (0.47)
Male$^{\psi}$	Gender (male = 1, otherwise = 0)	0.53 (0.50)	0.54 (0.50)	0.53 (0.50)	0.53 (0.50)
Years of schooling	Years of schooling	9.81 (4.91)	9.89 (4.93)	9.96 (4.94)	10.03 (4.93)
Primary education level$^{\psi}$	Education level (Finished primary education level = 1, otherwise = 0)	0.19 (0.39)	0.19 (0.39)	0.18 (0.39)	0.19 (0.39)
Lower secondary education level$^{\psi}$	Education level (Finished lower secondary education level = 1, otherwise = 0)	0.15 (0.35)	0.15 (0.35)	0.15 (0.36)	0.15 (0.36)
Upper secondary education level$^{\psi}$	Education level (Finished upper secondary education level = 1, otherwise = 0)	0.10 (0.30)	0.10 (0.30)	0.10 (0.30)	0.11 (0.31)
Higher vocational education level$^{\psi}$	Education level (Higher vocational certificate = 1, otherwise = 0)	0.06 (0.24)	0.06 (0.24)	0.06 (0.24)	0.06 (0.24)

Continued.

Table 4. *Continued.*

Variable	Description	2007 Mean (Standard Deviation)	2008 Mean (Standard Deviation)	2009 Mean (Standard Deviation)	2010 Mean (Standard Deviation)
Diploma$^{\psi}$	Education level (diploma = 1, otherwise = 0)	0.003 (0.06)	0.003 (0.06)	0.003 (0.05)	0.003 (0.06)
Bachelor $^{\psi}$	Education level (bachelor's degree = 1, otherwise = 0)	0.21 (0.41)	0.21 (0.41)	0.22 (0.41)	0.22 (0.41)
Master or higher$^{\psi}$	Education level (Master's degree or higher = 1, otherwise = 0)	0.03 (0.16)	0.03 (0.17)	0.03 (0.18)	0.03 (0.18)
Experience	Years of working experience	21.21 (12.27)	21.39 (12.33)	21.65 (12.45)	21.64 (12.52)
Experience squared	Years of working experience squared	600.42 (587.33)	609.51 (592.39)	623.69 (603.34)	624.93 (607.90)
Public$^{\psi}$	Working in the public sector (public sector = 1, otherwise = 0)	0.26 (0.44)	0.26 (0.44)	0.26 (0.44)	0.26 (0.44)
State enterprise$^{\psi}$	Work in the state-enterprise sector (state enterprise = 1, otherwise = 0)	0.02 (0.16)	0.03 (0.16)	0.02 (0.16)	0.02 (0.15)
Legislator$^{\psi}$	Occupation 1 (legislator, senior official, or manager = 1, otherwise = 0)	0.03 (0.18)	0.03 (0.18)	0.03 (0.18)	0.03 (0.18)
Professional$^{\psi}$	Occupation 2 (professional = 1, otherwise = 0)	0.13 (0.33)	0.13 (0.33)	0.13 (0.33)	0.13 (0.33)
Technician$^{\psi}$	Occupation 3 (technician or associated professional = 1, otherwise = 0)	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)	0.09 (0.28)
Clerk$^{\psi}$	Occupation 4 (clerk = 1, otherwise = 0)	0.09 (0.28)	0.09 (0.28)	0.09 (0.29)	0.09 (0.29)
Service workers$^{\psi}$	Occupation 5 (service workers and shop or market sales worker = 1, otherwise = 0)	0.07 (0.25)	0.07 (0.25)	0.07 (0.26)	0.07 (0.26)
Skilled agricultural$^{\psi}$	Occupation 6 (skilled agricultural or fishery worker = 1, otherwise = 0)	0.06 (0.23)	0.06 (0.24)	0.06 (0.24)	0.06 (0.23)
Craft$^{\psi}$	Occupation 7 (craft and related trade worker = 1, otherwise = 0)	0.16 (0.37)	0.16 (0.37)	0.16 (0.37)	0.16 (0.37)

Continued.

