

A STUDY ON HUMAN CAPITAL IN SOLOW MODELS

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF BACHELOR
OF SCIENCE WITH HONOURS

MATHEMATICS WITH ECONOMICS PROGRAMME
SCHOOL OF SCIENCE AND TECHNOLOGY
UNIVERSITI MALAYSIA SABAH

APRIL 2008

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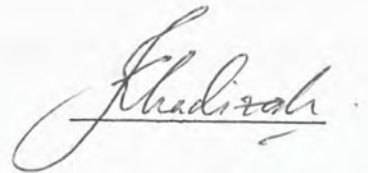
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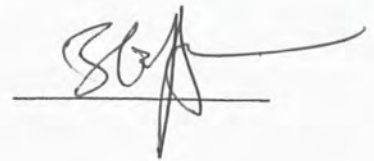
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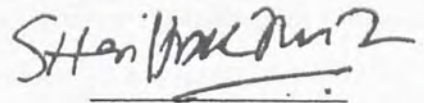
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ACKNOWLEDGEMENT

I would like to express my gratitude to all those who gave me the possibility to complete this dissertation.

First and foremost, I would like to extend my appreciation to my supervisor, Pn. Siti Rahayu Bt. Mohamad Hashim who has dedicated her precious time and effort in giving me guidance and assistance. In the process of accomplishing my dissertation, she taught me many things and gave me comments as well as suggestions that brought out the good ideas to me.

I would like to extend my sincere thanks to the lecturers from School of Business and Economic, especially Md. Roslinah Mahmud, for their guidance and suggestions. They help me in stimulating ideas and solving problems that are related to the macroeconomic and human resource.

My appreciate also goes to all the lectures who have been teaching me in these three years, giving me the basis knowledge in applied mathematics and statistic, so that I can able to use them in my study.

Last but not least, I would like to express my precious gratitude to my beloved family for supporting me and giving me much encouragement. Their continuous moral supports help me to build confidence when I feel doubted of myself. Appreciations are extended to all my fellow friends who are always ready to help and support me.

I feel proud and lucky to have all their supports. Without their encouragement and constant guidance, I could not have finished the dissertation on time. Once again, thank you.





ABSTRACT

Human capital has become more and more common when it comes to the discussion of the national economic growth. The government tends to increase the allocation to the education sector from year to year because they realized that this factor will lead us to strike the goal of our nation in the coming decade. Moreover, like education, health services can improve the quality of human resources, both now and in the future. Meanwhile, better health increases human potentialities and have an important influence on development of individual's abilities. This study is based on the Solow model which is easily can be extended to include total factor productivity (TFP) and human capital are represented by education and healthcare variable as determinant of economic performance. This production function is estimated using a regression model. The long run relationship between TFP, education, healthcare variables and gross domestic product (GDP), as well as the causal direction between each of them are examined. Several tests are conducted to support the regression model. There is no cointegrating relationship between the human capital and economic growth in a stationary time series. It shown that Islam (1995) finding, which is human capital, does not contribute significantly to explaining the economic development. It rather human capital significantly affects TFP which is positive correlated with the economic growth. Furthermore, the results also shown that the causality direction is from GDP to the human capital.



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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

For decades, there has been significant empirical work on economic growth. One of the important emphases which belief that human capital plays a major role in explaining cross-country variation in income per capita, as well as in improving the living standard. It has benefited all most region of the world since the industrial revolution.

Kendrick (1976) estimated that over half of the total U.S. capital stock in 1969 was human capital; therefore one might expect that ignoring human capital would lead to incorrect conclusions. By including the human capital can potentially change either the theoretical modelling or the empirical analysis of economic growth. At the theoretical level, appropriately accounting for human capital may alter one's view of the nature of the growth process. Lucas (1988), for example, assumed that decreasing returns to physical capital accumulation when human capital is held constant, the returns to human



capital plus physical capital are constant. At the empirical level, the existence of human capital can change the analysis of cross-country differences.

Economists believe that the human capital is important to growth have come out with different facts on how model human capital into different production functions and have suggested several estimation techniques. Unfortunately, there are some mixtures of results and conclusions appeared which make it difficult to understand clearly the role of human capital on growth, and also problematic to the policy makers in deciding which is the best policy for economic growth.

For instance, Islam (1995), using panel regressions, finds that human capital does not contribute significantly to explaining output. It rather human capital should significantly affect total factor productivity (TFP). Further more, Benhabib & Spiegel (1994) also include human capital into a growth-rate estimation of production function. They realize insignificant or negative coefficients for the human capital variable. This finding leads them to consider more complex paths whereby human capital affects growth. Besides, Mincer (2000) also conclude that human capital does not enter the production function as an input, but rather influences growth through its effect on TFP.



1.1.1 Investment of Human Capital

Human capital normally is defined as the investments in labour force which in terms education, training, and medical care. The role of human capital can be studied and analyzed which endogenous affect to the TFP by decomposed to these several types of factor. Otherwise, the human capital concept is recognized by some economists that human beings are as important factor in creating wealth. Investment in people is an appropriate concept for the people of Malaysia.

