Global Review of Business and Economic Research, Vol. 12 No. 2, (2016) : 207-218

EDUCATIONAL INEQUALITY, GRADUATE LABOUR FORCE AND ECONOMIC GROWTH IN MALAYSIA

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ABSTRACT

This study examines the relationship between graduate labour force with educational inequality, real gross national income and population growth in Malaysia. Empirical results show that the educational inequality is negatively associated with graduate labour force, indicating that less will enter higher education if high inequality exists in the system. On the other hand, our findings also indicate that high income level and population growth rate will significantly increase the relative demand for educated labour force and thus increase the ratio of the graduate to the labour force.

Field: *Economics of Education*

1. INTRODUCTION

Malaysia established her independence from Britain in 1957. There are three major ethnic groups in Malaysia. As of 2006, the total population of Malaysia was 25 million. Of this figure, the Bumiputera group which comprises the Malays and other aborigines accounted for 67.3% of the total population. The Chinese made up 25% and the Indians 7.2%. The remaining are the minority groups and non-Malaysians. Compared to the Chinese and Indians, the Bumiputera group has a higher birth rate and fertility level, suggesting that the Bumiputeras will remain the majority group in the future.

The development of higher education in Malaysia started only after World War two or during the pre-Independence period and was transplanted from the British during the British Colonial rule. Inevitably, the higher education system in Malaysia was very much a replication of the British higher education system (Kassim, 1989). During the British rule, many of the Malay schools which were dominated by the Malays, were usually in the rural areas and were provided by the British up to the elementary level only. Unlike the Malay schools, the English medium schools were in the urban areas and attended by town residents who were mostly Chinese and Indian. Most Malays had no access to English medium schools. However, the elite Malays and other ethnic groups commonly sent their children to the English medium schools where the quality of education was far better than the rural Malay-medium schools. Since most Malays were educated in the rural Malay-medium schools, their upward social mobility was ultimately restricted (Roslan, 2005). The disparity in the degree of access to educational opportunities among the three communities further contributed to the feeling of social and economic deprivation among the Malays.

It is widely accepted that the lack of educational opportunities is one of the main causes for the backwardness of the Malays and also a major contributing factor towards their poverty (Wong and Gwee, 1972; Abu Shah, 1987). The lack of educational opportunities of this specific group (the Malays) could be attributed to the disparity in the social and economic development of urban and rural areas. The official census for 1970 estimated that 85.1% of the Malays resided in rural areas and the poverty level was high in rural areas. Hence, the issue of poverty in Malaysia seems invariably to be associated with one community, i.e. the Malays.

After the jarring incidence of ethnic rioting in 1969, the desire to redress inequality in the opportunity structure of Malaysian society became a crucial expansionary factor (Snodgrass, 1974). Frustration over higher education policy during this period resulted in the National Operation Council (NOC) setting up a committee to study the campus life of students at the university. Recommendations were made under this study for further action to rectify the ethnic imbalances in higher institutions. Among other things, the committee for the study recommended increasing the proportion of Malay students in the total enrolment and in science-related faculties to reflect the population composition (Kassim, 1989). The New Economic Policy (NEP) which was enunciated in 1970 pledged that by 1990, the income disparity between the Malays and non-Malays would be reduced. The emphasis was on long-term targets for the Malay ownership of share capital; a higher proportion of Malays in professional and managerial positions; employment opportunities from the expansion of the economy, and greater opportunities in higher education (Abu Shah, 1987). Greater access to opportunity structures for the Malays especially in higher education was further emphasised in the Second Malaysia Plan (1971-1975). It was hoped that the Malay share would increase from almost negligible levels (1.9% in 1970) to 30% of the total share of all sectors of the economy.

After the NEP ended officially in 1990, the government implement another economic development programme which known as the New Development Policy (NDP) (1991-2000) to promote the Bumiputera interests. The objectives of this plan were to turn Malaysia into a fully industrialized country and also to increase the per capita income as four times as already by the year 2020. In order to achieve the objectives, the country has to turn to high-tech types of industrial production with a analogous increase in the intensity of capital investment and also greater retention of value-added by Malaysian producers (Drabble, 2004).