Table 4. *Continued.*

Variable	Description	2007 Mean (Standard Deviation)	2008 Mean (Standard Deviation)	2009 Mean (Standard Deviation)	2010 Mean (Standard Deviation)
Machine operator$^{\psi}$	Occupation 8 (plant and machine operator or assembler = 1, otherwise = 0)	0.13 (0.34)	0.13 (0.34)	0.13 (0.33)	0.13 (0.33)
Agriculture$^{\psi}$	Industry 1 (agriculture, including fishing, hunting, and forestry = 1, otherwise = 0)	0.11 (0.31)	0.11 (0.32)	0.12 (0.32)	0.11 (0.31)
Mining$^{\psi}$	Industry 2 (mining and quarrying = 1, otherwise = 0)	0.002 (0.05)	0.003 (0.05)	0.002 (0.05)	0.003 (0.05)
Utilities$^{\psi}$	Industry 3 (utilities = 1, otherwise = 0)	0.01 (0.09)	0.01 (0.09)	0.01 (0.09)	0.01 (0.09)
Construction$^{\psi}$	Industry 4 (construction = 1, otherwise = 0)	0.10 (0.30)	0.10 (0.29)	0.10 (0.29)	0.10 (0.30)
Low-skill manufacturing$^{\psi}$	Industry 5 (low-skilled manufacturing = 1, otherwise = 0)	0.14 (0.35)	0.13 (0.34)	0.13 (0.34)	0.13 (0.33)
High-skill manufacturing$^{\psi}$	Industry 6 (high-skilled manufacturing = 1, otherwise = 0)	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)
Low-skill services$^{\psi}$	Industry 7 (low-skilled services = 1, otherwise = 0)	0.21 (0.41)	0.21 (0.41)	0.22 (0.41)	0.22 (0.41)
High-skill services$^{\psi}$	Industry 8 (High-skilled services = 1, otherwise = 0)	0.34 (0.47)	0.34 (0.47)	0.34 (0.47)	0.34 (0.47)
Quarter 2$^{\psi}$	Quarter 2 dataset	0.25 (0.43)	0.25 (0.43)	0.25 (0.43)	0.28 (0.45)
Quarter 3$^{\psi}$	Quarter 3 dataset	0.24 (0.43)	0.25 (0.43)	0.24 (0.43)	0.18 (0.38)
Quarter4$^{\psi}$	Quarter 4 dataset	0.25 (0.43)	0.25 (0.43)	0.25 (0.43)	0.27 (0.44)

Source: Author's computations.

Table 5. **Classification by Industry**

Sector	Description
Agriculture	(i) Agriculture
	(ii) Fishing
	(iii) Hunting
	(iv) Forestry
Mining	(i) Mining
	(ii) Quarrying
Utilities	(i) Electricity
	(ii) Water supply
	(iii) Gas
Construction	
Low-skill manufacturing	(i) Food products
	(ii) Tobacco
	(iii) Textiles
	(iv) Footwear
	(v) Apparel
	(vi) Nonwearing textile products
	(vii) Wood and cork products
	(viii) Furniture and fixtures
	(ix) Leather and fur products not for wearing
	(x) Rubber products
	(xi) Petroleum products
	(xii) Other nonmetallic mineral products
	(xiii) Metal products, excluding machines
	(xiv) Transport equipment
	(xv) Miscellaneous
High-skill manufacturing	(i) Paper and paper products, printing, publishing
	(ii) Chemicals and chemical products
	(iii) Basic metals
	(iv) Machinery
	(v) Electrical machinery
	(vi) Medical and scientific equipment
	(vii) Photographic and optical products
	(viii) Watches and clocks
Low-skill services	(i) Retail trade
	(ii) Transportation
	(iii) Personal and household services
	(iv) Hotels and restaurants
	(v) Wholesale trade
	(vi) Recreational and cultural and cultural services
	(vii) Warehousing
	(viii) Sanitary and similar activities
High-skill services	(i) Public administration and defense
	(ii) Education, scientific, and research
	(iii) Health and medical services
	(iv) Social work and other social and community services
	(v) Communications
	(vi) Financial intermediation
	(vii) Real estate
	(viii) Business activities, including renting
	(ix) Insurance

Sources: Government of Thailand, National Statistical Office 2001–2011; Mehta et al. 2013.

EMPIRICAL STRATEGY AND METHODOLOGY

THE LOG EARNINGS IS A FUNCTION OF YEARS OF SCHOOLING, YEARS OF EXPERIENCE, AND YEARS OF EXPERIENCE SQUARED, AS SHOWN IN EQUATION (1).THE REGRESSIONS ARE BASED ON MINCER (1974):

$$\ln W_i = \gamma_1 + \gamma_2 Yrs\ of\ schooling_i + \beta_4 E_i + \beta_4 E_i^2 + u_i \qquad (1)$$

where $\ln W_i$ is the log of monthly earnings of individual i, $Yrs\ of\ schooling_i$ represents years of schooling of individuals, E_i is a potential year of working experience of individual i, E_i^2 is a potential year of working experience squared, and u_i is the random disturbance term.

