Australian Journal of Basic and Applied Sciences, 5(5): 1257-1274, 2011
ISSN 1991-8178

Modelling Education Tourism Using Gravity Model in Malaysian Public Higher Education Institutions

[1]Mr. Fadli Fizari Abu Hassan Asari, [1]Mrs. Asma' Rashidah Idris and [2]Norzaidi Mohd Daud

[1]Faculty of Business Management, Universiti Teknologi MARA, Terengganu Campus, 23000 Dungun, Terengganu, Malaysia.
[2]Faculty of Business Management/Institute of Business Excellence/Accounting Research Institute, Universiti Teknologi MARA, Shah Alam 40450 Shah Alam, Selangor, Malaysia.

Abstract: The objective of the study is to model international student enrolments using the Gravity Model whereby Malaysian public higher education institutions is the reference point. Results from panel data analysis using GLS-Two Way Estimation indicate that distance is the most elastic variable in determining the education tourism demand. The lower the distance, the higher enrolment it will be. Meanwhile, education tourism demand is positively related with Malaysian export. In addition, more enrolled students come from countries which have socio-economic agreement with Malaysia. Appropriate actions have been proposed, to place Malaysia as one of the major exporters in education tourism industry, parallel with its vision to become an international centre of excellence for education beyond year 2020.

Key words: Education Tourism, Gravity Model, Public Higher Education Institutions, Panel Data Analysis, Malaysia.

INTRODUCTION

Overview of Tourism Industry in Malaysia:

Over the past several decades, the tourism industry has become the leading export industry within the services sector worldwide. Different from other export goods, consumption takes place in location where it is produced and attracts inflow of foreign exchange. The tourism industry is currently Malaysian third most important industry in terms of foreign exchange earnings after the manufacturing and palm oil sectors. Its contribution to GDP growth is approximately 7.2 per cent, suggesting that the industry is still in its infancy and, hence, offers a wider scope and good potential for further and future growth. Tourists spent nearly RM67.1 billion in 2007, a 12.8 percent increase from 2006, and the fastest growth in 16 years. Tourists accounted for 10 to 12 per cent sales during Visit Malaysia Year 2007 (Elayne, 2008).

For January–September 2008 period, the mass of tourist arrivals to Malaysia was from the Southeast Asia region (74%), in which tourists from Singapore formed the largest group, followed by Indonesia and Thailand. Between 2007 to September 2008, the biggest increase was recorded by the arrivals of the Iranian tourists, which grew by 62.3% (Malaysia, 2008). The big increase is due to the aggressive promotional activities carried out by the government in attracting the Middle Eastern tourists especially during their holiday season between June and September every year. This is also a direct consequence of September 11 and the invasion of Iraq, which diverted them to the safe Muslim country of Malaysia (Amran, 2004). Based on these performances, Chaynee (2001) and Elayne (2008) suggested that, apart from contributing to economic growth, the call for greater attention to be placed on the tourism industry is linked to its effect in encouraging economic diversification. The tourism industry could serve as a cushion by reducing total reliance on the manufacturing sector. This statement is also parallel with the worldwide phenomenon. According to Mohd and Mohd (2010), the number of tourists' journeys increased from 25 million in 1950 to 700 million in 2003, and is predicted to reach 1.6 billion in 2020 worldwide. This implies that average annual growth rate of tourism sector is at 3.5%, while the growth rate of heavy industry is in the region of 3% International tourism has become a major foreign exchange earner for many low-income countries and small islands, and it is a principal export for 83%

Corresponding Author: Associate Professor Dr Norzaidi Mohd Daud, Faculty of Business Management/Institute of Business Excellence/Accounting Research Institute, Universiti Teknologi MARA, Shah Alam 40450 Shah Alam, Selangor, Malaysia.
Phone: +603 09 8400 400 Fax: +603 5544 4693
E-mail: zaidiuitm2000@yahoo.com

of developing countries (WTO, 2003).