On the basis of equal opportunity and equity considerations to increase enrolment of the "disadvantaged groups" at university level, more public expenditure was allocated for the expansion of higher education in the country. The expansion has involved the building-up of universities that were more geographically dispersed to allow greater accessibility to the community. Education and training are accorded high priority in national development under Malaysia's five year development plans. Since higher education in Malaysia is directly under the purview of the government, the policy on student intake and enrolment has been strictly scrutinised so that the ratio of students in higher education reflects the racial composition in the country (Abu Shah, 1987).

Until 2007, there are 19 public universities and more than 20 private universities and colleges offering variety of programmes leading to various levels of qualifications. Today Malaysia has an educated workforce with high literacy rate at more than 94 per cent and school leavers entering the job market have at least 11 years of basic education. Nearly 50 per cent of

the labour force works in services, 37 per cent in industry, and 13 per cent in agriculture (*www.ustr.gov*). A Labour Force Survey showed that the proportion of the labour force with tertiary education increased from 13.9 per cent in 2000 to 17.1 per cent in 2003. It is projected that 35 per cent of the labour force will have tertiary level qualifications by the year 2010. In addition to that, many Malaysian also study overseas and these graduates are globalised in the skills and outlook. Table 1 below shows the distribution of labour force participation by educational attainment and ethnic group for the year 2004.

Table 1
Labour Force Participation Rates by Educational Attainment and Ethnic Group in Malaysia, 2004

		Malaysian Citizens							
			Bumiputera						
Educational Attainment	*Total*	*Total*	*Total bumi-putera*	*Malay*	*Other bumi-putera*	*Chinese*	*Indian*	*Others*	*Non Malaysian Citizens*
Total	64.4	63.0	62.2	61.6	64.6	64.7	62.3	70.6	82.4
No Formal Education	54.3	50.4	55.1	47..3	63.4	37.2	44.1	55.7	73.3
Primary	66.7	63.0	63.9	61.7	71.3	61.4	59.9	80.7	85.0
Secondary	64.5	63.6	62.0	62.0	62.0	67.1	63.8	71.0	84.9
Tertiary	64.7	64.3	62.9	62.9	63.5	66.7	66.3	60.2	75.1

Source: Labour Force Survey Report, Malaysia (2004).

2. LITERATURE REVIEW

It is well documented that education plays an important function in human capital formation. Any activity that increases the quality of labour may be considered an investment in human capital. These include not only expenditures on formal education and on-the-job training but also on health, migration, job search and the preschool nurturing of students (McConnel et al., 2004). Education and training can improve the skills of the labour force, increase the wage or remuneration, and hence, improve the standard of living and enhance economic growth in the country. Recent theoretical analyses of international differences in growth rates have focused attention on the role of human capital and in many cross-country empirical studies of long-run economic growth include some proxy for human capital (Hanushek and Kimko, 2000).

It is also believed that equality of educational opportunity would be able to promote a more efficient allocation of educational resources by transferring some of the resources from students in the over-represented income class to students in the under-represented income class (Machlis, 1971). Normally, the over-represented income class students are those students who come from better-off families, and under-represented income class students come from low income families. Students from high income families are more likely to graduate from high school and enter a higher level of education than those from low income families. This is confirmed by a study done on selected developed and less-developed countries which shows that the relative chances of access to higher education of someone with highly skilled parents is greater than someone whose parents are less skilled workers (Psacharopolous, 1977). This is probably because wealthier families can afford the indirect cost of foregone earnings of their children while their children are still at school.

Thus, on the basis of widening the educational opportunities at the higher level of education in society, especially for those from the low income groups, many higher education systems in the world are heavily subsidised either by state or federal government or both. However, when education is heavily subsidised, making it almost free for students who eventually enroll, the adverse effect is likely to happen (Psacharopolulos, 1977). In other words, heavily subsidised education might exacerbate, instead of alleviating social disparities. As a result, equality of educational opportunity at the higher level would be reached with fewer students from lower income groups. In other words, higher education would be over represented by students from the higher income group or have a less than proportional representation or be under-represented by students from the low income families (Graham and Macmahon, 1987). Thus, in this case, a more efficient allocation of educational resources may not be achieved.