Human capital research has shown a connection between an improvement in educational achievement and a growth in economic production. Human capital was defined as investing in both formal and informal education and training which provides and enhances individual productivity by providing knowledge, skills, and attitudes and motivation necessary for economic and social development.

For instance, numerous empirical studies, Schultz (1961) and Zidan (2001) demonstrate that more educated and skilled people adapt better to change. They are able to benefit from opportunities that become available and create new opportunities of their own. A more educated labour force is a more flexible workforce. More educated people are better able to take in new ideas, accept foreign technologies, improve local technologies, understand and apply the knowledge from developed country to local situations.



Referring to Malaysia Budget 2007, to further strengthen the education and training system, a sum of RM33.4 billion or 21 percent of the overall budget 2007 is allocated for the operational and development expenditure. It is divided to three categories which are primary education with RM6.7 billion, RM 6.2 billion for secondary education, RM 10.4 billion for higher education as well as RM10.1 billion for the training programs. For healthcare status, the government to live up to its responsibility of ensuring that all citizens and others residents of Malaysia has equitable access to safe, adequate and quality healthcare. A sum of RM10 billion is allocated for the provision of health facilities and equipment, services of specialists and training programs.

1.1.2 Total Factor Productivity (TFP)

Malaysia has embarked on a plan to enter the association of developed industrial nations by 2020 by focusing on total factor productivity growth as highlighted in the Second Industrial Master Plan 1996-2005. Productivity growth is essential to ensure a higher standard of living and better quality of life in Malaysia. This growth depends on several factors such as quantitative expansion of physical capital per worker or capital intensity. TFP addresses the effects in total outputs which not caused by inputs or productivity. Improvement in TFP require skills upgrading, better organization and management systems, technological advancement and improvement in methods of production, as well as the shift towards higher added value processes and industries (Mahadevan, 2001)



Most of the previous studies have used the predictable growth accounting approach fundamental the nonfrontier approach to identify the two sources of output growth given by input growth and a residual measure of TFP growth. The nonfrontier methodology is based on the assumption that all industries are fully realizing their capacity in the production process and, thus, are technically efficient. Hence, the residual TFP growth measure of the previous studies is synonymous with that the intangible technological progress and possible gains from technical efficiency are completely ignored (Mahadevan, 2001).

Solow (1957) measured productivity growth for the U.S economy using an aggregate production function. He computed TFP growth as the residual after subtracting labour and capital growth from output growth. His produce, often denoted as “growth accounting” has been replicated for many other countries, time periods, and sets of inputs which Sala-i-Martin (1996) summarizes. Solow neoclassical models argue that economic growth which in terms of output per person is not sustainable without continuous increases in TFP since factor accumulation exhibits diminishing returns is in the long run self-defeating.



1.1.3 Education

Education is one of the critical dimensions through which public policies for economic growth and human development can be assessed and analyzed. The central role of human capital in economic development has recently been recognized in endogenous growth theories, proposed and discussed during the 1990s and repeatedly emphasized by international institutions and political declarations.

During the Eighth Malaysia Plan (2001-2005), Malaysia concerted efforts to increase accessibility to education and training resulted in increased enrolment at all levels from pre-school to degree level. A special focus was given to reduce the performance gap between rural and urban schools through the upgrading of teaching and learning facilities and placement of more trained teachers in rural schools. In support of the achievement of a productivity-driven growth, which requires highly skilled, trainable and knowledge manpower, substantial progress was made to provide more opportunities for the residents to pursue tertiary education and training.

Education development in Malaysia in recent years has focused on a strengthening vocational training to meet the needs of skill development across all occupational stratum. The mix of education and training is available for skill development for a given occupation. Furthermore, education not only increases the professional skills of labour force and the marginal productivity. Hence, the role of education which is one of the variables in human capital is strongly being determined.



Referring to Malaysia Budget 2007, it represented a significant increase of RM4.4 billion to be spent in the education sector compared to the previous year, which in itself is a substantial increase from 2005. However, the overall proportion of expenditure on education remains the same approximately 21 percent of the budget.

1.1.4 Healthcare

Healthier workers are physically and mentally more energetic and robust. They are more productive and earn higher wages. They are also less likely to be absent from work because of illness. Illness and disability reduce hourly wages substantially, with the effect especially strong in developing countries, where a higher proportion of the work force is engaged in manual labour than in industrial countries. Health, in form of life expectancy, has appeared in many cross-country growth regressions, investigators generally find that it has a significant positive effect on the rate of growth.

Like education, health services improve the quality of human resources, both now and in the future. Better health for the employees can provide immediate benefits by increasing the employees' strength, stamina, and ability to concentrate while on the job. Otherwise, better child health and nutrition promote future productivity by helping children develop into stronger, healthier adults. In addition, enhance the ability of productive skills and attitudes through schooling. It has been shown that healthy, well-fed children have higher attendance rates and are able to concentrate better while they are in school.