However, conventional tourism is vulnerable to current shocks especially in those areas relating to tourists' comfort, health and security. Health outbreaks such as the Japanese Encephalitis (J.E), Bird Flu and Coxsackie B had decreased the international tourism demand during the 1997-2000 period. There was also a severe plunge in tourist arrivals in the 2003-2004 period due to the haze incident, SARS scare, Iraq War and Bali's terrorist bombing. The scenario recurred in 2009 due to the H1N1 pandemic. This seasonal and unstable flow of tourist arrivals is not good for the Malaysian tourism industry. The quest for secured tourism has become a cumbersome challenge. As a result, the Malaysian government has put strong emphasis on alternative tourism industries such as education tourism and health tourism to absorb this seasonal tourism dilemma. These types of tourism are more consistent, flexible and have longer duration for tourists to stay and expend. For example, tourists for education tourism, such as undergraduate students stay as long as four to six years compared to conventional tourists, who stay in a range of one night to four days. Undergraduate students also spend a lot of money during their study especially on tuition and accommodation fees (F. Fizari *et al*., 2010).

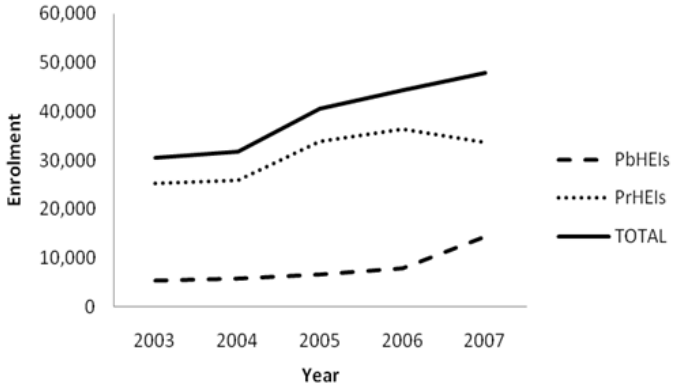
Education Tourism Sector in Malaysia:

The term education tourism or edu-tourism refers to any "program in which participants travel to a location as a group with the primary purpose of engaging in a learning experience directly related to the location" (Bodger, 1998). This type of tourism may be categorized into the following dimensions; cultural / historical,eco-tourism / nature based tourism / rural tourism, and study abroad programs (Ankomah and Larson, 2004). Since education tourism is an economic activity under the tourism sector, it becomes one of Malaysian export commodities and attracts in-flow of foreign exchange (Norzaidi *et al.*, 2010). For example, AUS$ 1.8 billion is generated per year by international students enrolment in Australia (Md., 2005).

Currently, there are 20 public universities, 33 private universities and university colleges, 4 foreign university branch campuses, 27 polytechnics, 59 community colleges and about 500 private colleges (Malaysia, 2010; Hisham and Norzaidi, 2009; Norzaidi and Intan Salwani, 2009). The public higher education institutions (PbHEIs) are focusing on local students and offering programmes locally as their operation mostly depend on the government grants. On the other hand, the private higher education institutions (PrHEIs) are receiving more international students and offering local and twinning programmes with external universities. Charging higher tuition fees in the absence of education subsidy grant as allocated to the public institutes. This is also parallel with their profit driven objective. In 2007, there were 47,928 international students in Malaysia (Malaysia, 2008). All institutes are administrated under the Malaysian Ministry of Higher Education.

Statistics on the international student enrolments in Malaysian public and private higher education institutions is the best evidence in explaining the prospect of this education tourism. Based on Figure 1, there was a steady growth of international student enrolments from 2003 to 2007. In 2003, Malaysia received 30,397 students before reaching the peak of 47,928 students in 2007. For the public higher education institutions, there was a considerable increase in the number of international students in the year 2007 where the amount almost doubled up to 14,324 students from 7,941 in the previous year. This is anticipated since the institutions have taken several assertive actions such as upgrading the existing post of the Deputy Vice Chancellor (Academic) to Deputy Vice Chancellor (Academic and Internationalization) in 2005, whereby the task of attracting and managing the international students previously handled by various departments in the public universities has been placed under the second top post authority. The public universities have also teamed up with other agencies in conducting international road shows all over the world; and scores of Memorandum of Understandings (MoUs) between local public universities and foreign universities have been signed especially in the area of students and staffs exchange.

