

## **How Much Do Student Loan Sizes Affect Returns on Tertiary Education for Thai Persons With Disabilities?**

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### **Abstract**

This paper is motivated by the fact that there were about 1.5 million disabled persons in Thailand in 2011. A year later, 234,390 of them had died; many of the deaths were premature. The major causes of their deaths could be traced back to deprived socio-economic conditions. At present, registered disabled persons are entitled to a monthly payment of 500 Baht (17 USD), and have access to low cost medical services. It is inevitable that a new initiative is needed to promote better quality of life. Access to tertiary education is one of the viable options. Disabled persons are usually credit constrained; access to sufficient student loans is, therefore, a pre-requisite to access tertiary education. Using a unique health literacy data set of Thai persons with disabilities, this paper examines how different student loan sizes affect returns on tertiary education. Propensity Score Matching is used to estimate the differences in the log of earnings between disabled persons with tertiary degrees, and disabled persons with basic education qualifications. A subsequent exercise on the effects of different loan sizes is conducted using the Thai Student Loans Fund (SLF) arrangement. The exercise reveals that rates of returns do not vary significantly with loan sizes. These findings suggest that promoting greater access to tertiary education for disabled persons will be beneficial to individuals, as well as the society at large. Supplementary in-depth interviews highlight the importance of post-graduation placement services.

**Keywords:** Disabled rights, education policy, student loans

## Introduction

Based on the National Office for Empowerment of Persons with Disability figures (NOEPD), in 2011 there were about 1.5 million disabled persons in Thailand. A year later, 234,390 of them had died. Many of them died prematurely due to lack of proper care and severe poverty. At the time of writing, disabled persons are entitled to a monthly allowance of 500 Baht (17 USD)<sup>1</sup>. By and large, disabled persons' educational attainments rarely go beyond basic education. They are either unemployed or only marginally attached to the labor market, with typical jobs being lottery sellers, basic handicraft makers or massagers (National Office for Empowerment of Persons with Disability, 2013).

The above overview raises two interesting issues. The first relates to the insufficiency of the monthly allowance, which precludes them from acquiring proper health care and nutritional food to sustain their health. Raising payments requires that additional public resources must be diverted from elsewhere. Such a diversion often comes with opportunity costs. The second issue is the low level of educational attainment. Researches in the field of education and labor market outcomes have consistently found that more education allows individuals to be more productive; as a result, they will also enjoy higher earnings throughout their working lives (Psacaropoulos and Patrinos, 2004). The second issue also implies that education can be a powerful instrument to help disabled individuals who are able and willing to undertake such an investment, to achieve a better living standard. Being able to support themselves also helps to free up public resources, which can be made available to other disabled persons.

Such an initiative, however, has to be supported by hard empirical evidence on whether such investment will yield positive returns. Another related empirical issue stems from the fact that many disabled persons are in poverty. They do not have sufficient resources to undertake such an investment. In addition, without proper collateral, they are denied access to commercial loans. One of the promising avenues for the disabled in Thailand is to undertake this investment by borrowing from a public student loans scheme, called the Student Loans Fund (SLF). Again, the empirical question is whether borrowing from the SLF to cover their tuition fees and related expenditures is an economically sound decision. This paper attempts to address these two empirical issues.

The remaining sections are organized as follows: Section 2 provides the historical background and payment arrangements of the SLF; Section 3 lays out a conceptual framework relating education to health outcome and potential earning; the research methodology will be discussed in section 4; data and results are offered in section 5; section 6 concludes the study.

## History of the SLF and Its Arrangement<sup>2</sup>

The idea of making student loans available to the poor was formed in 1995, while the Democratic Party was leading the Thai government. The Student Loans Fund (SLF) was set up in 1996, while the Chart Thai Party was the leading party of the government. The main objective of the SLF is to foster access to upper secondary and

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<sup>1</sup>The exchange rate is approximately 30 baht to 1 US dollar.

