THE RELATIONSHIP BETWEEN EDUCATION AND ECONOMIC GROWTH IN MALAYSIA

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ABSTRACT

During the first fifteen years (1991-2005) towards 2020, Malaysia's economy has been growing rapidly at an average rate of 6.2 percent per annum. Physical capital and labour inputs are important basic factors that contribute to economic growth. However, a mere dependence on these basic factors may not uphold the economic growth. Conversely human capital and technology are crucial to sustain the economic growth. This study examines the relationship between education and economic development in Malaysia for the period of 1980-2005. Education is the major component of human capital. Three variables used as proxies for education are the enrolment rate in primary school, secondary school and institutions of higher learning. The study is based on the Cobb-Douglas production function which can easily be extended to include human capital as determinant of economic growth. This function is estimated using a multiple regression model. The long-run relationship between educational variables and gross domestic product (GDP), as well as the causal direction between them are examined. Several tests are conducted to support the model. The results suggest that all the time series data are stationary after the first and second differences but there exists a cointegrating relationship between educational variables and GDP. Causality runs through enrolment rate in primary to GDP while reverse causality runs through GDP to enrolment rate in secondary and tertiary.



v

ABSTRAK

Pada tahun 1991-2005, ekonomi Malaysia bertumbuh dengan cepat dan mencapai kadar pertumbuhan purata sebanyak 6.2 peratus setahun. Modal fizikal dan input buruh merupakan faktor pertumbuhan ekonomi yang penting. Walau bagaimanapun, pergantungan pada faktor asas pengeluaran ini semata-mata tidak semestinya menjamin pertumbuhan ekonomi. Sebaliknya, modal insan dan teknologi adalah penting untuk mengekalkan pertumbuhan ekonomi. Kajian ini mengkaji hubungan antara modal insan dengan pertumbuhan ekonomi di Malaysia bagi tahun 1980-2005. Pendidikan adalah komponen modal insan yang utama. Tiga pembolehubah yang digunakan sebagai proksi kepada pendidikan ialah kadar enrolmen untuk sekolah rendah, sekolah menengah dan institusi pendidikan tinggi (IPT). Kajian ini berdasarkan fungsi pengeluaran Cobb-Douglas yang boleh dimasukkan pembolehubah modal insan sebagai penentu pertumbuhan ekonomi. Fungsi ini dianggar dengan menggunakan model regresi. Hubungan jangka masa panjang antara pendidikan dan Keluaran Dasar Negeri Kasar (KDNK), dan hala tuju unsur penyebab bagi dua pembolehubah ini ditentukan. Beberapa ujian dijalankan untuk menyokong model ini. Keputusan mencadangkan semua data adalah pegun selepas pembezaan pertama dan kedua. Namun, wujudnya hubungan jangka masa panjang antara pembolehubah pendidikan dan KDNK. Hala tuju bagi unsur penyebab adalah dari kadar enrolmen sekolah rendah ke KDNK sementara hala tuju sebaliknya adalah dari KDNK ke kadar enrolmen sekolah menengah dan IPT.



CONTENTS

| | | | Page |
|------|-----------------------|--|------|
| DEC | LARATION | | ii |
| CER | TIFICATION | 1 | iii |
| ACK | NOWLEDG | EMENT | iv |
| ABS | TRACT | | v |
| ABS | TRAK | | vi |
| LIST | OF CONTE | NTS | vii |
| LIST | OF TABLES | 5 | ix |
| LIST | OF APPENI | DICES | x |
| CHA | PTER 1 | INTRODUCTION | |
| 1.1 | Introductio | n | 1 |
| | 1.1.1 Gross | s Domestic Product (GDP) | 6 |
| | 1.1.2 Gross | s Capital Formation (GCF) | 8 |
| | 1.1.3 Hum | an Capital | 9 |
| | 1.1.4 Total | Factor Productivity (TFP) | 11 |
| 1.2 | Objectives | of Study | 12 |
| 1.3 | Significance of Study | | 13 |
| 1.4 | Organization of Study | | 13 |
| 1.5 | Scope of S | tudy | 14 |
| CHA | PTER 2 | LITERATURE REVIEW | |
| 2.1 | Introductio | 'n | 15 |
| 2.2 | The Devel | opment of Human Capital Theory | 16 |
| 2.3 | Empirical | Studies | 18 |
| 2.4 | Empirical | Methods | 30 |
| | 2.4.1 Neoc | lassical Production Function | 31 |
| | 2.4.2 New | Growth Theories | 33 |
| 2.5 | Education | Variables | 34 |
| CHA | PTER 3 | METHODOLOGY | |
| 3.1 | Introductio | on of Cobb-Douglas Production Function | 36 |
| 3.2 | Model | | |