In an economy in which with the marginal productivity is very low, the production benefits of extended working life are necessarily small. Unlike education expenditures, which increase only the quality of human resources, health expenditures also increase their quality in the future by lengthening expected working life. In addition, health is extremely important in childhood when they have an important influence on creation of human capital and on the development of individual's abilities. The government can thereby significantly improve the health of people during their life and increase life expectancy which has a positive effect on economic growth and stability.

1.2 SIGNIFICANCE OF STUDY

The main problem faced by government is allocating scarce resources across competing activities and sectors. In a market-oriented economy, the competitiveness of a country on its stock of both physical and human capital that can bring the country's capacity into full play. Since economists treat human capital as an investment, it is important to estimate its benefits in the form of contribution to total factor productivity, but rather than influences economic growth and its rate of return.

Most of the empirical studies defined the contribution of human capital solely in terms of schooling. Bloom (2001) attempted to extend the production function by including two additional variables that micro-economists have defined as fundamental components of human capital: training and work experience, and health. Therefore, the validity of the hypothesis which is expansion of human capital is critical for drawing



relevant policy implications for developing economies. As the result, studying and estimating the theoretical the role of human capital in economic growth can help the policymakers to make the significant decisions in future.

1.3 OBJECTIVES OF STUDY

The contribution of the labour quality or human capital to the Malaysia productivity development can be analyzed by using the econometric tests and analysis. The objectives of this research are:

- i) To identify the role of human capital on economic development.
- ii) To determine the human capital, represented by education and healthcare independently as the inputs of production for economic performance.
- iii) To identify contribution of human capital in economic performance.

1.4 ORGANIZATION OF STUDY

This paper is organized as follows. This paper has introduced briefly the relevance of studies and objectives. The section two develops with the literature review which is the critical discussion of the idea of endogenous growth theory and the relation to the process of human capital formation. Section three presents the model and hypothesis testing for the analysis in this paper. Besides, it also describes how the study was conducted by using the econometric analysis. Section four presents the reports of econometric analysis



proposed for the hypotheses testing in this study. Section five presents the discussion on the results of the proposed model. Further more, the conclusions and recommendations based on the discussion and analysis of the results also included.

1.5 SCOPE OF STUDY

In this study, the human capital does not enter the production function as an input, but rather than influences economic growth through its affect on total factor productivity. The main results indicated that investment in human capital, measured by education, and healthcare for the period 1977-2006. The analysis is confined to Malaysia.

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CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In the 1950s, the production factors consist of the four traditional factors which are capital, land, labour and entrepreneurship. Kendrick (1976) estimated that over half of the total U.S. capital stock in 1969 was human capital. There exists an opening which was referred to as the residual factor, human capital (Schultz, 1961). Therefore, one might be expecting that ignoring human capital would lead to inaccurate conclusions.

Schultz (1961) invented the term human capital in the 1960s to reflect the value of human capacities. He believed human capital was like any other type of a capital and investing on human capital would lead to a higher production. Besides, Schultz (1961) also identified that human capital as the residual factor in production function of goods and services.



2.2 EMPIRICAL STUDIES

The basic of human capital lies in the theories of Schultz (1961). Shultz (1961) suggests that education enhances an individual's ability to successfully deal with disequilibria in changing economic conditions. He produced his ideas of human capital in the early 1960s as a ways of explaining the advantages of investing in education to improve agricultural output. Moreover, he has demonstrated that the yield on human capital in the U.S. economy was larger than that based on physical capital such as new plant and machinery. Besides, he has been established that investment in education is a major source of growth in *TFP* and, hence national income.

Oketch (2006) applied a panel regression methodology for the purpose of measuring the contribution human capital to economic growth in Africa. The sample analyzed in his study consists of a set of 47 Africa nations out of the 54 countries. He concludes that investment in human capital and physical capital are important determinants of economic growth and development in Africa. In his study, he found that human capital invested in basic and advanced education is both positive and significant, and consistent with the hypothesis that both contribute to total factor productivity (*TFP*).



Becker (1964) suggests that education and training raise the productivity of workers by imparting useful knowledge and skills; others provide different explanation for how education is related to worker productivity. One is based on the argument that the higher earnings of educated workers simply reflect their superior ability acquired during the process of education, rather than through skills and knowledge. He built on the idea, explaining that expenditure on education, training and medical care could all be considered as investments in human capital. Human capital is an essential factor in production of output because people cannot be separated from their knowledge, skills, health or values in the way they can be separated from their financial and physical assets.

At the level of the nation, recent periods of sustained growth in TFP are closely associated with improvement in a population's schooling, nutrition, and healthcare (Denson, 1962). At the level of the individual, statistical studies of random sample surveys and censuses reveal significant positive partial correlations between wages, earnings or income and a worker's schooling, nutrition, and health, stratified by sex and controlling for age or post-schooling experience (Strauss & Thomas, 1995).

By tracing back from Schultz (1961), Denson (1962), Mincer (1962), Becker (1964), Romer (1990) and Barro (1995), definitions of human capital, human capital investment through education, on-the-job training and the medical care do have a direct impact on economic yields. These economic yields have been traced by the definitions as having a better and improved workforce. There is general agreement that the human

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