Psacharopoulos (1977) introduced a simple measure that can capture the degree of existing educational inequality in education system. The measure is in the form of the coefficient of variation of enrolment at the three levels of education and is called the index of education inequality or EDNEQ. This approach was later adopted by Ram (1982). The coefficient of variation of student enrolment at the three levels of schooling (EDNEQ) is given as:

$$EDNEQ = \left[\sum_{i=1}^{3} \left(E_i - \overline{E} \right)^2 / 3 \right]^{1/2} \div \overline{E} \tag{1}$$

where E_i is the total number of students enrolled at the first level (E_1), second level (E_2) and third level of education (E_3) and $\overline{E}$ is the mean enrolment at the three levels of education. The value EDNEQ indicates the degree of educational inequality in an education system. In the case of perfect equality, EDNEQ will be equal to zero. The greater the value from 0, the greater will be the inequality of educational opportunity. In other words, the index is larger than 0 if inequality of access exists. The expression of the value of EDNEQ, thus at least broadly, reflects the steepness or the shape of the educational pyramid (Ram, 1982).

In relation to EDNEQ, the value of EDNEQ will always be greater than 0 regardless of whether the country is developed or less developed. This is because enrolment at primary level (E_1) is always greater than the other two levels of education, which is generally pictured in a normal educational pyramid. In other words, it can be written as, $E_1 > E_2 > E_3$. Because of this ranking, the EDNEQ will decrease when E_3 increases. Similarly, the EDNEQ will increase if E1 increases. In his study on 64 countries, Psacharopoulos (1977) found that the degree of educational inequality was significant in less advanced countries.

In a study on inequality, poverty and development for 60 countries, Ahluwalia (1976) seeks the relationship between the distribution of income and the process of development in these countries. There is cross-section evidence which indicates that there is a distinct inverse U-shaped pattern between the level of development and the Gross National Product (GNP) per capita and inequality. This is supported by the hypothesis in Kuznets (1955) on Economic Growth and Income Inequality. Kuznets suggests that a country's economic growth and its income inequality is greater in the early stages of development. In other words, income inequality tends to have a negative relationship with the level of growth in the initial development stages. However, this relationship changes to a positive relationship when development impacts

positively on the economy. However, how far does the level of development measured in terms of GNP per capita have an effect on educational inequality since the educational inequality itself has a significant relationship with distribution of income? Nonetheless, many of the previous studies do not make conclusions about the actual kind of relationship between educational inequality and income distribution.

Blanden, *et al.* (2003) studied on changes in educational inequality by using data sources from the US and the UK. They used two types of data to study changes in the association between parental income and education participation or attainment, i.e. cross-sectional household level data and longitudinal surveys data. They found a sharp increase in the inequality of education over time in the UK. They also found that changes in financing policy reduced the financial support available to those from low income families at the higher education level in the UK and this led to a very sharp rise in educational inequality at that level. There seems to be an amplifying effect on the education-income relation when the UK Higher Education financing policy became increasingly regressive through its removal of subsidies targeted for people from poorer families. The study also showed that education systems and the policies that shape them seem to matter by showing different patterns in the connection between education and family income over time in the UK relative to the US. Therefore, it means that appropriately designed education policies can counter educational inequality.

Checchi (1999) found empirical evidence which supports the negative relationship between inequality and growth. In this study, Checchi applied an overlapping generation model where the individuals can invest part of their time in education, for higher rewards in the following period. With the absence of financial markets (the imperfect financial market where interest rate charged is inversely proportional to family wealth), the optimal choice of education is wealth constrained, since education is costly. In this study also, Checchi reveals that the financial constraints seem to have the potential in limiting the access to secondary education when the degree of development with the (log of) per capita output is controlled. When a gender difference is considered, there is evidence that female participation in education is more strongly conditioned by family wealth, starting from primary education. He also suggests that a country should spend more additional resources on educational programmes (like building schools and hiring more teachers) to increase the educational level among the population by implementing redistributive policies (via taxes and subsidies). An effective redistributive policy seems to reduce income inequality amongst the population.

3. METHODOLOGY

3.1 The Estimation of the Model

In this study, the functional relationship of tertiary educational level attainment of the work force with the explanatory variables is expressed as follows:

$$TWF = f(EDNEQ, RGNI, PGRO) \quad (1)$$

where, TWF is the ratio of the graduate work force to the total labor force. TWF is regarded as a dimension of human capital and also a measure of government's policy in producing the graduates in the labour force. EDNEQ is a measure of educational inequality in term of dispersion of enrolment by school levels using the coefficient of variation. RGNI and PGRO denote,

respectively, the real Gross National Income and the population growth rate. The sample period in this study spans from 1982 to 2004 with the use of yearly observation. The specification of the model is straightforward, where the TWF and EDNEQ are presumed to have a negative relationship, while RGNI and PGRO are positively correlated to TWF.