UNIVERSITI MALAYSIA SABA

U

| 3.3 | Econometric Tests and Analysis | | | |
|------|---|----|--|--|
| | 3.3.1 Randomness Test | 40 | | |
| | 3.3.2 Jarque-Bear Test | | | |
| | 3.3.3 White's Heteroscedasticity Test | | | |
| | 3.3.4 Serial Correlation | 43 | | |
| | 3.3.5 R^2 and Adjusted R^2 | 45 | | |
| | 3.3.6 Stationary and Nonstationary Time Series | | | |
| | 3.3.7 Unit Root Test | | | |
| | 3.3.8 Dickey-Fuller (DF) Test and Augmented Dickey- | | | |
| | Fuller (ADF) Test | | | |
| | 3.3.9 Cointegration Test | | | |
| | 3.3.10 Granger Causality Test | | | |
| CHA | PTER 4 DATA ANALYSES AND | | | |
| | ECONOMETRIC RESULTS | | | |
| 4.1 | Introduction | 57 | | |
| 4.2 | Econometric Results | | | |
| | 4.2.1 Regression Model | 58 | | |
| | 4.2.2 Randomness Test | 60 | | |
| | 4.2.3 Normality Test | 61 | | |
| | 4.2.4 White's Heteroscedascity Test | 62 | | |
| | 4.2.5 Serial Correlation | 63 | | |
| | 4.2.6 Unit Root Test | 64 | | |
| | 4.2.7 Dickey-Fuller (DF) Test | 65 | | |
| | 4.2.8 Augmented Dickey-Fuller (ADF) Test | 66 | | |
| | 4.2.9 Cointegration Test | 68 | | |
| | 4.2.10 Granger Causality Test | 69 | | |
| CHA | PTER 5 DISCUSSION AND CONCLUSION | | | |
| 5.1 | Discussion | 72 | | |
| 5.2 | Conclusion 78 | | | |
| 5.3 | Limitation and Suggestion | 79 | | |
| REFI | ERENCES | 81 | | |
| APPI | ENDICES | 87 | | |



LIST OF TABLES

| Table | No. | Page |
|-------|--|------|
| 1.1 | Contribution of factors of production in Seventh and Eighth Malaysia Plan | 4 |
| 1.2 | Access to education and class size for year 1990 and 2005 | 5 |
| 3.1 | Durbin-Watson d test: Decision rules | 44 |
| 3.2 | Modified d test | 45 |
| 3.3 | Four possible results for Granger causality test | 56 |
| 4.1 | The value of \overline{R}^2 and explained variation in $\ln Y$ | 60 |
| 4.2 | Results of the randomness test | 60 |
| 4.3 | Jarque-Bera values for each variable | 61 |
| 4.4 | Jarque-Bera values for residual series for each model | 62 |
| 4.5 | Number of coefficient, White statistic, critical value and the decision made | 62 |
| 4.6 | Decision Rules of Durbin-Watson test for Model E_1 , E_2 and E_3 | 63 |
| 4.7 | Durbin-Watson Statistics and results | 64 |
| 4.8 | DF test statistics and critical values for each variable in the level | 66 |
| 4.9 | ADF test statistics and p-values for all variables | 67 |
| 4.10 | DW statistics for the cointegrating regression | 68 |
| 4.11 | Critical values for cointegraing test | 68 |
| 4.12 | F-statistics of Granger causality tests | 70 |
| 4.13 | Decisions and causal direction | 70 |



