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The Economic Benefits of Malaysian University Degrees

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Abstract

This study analyzes the net returns of educational investment in Malaysia using the net present value approach. The estimations consider the tuition payments of nine different bachelor degree programs of public and private universities in Malaysia and the forgone earnings while undertaking the degree programs as the cost of investments in human capital. The returns to education investment are based on the expected income accrued by the individual over the employment period until retirement. Under the assumptions that an individual would work until the retirement age of 60 years and a discount rate of 4 percent, the estimations show that holding a computer science degree from Universiti Sains Malaysia would give the highest net present value. Holding a medical degree, in general, would give the lowest net returns on educational investment as compared to the other selected programs. The net returns are sensitive to the costs of education, earnings and the duration of undertaking the degree programs.

Keywords: *Human capital investment, net present value, private rate of return, educational investment, Malaysian degree programmes*

INTRODUCTION

Many Malaysians now consider tertiary education as a gateway to the middle income. After secondary school, students' enrollments into popular degree programs such as accounting, computer science, medicine, engineering, and architecture have shown a rising trend. Students expect to earn a good income in the future, and are willing to finance their studies, especially through an educational loan. Are popular degree programs worth pursuing financially? This question is central to the decision of this paper. The primary objective of our study is to estimate the net returns of selected degree programs offered by public and private universities in Malaysia.

A study by Arshad (2016) showed that the marginal rate of returns to a university degree was the highest as compared to other lower qualifications in Malaysia. Besides qualification, the study also found that earning differentials could be attributable to occupational activities and regional/urban-rural locations in Malaysia. The difference in the wage premium due to educational levels has encouraged more individuals to pursue higher education. Educational acquirement has led university's graduates to receive better income, have a higher probability of being employed, and be less likely to experience poverty compared to those without a bachelor degree (Chan, 2016).

Despite the above understanding, many studies on human capital investment often relied on the Mincerian earning function to estimate the private rate of returns (in percentage). Such approach, however, fails to take into account the costs of the investment. As a consequence, the approach also is silent in providing any net returns in currency value for a specific qualification—for example, no answer is given to the question of what is the dollar net returns for holding a certain degree?

This study, therefore, takes the net present value approach to evaluate the human capital costs and benefits of pursuing a university's degree. The approach will provide more specific answers to our research question. In the next section, we explore the extant literature on the subject. The methodology employed in this study and the results are discussed in subsequent sections.

LITERATURE REVIEW

The significant role of human capital in fostering economic growth is a well-established argument in the economic literature (Asteriou & Agiomirgianakis, 2001; Baldacci, Clements, Gupta, & Cui, 2008; Hanushek, 2013). The significant positive relationship between human capital development and economic growth has sparked the discussion on the importance of educational investment, at both public and private decision-making levels. At each level of educational investment, the analysis is different in terms of the possible benefits and costs. Such difference could be understood from the existence of a considerable strand of literature on social and private rates of return to investment in education (Psacharopoulos, 2006).

The Malaysian government has put a significant emphasis on educational investment, as one of the policy instruments to develop the country. The effects of human capital to economic growth have been the focus of many studies in Malaysia (e.g., Islam *et al.,* 2016; Kenayathulla, 2012; Mat, Mansur, & Mahmud, 2015; Rusli & Hamid, 2014). Human capital investment stood as the primary catalyst for innovation and the returns to human capital accumulation could be justified by the successful introduction and adaptation of a country to any technological and organizational changes (Rusli & Hamid, 2014). According to Arshad and Malik (2015), the presence of highly educated human capital would influence the new technology adaptation in a country as a highly educated worker would adapt to new technology faster as compared to low educated workers. Gemmell (1997) argued that investment in education would create positive production externalities in which educated employers could improve not only their productivity, but also those of the less-well-educated subordinates.