In order to study the long run equilibrium relationship as well as the short run causal linkage among tertiary educational level attainment of the work force, educational inequality, real gross national income and growth rate of population, a vector autoregressive (VAR) system is constructed as in Equation (2):

$$\begin{bmatrix} \Delta LTWF_t \\ \Delta LEDNEQ_t \\ \Delta LRGNI_t \\ \Delta PGRO_t \end{bmatrix} = \Gamma(L) \begin{bmatrix} \Delta LTWF_{t-1} \\ \Delta LEDNEQ_{t-1} \\ \Delta LRGNI_{t-1} \\ \Delta PGRO_{t-1} \end{bmatrix} + \Pi \begin{bmatrix} LTWF_{t-1} \\ LEDNEQ_{t-1} \\ LRGNI_{t-1} \\ PGRO_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{TWF} \\ \varepsilon_{EDNEQ} \\ \varepsilon_{GNI} \\ \varepsilon_{PGRO} \end{bmatrix} \tag{2}$$

where Δ is the first differencing operator, $\Gamma(L)$ is a 4×4 polynomial matrix of coefficients to be estimated, L is the lag operator, G represents short-run adjustments among variables across the four equations in the system, Π is the error-correction component in levels, and ε's are white noise error terms.

The matrix consists information about the long run relationship between the variables in the VAR, and the rank of Π is the number of linearly independent and stationary linear combination of the variables studied. If Π has a rank of zero, $r = 0$, the variables are not cointegrated. If Π has a full rank, $r = 4$, the variables are stationary at their levels. If the rank of P equals to r, in which $r < 4$, then there will exist r possible stationary linear combinations among the elements in the VAR, and $4 - r$ common stochastic trends.

Johansen (1988) proposed two likelihood ratio test statistics for identifying the number of cointegrating vector, namely the maximum eigenvalue and the trace test statistics. These two tests have same null hypothesis of "there is r or less cointegrating vectors". However, the alternative hypothesis of maximum eigenvalue test is "there is $r + 1$ cointegrating vectors", while trace test has the alternative hypothesis of at most r cointegrating vector.

Prior to the conduct of cointegration analysis, one should examine the stationary properties of the variables. To this end, we utilize the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992) unit root test to verify the order of integration of each of the variables involved. If the variables are non-stationary and not cointegrated, we have to use the standard VAR in estimation. Nevertheless, if the data are non-stationary and tertiary educational level attainment of the work force (TWF) is cointegrated with the explanatory variables (EDNEQ, RGNI and PGRO) identified in this study, by the Granger representation theorem, we need to incorporate the error-correction term in the estimation. The existence of a cointegrated relationship in the long run indicates that the residuals from the cointegration equation can be used as an error-correction representation as in Equation (3):

$$\Delta LTWF_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta LTWF_{t-1} + \sum_{i=0}^{p} \beta_2 \Delta LEDNEQ_{t-1} + \sum_{i=0}^{p} \beta_3 \Delta LRGNI_{t-1} + \sum_{i=0}^{p} \beta_4 \Delta PGRO_{t-1} + \delta ECT_{t-1} + \mu_t \quad (3)$$

4. EMPIRICAL RESULTS

4.1 Time Series Properties of the Data

The KPSS unit root test results are presented in Table 2. The null hypothesis of the data series is stationary for KPSS test, which is opposed with the hypotheses of standard Augmented Dickey-Fuller and Phillips-Perron unit root tests. In the levels form, results show that the null hypothesis is rejected at the conventional significance level, implying that the variables under study are non-stationary. Nevertheless, failure to reject the null hypothesis in the first differences showing that the variables are in $I(1)$ processes. As the data are in difference stationary processes, the estimation should be conducted in the first differences series instead of in their levels. Therefore, we proceed to examine the existence of the long run relationship among the variables using the Johansen and Juselius multivariate cointegration test in the following step.

Table 2
KPSS Unit Root Test Results

Variables	*Without Trend*	*Trend*
LWTF	0.6868(3)**	0.0938(3)
LEDNEQ	0.5730(3)**	0.1619(3)**
LGNI	0.6725(3)**	0.0964(3)
PGRO	0.5047(3)**	0.1742(3)**
DLWTF	0.2088(7)	0.1234(7)
DLEDNEQ	0.2739(2)	0.1058(2)
DLGNI	0.0835(1)	0.0842(1)
DPGRO	0.4426(4)	0.1047(3)

Notes: LTWF = natural log of tertiary level education to the total workforce ratio in Malaysia, LEDNEQ = natural log of index for the educational inequality, LRGNI = natural log of real gross national income, PGRO = population growth rate. Asterisks (**) indicate significant at 5% level.