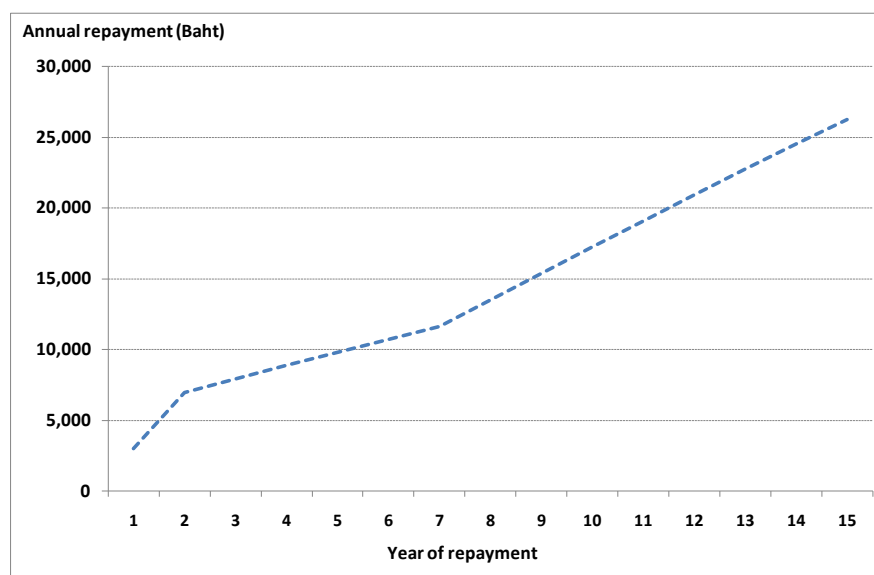
<sup>2</sup>This section is based on Chapman and Lounkaew (2009) and Chapman *et al* (2010).

higher education for students from low-income families. It is believed that greater access will eventually reduce inequality in education opportunities between the rich and the poor. An increased stock of graduates will also increase the country's competitiveness, and hence sustain economic growth in the long-run. To accomplish the above objective, the SLF provides loans for upper secondary, vocational and undergraduate education to students whose family income does not exceed 200,000 baht per annum. The average public fund allocated to the scheme is around of 27,000 million baht per annum (Office of Student Loans Fund, 2007).

Essentially, the SLF is a mortgage-type loan, with a maximum repayment period of 15 years. Annual repayment is an increasing proportion of the loan size, ranging from 1.5 per cent in the first year of repayment, to 13 per cent in the last repayment period. The nominal interest rate charged on the loan is one per cent. There are two types of grace period built into the SLF. The first interest rate grace period is before the interest rate begins to accrue two years after graduation, or termination from the program enrolled. Therefore, for a four-year program, the interest rate grace period is six years. Second, there is also a two-year repayment grace period after graduation, or termination from the program enrolled.

The loans cover tuition fees as well as living expenses. The loan ceilings for tuition fees differ depending on the field of study; the loan ceilings for tuition fees vary from 60,000 Baht per year for social sciences and humanities, to 150,000 Baht per year for selected science and medical programs. Loans for living allowances are limited to 26,400 Baht per year.<sup>3</sup> Figure 1 illustrates a repayment pattern for a loan size of 200,000 Baht, or about US\$6,450.

**Figure 1: SLF Repayments for the Debt of 200,000 Baht (about US\$6,450)**



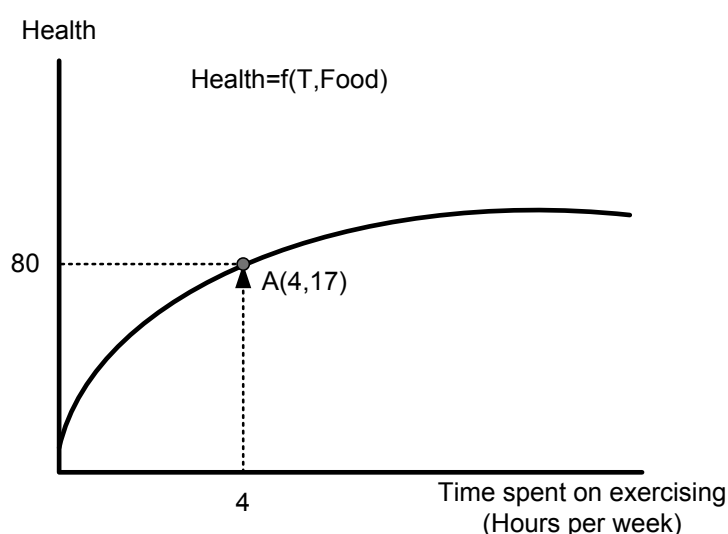
### Conceptual Framework

The production of health will be measured to illustrate these points: under the assumption that health can be measured in unit terms, where a higher value of health