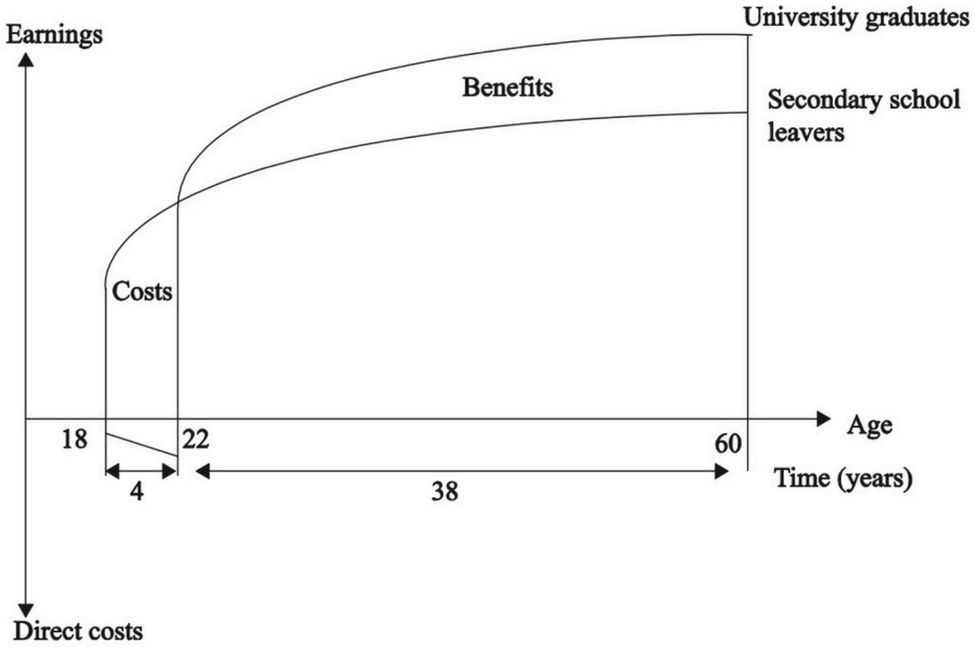
AN EXTENDED EARNINGS FUNCTION WHICH REPLACES YEAR OF SCHOOLINGI WITH LEVELS OF SCHOOLING AND INDIVIDUAL CHARACTERISTICS IS SHOWN IN EQUATION (2):

$$\ln W_i = \beta_1 + \beta_2 X_i + \beta_3 S_i + \beta_4 E_i + \beta_4 E_i^2 + u_i \qquad (2)$$

THE INTERNAL RATE OF RETURN OF EDUCATION IS ESTIMATED IN TERMS OF BOTH PRIVATE AND SOCIAL RATE OF RETURNS. THE PRIVATE RATE OF RETURN IS USED TO DESCRIBE THE DEMAND FOR EDUCATION AND ASSESS THE EQUITY EFFECTS OF PUBLIC EDUCATION EXPENDITURES (PSACHAROPOULOS 1994, 1995).

ON THE OTHER HAND, THE SOCIAL RATE OF RETURN REVIEWS THE COSTS AND BENEFITS OF THE EDUCATION INVESTMENT FROM THE GOVERNMENT'S VIEWPOINT (PSACHAROPOULOS 1994, 1995).

Figure 2. **Stylized Age–Earnings Profiles**



Source: Adapted from Psacharopoulos, G. 1995. The Profitability of Investment in Education: Concepts and Methods. Human Capital Development and Operations Policy Working Paper No. 15280. Washington, DC: World Bank.

THE FIRST METHOD TO COMPUTE THE PRIVATE RATE OF RETURN TO AN INVESTMENT IN A GIVEN LEVEL OF EDUCATION IS FINDING THE RATE OF DISCOUNT (R) THAT EQUALIZES THE STREAM OF DISCOUNTED BENEFITS TO THE STREAM OF COSTS AT A GIVEN POINT IN TIME AS SHOWN IN EQUATION

$$\sum_{t=1}^{38} \frac{(W_U - W_s)_t}{(1+r)^t} = \sum_{t=1}^{4} (W_S - C_U)_t \, (1+r)^t$$

where $W_U - W_s$ is the earnings differential between a university graduate (subscript U) and a secondary general school graduate (subscript s, the control group), C_U represents the direct costs of university education (e.g., tuition, fees, books), and W_s denotes the student's foregone earnings or indirect costs (Psacharopoulos 1995).

THE SECOND METHOD IS THE SHORTCUT METHOD TO APPROXIMATE THE PRIVATE RETURNS TO EDUCATION BASED ON PSACHAROPOULOS (1995):

$$private\, r = \frac{\bar{W}_U - \bar{W}_s}{4(\bar{W}_s)}$$

where $\bar{W}$ refers to the mean earnings of an individual with the subscripted education level, $\bar{W}_U$ is the mean earnings of an individual with a university education, $\bar{W}_s$ is the mean earnings of an individual with a general secondary education, and 4 years is the length of the university cycle. The social rate of return in this case is shown in equation (5):

THE SOCIAL RATE OF RETURN

$$social\, r = \frac{\bar{W}_U - \bar{W}_s}{4(\bar{W}_s + C_U)}$$

where C_U is the annual direct cost of university education.

EMPIRICAL RESULTS

Table 6. **Mincer-Type Returns to Education**

	Log Monthly Earnings			
Explanatory Variable	**2007**	**2008**	**2009**	**2010**
Constant	6.8274***	6.8884***	6.8628***	6.9836***
	(0.0098)	(0.0098)	(0.0093)	(0.0098)
Years of schooling	0.1376***	0.1337***	0.1322***	0.1263***
	(0.0005)	(0.0005)	(0.0005)	(0.0006)
Experience	0.0501***	0.0503***	0.0514***	0.0506***
	(0.0007)	(0.0006)	(0.0006)	(0.0006)
Experience squared	−0.0006***	−0.0006***	−0.0006***	−0.0006***
	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Number of observations	209,999	210,810	209,260	191,593
R-squared	0.4497	0.4577	0.4601	0.4575

Notes: Robust standard errors in parentheses. *** = significant at 1% level, ** = significant at 5% level.
Source: Author's computations.