At an individual level, the basic idea underpinning human capital investment requires the sacrifices of resources today for the expected stream of benefits in the future (Psacharopoulos, 2006; Cebeci, Algan, & Cankaya, 2015). For instance, in pursuing a four-year degree program, a student would incur the direct costs of attending a university such as the tuition fees, books and stationery and daily expenses. At the same time, there is also an indirect cost concerning foregone earnings had the person worked after finishing his or her high school. In terms of benefits, according to Mincer (1991), educated workers mainly enjoy at least three main advantages over the less-educated workers in the labor market, namely higher wages, greater upward mobility in income and occupation, and better social circles and mixed**.**

Despite the education benefits, the escalating cost of higher education has raised the question regarding the financial worthiness of the human capital investment. According to a study by Oreopoulos and Petronijevic (2013), the inclusion of variables such as the opportunity cost of choosing university over full-time employment and the possible accumulation of debt

burden from a student loan has further increased the costs of obtaining a university qualification. Changes in social, cultural, economic and technological activities have also affected the development of human capital by modifying the general structure of costs and benefits of investment in education. Additional variables such as the inflation rate and technological development could alter the demand and supply of education, thus varying the estimation form time to time (Patrinos, 2016). For this reason, students could still be making a wrong investment choice due to the presence of these different variables despite having the overview on the economic and non-economic benefits and costs of higher education (Oreopoulos & Petronijevic, 2013).

Returns to education investment also depend on employer's perspective on the qualification obtained by the workers (Mohamad Yunus, 2017). Given today's complex labor market environment, employers, in general, view that it is essential for workers to demonstrate the capacity to think critically, communicate clearly, and solve complex programs regardless their undergraduates major (Cebeci et al., 2015). To achieve the employer's expectations, rather than just providing students with specific skills and knowledge, education now are are expected to; (i) encourage an individual to socialize, (ii) equip a person to acquire more and better knowledge, skill, attitude, behaviour, and habit, and (iii) groom an individual to develop professional capabilities (Cebeci et al., 2015). Considering the enhancement effects of these variables would also reflect the benefits of investment in human capital. Perhaps, the returns to education could be tied to these benefits, aside from focusing on the economic returns.

It is well-documented that college-educated workers will earn more than the high-school-educated individual and the difference has been growing over the past few decades (Arshad, 2016). Based on a study done by Oreopoulos & Petronijevic (2013), on average the lifetime earnings of a college graduate was 75% higher compared to the lifetime earnings of a high school graduate in 1999, and the figure had continued to increase to 84% in 2009. Aside from the monetary advantages associated with the return on investment of education, college graduates are often subject to a higher probability of being hired where research has found that in 2011, the unemployment rate for college graduates in the United States was only 4.4%, in contrast to 8.5% for high school graduates (Oreopoulos & Petronijevic, 2013). In general, workers with a college degree nearly always earn exceptionally higher in their respective occupation compared to those with just a high school certificate, even in the low-skilled profession such as sales or service workers as an employer rationally would be paying for whatever additional gains associated with employing college-educated workers (Oreopoulos & Petronijevic, 2013).

A study by Able and Deitz (2014) probed into the effect of students' undertaking specialization on the rate of return on investment in education. Their findings indicated that the return varied significantly between courses and majors. Students were more likely to receive higher returns on their educational investments if their areas of specialization were associated with technical training, such as engineering, mathematics, and computers. The study concluded that courses and specialization and choice of occupation were two critical determinants of returns to education.

A report by Gallup University and Purdue University (2015) study found that 52% of public university alumni strongly agreed that their education was worth the cost of investment. The perception, however, was lower for private non-profit universities alumni (with 47% of them strongly agreed) and private for-profit universities (only 26% strongly agreed). The study pointed out that a majority of the undergraduates were unable to reap the benefits from the investment due to the burden of student loans. The study also found that the issue was more prevalent among students attending private universities.