For the private higher education institutions, since they have more institutes and branches, they were the biggest contributors for international student enrolments. There was an increase in the number of programmes especially the twinning programs such as the 2+1 and 3+1 programmes with foreign universities. The establishment of some international universities campus branches for instance, Monash University and Nottingham University in Malaysia shows how serious they are in this business. Since 1998, the Malaysian currency stands around RM3.80 to a Dollar. At this exchange rate, Malaysians' cost of living appears "lower" due to the depreciation of Malaysian Ringgit. Owing to this reason and the unlimited spaces offered by the private institutions, the number of international student enrolments has increased from 2003 until 2006. The enrolment however, has dropped off slightly to 33,604 in 2007 compared to 36,449 in the previous year. The decline in number may be caused by the rivalry between the public and private institutions.



Source: Ministry of Higher Education, Malaysia

Fig 1: International Student Enrolments in Malaysian Public and Private Higher Education Institutions (2003-2007).

The Gravity Model:

There is a popular narrative that Newton was sitting under an apple tree when an apple fell on his head, and he suddenly thought of the Universal Law of Gravitation. Newton's law of universal gravitation states that every massive particle in the universe attracts every other massive particle with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between them. Separately, it was shown that large spherically-symmetrical masses attract and are attracted as if all their mass were concentrated at their centres. As a result, in 1687, Newton proposed the "Law of Universal Gravitation". It implies the attractive force between two objects; *i* and *j* is proportional to their masses and inversely proportional to their respective distance (Head, 2000)(See Figure 2).

$$F_{ij} = G \frac{m_i m_j}{d_{ij}^2} \qquad \text{(Equation 1.1)}$$

Where notation is defined as follows:

- F_{ij} is the attractive force.
- m_i and m_j are the masses.
- d_{ij} is the distance between the two objects.
- G is a gravitational constant depending on the units of measurement.

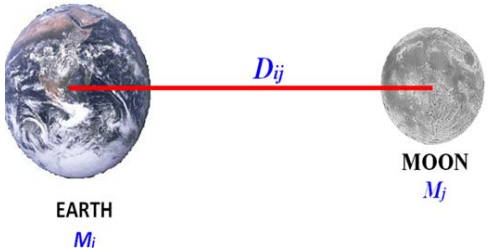


Fig. 2: Gravitational Force Model between the Earth and the Moon.

Since the Equation 1.1 comes in multiplicative form, we can rewrite the model into a log-log function such as follows:

$$\ln (F_{ij}) = \alpha + \beta_1 \ln (m_i \cdot m_j) + \ln \beta \ (d_{ij}^2) + u_i \qquad \text{(Equation 1.2)}$$

Isard (1954) proposed the same functional form that could be applied to international trade flows. This general gravity law for social interaction may be expressed in the same notation as:

$$F_{ij} = G \frac{m_i^{\alpha} m_j^{b}}{d_{ij}^{q}}$$ (Equation 1.3)

Where;

- F_{ij} is the" flow" from origin i to destination j, or, in some cases, it represents total volume of interactions between i and j (e.g. volume of bilateral trade between two countries).
- m_i and m_j are the relevant economic sizes of the two locations (e.g. National Income such as Gross Domestic Product, GDP and Gross National Product, GNP).
- d_{ij} is the distance between the locations; usually measured centre to centre. (e.g. Distance between capital city of i and j).

For instance, if F_{ij} is measured as a monetary flow (e.g. export values), the symbol m is usually defined as the Gross Domestic Product (GDP) of importer and exporter countries, while d_{ij} is the distance between the locations; usually measured from exporter country's capital (e.g. Kula Lumpur) to importer country's capital (e.g. Canberra)(See Figure 3).

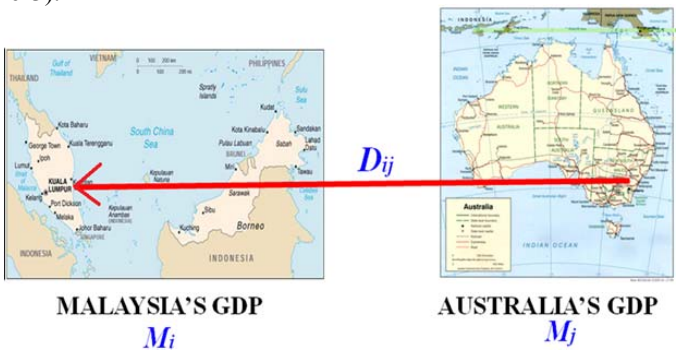


Fig. 3: Trade Flows from Malaysia to Australia.