4.2 Johansen-Juselius Cointegration Test Results

Table 3A reports the Johansen-Juselius multivariate cointegration test results. Empirical results show that the null hypothesis of zero cointegration ($r = 0$) is rejected by both the trace and maximum eigenvalue test statistics at 5 per cent significant level. However, we cannot reject the null hypothesis of at most one cointegrating vector, indicating the existence of a single cointegrating vector and thus there is a long run equilibrium nexus among the variables in the model. Table 3B tabulates the normalized cointegrating vector. The coefficient estimates of the cointegrating vector are given by $\beta' = (-1.00, -2.356, 0.650, 0.317)$. These values are normalized with respect to the tertiary educational level attainment of the work force, and they reflect the long run elasticity measures of the variables. As hypothesized, the tertiary educational level attainment of the work force is positively related to real gross national income and

population growth rate. However, educational inequality possesses negative relationship with tertiary educational level attainment of the work force.

Table 3A
Johansen-Juselius Cointegration Tests Results

Variables: LTWF, LEDNEQ, LRGNI, PGRO

H_0	H_1	λ-trace	$CV_{(trace, 5\%)}$	H_0	H_1	λ-max	$CV_{(max, 5\%)}$
r = 0	r ≥ 1	55.860**	47.856	r = 0	r = 1	37.000**	27.584
r ≤ 1	r ≥ 2	18.860	29.797	r ≤ 1	r = 2	11.318	21.312
r ≤ 2	r ≥ 3	7.542	15.495	r ≤ 2	r = 3	6.753	14.265
r ≤ 3	r = 4	0.788	3.841	r ≤ 3	r = 4	0.788	3.841

Notes: r is the number of cointegrating vector. Asterisks (**) indicate significant at 5% level.

Table 3B
Parameter Estimates of Normalized Cointegrating Vectors

Parameter Estimated	*Constant*	*LTWF*	*LEDNEQ*	*LRGNI*	*PGRO*
Elasticities[t-statistics]	-4.210	1.000	-2.358 [-2.399]**	0.650 [21.050]***	0.317 [1.765]*

Note: Asterisks (*), (**) and (***) denote significant at 10%, 5% and 1% levels, respectively.

4.3 Error-Correction Model (ECM) Estimation

Given the results of cointegration tests, we then conduct the ECM-based causality tests for the model. The estimation of ECM for tertiary educational level attainment of the work force is summarized in Table 4. Statistically, this model appears well specified as it passes all the diagnostic tests. The model is free from residuals autocorrelation and autoregressive conditional heteroscedasticity (ARCH) problems. In addition, it has a correct functional form and it is relatively stable as shown by the CUSUM and CUSUM of squares stability tests in Figure 1 and Figure 2.

Table 4
Estimation of Error Correction Model

Variables	*Coefficients*	*Std. Errors*	*t-statistics*	*p-values*
Constant	0.0466	0.0220	2.1183	0.0557
ECT(-1)	-0.4737	0.1690	-2.8026	0.0160
$\Delta LTWF_{t-1}$	0.3152	0.2586	1.2190	0.2463
$\Delta LEDNEQ_{t}$	0.7545	0.5683	1.3277	0.2090
$\Delta LEDNEQ_{t-1}$	-0.0281	0.6752	-0.0416	0.9675
$\Delta LRGNI_{t}$	0.0829	0.1330	0.6232	0.5448
$\Delta LRGNI_{t-1}$	-0.0945	0.1151	-0.8214	0.4274
$\Delta PGRO_{t}$	0.2412	0.5895	0.4092	0.6896
$\Delta PGRO_{t-1}$	-0.2536	0.4777	-0.5310	0.6051
Diagnostic Tests:				
JB	1.858 [0.395]			
AR[2]	0.716 [0.512]			
ARCH[2]	2.571 [0.108]			
RESET[2]	2.240 [0.157]			

Notes: JB is the Jarque-Bera statistic for testing normality. AR[2] and ARCH[2] are the Lagrange Multiplier tests of 2^{th} order serial correlation and ARCH effects, respectively. RESET refers to Ramsey RESET specification test.