Table 7. **Determinants of Earnings (dependent variable: log monthly earnings)**

	Log Monthly Earnings			
Explanatory Variable	**2007**	**2008**	**2009**	**2010**
Constant	8.2439***	8.3047***	8.3176***	8.4071***
	(0.0049)	(0.0051)	(0.0049)	(0.0049)
Education attainment				
Primary education	0.1403***	0.1319***	0.1175***	0.1065***
	(0.0070)	(0.0070)	(0.0066)	(0.0069)
Lower secondary	0.3549***	0.3223***	0.2881***	0.2698***
	(0.0076)	(0.0076)	(0.0074)	(0.0072)
Upper secondary	0.5098***	0.4754***	0.4373***	0.4071***
	(0.0088)	(0.0084)	(0.0079)	(0.0083)
Secondary vocational	0.8165***	0.7445***	0.6937***	0.6442***
	(0.0117)	(0.0114)	(0.0122)	(0.0127)
Higher vocational	0.9015***	0.8494***	0.8112***	0.7586***
	(0.0099)	(0.0103)	(0.0096)	(0.0096)
Diploma	0.9417***	0.8324***	0.8667***	0.8014***
	(0.0508)	(0.0503)	(0.0442)	(0.0470)
Bachelor's	1.3888***	1.3404***	1.2997***	1.2371***
	(0.0071)	(0.0071)	(0.0070)	(0.0072)
Master's or higher	2.0688***	1.9743***	1.9650***	1.8829***
	(0.0147)	(0.0122)	(0.0119)	(0.0147)
Number of observations	209,999	210,810	209,260	191,593
R-squared	0.4071	0.4152	0.4145	0.4101

Notes: Robust standard errors in parentheses. *** = significant at 1% level, ** = significant at 5% level.
Source: Author's computations.

Table 8. **Returns to Education in Thailand: Extended Earnings Function Method (%)**

Education Level	**2007**	**2008**	**2009**	**2010**
Primary	2.3	2.2	1.9	1.8
Secondary (General)	6.2	5.7	5.3	5.0
Secondary (Vocational)	11.3	10.2	9.6	8.9
Bachelor's	21.9	21.6	21.6	20.8

Note: Computations are based on extended earnings function method described in Psacharopoulos, G. 1995. The Profitability of Investment in Education: Concepts and Methods. Human Capital Development and Operations Policy Working Papers No. 15280. Washington, DC: World Bank.