However, it has been criticized; due to lack of theoretical foundation. Therefore some adjustments have been made especially relating to "social interactions" including migration, tourism, and foreign direct investment variables. The adjusted Gravity Model embedded with theoretical framework has been discussed by Anderson (1979), Bergstrand (1985) and Mátyás (1997). The model is the most significant model in the bilateral field as it explains the push factor of origin country, pull factor of destination country and distance between both countries. Most of the model built in qualitative variable in order to reduce the impact of spatial dependence. Thus, the main purpose of the study is to determine the international student enrolments in Malaysian public higher education institutions from the year 2003 until 2007, employing macroeconomics independent variables that consist of four quantitative and two qualitative variables using Gravity Model. The variables such as mass Gross National Income (GNI) per capita of Malaysia and origin country, Malaysian export to the importer countries and blocs of ASEAN or non-ASEAN countries taking into account the macroeconomics perspective. The public higher education institutions in Malaysia have been chosen as the case study because there is a need to look on the impact of the Malaysian government's proactive measures taken in promoting education tourism within its own administrated agencies. In short, the study consists of two objectives. First objective is to model education tourism using the Gravity Model whereby Malaysian public higher education institutions is the case study and the capital of Malaysia, Kuala Lumpur is the reference point. The second objective is to analyse the significant of independent variables used in this model, on the international student enrolments in Malaysian public higher education institutions.

1.5 Theoretical Framework:

For this study, it is strongly recommended that a specific education tourism model according to the Gravity Model as proposed by Rodrigue (2004) be utilised. In this case, Kuala Lumpur will be the center of attraction, while Malaysia is the destination country.

$$IS_{imj} = k \frac{m_i m_j}{d_{im}^{2}}$$ (Equation 1.4)

Where;

- $IS_{im,}$ is the total international students arriving from country *i* and enrolled in Malaysian public higher education institutions, *m*
- m_i is measured as a factor to generate movement of international undergraduates (emissiveness)
- m_m is measured as a factor to attract movement of international undergraduates (attractiveness)
- d_{im} is the distance between the origin country's capital and Kuala Lumpur

According to Abdul *et al*.., (2003), these emissiveness and attractiveness factors were best explained by four quantitative variables which are mass Gross National Income (GNI) per capita of Malaysia and origin country, Consumer Price Index (CPI) ratio of Malaysia over origin country, Volume of Export from Malaysia to origin country and Distance between Malaysian capital, Kuala Lumpur and origin country's capital. Two qualitative variables will also enter the model to capture the pattern of international student enrolments from ASEAN / non-ASEAN countries and OIC / non-OIC countries (See Figure 4).

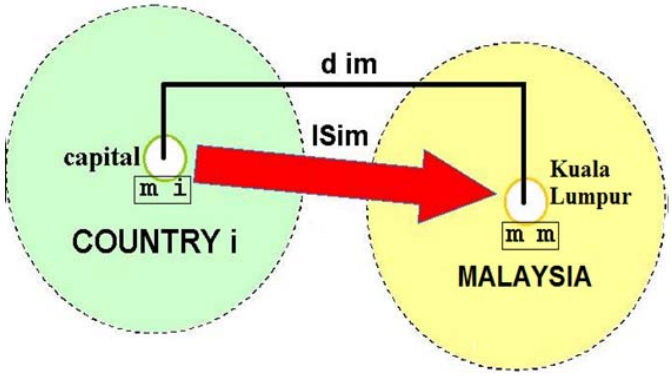


Fig. 4: The Gravity Model application on International Student Enrolments in Malaysia.

The following hypotheses could be tested in this study. These hypotheses are based on the quantitative and qualitative variables occurring in the model:

- Malaysia has exported more education tourism service to wealthier countries with higher Gross National Income (GNI) per capita as they have higher purchasing power.
- Malaysia has attracted more international students as it offers lower tuition fees and living cost compared to their home countries as described through the Consumer Price Index (CPI) ratio.
- Malaysian export of education tourism service will escalate as the total Malaysian export proliferates. This happens, as education tourism is a proportion of international export commodity.
- Distance negatively influences international student enrolments; therefore Malaysia has developed more active foreign trade relations with adjacent countries.
- As Malaysia is a member of ASEAN, it experiences a positive impact on international student enrolments buoyed up by "border effect" and "regional effect".
- As Malaysia is an OIC group member, Malaysia obtains a positive impact on international student enrolments among OIC members.