LIST OF APPENDICES

Appendix

| A | Data used in the analysis | 87 |
|---|---|-----|
| В | Data in natural logarithm | 88 |
| С | Output of the regression model | 89 |
| D | Calculations for randomness test | 91 |
| E | Output for Jarque-Bera Test (series and residual) | 99 |
| F | Output for White's Heteroscedasticity Test | 102 |
| G | Output for Dickey-Fuller Test | 104 |
| Н | Output for Augmented Dickey-Fuller Test | 113 |
| I | Output for Cointegration Test | 122 |
| J | Output for Granger Causality Test | 124 |



CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Malaysia has made significant steps in developing its economy and improving the quality of its residents' life. Economy development in Malaysia has gone through many stages starting from the Development Plan of Malaya (1950-1955) until the Ninth Malaysia Plan (2006-2010). Since its Independence, real gross domestic product (GDP) has grown by an average of 6.5 percent per annum and GDP per capita in current prices grew by 7.0 percent per annum during 1957 to 2005 (Ninth Malaysia Plan, 2006-2010). Widespread advances were made in education, health, infrastructure and industry.

During the first fifteen years (1991-2005) towards 2020, Malaysia economy grew at an average rate of 6.2 percent per annum despite of the challenging global environment such as Asian financial crisis (1997-1998), September 11 incident (2001), wars in Afghanistan and Iraq, outbreaks of Severe Acute Respiratory Syndrome (SARS) and



avian flu as well as increase in world oil prices (Ninth Malaysia Plan, 2006-2010). Growth contracted during the Asian financial crisis (1997–1998), and the government was forced to cut spending and defer several large infrastructure projects. The unemployment and interest rates rose, and thousands of foreign workers were forced to leave the country. However, the economy began recovering in 1999. Growth was achieved with low average inflation rate of 2.9 percent per annum and low average unemployment rate of 3.1 percent over the period of 1991-2005. In the coming fifteen years (2006-2020), the National Mission will be implemented in order to concentrate the country's efforts on priority areas which will ultimately lead to achieving Vision 2020. These priority areas encompass the nation's global competitiveness, human capital development, national integration, ethnic relations, distribution of income and wealth and the quality of life (Ninth Malaysia Plan, 2006-2010).

The nature growth in Malaysia's economy is attributed to the growth process which is whether intensive or extensive. The intensive growth means that the economy grows because it uses new technologies and becomes more efficient, creating more and more output per unit of inputs, while extensive growth means that the economy grows because it uses more resources as inputs, such as more factories, buildings, and machines, and has higher participation rates in the labor force (Sarel, 1997). This distinction plays a crucial role in determining how we judge the performance of the economy and how we regard the future growth prospect. Consequently, it is important to know that the main factor for the economic growth in order to reach a greater height of economic growth while minimizing the negative influences which are either intensive or extensive.



Young (1995) decomposes the growth rates of several Asian countries into an extensive component, measured by the rate of factor accumulation and an intensive one, measured by the growth rate of total factor productivity (TFP). His surprising conclusion is that growth rates of TFP in Asian economies are not at all as spectacular as their growth rate of output. He estimates their rate of TFP growth to be lower than in industrial countries. Some of the studies, for example, Kim and Lau (1993), support for Young's results. However, most studies support for the view that TFP growth in East Asia was much stronger than Young's research suggests.