The estimated coefficient of the ECT which measures the speed of adjustment back to the long run equilibrium level is statistically significant and correctly signed, confirming further that the variables in the system are cointegrated. The estimated coefficient of ECT is -0.474, implying that about 47.4 per cent of the short run deviations of the tertiary educational level attainment of the work force would be adjusted each year towards its long run equilibrium level. In other words, this indicates that the tertiary educational level attainment of the work force needs slightly more than two years to correct disequilibrium among the four variables in the model.

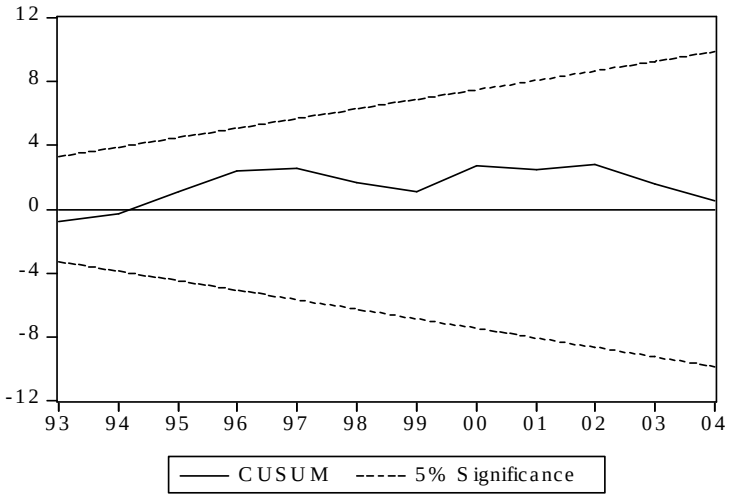

Figure 1: CUSUM Stability Test for ECM

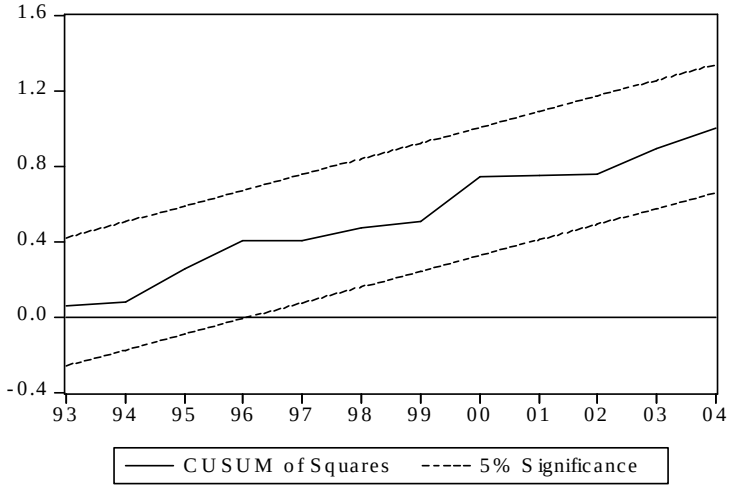

Figure 2: CUSUM^2 Stability Test for ECM

4.4 Short Run Granger Causality Relationship

It is of interest to know about the short run dynamic causal relationship among the variables in the model given that there have a stable long run relationship. The short run causality test can be conducted by applying the *F*-test of overall significance in the Wald test context to test the joint significance of the sum of the lags of each first difference explanatory variable in the equation. Table 5 reveals that there is no short run causality observed in the model. It is evident that while the variables have a common stochastic trend in the long run, the short run causal channels do not exist from educational inequality, real gross national income and population growth rate to tertiary educational level attainment of the work force.

Table 5
Short-run Granger Causality Test Results

Null Hypothesis	*F-statistic of Wald Test [p-value]* $\Delta LTWF_t$
$\sum_{i=1}^{1} \Delta LTWF_{t-i}$	1.486 [0.246]
$\sum_{i=0}^{1} \Delta LEDNEQ_{t-i}$	0.888 [0.437]
$\sum_{i=0}^{1} \Delta LRGNI_{t-i}$	0.438 [0.656]
$\sum_{i=0}^{1} \Delta PGRO_{t-i}$	0.225 [0.802]

Note: Asterisks (*) and (**) indicate significant at 10% and 5% levels, respectively.