Considering higher education as an investment, theories like the net present value (NPV) or the internal rate of return (IRR) of the cash flow streams are a convenient, yet insightful approach to estimate the various forms of investment, including education. Poteliene and Tamasauskiene (2013) argued that both of these methods are based on the same principle and in many cases may give an equivalent estimation. Using the NPV approach, we could estimate the net return for a specific degree (Kara, 2009). In the next section, we present the methodology employed in this study.

METHODOLOGY AND DATA DESCRIPTIONS

The Estimation Model

To estimate the net return on education investment, we employed the net present value approach in this study. Subject to several assumptions, the approach, in principle, requires information on the costs incurred and expected returns over certain periods. For the purpose of this analysis, consider a case of a 17-year-old individual who just graduated from high school and was faced with two options: (i) to enter the labor market directly with only a high school certificate (henceforth referred to as option 1), or (ii) to undertake a bachelor's degree (henceforth referred to as option 2). Assuming that the individual enters the labor market at the age of 18 and retires at the age of 60, the net present value of earnings for option 1 is expressed as:

$$NPV_{HS} = w_{HS} + \frac{w_{HS}}{(1+r)} + \frac{w_{HS}}{(1+r)^2} + \cdots + \frac{w_{HS}}{(1+r)^{41}} \quad (1)$$

where w_{HS} represents the annual wage rates for a high school qualified worker and r denotes the worker's discount rate. There are 42 terms in this sum, one term for each year that elapses between the ages of 18 until 60. Note that, in equation (1), the individual worker has no cost for human capital investment since he or she does not attend extra years of schooling (university level). Schooling from primary until high school completion is considered mandatory (at least, until 16 years old). To simplify the estimation, we consider high school completion until the age of 17.

For option 2, the net present value of lifetime earning streams for the individual with a bachelor's degree could be determined from the following equation:

$$NPV_{uni} = -H - \left(\sum_{t=1}^{s} \frac{H}{(1+r)^t}\right) + \left(\sum_{k=s+1}^{41} \frac{w_{uni}}{(1+r)^k}\right) \quad (2)$$

where NPV_{uni} is the net present value of a worker with a bachelor degree qualification, H is the costs of undertaking a bachelor's degree program, t is a yearly schooling period for $t = 1, 2, \ldots, s$, r is the worker's discount rate, w_{uni} is the worker's earnings with a bachelor's degree qualification, k is the yearly working period for $k = s+1, \ldots, 41$.

Note that the term $-H - \left(\sum_{t=1}^{s} \frac{H}{(1+r)^t}\right)$ in equation (2) gives the present value for the costs of undertaking a bachelor's degree program. The computation of the present value for returns to having a degree qualification, or, $\sum_{k=s+1}^{41} \frac{w_{uni}}{(1+r)^k}$, was based on the assumption that the worker would enter the labor market directly after his university study until retirement at the age of 60 years old. The value of r was assumed to be at four percent—with reference to the average lending rate in Malaysia. The estimations of equation (2) involved the costs of educational investment for selected bachelor degree programs across six local universities (three public and three private) together with average annual earnings of different career paths (career is matched according to the degree).

Costs Data

For option 1, no cost was incurred since the individual participated in the job market after he or she finished high school.

To estimate equation (2), we considered the direct costs and the opportunity cost of undertaking nine different bachelor degree programs, as listed in Table 1. The direct costs were given by tuition fees for each program offered in six selected public and private universities in Malaysia. The universities considered were Universiti Islam Antarabangsa Malaysia (UIAM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM), Taylor's University Malaysia (Taylor's), INTI International University (INTI) and International Medical University (IMU). We selected three public universities (UIAM, UKM, and USM) and three private universities (Taylor's, INTI and IMU) so that some comparison would be possible between the two types of university. The selection of the universities also took into account ease of accessibility and availability of fees information and range of bachelor degrees offered. Note that, as shown in Table 1, not all fees information was available for the private universities since they have limited degree programs offered (mainly the programs offered were highly demanded).