<sup>3</sup> See Office of Student Loans Fund (2007) for details.

corresponds to better health condition, two inputs are used to produce health. The first is food intake per week; the second input is time spent on exercising per week. An increase in either input will increase health outputs. Figure 2 depicts the production function of health, using time spent on exercising per week as an argument on the horizontal axis. The more time is spent exercising, the higher are the health outputs. However, the production function is concave, to reflect the fact that the improved health outcomes gained from the first few hours spent on exercising are greater than the gains from the 22<sup>nd</sup> hour spent exercising.

**Figure 2: Health Production Function**



The positive relationship between schooling and health is empirically well-documented (see for example, Donald, 1991; Cheolsung and Kang, 2008; Mary, 2009). By and large, schooling can improve the health capital of an individual directly and indirectly. The direct influence of better schooling channels through individuals' health-related behavior, such as smoking, drinking, eating habits, amount of time devoted to exercise, ability to observe one's health, and the ability to find access to appropriate health care services. Indirect channels come in the form of a better working environment, better peer group, higher income, and hence, a better standard of living.

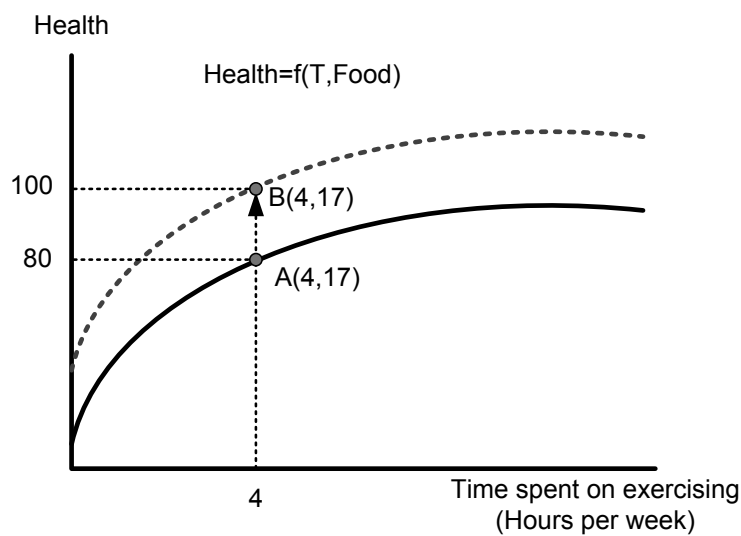
Conceptually, if more schooling leads to better productive efficiency, then this additional schooling shifts the production function upward; consequently, a similar mix of inputs corresponds to a higher output lying at the frontier of the new production function. This is shown in Figure 3. Prior to attaining more education, 4 hours of exercising and 17 units of food per week produces 80 units of health outputs. More schooling shifts the production function upward. With the new production function, a similar mix of inputs now produces 100 units of health outputs.

Figure 4 demonstrates the situation in which more schooling leads to better allocative efficiency. Prior to attaining more education, 3 hours of exercising and 20 units of food were used to produce 80 units of health outputs. New insights are gained from more education results in the new input mix of 4 hours of exercising and 17 units of

