ESTABLISH A RELATIONSHIP BETWEEN HUMAN CAPITAL INVESTMENT AND PRODUCTIVITY GROWTH IN MALAYSIA

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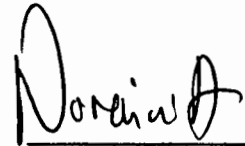**20 April 2007**
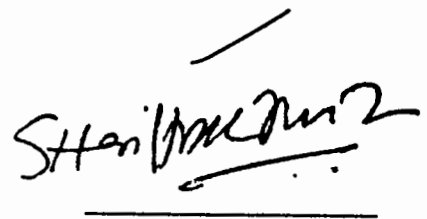
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ABSTRACT

Rapid economic growth and improving living standards have benefited almost all regions of the world since the industrial revolution. The main focus of this dissertation is to explore the role that human capital investment should participate in improving the nation's productivity. The study involves two way links between the total public health services expenditure with the productivity growth, measured in RM million terms, and between the total education expenditure with the productivity growth. The total expenditure is included the federal government's total operational and total development expenditure on the public health services and education. The models included in this study are based on the Cobb-Douglas production function where human capital variable is added to examine the relationships. This study examines the cointegration level to check the existence of a long-run relationship between the variables. In addition, this study conducts the Granger Causality test to examine the causality pattern in the model. From the Pearson correlation test, it shows the models in this study show a strong correlation relationship. This study determining the direction of causality shows a long-run causality relationship between the total productivity with the total expenditure on public health services, and between the total productivity with the total expenditure on education as well.

MENGKAJI HUBUNGAN ANTARA PELABURAN DALAM MODAL INSAN DENGAN PERTUMBUHAN PRODUKTIVITI DI MALAYSIA

ABSTRAK

Kebanyakan negara di dunia mengalami pembangunan ekonomi yang giat dan darjah kehidupan telah diperbaiki sejak revolusi industri. Tujuan utama disertasi ini ialah untuk mengkaji peranan modal insan dalam pertumbuhan jumlah productiviti di negara Malaysia. Kajian ini melibatkan dua hubungan yang mengkaji modal insan yang menggunakan proksi jumlah perbelanjaan untuk kesihatan dengan jumlah produktiviti manakala yang seterusnya ialah mengkaji hubungan antara jumlah perbelanjaan untuk pendidikan dengan jumlah produktiviti. Jumlah perbelanjaan yang ditekankan dalam kajian ialah jumlah perbelanjaan kerajaan persekutuan dalam sektor perbelanjaan untuk mengurus dan membangun untuk kesihatan dan pendidikan. Model yang dimasukkan dalam disertasi ini adalah berdasarkan fungsi Cobb-Douglas dimana pembolehubah modal insan ditambahkan. Daripada ujian korelasi Pearson, keputusannya menunjukkan satu hubungan korelasi yang kuat di antara pembolehubah tidak merdeka dengan pembolehubah merdeka dalam model yang digunakan. Kajian ini menguji tahap kointegrasi antara pembolehubah dalam model dengan tujuan mengkaji wujudnya hubungan jangka masa panjang. Selain itu, ujian Granger Causality dijalankan untuk menunjukkan hala penyebab antara pembolehubah jumlah produktiviti dengan jumlah perbelanjaan dalam kesihatan dan jumlah produktiviti dengan jumlah perbelanjaan dalam pendidikan. Daripada analisis, wujudnya hubungan jangka masa panjang, dimana kedua-dua pembolehubah modal insan merupakan penyebab Granger dengan jumlah produktiviti.

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LIST OF ABBREVIATION

R&D	Research and Development
TFP	Total Factor Productivity
OECD	Kuala Lumpur Stock Exchange
GDP	Gross Domestic Product
SPSS	Statistical Package for Science Social
OLS	Ordinary Least Squares
ASEAN	Association of Southeast Asian Nation
ICT	Information and Communication Technology
ADF	Augmented Dickey-Fuller test
SSE	Sum of Square Error
RM	Ringgit Malaysia

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LIST OF SYMBOLS

$>$	Greater than
$\geq$	Same or greater than
$\leq$	Same or less than
$<$	Less than
α	Alpha
β	Beta
γ	Gamma
δ	Delta
ϕ	Decimal
$=$	Equals
$+$	Add
$-$	Subtract
$\%$	Per cent
e	Exponential
ln	Nature logarithm
$\log$	Logarithm
Σ	Summation
H_0	null hypothesis
R^2	Coefficient of determination
$\bar{R}^2$	Adjusted coefficient of determination

→	Rightwards arrow
↔	Left right arrow

CHAPTER 1

FOREWORD

1.1 INTRODUCTION

Malaysia's attainment on the context of human capital can be observed from the total allocation towards education and training sector. In the Forth Malaysia Plan, an allocation of RM4.8 million towards the sector of education and training and this total amount of allocation has increased to RM10.2 million in the Seventh Malaysia Plan (Mohd. Nasir Saukani, 2003). The table below shows the growth of the total allocation money on education and training based on the Malaysia Plan (Mohd. Nasir Mohd. Saukani, 2003).