Malaysia's economy grew from heavy-based in capital in 1991 to more evenbased on capital, labour and TFP in 2005 following the expansion of the growth of knowledge-based service industries. Productivity and efficiency improved as the economy progressed towards becoming more knowledge-based. Table 1.1 shows the contribution of factors of production achieved in the Seventh and Eighth Malaysia Plan, and aimed in the Ninth Malaysia Plan. Based on this table, the TFP contribution to GDP increased to 29.0 percent in Eighth Malaysia Plan compare with 24.0 percent achieved during the Seventh Malaysia Plan. The contribution of labour to GDP at 33.2 percent was also higher than 30.8 percent during the Seventh Plan. However, the contribution of capital to GDP at 37.8 percent was lower than the 45.2 percent achieved during Seventh Plan. These results indicate that our economy was gradually shifting towards productivity-driven growth. Increase in the contribution of TFP to GDP indicates that other factors, apart from labour and capital, are getting important in determining the level of GDP.



| | Achieved | | | | | |
|------------------|--------------------------------|-------------|--------------------------------|-------------|--------------------------------|-------------|
| | 7MP | | 8MP | | Target 9MP | |
| Factor | % of Contribution to GDP | % of GDP | % of Contribution to GDP | % of GDP | % of Contribution to GDP | % of GDP |
| GDP | 4.8 | 100.0 | 4.5 | 100.0 | 6.0 | 100.0 |
| Labour | 1.5 | 30.8 | 1.5 | 33.2 | 1.8 | 29.9 |
| Capital | 2.2 | 45.2 | 1.7 | 37.8 | 2.0 | 34.3 |
| TFP ¹ | 1.1 | 24.0 | 1.3 | 29.0 | 2.2 | 35.8 |

 Table 1.1
 Contribution of factors of production in Seventh and Eighth Malaysia Plan.

Note: ¹ Total factor productivity (TFP) is estimated using the Cobb-Douglas production function by subtracting from total growth the portion which is accounted for by increases in labour and capital.

Recently, our national education participation rate has increased significantly at the pre-school and tertiary levels. Table 1.2 shows that the access to education and class size for year 1990 and year 2005. The average class size and teacher-student ratios improved for primary and secondary schools. Besides, colleges and universities were established for the expansion of opportunities for skills enhancement and lifelong learning (Ninth Malaysia Plan, 2006-2010).



| | | | Average OECD |
|---|--------|--------|-------------------|
| | 1990 | 2005 | Countries (2003) |
| Participation Rate (%) | | | |
| Pre-school (4-6 years old) | 33.1 | 60.0 | |
| Primary | 93.2 | 96.0 | |
| Secondary | 68.0 | 85.0 | |
| Tertiary ¹ (17-23 years old) | 16.9 | 29.9 | |
| Average Class Size (Student) | | | |
| Primary | 33.2 | 31.0 | 21.6 |
| Secondary | 33.6 | 32.5 | 23.9 ² |
| Teacher-Student Ratio | | | |
| Primary | 1:20.4 | 1:17.2 | 1:16.5 |
| Secondary | 1:18.9 | 1:16.3 | 1:13.6 |

 Table 1.2
 Access to education and class size for year 1990 and 2005.

Source: Ministry of Education and Ministry of Higher Education

Note: ¹ Refers to degree, diploma, Sijil Tinggi Persekolahan Malaysia, matriculation, Alevel and Sijil Pelajaran Malaysia certificate.

² Refers to lower secondary.

In an era of increasing globalization and accelerating worldwide technological advances, shortage in human skills may be an effective constraint to the economic growth. Human capital accumulation has been recognized as one of the most important engines of economic growth. Barro (1991), Barro and Lee (1993) and Baumol (1986) argue that human capital plays an important role as a facilitating factor on the international transfer of technology from innovating countries to "imitating" ones, helping them to catch-up with the developed countries. Consequently, the human capital investment has become increasingly important. Education has been widely accepted as the principal institutional



mechanism for developing human skills and knowledge. Therefore, most developing countries believe that the rapid expansion of educational opportunity is the key to their economic and national development. Our country, Malaysia has recently committed to the goal of expansion of educational opportunities especially in higher education.

In a knowledgeable economy, tertiary education can help economies keep up or catch up with more technologically advanced societies. Higher education graduates are likely to be more aware of and better able to use new technologies. They are also more likely to develop new tools and skills themselves. Their knowledge can improve the skills and understanding of non-graduate coworkers and thus increase the skilled workers in the labour force. In fact, the educational planning and the development planning are closely related since both of these plans are considered as national frameworks of policies with a common objective that is the realization of a rapid and healthy economic development. Therefore, a positive long-run relationship between economic development and education is expected.