We obtained information for the tuition fees from each university's website (we collected the data between March and April 2018). Table 1 shows the total yearly fees (involving two semesters) for nine selected programs, namely, Bachelor of Law, Bachelor of Accounting, Bachelor of Computer Science, Bachelor of Civil Engineering, Bachelor of Architecture, Bachelor of Medicine, Bachelor of Pharmacy, Bachelor of Dentistry and Bachelor of Nursing. We omitted other direct expenses such as books and cost of living from the estimation due to difficulties in getting such data.

For the opportunity cost, it was represented by the forgone income an individual would incur when attending a university. We took the annual minimum wage level in Malaysia in 2017, RM1,000 per month or RM12,000 per year, as the forgone income measure. The summation of both the direct costs and opportunity cost incurred throughout the university's years were considered to represent the total economic costs for the educational investment.

Table 1:
Total Annual Fees per Year (two semesters)

Programs	**Total Fee Per Year (RM)**					
	Public Universities			**Private Universities**		
	UIAM	UKM	USM	TAYLORS	INTI	IMU
Arts Program						
Bachelor of Law	2,638.00	1,884.00		30,975.00	16,688.75	
Bachelor of Accounting	2,638.00	1,884.00	1,472.00	24,780.00	19,676.00	
Bachelor of Computer Science	2,692.00	1,964.00	1,648.00	28,725.00	20,986.25	
Bachelor of Civil Engineering	3,042.00	2,124.00	1,712.00	31,453.20	19,323.00	
Bachelor of Architecture	3,042.00	2,124.00	1,712.00	35,235.00	24,398.50	
Science Program						
Bachelor of Medicine	3,442.00	2,444.00	2,032.00	69,856.33		85,716.67
Bachelor of Pharmacy	3,442.00	2,364.00	1,952.00	37,786.40		35,983.33
Bachelor of Dentistry	3,442.00	3,964.00	2,032.00			103,716.67
Bachelor of Nursing	3,442.00	2,060.00	2,032.00			9,466.67

Source: Finance Division of each university

Earnings Data

The economic benefits of educational investment were represented by the worker's lifetime earnings. To estimate equation (1), we assumed that an individual who entered the workforce with high school certificate would only earn the minimum wage, RM 1,000 per month or RM12,000 annually, from the age of 18 until the age of retirement, 60-year-old.

The estimation of equation (2), on the other hand, was based on the average annual earning associated with each respective university qualification obtained (refer to Table 2). The information was obtained from JobStreet.com, a website that facilitates the matching and communication of job opportunities between jobseekers and employers in Malaysia. The average earnings for workers at entry, junior executive, and senior executive levels were considered in estimating equation (2). Therefore, the yearly working period, *k*, in $\sum_{i=s+1}^{41} \frac{w_{uni}}{(1+r)^i}$ from equation (2) was further broken into those three levels of working periods. In the estimation, we assumed that the entry level earning lasted for seven years starting from the beginning of the individual's career. Then, for the next 11 years of his or her career, the individual would earn the average junior executive's earning and for the remaining years until retirement, the individual would earn the average senior executive's earning level.

Table 2:
Bachelor Qualifications, Occupations, and Average Annual Earnings

Program	**Career**	**Average Annual Earnings (RM)**		
		Entry Level (0-7 years)	**Junior Executive (8-11 years)**	**Senior Executive (12- retire)**
Bachelor of Law	Law / Legal	**32,256.00**	**42,528.00**	**67,140.00**
Bachelor of Accounting	Accounting / Audit / Tax Services	**25,176.00**	**32,064.00**	**50,712.00**
Bachelor of Computer Science	Consulting (IT, Science, Engineering & Technical)	**39,672.00**	**56,184.00**	**94,896.00**
Bachelor of Civil Engineering	Construction / Building / Engineering	**35,088.00**	**46,032.00**	**72,804.00**
Bachelor of Architecture	Architectural Services / Interior Designing	**35,256.00**	**46,284.00**	**66,576.00**
Bachelor of Medicine	Healthcare / Medical	**33,984.00**	**41,772.00**	**73,728.00**
Bachelor of Pharmacy	Biotechnology / Pharmaceutical / Clinical Research	**28,116.00**	**42,192.00**	**51,360.00**
Bachelor of Dentistry	Dentist	**34,500.00**	**45,540.00**	**64,140.00**
Bachelor of Nursing	Registered Nurse	**29,004.00**	**38,004.00**	**48,000.00**