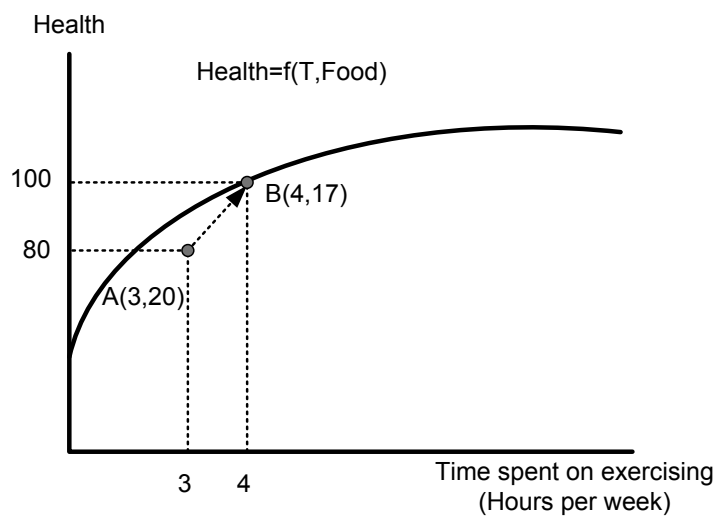
food; the new health output is 100 units. This is the maximum attainable level of output.

An econometric model to test productive efficiency involves the use of a simultaneous equation to approximate the production function. The model predicts that, holding all other inputs constant, the schooling coefficient is positive. Alternatively, the allocative efficiency model predicts that there is no direct effect of schooling on health output, if all other inputs relevant to the production of health are included. It should be noted, however, that both approaches predict positive relationships between schooling and health outcome in the reduced form health equation (Grossman, 2006).

**Figure 3: Illustrating Productive Efficiency**



**Figure 4: Illustrating Allocative Efficiency**



In the context of this study, the positive contribution of schooling on health outcome enables a disabled individual to be more productive, and be valued more highly in the labor market. In addition, better education empowers them to take better care of themselves; this also increases their health capital. To formalize this, let  $Z$  be the level of non-health human capital;  $H$  is the level of health capital. Then, annual wage increases can be accounted for by changes in human capital and changes in health capital, as shown in the equation:

$$\Delta\%w(t) = \alpha\Delta\%Z(t) + \beta\Delta\%H(t)$$

### The Data and Methodology

This section begins with a discussion on the basic information of the Thai health literacy data; the most recent and most comprehensive data set available for a study of this nature. Then the empirical method - Propensity Score Matching (PSM) - employed to estimate the percentage differences in annual income, will be elaborated.

#### Data

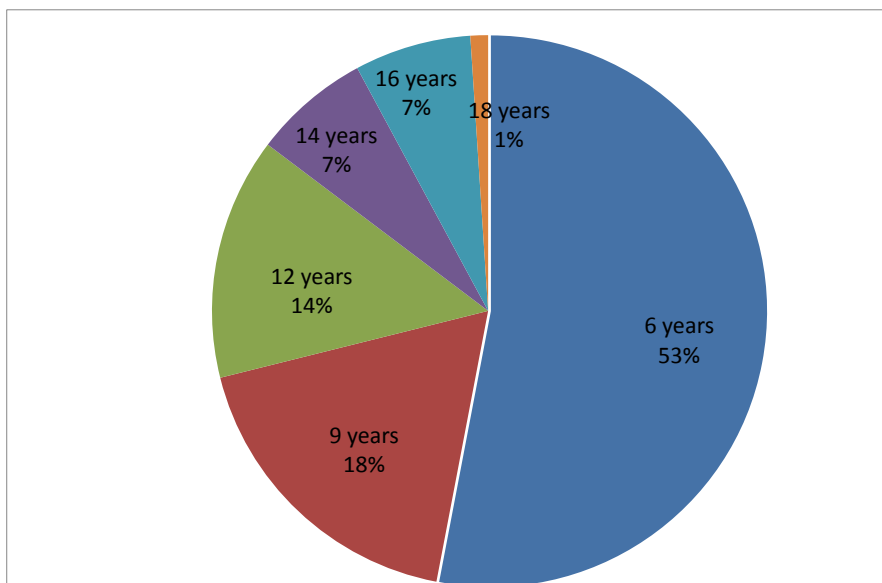
Data on persons with a disability are scarce. In Thailand, the Thai Health System Research Institute (HSRI)'s health literacy<sup>4</sup> data set is the most recent and most comprehensive data on persons with disability - blind, deaf and otherwise handicapped. The data, collected in early 2013, contained 1,600 samples of persons with a disability nation-wide. The challenge of this exercise was that there was no unified record of disabled persons in Thailand. HSRI contacted major disability associations to request access to their records. These records were then combined; whenever a name was repeated, only one would be kept. Participants in this survey were then randomly selected from this unified list containing 12,245 names. The key information relevant to this study are: types of disability, gender, age, educational attainment, total personal income, self-rated health condition and health literacy. Table A1 in the appendix provides the details of the variables used in this study.