1.1.1 Gross Domestic Product (GDP)

A country's gross domestic product (GDP) is one of several measures of the size of its economy. GDP is the market value of all final goods and services produced within a country in a given period of time (Mankiw, 2004). GDP measures the total income of everyone in the economy and the total expenditure on the economy's output of goods and services. GDP can measure these two things at once because income must equal



expenditure for an economy as a whole. Nominal GDP is the production of goods and services valued at current prices while real GDP is the production of goods and services valued at constant prices. Changes in real GDP reflect only changes in the amounts being produced but it is not affected by the changes in price. Thus, the level of real GDP is a better gauge than nominal GDP to measure economy's productivity and performance because it is not influenced by the inflation rate. Meanwhile, the growth of real GDP which is measured as the percentage change in real GDP is a good gauge of economic growth (Mankiw, 2004).

GDP is divided into four components which are consumption, investment, government purchases and net exports as given below:

GDP = C + I + G + NX

where

| C = Consumption I = Investment G = Government purchases NX = Net export (export - import) | GDP | = Gross domestic product |
|--|-----|--------------------------------|
| I = Investment G = Government purchases NX = Net export (export - import) | С | = Consumption |
| G = Government purchases NX = Net export (export - import) | I | = Investment |
| NX = Net export (export – import) | G | = Government purchases |
| | NX | = Net export (export – import) |



1.1.2 Gross Capital Formation (GCF)

Gross capital formation (GCF) is one of the principal components of final expenditures, typically accounting for around 20 percent of GDP. It is measured by the total value of the gross fixed capital formation (GFCF), changes in inventories and acquisitions less disposals of valuables for a unit or sector (Mankiw, 2004)..

Gross fixed capital formation (GFCF) is the largest component of gross capital formation. GFCF consists of

- acquisitions less disposals of new or second-hand tangible fixed assets in the form of machinery and equipment, dwellings, other buildings and structures, cultivated assets and so on.
- b) major improvements to existing fixed or natural assets, including land.
- c) acquisitions less disposals of intangible fixed assets (e.g., computer software).

Fixed assets are goods that are used repeatedly, or continuously, for at least a year in the process of producing other goods or services. Changes in inventories consist of the value of the raw materials, semi-finished or finished goods put into inventories (or stocks) by producers less the value of the goods disposed of. Valuables are non-financial goods that are not used primarily for production or consumption and are held as stores of value or in the expectation of capital gains (Mankiw, 2004). Hence, by deducting the change in stock, gross capital formation is used to measure the physical capital in a country.



1.1.3 Human Capital

Human capital is the knowledge and skills acquire through education, training, and experience. Human capital investment including education, training, research and development (R&D), are as important as physical capital investment for a country's long-run success (Mankiw 2004). According to Todaro (1994), human capital is defined as the investment in the labor force in terms of education, health care and on-the-job training. Some economists argue that human capital is particularly important for economic growth because of its positive externalities. Many models introduce human capital externalities so that human capital is a crucial factor in determining growth.

Human capital is one of the determinants of productivity which also include physical capital, natural resources and technological knowledge. Andreosso-O'Callaghan (2002) reported that the need for appropriate human capital development and accumulation is a prerequisite for modern economic growth in both developed and developing economies. According to Barro and Lee (2000), human capital particularly which attained through education, has been emphasized as a critical determinant of economic progress.

According Ninth Malaysia Plan (2006-2010), the quality of human capital is a key determinant in the achievement of its goals and objectives. During this period, efforts will be intensified to develop the Malaysia's human capital in order to drive the transformation to a knowledge-based economy. Programmes and projects will be



undertaken to improve the education system, increase innovation and ensuring holistic human capital development.