Table 9. **Determinants of Earnings (dependent variable: log monthly earnings)**

Explanatory Variable	Log Monthly Earnings 2007	2008	2009	2010
Constant	5.3086***	5.4360***	5.4913***	5.608***
	(0.0427)	(0.0391)	(0.0417)	(0.0399)
Education attainment				
Primary education	0.2070***	0.1834***	0.1602***	0.1601***
	(0.0071)	(0.0076)	(0.0071)	(0.0069)
Lower secondary	0.4107***	0.3759***	0.3367***	0.3512***
	(0.0082)	(0.0085)	(0.0080)	(0.0079)
Upper secondary	0.5452***	0.5058***	0.4659***	0.4730***
	(0.0091)	(0.0095)	(0.0088)	(0.0092)
Secondary vocational	0.6794***	0.6371***	0.5805***	0.5981***
	(0.0109)	(0.0108)	(0.0107)	(0.0116)
Higher vocational	0.8562***	0.8084***	0.7480***	0.7637***
	(0.0108)	(0.0110)	(0.0102)	(0.0103)
Diploma	0.8207***	0.7175***	0.7580***	0.7209***
	(0.0420)	(0.0460)	(0.0347)	(0.0353)
Bachelor's	1.1560***	1.1082***	1.0343***	1.0498***
	(0.0110)	(0.0108)	(0.0103)	(0.0107)
Master's or higher	1.6239***	1.5312***	1.4745***	1.4810***
	(0.0171)	(0.0151)	(0.0144)	(0.0167)
Region of residence				
Bangkok	0.0020	0.0194***	0.0255***	0.0250***
	(0.0057)	(0.0052)	(0.0049)	(0.0054)
North	−0.1419***	−0.1469***	−0.1342***	−0.1173***
	(0.0064)	(0.0060)	(0.0057)	(0.0055)
Northeast	−0.1188***	−0.1030***	−0.1094***	−0.1044***
	(0.0074)	(0.0071)	(0.0068)	(0.0067)
South	0.0057	0.0163***	−0.0213***	−0.0179***
	(0.0056)	(0.0053)	(0.0052)	(0.0054)
Area of residence				
Municipal	0.0834***	0.0855***	0.0977***	0.0854***
	(0.0032)	(0.0031)	(0.0031)	(0.0033)
Log gross provincial product per capita	0.1604***	0.1570***	0.1559***	0.1505***
	(0.0034)	(0.0032)	(0.0034)	(0.0032)
Male	0.1631***	0.1672***	0.1659***	0.1555***
	(0.0040)	(0.0039)	(0.0037)	(0.0039)
Marital status				
Married	0.0535***	0.0604***	0.0734***	0.0777***
	(0.0049)	(0.0044)	(0.0043)	(0.0046)
Divorced, separated, or widowed	−0.0107	−0.0067	−0.0034	−0.0053
	(0.0086)	(0.0077)	(0.0075)	(0.0076)
Work characteristics				
Experience	0.0350***	0.0336***	0.0330***	0.0336***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Experience squared	−0.0004***	−0.0004***	−0.0004***	−0.0004***
	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Public	0.1500***	0.1354***	0.1592***	0.1298***
	(0.0072)	(0.0071)	(0.0067)	(0.0075)
State enterprise	0.3921***	0.3685***	0.3743***	0.4020***
	(0.0158)	(0.0140)	(0.0147)	(0.0166)
Legislator	0.3547***	0.3828***	0.3896***	0.4115***
	(0.0151)	(0.0150)	(0.0150)	(0.0150)
Professional	0.4674***	0.4945***	0.5012***	0.5018***
	(0.0102)	(0.0094)	(0.0094)	(0.0104)
Technician	0.3686***	0.3544***	0.3454***	0.3461***
	(0.0087)	(0.0077)	(0.0076)	(0.0085)
Clerk	0.2145***	0.2096***	0.2125***	0.2022***
	(0.0076)	(0.0071)	(0.0072)	(0.0074)
Service workers	0.1415***	0.1444***	0.1454***	0.1354***
	(0.0075)	(0.0089)	(0.0071)	(0.0077)
Skilled agricultural	0.1138***	0.1817***	0.0878***	0.1182***
	(0.0125)	(0.0112)	(0.0106)	(0.0116)
Craft	0.0594***	0.0635***	0.0683***	0.0811***
	(0.0065)	(0.0063)	(0.0060)	(0.0062)
Machine operator	0.2254***	0.2220***	0.2115***	0.2078***
	(0.0066)	(0.0061)	(0.0059)	(0.0063)
Mining	0.6015***	0.6067***	0.5466***	0.5099***
	(0.0419)	(0.0327)	(0.0368)	(0.0368)
Utilities	0.4870***	0.3958***	0.4488***	0.3329***
	(0.0304)	(0.0307)	(0.0266)	(0.0280)
Construction	0.3653***	0.3454***	0.3380***	0.2697***
	(0.0105)	(0.0103)	(0.0099)	(0.0098)
Low-skill manufacturing	0.3463***	0.3374***	0.3061***	0.2789***
	(0.0105)	(0.0098)	(0.0097)	(0.0094)
High-skill manufacturing	0.4645***	0.4386***	0.4021***	0.3702***
	(0.0105)	(0.0098)	(0.0098)	(0.0097)
Low-skill services	0.4135***	0.3888***	0.3814***	0.3314***
	(0.0098)	(0.0092)	(0.0091)	(0.0090)
High-skill services	0.3487***	0.3389***	0.3379***	0.2765***
	(0.0103)	(0.0101)	(0.0099)	(0.0099)
Survey quarter				
Quarter 2	0.0136***	−0.0040	−0.0065	0.0099**
	(0.0051)	(0.0049)	(0.0047)	(0.0046)
Quarter 3	0.0146***	0.0196***	0.0243***	0.0365
	(0.0052)	(0.0050)	(0.0047)	(0.0052)
Quarter 4	0.0271***	0.0122***	0.0190***	0.0347
	(0.0053)	(0.0049)	(0.0047)	(0.0046)
Number of observations	209,999	210,810	209,260	191,593
R-squared	0.6116	0.6282	0.6332	0.6176

Notes: Robust standard errors in parentheses. *** = significant at 1% level, ** = significant at 5% level.
Source: Author's computations.