Methodology and Materials:

Model Specification:

This study models the international student enrolments in public higher education institutions in Malaysia, in the same manner as the demand for any other goods or services from abroad. It uses macroeconomics panel data set (2003-2007) consisting of 1 dependent variable and 6 independent variables; 4 quantitative variables and 2 qualitative variables. Comparison made by Mueller and Rockerbie (2004) uncovered that the econometric approach is conceivably the most familiar method and usually straightforward in estimating the demand for higher education. A study made by Lim (1997) found that 81% of 100 empirical studies on tourism using single linear equation or log linear equation. As a result, estimated coefficients can be interpreted as elasticities (Resina and Aruna, 2004, Mohd and Mohd, 2010). There has been a strong preference in the tourism demand literature for the log-log model due the ease of interpretation of the coefficient as estimated elasticity, as well as other statistical attributes of the model (Christin and McAleer, 2003). The logarithm equation is written in the Equation 2.1.

$$\ln STUDENT_{im} = a + \beta_1 \ln(GNIPC_{im}) + \beta_2 \ln(CPI_{im}) + \beta_3 \ln(EXP_{im}) + \beta_4 \ln(DIS_{im}) + \beta_5(D\text{-}ASEAN) + \beta_6(D\text{-}OIC) + u_i \quad \text{(Equation 2.1)}$$

where the sub index *i* is for origin country, *m* for Malaysia (the destination country) and ln denotes the natural logarithms ($\log^{10}$).

Dependent Variable:

International Student Enrolments ($STUDENT_{im}$):

The demand on education tourism is revealed by the number of international student enrolments in Malaysia. The data has been obtained from the Malaysian Ministry of Higher Education website. Sample consists of 135 importer countries (including other countries) which come from different socio- economic and geographical backgrounds. It is valued in number.

Independent Variable (Quantitative):

Gross National Income per capita ($GNIPC_{im}$):

The data was obtained from World Bank: World Development Indicator 2009 online version. It is valued in US$. It is represented by $GNIPC_{im}$. GNP per capita of origin country ($GNIPC_i$) and Malaysia ($GNIPC_m$) formulating the model in multiplicative form which is defined as:

$$\ln (GNIPC_{im}) = \ln [GNIPC_i \times GNIPC_m] \quad \text{(Equation 2.2)}$$

The variable GNI per capita can be interpreted as the level of wealth and economic development. The World Bank employs the Atlas conversion factor in calculating GNI per capita for certain operational purposes. Its expected sign is positive, as residents of wealthier countries will 'buy' cheaper education service elsewhere compared to their countries. All collected data is of secondary type and exists in annual format.

Consumer Price Index (CPI_{im}):

The data was taken from United States Department of Agriculture website. It is valued in index. The values of consumer price index in Malaysia (CPI_m) and consumer price index of origin country (CPI_i) enter the model in divisional form. It is used as a proxy of tourism or relative price variable. It uses CPI_{im} notation, where year 2000 acts as weighted value for the index. Based on Durbarry (2000), the price of tourism in the destination is relative to its domestic price, which is defined as:

$$\ln(CPI_{im}) = \ln [CPI_m / CPI_i] \quad \text{(Equation 2.3)}$$

where CPI_m is the consumer price index in Malaysia and CPI_{im} is consumer price index of origin country. This ratio gives the relative price of tourism and influences the decision whether to study in Malaysia or in home country. It also characterizes the cost of living between two countries. The expected sign for this variable is negative.

Malaysian Export (EXP_{im}):

The data was retrieved from Thomson Reuters Datastream. It is valued in million US$. The total volume of export consists of both goods and services exported by Malaysia annually. It is important to elucidate the proportion of education tourism service over the Malaysian total export. Established bilateral trade between Malaysia and origin country may open for a wider promotion and marketing of education tourism together with the other types of tourism. A positive sign is expected as the education tourism demand increases due to the increase in the Malaysian export.

Distance ($DIST_{im}$):

The variable measures the distance between Malaysian capital (Kuala Lumpur) and origin country's capital. It is stated in kilometers. The Distance Calculator set the geographical destination accessible via Bali Indonesia Travel portal. Those calculations were done using the latitude and longitude information of Malaysian capital and importer country's capital. It is one of the fundamental variables of the Gravity Model as suggested by Bergstrand (1985). It plays an important role in determining transportation cost to a destination country by

land, sea and air. Its negative relationship with the international student enrolments is expected since the further the distance, the higher the transportation cost to arrive at a destination country will be.