5. CONCLUSION

In this study, we examine empirically the factors affecting the graduate work force in the Malaysia labour market using yearly time series data from 1982-2004. The explanatory variables identified in our model include educational inequality index, real Gross National Income and the population growth. The KPSS unit root test indicates that all the variables are in difference stationary processes. Therefore, we proceed to the Johansen and Juselius multivariate cointegration tests to gauge the long run equilibrium relationship among the variables. Both the maximum eigenvalue and trace tests report that there exists a single cointegrating vector in the model. The coefficients estimated from the normalized cointegrating vector are consistent with the hypothesized propositions in which real income and population growth do have significant positive effects on the demand for more educated labour. Meanwhile, the educational inequality is negatively associated with graduate labour force, indicating that less will enter higher education if high inequality exists in the system. In addition, our findings also show that the changes in the identified explanatory variables do not have the ability to influence the graduate work force in the short run. Our study also show that, the value of EDNEQ is reducing every year, however, the figure is still significant. In view of this, we propose that the development of education at all levels should be planned properly with long-term goals and

should not be short sighted. Effort should be taken to narrow down the educational inequality while maintaining a vigorous economic growth rate.

References

Abu Shah, I. (1987), *The Use of Higher Education as an Intervention Strategy in the Economic Development of Plural Society: A Case Study of MARA Institute of Technology in the Economic Policy of Malaysia*. Ph.D. Dissertation, University of Maryland College Park.

Ahluwalia, M. S. (1976), Inequality, Poverty and Development. *Journal of Development*, 3, 307-342.

Blanden, J., Gregg, P. and Machin, S. (2003), Changes in Educational Inequality. *CMPO Working Paper Series*, No. 03/079.

Checci, D. (1999), Inequality in Income and Access to Education. A Cross-Country Analysis (1960-90). University of Milano-Bicocca, *Working Paper*, 21.

Department of Statistics, Malaysia (2004), *Labour Force Survey Report*. Putrajaya: Department of Statistics, Malaysia

Drabble, J. H. (2004), *Economic History of Malaysia.* [On-line]. Available: *http://eh.net/encyclopedia/article/drabble.malaysia.*

Graham, J. W. and Macmahon, W. W. (1987), Personal Earnings Variation and Education. In Psacharopoulos, G. (ed.), *Economics of Education Research and Studies*. Pergamon Press.

Granger, C. W. J. (1988), Some Recent Development in a Concept of Causality, *Journal of Econometrics*, 39, 199-211.

Hanushek, E. and Kimko, D. (2000), Schooling, Labor-Force Quality, and the Growth of Nations. *The American Economic Review*, 90(5), 1184-1208.

James, E. and Benjamin, G. (1988), *Public Policy and Private Education in Japan*, Macmillan Press.

Johansen, S. (1988), Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 12, 231-254

Kassim, M. (1989), *Preferential Policy in Higher Education in Malaysia: A Case study of Malay Graduates at the Universiti of Science, Malaysia*. Ph. D. Dissertation, University of Wisconsin-Madisson.

Kuznets, S. (1955), Economic Growth and Income Inequality. *American Economic Review*, 45(1), 1-28.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P. and Shin, Y. (1992), Testing the Null Hypothesis Stationarity Against the Alternative of a Unit Root: How Sure Are We that Economic Time Series Have a Unit Root? *Journal of Econometrics*, 54, 59-78.

Machlis, P. (1971), *The Distributional Effects of Public Higher Education in New York City*. Ph. D. Dissertation, the State University of New Jersey.

McConnel, C., Brue, S., and Macpherson, D. (2004), *Contemporary Labor Economics. 6th ed.* McGraw-Hill/Irwin.

Psacharopoulos, G. (1977), The Perverse Effects of Public Subsidisation of Education or How Equitable os Free Education? Comparative Education Review, 21, 69-90.

Ram, R. (1982), Public Subsidisation of Schooling and Inequality of Educational Access: A New World Cross-Section Study. *Comparative Education Review*, 26, 36-47.

Roslan, A. H. (2005), *Income Inequality, Poverty and Development Policy in Malaysia*. [On-line]. Available: *http://cde.u-bordeaux4.fr/SBROSLAN.pdf /2006*).

Snodgrass, D. (1974), The Fiscal Systen as an Income Redistributor in West Malaysia. *Public Finance,* 29**,** 56-75

Wong, H. K. and Gwee, Y. H. (1972), *Perspective: The Development of Education in Malaysia and Singapore.* Heinnemann Educational Books (Asia) Ltd.