Table 10. **Mean Earnings and Direct Cost by Level of Education, 2010**

Education Level	Mean Earnings Cycle (B/year)	Length of School (years)	Annual Direct Cost per Public School Year (B)
No education	51,302.5	n.a.	n.a.
Primary	66,449.5	6	40,970
Secondary (General)	90,258.8	6	29,600
Secondary (Vocational)	122,657.4	3	29,600
		3	40,242
University	224,654.5	4	67,885

B = baht, n.a. = not applicable.
Note: $1 = B35.65 as of 28 August 2015.
Sources: Government of Thailand, National Statistical Office. National Labor Force Survey (Table 2: Number and Percentage of Employed Persons by Industry, 2001–2011). http://service.nso.go.th/nso/nso_center /project/search_center/23project-th.htm (accessed 30 May 2011); National Education Account of Thailand. seminar.qlf.or.th/File/DownloadFile/699

Table 11. **Returns to Education—Full Discounting Method** (%)

Education Level	Social Returns
Primary	3.4
Secondary (General)	5.7
Secondary (Vocational)	8.0
University	11.3

Sources: Government of Thailand, National Statistical Office. Labor Force Survey, 2010. http://web.nso.go.th/eng/stat/lfs_e/lfse.htm; National Education Account of Thailand. seminar.qlf.or.th/File/DownloadFile/699

Table 12. **Shortcut Estimates of the Returns to Education** (%)

Education Level	Private Returns	Social Returns
Primary	4.9	2.7
Secondary (General)	6.0	4.1
Secondary (Vocational)	14.1	8.8
University	37.2	21.3

Sources: Government of Thailand, National Statistical Office. Labor Force Survey, 2010. http://web.nso.go.th/eng/stat/lfs_e/lfse.htm; National Education Account of Thailand. seminar.qlf.or.th/File /DownloadFile/699

Table 13. **Mean Earnings and Direct Cost by Level of Education and Gender**

Education Level	Mean Earnings (B/year)		Length of School Cycle (years)	Annual Direct Cost per Public School Year (B)
	Male	Female		
No education	56,338.8	46,840.7	n.a.	n.a.
Primary	71,254.0	59,399.4	6	40,970
Secondary (General)	97,279.9	80,897.9	6	29,600
Secondary (Vocational)	132,224.3	108,986.7	6	40,242
University	247,880.8	210,802.3	4	67,885

B = baht, n.a. = not applicable.
Note: $1 = B35.65 as of 28 August 2015.
Sources: Government of Thailand, National Statistical Office. Labor Force Survey, 2010. http://web.nso.go.th/eng/stat/lfs_e/lfse.htm; National Education Account of Thailand. seminar.qlf.or.th/File/DownloadFile/

Table 14. **Shortcut Estimates of the Returns to Education by Gender (%)**

Education Level	Private Returns		Social Returns	
	Male	Female	Male	Female
Primary	4.41%	4.47%	2.55%	2.38%
Secondary (General)	6.09%	6.03%	4.30%	4.03%
Secondary (Vocational)	14.26%	13.91%	9.11%	8.29%
University	38.70%	40.14%	22.80%	21.83%

Sources: Government of Thailand, National Statistical Office. Labor Force Survey, 2010. http://web.nso.go.th/eng/stat/lfs_e/lfse.htm; National Education Account of Thailand. seminar.qlf.or.th/File/DownloadFile/699