Independent Variable (Qualitative):

Adjacency - ASEAN Countries ($D\text{-}ASEAN_{im}$):

It defines the attraction of students from adjacent countries to study in Malaysia owing to the "border effect" and "regional effect". Value 1 is given for international student coming from ASEAN country and value 0 is for international student from non-ASEAN country. Higher composition is expected for international students come from ASEAN countries.

Socio-Economic Bloc - OIC Countries ($D\text{-}OIC_{im}$):

It defines the attraction of students from countries which have socio-economic agreements with Malaysia. Value 1 is given for international student coming from OIC country and value 0 is for international student from non-OIC country. Higher composition is expected for international students come from OIC countries.

Data Analysis:

The raw data was inserted into the Microsoft Excel software to be modified due to the model restrictions. All the data is inserted on yearly basis. Then, all data has been converted into a natural log value ($\ln^{10}$) before being analyzed using STATA 10.1 software. Descriptive statistics has been prepared to give a brief interpretation of the data. The relationship between international student enrolments on one hand and the independent variables on the other is then estimated using panel data analysis. There are three models to be considered in acquiring the best result.

Pooled Ordinary Least Squares (POLS):

The model is based on the assumption that both the intercept and coefficient for each individual are constant across cross-sectional individuals in the POLS equation (Kiyung, 2010). Abdul *et al.*., (2003) found the four signifant factors contributing for the international tourist arrivals in Malaysia using this model. It is the basic approach in estimating the panel data. It is the basic approach in estimating the panel data. The fitted regression line can be written as below:

$$\hat{y}_i = b_1 + b_2 x_i \qquad \text{(Equation 2.4)}$$

where the least square residuals is written in the following manner:

$$\hat{e}_i = y_i - \hat{y}_i = y_i - b_1 - b_2 x_i \qquad \text{(Equation 2.5)}$$

According to Vera (2009), POLS estimates for the unknown parameters β_1 is obtained through this estimation:

$$b_1 = \bar{y} - b_2 \bar{x} \qquad \text{(Equation 2.6)}$$

while β_2 is obtained by minimizing the sum of squares function as in the equation below:

$$b_2 = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2} \qquad \text{(Equation 2.7)}$$

The estimated coefficient using the log-log model may well explain the elasticity of each independent variable.

Random Effects Model (REM):

In statistics, REM also known as a variance components model is a kind of hierarchical linear model. It assumes that the dataset being analyzed consists of a hierarchy of different populations whose differences relate to that hierarchy. In econometrics, it is used when one assumes that there are no fixed effects (Wikipedia, 2009). According to David (2009), REM is a slightly respecified version of the model:

$$y_{it} = \alpha_0 + X_{it}\beta + \alpha_i + \varepsilon_{it} \quad \text{(Equation 2.8)}$$

In addition, the assumption is that the α_i are unobserved random variables which follow a probability distribution known up to some finite set of parameters. Others are:

$$\begin{array}{lll} E(\alpha_i) = E(\varepsilon_{it}) = 0 & Var(\alpha_i) = \sigma_\alpha^2 & Var(\varepsilon_{it}) = \sigma_\varepsilon^2 \\ E(\alpha_i\ \varepsilon_{it}) = 0 & E(\varepsilon_{it}\ \varepsilon_{js}) = 0 & E(\alpha_i\ \alpha_j) = 0 \end{array} \quad \text{(Equation 2.9)}$$

Therefore a co-variance matrix can be written as below:

$$E\left(u_i u_i'\right) = \Omega = \begin{bmatrix} \sigma_\alpha^2 + \sigma_\varepsilon^2 & \sigma_\alpha^2 & \cdots & \sigma_\alpha^2 \\ \sigma_\alpha^2 & \sigma_\alpha^2 + \sigma_\varepsilon^2 & \cdots & \sigma_\alpha^2 \\ \vdots & \vdots & \ddots & \vdots \\ \sigma_\alpha^2 & \sigma_\alpha^2 & \cdots & \sigma_\alpha^2 + \sigma_\varepsilon^2 \end{bmatrix} \quad \text{(Equation 2.10)}$$