Figure 5 and 6 provide an overview of the data. It can be seen that only about 15 percent of persons with a disability surveyed have tertiary qualifications. A weighted average of the annual income of a tertiary degree holder is about 2.3 times higher than those with basic education.

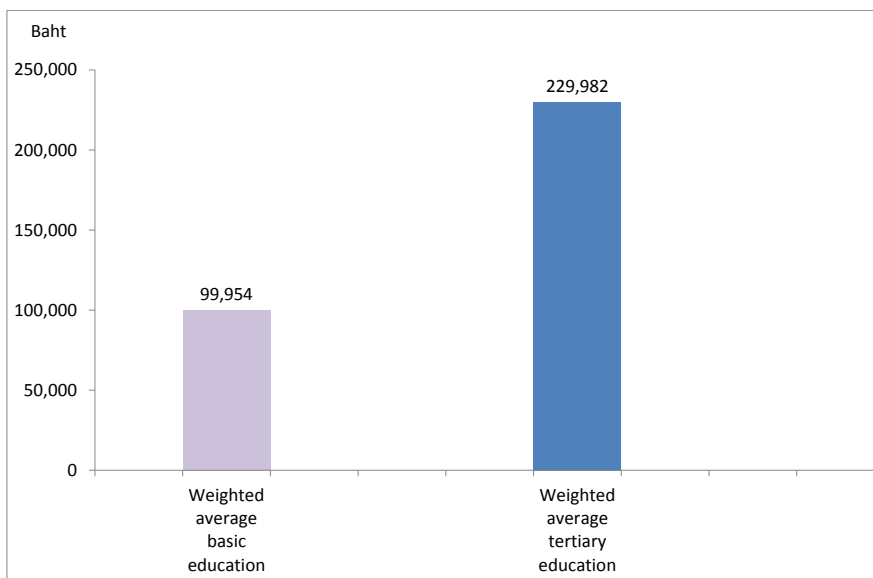
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<sup>4</sup>According to the U.S.'s Centers for Disease Control and Prevention (CDCP), Health Literacy is the capacity to obtain, process, and understand basic health information and services to make appropriate health decisions (CDCP, 2013).

**Figure 5: Distribution by Education**



**Figure 6: Weighted Average of Annual Income**



**Empirical Method**

A typical approach to estimate returns on education relies on the Mincerian earning function. Years of schooling is used as a one of the regressors to capture the effect of additional years of education on earnings. It is a well-known fact in economic labor literature that the schooling coefficient is contaminated by bias introduced by omitting certain variables such as individual ability and attitude towards learning (Griliches, 1977; Berger and Leigh, 1989; Card 2000). Attempts have been made to address these issues; yet none of them has been satisfactory.

Another approach which allows us to address such bias is to frame the exercise in the context of a treatment-control research design. In an ideal setting, we can randomly assign disabled persons with access to tertiary education into treatment and control groups. In such a randomized control exercise, the difference in average earnings is

caused by the treatment. Unfortunately, it is not possible to conduct such an exercise. The second-best approach is to carry out a quasi-experimental design which mimics as closely as possible the characteristics of a randomized control experiment. PSM is one such approach (Morgan and Winship, 2007; Brand and Xie, 2010). This approach is now discussed.