Table 1.1   Government budget on education and training (RM million)

	Forth Malaysia Plan (1981-1985)	Fifth Malaysia Plan (1986-1990)	Sixth Malaysia Plan (1991-1995)	Seventh Malaysia Plan (1996-2000)
Budget on education and training	4.8	5.8	7.8	10.2
Percentage distribution in government's total expenditure	9.9	15.6	13.3	15.1

Referring to the year 2006 budget Malaysia, the budget for education and training has increased bombastically to RM5 million. Four strategies have been outlined in the 2006 budget; one of the strategies is to develop human capital. Under this strategy, a total of RM9.9 million has been allocated to the social sector that included education, health and housing (Abdullah Ahmad Badawi, 2005).

1.1.1 The concept of human capital investment

Human capital is a way of defining, categorizing and developing people's skill and abilities where they will be contributing in employment. Government will budget an amount of money to be invested in the human capital development. The allocation of money in developing human capital is known as investment because it has a scale of return to country's productivity in every sector. Government will allocate a sum of money in the development of education, training, healthcare and research and development (R&D). In another words, there is an allocation of money supply to the development of human capital. In return, the relationship between the real wage rate and the total factor productivity growth (TFP) has accelerated in the manufacturing sector since 1980. According to (Lee, 2005), the total factor productivity is expressed as productivity. Output per worker often refers to as labour productivity. There has been plenty of research on the human capital related to the economics of growth. There are four determinants in productivity. There are physical capital, human capital, natural resources and technological knowledge, where human capital is only one of the determinants for productivity (Mankiw, 2004).

1.1.2 The history of human capital

Many early economic theories mention the term of human capital as labour which is one of the three factors of production. The first people who discuss human capital is Arthur Cecil Pigou. According to him, there is such thing as investment in human capital as well as investment in material capital. Soon, his idea has been recognized. The distinction between economy in consumption and economy in investment becomes blurred. Up to a point, consumption is investment in personal productive capacity. This is especially important in connection with children which is to reduce unduly expenditure on their consumption may greatly lower their efficiency in their after-life. Even for adults, after we have descended a certain distance along the scale of wealth, so that we are beyond the region of luxuries and unnecessary comforts, a check to personal consumption is also a check to investment. The term uses in the modern neoclassical economic literature dates back to Mincer J. (1958) introduced the application of the idea of human capital in economics. Becker's book entitled *Human Capital*, published in 1964, became a standard reference for many years. In this view, human capital is similar to physical means of production, one can invest in human capital via education, training, medical treatment and one's income depends partly on the rate of return on the human capital one owns. Thus, human capital is a stock of assets one owns, which allows one to receive a flow of income, which is like interest earned. Human capital is substitutable as it will not replace land, labor, or capital totally but it can be substituted for them to various degrees and be included as a separate variable in a production function (Bowles, Gintis, 1975).

The introduction of the term is explained and justified by the unique characteristics of knowledge. Unlike physical labor and the other factors of production, knowledge is expandable and self generating with experience, e.g. Doctors get more experience and their knowledge base will increase, as will their endowment of human capital. The economics of scarcity is replaced by the economics of self-generation. Besides that, knowledge is transportable and shareable. It is saying so because knowledge is easily moved and shared. This transfer does not prevent its use by the original holder. However, the transfer of knowledge may reduce its scarcity-value to its original possessor.

Modern labor economics tries to explain all differences in wages and salaries in terms of human capital. The concept of human capital can be infinitely elastic, including immeasurable variables such as personal character or connections with insiders via family or fraternity. This allows the theory to be tautologically true without explaining anything. Often, it is not the education or training that one has which determines the value of one's education, but the prestige of the credential or degree received. Someone who gets a degree from an elite school will likely get a higher income than one from a large government-funded one, even if they have exactly the same knowledge.

Others point to the existence of market imperfections which are especially rampant in labour markets that imply the existence of non-competing groups or labor-market segmentation. In these theories, the return on human capital differs between

different labor-market segments. Similarly, discrimination against minority or female employees implies different rates of return on human capital.

1.1.3 Relationship between human capital investment and productivity growth

There have been so many studies about the relationship among education and the labour market. Expenses in education is just one of the sector in human capital development, while the government expenses in training, research and development (R&D) and healthcare are playing an important role in labour market as well. One indication of this is the large residual variance typically remaining in empirical work attempting to explain wages by schooling, experience and other explanatory variables. By investing in human capital investment, an individual can affect the wage rate and achieve a higher expected wage. A feature that distinguishes investments in education from other risky investments is the non-existence of a risk-free option, not even a worker who abstains from investing in education can be certain about his or her future earnings. Indeed, an interesting question from the point of view of investment behaviour is whether an increase in human capital increases or decreases wage rate. The conventional wisdom Mincer J. (1958) is about from looking at the unexplained wage variation, human capital seems to be associated with increased wage variability. Against this evidence stands a host of other indicators that point towards the conclusion that investments in human capital may rather reduce earnings variation. Remaining within the empirical earnings literature, a typical observation is that educated workers are more likely to receive further training; training in turn generates specific human capital which tends to increase their wages and soon lead to

higher productivity rate. Relatedly it is frequently argued that more educated individuals are likely to face less uncertainty regarding match-quality when contracting with employers by the fact that more information about them is available. One branch of the literature considers the risk of being low-paid would suggest that education can be instrumental in helping an individual to avoid becoming low-paid and also to get off from low-paid jobs.