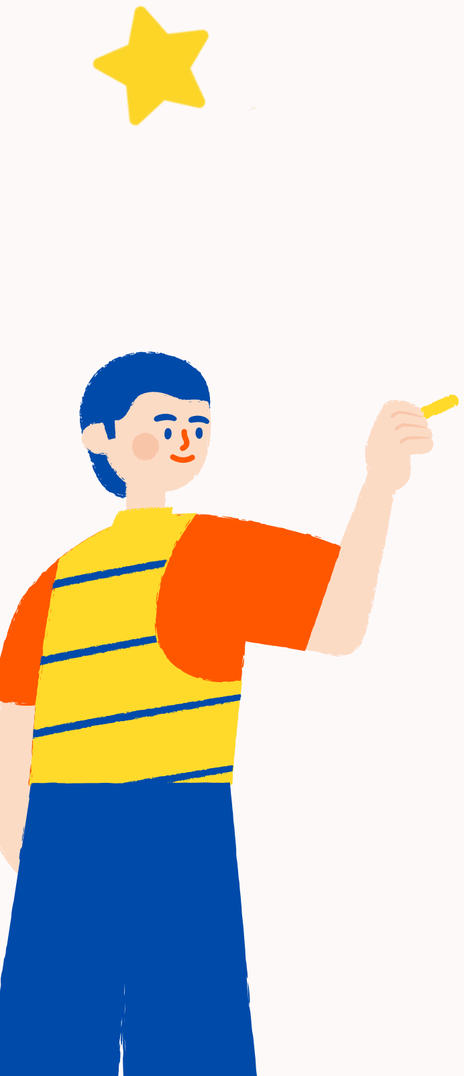
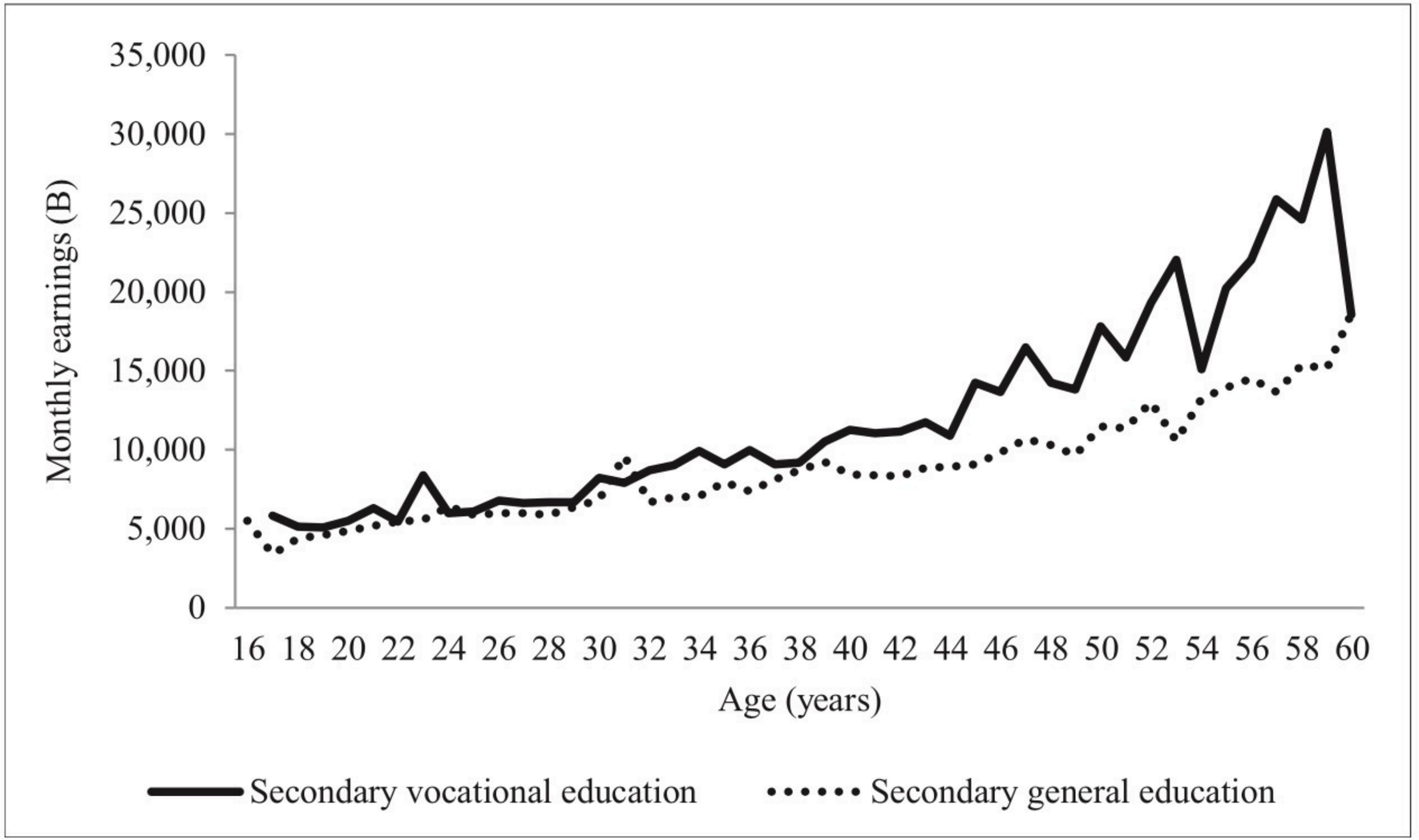


Figure 3. **Average Monthly Earnings for Secondary Vocational Education Attainment and Secondary General Education Attainment**