In essence, PSM creates a statistical comparison group based on a propensity score - the probability to participate in a treatment. The probability estimate is based on the observed characteristics of participants. Participants and nonparticipants are then matched by their propensity scores. The average treatment effect of the program can be estimated by the differences in the mean values of outcomes between these two groups. It should be noted that, in practice, PSM is most useful when observed characteristics have sufficient influence on the program participation decision. Sufficient characteristic information also helps to minimize bias inherent in the program (Rosenbaum and Rubin, 1984; Dehejia and Wahba, 2002)

In the context of this study, omitted variable bias is more pronounced because of the design of the health literacy survey. The primary purpose of this survey was to collect data on health literacy, without much attention paid to collecting socio-economic background information. Consequentially, Mincerian estimates will suffer from omitted variable bias, possibly to a greater degree than typical estimates using labor force survey data. The question is whether PSM would help to mitigate such bias.

The answer to the above question is positive. The health literacy data contain some basic characteristics; in addition, the data also contains disabled persons' self-rated health status, as well as health literacy scores. Conceptually, health literacy helps to make appropriate health decisions. Persons who score higher in health literacy are more likely to be capable of looking after themselves. Unobserved characteristics that influence one's decision to undertake tertiary education correlate with health literacy scores. Including health literacy scores into the estimate of propensity scores will, therefore, increase the accuracy in matching characteristically identical individuals in the two groups.

To obtain returns on tertiary education – defined as percentage differences in annual income- between tertiary degree holders, and those with basic education, a log of annual incomes is used as the dependent variable. The key to this exercise is best viewed in a quasi-experimental context. The first step is to make use of data on individual characteristics, geographical information and health-related data, to construct an overall propensity score for each individual. These scores are then used to match individuals with similar overall characteristics whose only differences are educational attainments. The matching process artificially assigns educational attainment as the treatment. If tertiary education leads to higher earnings, then on average, a person with such qualification should earn more than a person with a similar propensity score with basic education.

The effect of student loan sizes on returns on education is estimated by deducting the annual payment required to service the loans from the annual income of tertiary degree holders, prior to commencing the PSM exercise. The amounts to be deducted are based on the repayment schedule of the SLF. Three loan sizes are used in the



estimate: 200,000 baht, 300,000 baht, and 400,000 baht. The estimate is also restricted to include only those aged between 25 and 50.

### Results

The result from the PSM estimate of the average treatment effect of having a tertiary degree is shown in Table 1. It can be seen that a person with a disability with tertiary education enjoys about a 29.5 percent higher annual income, compared to a person without such a qualification. The difference is statistically significant. This confirms the argument developed in section 3 that education, after controlling for health and other characteristics, determines one's total human capital, and hence one's income. Table 2 compares the results obtained from this study with two previous findings by Lamichhane and Sawada (2013), and Mori and Yamagata (2009). It can be seen that the Thai estimate in this study is consistent with the two previous findings; the estimates of the returns on tertiary education are in the order of 30 percent.

The effects of student loan sizes on returns on tertiary education are calculated as previously described. The results in Figure 7 show the effect of borrowing from the SLF to finance their education. The baseline estimate for the debt size of 200,000 baht, which is a typical debt size for a normal person borrowing from the SLF, reduces the return to 22; further increases in debt to 300,000 and 400,000 baht reduce the returns further to 18 and 14 percent respectively. Thus it can be concluded that while higher loan size does affect returns on education for persons with disability, they can still enjoy considerable returns on such investment; investment in tertiary education is a worthy investment and will surely help to improve the quality of lives of those who have successfully undertaken it.