Sources: JobStreet.com; 2017 Salary Report

RESULTS AND DISCUSSIONS

For option 1, the estimated net present value of lifetime earnings for an individual with only a high school certificate, NPV_{HS}, was RM254,227.52. Note that, to maximize a lifetime earning, an individual would only consider to have more schooling years (attending university) only if $NPV_{uni} > NPV_{HS}$. In other words, the net present value of lifetime earnings with a bachelor's

degree needs to be more than RM 254,227.52 for an individual to consider attending a university.

The estimation results for option 2, using equation (2), are presented in Table 3. Note that, in undertaking the estimation, the schooling period differs across programs and universities (see some notes below Table 3). Including the preparation years, most of the programs required five schooling years to finish. Programs such as the Bachelors of Medicine, Pharmacy, Dentistry, and Nursing, in general, take six schooling years (the longest period to finish a program).

Table 3:
Net Present Values for Bachelor Degree Programs for the Selected Universities

Program	Net Present Value (RM)						Average by program
	Public Universities			Private Universities			
	UIAM	UKM	USM	TAYLORS	INTI	IMU	
Bachelor of Law	735,131	738,622		685,715*	739,647*		539,867
Bachelor of Accounting	534,668	538,159	540,067	432,153	487,460		398488
Bachelor of Computer Science	999,423	1,002,803	1,004,257	974,677*	1,003,893*		997011
Bachelor of Civil Engineering	789,826	794,076	795,984	743,829	714,446		767632
Bachelor of Architecture	756,407	760,657	762,565	693,597*	734,507*		741547
Bachelor of Medicine	763,366	767,987	769,894	342,833*		256,369**	580090
Bachelor of Pharmacy	607,381	612,372	614,279	448,370		456,718**	547824
Bachelor of Dentistry	732,473	730,057	654,275			487,214**	651005
Bachelor of Nursing	568,836	575,235	575,364			489,782**	552304
Average by university	720,835	724,441	714,586	617,310	735,991	422,521	

*Note: For figures without an asterisk, the duration of study is five years, *the duration of study is four years and ** the duration of study is six years.*

As shown in Table 3, at four percent discount rate, the net present values of every bachelor degree programs outweigh the net present value of lifetime earnings of an individual with only a high school certificate, or $NPV_{uni} > NPV_{HS}$ for all the programs. The highest NPV_{uni} is RM1,004,256.65 for an individual with a bachelor in computer science from USM. The earning difference for this person as compared to a person with only a high school certificate is by 295 percent, as given by $\left(\frac{(1{,}004{,}256.65-254{,}227.52)}{254{,}227.52} * 100\right)$. The lowest NPV_{uni} is RM256,368.70 for holding a bachelor of medicine from IMU. The earning difference of the qualification with someone with only a high school certificate is by 0.84 percent.

Selection of the area of study also matters in human capital investment. Our results suggest that different bachelor degrees give different returns to workers, in terms of their future earnings. From our analysis, bachelor of computer science, in general, gives the highest net present value to human capital investment. The costs incurred throughout the study period for

this program is comparatively cheaper than the other programs. At the same time, the market wage for engineering and technical consultancy works related to this area also pay among the highest, as shown in Table 2.