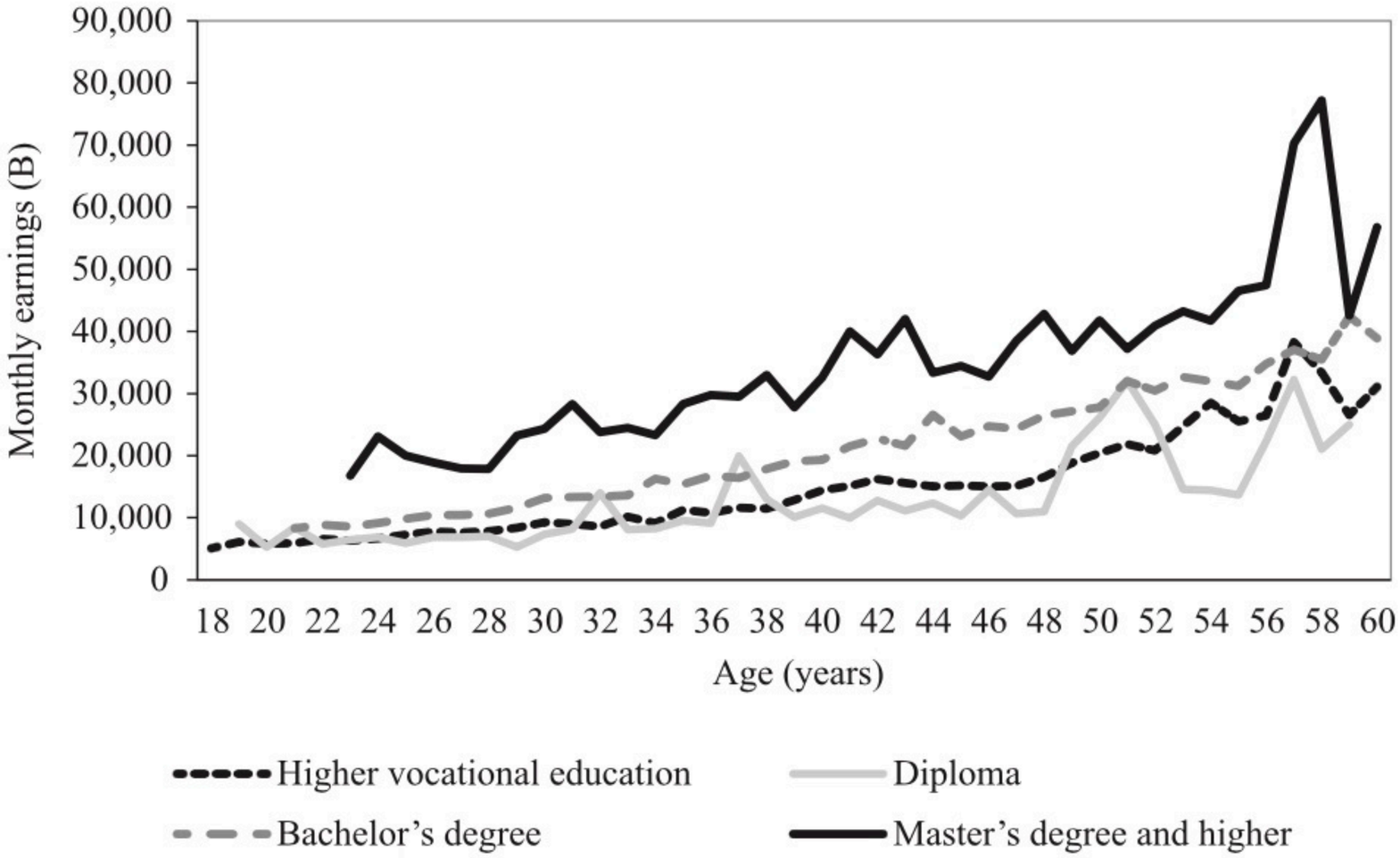


B = baht.

Source: Government of Thailand, National Statistical Office. Labor Force Survey, 2010. http://web.nso.go.th/eng/stat/lfs_e/lfse.htm

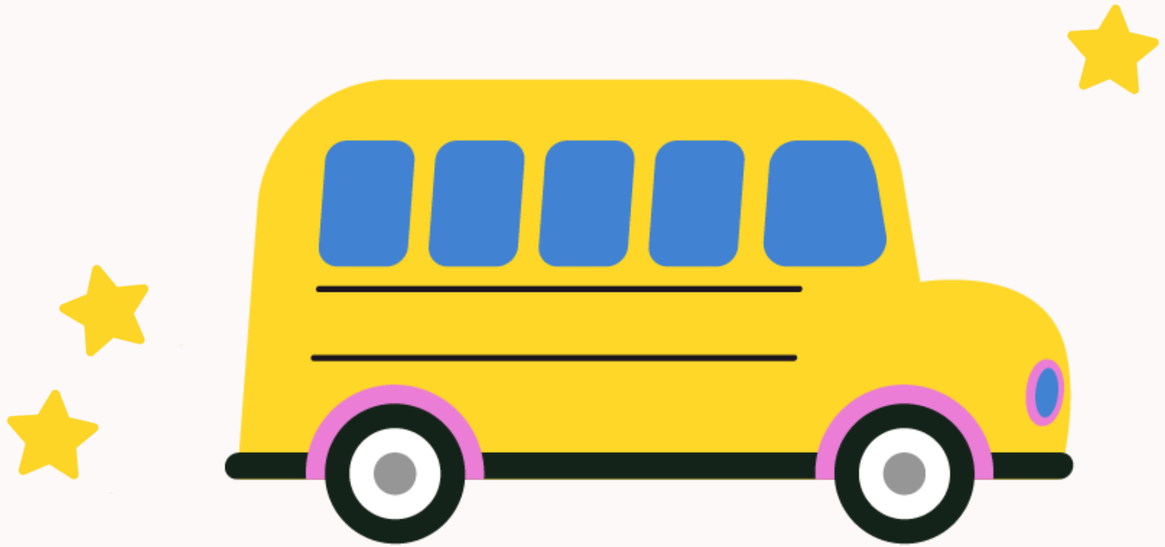
POLICY IMPLICATIONS AND CONCLUSIONS

Figure 4. **Average Monthly Earnings for Higher Vocational Education Attainment, Bachelor's Degree Attainment, and Master's Degree or Higher Attainment**



B = baht.

Source: Government of Thailand, National Statistical Office. Labor Force Survey, 2010. http://web.nso.go.th/eng/stat/lfs_e/lfse.htm



THANK YOU