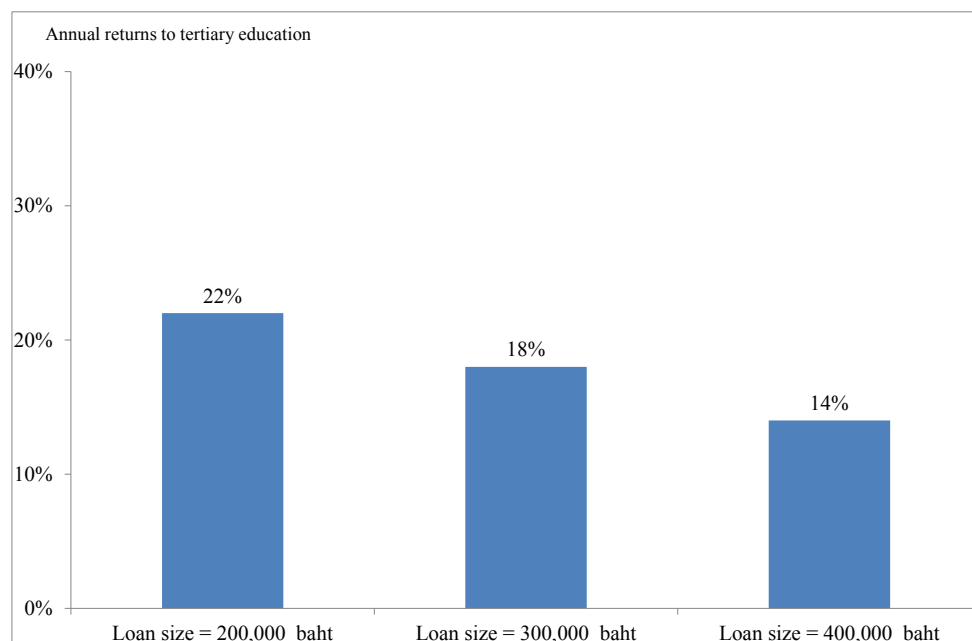
**Table 1: Propensity Score Matching Estimates**

Variable	Mean value			S.E.	T-stat
	Tertiary education	Basic education	Difference		
Log of annual income	9.240	8.945	0.295	0.142	2.09**

\*\* Statistically significant at  $\alpha = 0.05$

**Table 2: Comparisons to Previous Studies**

Author (s)	Country	Returns to education
Lamichhane and Sawada (2013)	Nepal	30.4%-33.2%
Mori and Yamagata (2009)	Philippines	24.7%-30.1%
This study	Thailand	29.5%

**Figure 7: Effects of Student Loans Sizes on Returns on tertiary Education**

### Conclusion

This paper is motivated by the fact that there were about 1.5 million disabled persons in Thailand in 2011. A year later 234,390 of them had died; many of the deaths were premature. Education seems to be one of the candidates that can help some of the more able disabled persons to come out of deprived situations. Such an initiative, however, has to be supported by hard empirical facts as to whether such an investment will yield positive returns. This paper addresses this question by providing estimates of the returns on tertiary education for persons with disabilities.

The Thai health literacy data is used to undertake this exercise. As dictated by the nature of the data, PSM is used to estimate the returns on education. It has been found that returns on education for tertiary education are at about 29.5 percent. When taking into account the fact that disabled persons have to rely on student loans to commence such an endeavor, returns on education fall to around 14 to 22 percent, depending on the loan size. The results confirm that tertiary education is a worthy investment, and will surely help to improve the quality of lives of those who have successfully undertaken it.

There are two other critical challenges that must be addressed in conjunction with promoting access to tertiary education. The first stems from the fact that disabled graduates cannot compete with typical graduates in the labor market; policies to promote hiring disabled graduates will greatly improve their success in the labor market. The second challenge is the perception toward persons with disability. They have long been stigmatized as having to constantly rely on public support. Such a negative perception may hinder their progress in the workplace, and climbing social ladders. A new fact-based perception that disabled persons are valuable members of our society must be promoted. By addressing these two challenges appropriately, education will be the key to ensure that they can contribute productively to society.

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## Appendix

### Table A1: Summary of Variables

Variable	Description
<b>Individual characteristics</b>	
Age	Measured in years
Sex	Male = 0 Female = 1
Numbers of household members	Numbers of persons
Occupations	1 = Unemployed 2 = Employee 3 = Business owner 4 = Agriculture 5 = Government or public enterprise officials 6 = Others
Income	Personal income from work only, measured in Baht per annum.
Education	Basic education = 0 Tertiary education = 1
<b>Geographical variables</b>	
Urban	Rural = 0 Urban = 1
Regions	1 = Central 2 = East 3 = South 4 = North 5 = North east
<b>Health-related variables</b>	
Self-rated health	1 to 10
Health literacy	1 to 10
Types of disability	1 = Chronic 2 = Blind 3 = Handicapped 4 = Deaf