To emphasize the above finding, notice that the annual tuition fee charged by USM for a computer science degree is RM1,648.00, which is the second lowest of the observations in Table 1. Students undertaking the program take five years to complete the degree, before he or she could reap relatively the highest income compared to other jobs (in Table 2) for the next 37 years of working. Given the low costs and high returns of such investment, it is not surprising to find that the net present value for a Bachelor of Computer Science from USM gives the highest human capital returns. However, we would like to caution readers that in this study, we have considered an individual with a bachelor in computer science will be hired as a consultant in computer science areas. Based on the data collected, this career has the highest entry income, as well as at the junior and senior executive income levels.

Also, as presented in Table 3, the Bachelor of Medicine, offered by International Medical University (IMU) scored the lowest returns on educational investment. Several factors may explain the result. Firstly, the annual fees for this program are one of the highest at RM85,716.67 per annum. Note that IMU is a private university and a medical course is not a cheap program to run. Secondly, the duration of a study period to obtain a medical degree from IMU is six years, as compared to five years at other public universities. Even though the earnings associated with a Bachelor of Medicine considered in the estimation was fairly high, but that was offset by the high fees and a longer study period.

Except for Bachelor of Laws and Bachelor of Accounting, the results in Table 3 also show that science-related programs (e.g., computer science, engineering, architecture and allied health), have higher returns on human capital investment than the two art/social science degrees—refer to the average net returns by programs. Selection of a university also plays an important role in determining the return on educational investment for an individual. In general, undertaking a degree from the three public universities (UIAM, UKM, and USM) would result in higher net present values of lifetime earnings as compared with having a similar degree but from any of the private universities.

Based on the estimations in Table 3, we also computed the average net present value for each university, $\frac{\sum(\text{NPV of each university})}{\text{No of programs}}$. As shown in the table, the average net present values for three of the public universities are relatively higher as compared with the three selected private universities. The reason is all of the public universities chosen in this study have lower total annual fees in comparison with the three private universities. At the same time, the duration of study for all the bachelor degree programs offered in all three public universities is relatively shorter, especially for bachelors in Medicine, Pharmacy, Dentistry, and Nursing. The programs require only five years of schooling under any of the public universities. In a private university such as IMU, all of the programs take six years for completion. The additional year, thus, caused a delay in labor market entry for an individual. Without the delay, apart from saving an additional cost of one year of schooling, the individual now also has an additional year to recoup the benefit of his or her educational investment.

CONCLUSION

The objective of this study is to estimate the returns on educational investment in Malaysia. We have evaluated educational returns for nine bachelor degree programs across six universities in Malaysia. From the estimations, we have found that the net present values of a university study

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are higher than the net present value of only having a high school certificate. Our results also suggest that returns to educational investment depend on the area of study, duration of the study period, and the type of university enrolled in (public or private), holding other factors equal. Post-schooling income and fee structure differential in all investment options are two main factors in influencing the estimation of the return on human capital investment.

The estimations should stand as a general guide for an individual to make his or her educational planning. The estimations show that the Bachelor of Computer Science offered by Universiti Sains Malaysia (USM) has the highest net present value of lifetime earnings due to the relatively lower fees and high economic returns associated with the degree. On average, the net present value of lifetime earnings for programs offered in private universities observed in this study are relatively low compared to the return from the investment options offered by the public universities. Choosing which bachelor degree program is a monumental decision for an individual to consider. Having the information and estimation about the expected return and yield of the investment will surely help the decision-making process for individuals.

This study, however, is constrained by several assumptions and limitations. One of the limitations is that only monetary costs and benefits were considered in this study, while the benefits of education certainly extend beyond financial gains. Although the positive net present value of lifetime earnings suggests that all the investments options are worthwhile, the analysis is sensitive to the discount rate figure, the projection of income and economic costs included in the calculation. Slight changes in these variables will affect the estimation value and influence the decision-making process of the individual. The selection of jobs associated with the degree programs is another stringent condition that limits this study. For future research, we suggest that a comparative study involving a set of overseas universities be considered.

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