The development of human capital is a prerequisite towards attaining higher value-added growth based on knowledge and technology. According to Malaysia Budget (2007), a sum of RM33.4 billion or 21 percent of the overall budget, is allocated for operational and development expenditure. Of this, RM6.7 billion is allocated for primary education, RM6.2 billion for secondary education, RM10.4 billion for higher education and RM10.1 billion for training programmes.

The demand for high level skills increases when the economy moves towards higher capital-intensity and knowledge-based production process. Consequently, it is essential for the nation to create a critical mass of trained, skilled and knowledge manpower to sustain economic growth and increasing competitiveness. During the Seventh Malaysia Plan period (1996-2000), the supply of highly skilled and trained manpower increased as a result of capacity expansion in education and training institutions. Therefore, strengthening the education and training delivery system becomes more responsive to the changing needs of industries and technological advancements. Education which is one of the major components in human capital has been used as proxy for human capital. Education, especially tertiary education, increases cognitive skills of labor force and its marginal productivity, and facilitate the absorption of advanced technology from developed countries. Hence, the role of education in economic growth is being determined.



1.1.4 Total Factor Productivity (TFP)

Total Factor Productivity (TFP) is estimated using the Cobb–Douglas production function by subtracting the portion which is accounted for by increases in labour and capital from total growth. According to Solow (1957), a country's output growth can be explained by its labor and capital input accumulations as well as its TFP growth by using the Solow growth model. TFP growth is indirectly derived as a residual (Solow residual) that is the portion of growth left unaccounted for and is not explained by the weighted sum of the growth in the factor inputs. Changes in the Solow residual or TFP can come about for many reasons.

According to Malaysia Productivity Report (2000), basically, there are five major determinants of TFP growth. They are:

- i. Demand intensity which indicates the extent of productive capacity of the economy.
- ii. Education and training of the workforce which aims to upgrade skills and knowledge.
- iii. Economic restructuring which refers to the movement of resources from less productive to the more productive sectors of the economy.
- iv. Capital structure which relates to the proportion of investments in productive capital inputs.
- v. Technical progress which relates to the effective and efficient utilization of technology, innovation, work attitudes and management and organizational effectiveness.



Economists often refer to TFP as technology in the widest possible sense. The effect of education on GDP growth is reflected by the TFP residual. The growth accounting method is used to disentangle the contribution to the TFP growth made by education and then its contribution to GDP growth. The contribution of TFP to GDP is projected to be higher at 35.8 percent in the Ninth Malaysia Plan, with the economy becoming more knowledge-based. Efficiency of capital is expected to improve with increasing efficiency in the production process and productivity utilization of assets while the quality of labour farce is expected to improve through education and training. Consequently, the contribution of capital and labour to GDP is projected at 34.3 and 29.9 percent respectively (Table 1.1).

1.2 OBJECTIVES OF STUDY

The main objective of the study is to examine the relationship between education and economic performance in Malaysia. Therefore, my objectives can be categorized as below:

- i. Estimate the contribution of education to economic growth.
- Determine the long-run relationship between education and economic performance.
- iii. Determine the causal direction between education and economic growth



1.3 SIGNIFICANCE OF STUDY

The main problem faced by government is allocating scarce resources across competing activities and sectors. The choice between alternative investments such as education versus physical infrastructure depends on society's objectives indicating governmental decisions, and on the comparison of costs and future benefits of investment (Madrid-Aris, 2000). Since economists treat education as an investment, it is important to estimate its benefits in the form of contribution to economic growth and its rate of return.

The role of education may be different between the earlier and the later stages of modern economic growth. Therefore, the validity of the hypothesis that the expansion of educational opportunity is the key to their economic and national development is critical for drawing relevant policy implications for developing economies. As a result, studying and estimating the theoretical relation between education and economic growth can help the policymakers to make the policy decisions in future.

1.4 ORGANIZATION OF STUDY

This chapter has briefly introduced the context and the relevance of the study, objectives and significance of study. The following chapter (Chapter 2) provides the literature review which is critical discussion of the work performed in related field by others. Chapter 3 describes systematically how the study was conducted by using econometric analysis including the formula, model and test. Chapter 4 reports econometric results on



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