However, there are also other sources of earnings variation which human capital can be expected to affect. These include lost earnings due to unemployment, sickness, disability, etc. Looking at the unemployment risk for example, one of the most firmly established facts is that more highly educated people are unemployed to a smaller extent. Hence education reduces unemployment risk. The same seems to apply to other sources of earnings losses such as occupational injury risks.

Based on Mankiw N.G. (2004), productivity is defined as the amount of goods and services produced from each hour of worker's time. A country's standard of living depends on its ability to produce goods and services. There are few determinants of productivity which are physical capital, human capital, natural resources and technological knowledge. Obviously, the human capital is closely related to productivity but how far does the investment to this determinant will affect the total factor productivity in Malaysia? What is the human capital role in a country's economic performance? The relation of education and literacy of scientific and technical knowledge developed through R&D to labour productivity growth within the medium term. Based on

(McMahon W.W, 1984), empirical results for the United States and fourteen other major Organization for Economic Co-Operation and Development (OECD) nations for five year time periods from year 1955 through year 1980 found that education as measured both by the average educational attainment of the labour force and by the percentage of advanced level graduates who bring technology to bear on production to be significant determinants of productivity growth. Gross investment in physical capital also transmits the R&D and has a positive influence, as do higher utilization rates and the technology transfer associated with lower initial productivity levels.

1.2 OBJECTIVE

This research is conducted with the purpose of investigating the relationship between the macroeconomic factors in Malaysia. The purpose of this research is to determine how far the government expenses on human capital investment will have the effects on two other important variables which are the human capital investment and the total productivity growth. The real average wage is the average income per worker in the existing labour market. In this framework the state of productivity is measured by total factor productivity (TFP). The total factor productivity (TFP) is expressed as the overall productivity in a country (Lee J.W., 2005), did a research on the topic of human capital and productivity for Korea's sustained economic growth. He used the Cobb-Douglas production function to investigate the relationship between the determinants of productivity. The multiple regression model will be used in this research to investigate the

patterns of relationship between these macroeconomic factors and the productivity in the context of Malaysia.

1.3 SCOPE OF RESEARCH

The scope of this research is only uses Malaysia's data from 1st January 1980 until 31st December 2005. Part of the information of data including the total labour force can be obtained in the Malaysia's economic report. The else data such as real GDP and human capital expenditure obtain from Department of Statistics Malaysia and some data source from Bank Negara Malaysia at Kota Kinabalu, Sabah. This research is doing by the assistance of statistical software package of SPSS version 12.0, Microsoft Excel and Eviews student version 4.1.

CHAPTER 2

LITERATURE REVIEW

2.1   INTRODUCTION

The Ninth Malaysia Plan charts the strategic direction for the migration from a production-based economy to a knowledge-based economy. In the ninth Malaysia Plan stated that education plays a crucial role in developing human capital and becomes a critical success factor in shifting the economy towards a k-based economy. Human capital is developing rapidly in this recent era, the growth in human capital needs efficient labour to gain productivity for the nation (Abdullah Ahmad Badawi, 2005).

The thrust of the Ninth Malaysia Plan, 2006 – 2010 is the development of the national human capital to produce sufficient knowledge workers that are needed by the nation to achieve knowledge-based economy as well as the objective of the Vision 2020. Knowledge is increasingly driving growth and transforming nations and the way of life. The frontiers of knowledge are boundless, producing wealth for both entrepreneur and economy for knowledge creation, commercialisation and innovation. Recognising the critical need for knowledge as input, Malaysia has embarked on the transformation from

an input – driven growth strategy that had served well in the past to one that is increasingly driven by knowledge in order to achieve sustainable high growth and development. Education increases the knowledge, skills and competencies of individual workers, allowing them to accomplish particular tasks better and to adapt more easily to changing job requirements. In the words of the former Prime Minister, he said that human resource development is the foundation to the success of any nation. With an educated and trained human resource, a nation could overcome any challenges and obstacles boldly. The education and training sector is pertinent towards providing the nation with knowledgeable and skilled manpower. It has been proven that a nation could develop and progress if it has a highly knowledgeable and skilled human resource.

Most of the researchers use growth accounting model as the model in analyzing the relationship between the human capital and the economic growth. The model will be discussed in the following part. The next part is a summary of the past research of related journal and working paper on the related issues. Finally, the last part of chapter 2 is a conclusion from the discussion before.

2.2   MODEL

In the analysis and research on relationship of human capital with productivity output which is measure as GDP, the Cobb-Douglas production function is being used regularly.

$$Y_t = f(A_t, K_t, H_t, L_t) \tag{2.1}$$

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