A Generalized Least Squares (GLS) procedure is possible if we can transform the dependent and independent variables by:

$$\Omega^{-1/2} = I - \frac{\theta}{T} ii' \quad \text{(Equation 2.11)}$$

Where,

$$\theta = 1 - \sigma_\varepsilon \Big/ \sqrt{T\sigma_\alpha^2 + \sigma_\varepsilon^2} \quad \text{(Equation 2.12)}$$

i.e. run a regression with dependent variable

$$\tilde{y}_{it} = y_{it} - \theta \bar{y}_i \quad \text{(Equation 2.13)}$$

and the independent variable.

$$\tilde{X}_{it} = X_{it} - \theta \bar{X}_i \quad \text{(Equation 2.14)}$$

Fixed Effects Model (FEM):

Statistical model that represents the observed quantities in terms of explanatory variables that are all treated as were non-random. This is in contrast to the REM and mixed models in which either all or some of the explanatory variables are treated as if they arise from the random causes (Wikipedia, 2009). According to David (2009), let:

$$\bar{y}_i = T^{-1} \sum_{t=1}^{T} y_{it} \quad \text{(Equation 2.15)}$$

Similarly X_i is defined as the vector of unit *i* specific means which refers to the independent variable. Then the mean-differenced estimator is:

$$\hat{\beta}_W = W_{XX}^{-1} W_{Xy} \quad \text{and} \quad \hat{\alpha}_W = \bar{y}_i - \bar{X}_i \hat{\beta}_W \quad \text{(Equation 2.16)}$$

where,

$$W_{XX} = \sum_N \sum_T \left(X_{it} - \bar{X}_i\right)' \left(X_{it} - \bar{X}_i\right) \quad \text{(Equation 2.17)}$$

and,

$$W_{Xy} = \sum_N \sum_T \left(X_{it} - \bar{X}_i\right)' \left(y_{it} - \bar{y}_i\right) \quad \text{(Equation 2.18)}$$

The mean square error in this model is:

$$s_W^2 = \left(N(T-1) - K\right)^{-1} \left(W_{yy} - W_{Xy}' W_{XX} W_{Xy}\right) \quad \text{(Equation 2.19)}$$

where,

$$W_{yy} = \sum_N \sum_T \left(y_{it} - \bar{y}_i\right)^2 \quad \text{(Equation 2.20)}$$

and K is the number of columns in xit

In order to choose between the POLS and REM, Breusch and Pagan Multiplier Test must be conducted. If the null hypothesis cannot be rejected, data will be analyzed using POLS. If the null hypothesis is rejected, REM is the solution. The test statistics is:

$$LM = \frac{NT}{2(T-1)} \left[\frac{\sum_N \left(\sum_T \varepsilon_{it}\right)^2}{\sum_N \sum_T \varepsilon_{it}^2} - 1 \right]^2 \sim \chi_1^2 \quad \text{(Equation 2.21)}$$

Another stage is to compare between REM and FEM by using Hausman Fixed Test. If the null hypothesis cannot be rejected, Random Effects can be done with extension of the GLS–Two Way Estimation. The test statistics is:

$$\left[\hat{\beta}_{FE} - \hat{\beta}_{RE}\right] \left[\mathrm{Var}(\hat{\beta}_{FE}) - \mathrm{Var}(\hat{\beta}_{RE})\right]^{-1} \left[\hat{\beta}_{FE} - \hat{\beta}_{RE}\right] \sim \chi_K^2 \quad \text{(Equation 2.22)}$$

If the null hypothesis is rejected, FEM is the solution where FEM-Two Way Estimation can be used. The year and country can also be converted into quantitative variables in both GLS–Two Way Estimation and FEM-Two Way Estimation. The quantitative variables can be tested on the individual or joint significance.

RESULTS AND DISCUSSION

Enrolment Trend and Country Classification:

From 2003 until 2007, there were 39,861 international students from 134 countries enrolled in the Malaysian public higher education institutions. A total number of 5,239 enrolled in 2003, increased slightly to 5,735 in 2004, followed by 6,622 in 2005. The number elevated to 7,941 in 2006 before exponentially doubled up to 14,324 in 2007 as shown in Figure 5. Africa becomes the biggest continent with 46 countries representing 34% of the total importer, followed by Asia with 43 countries (32%). Other importers are Europe with 26 countries representing 20%, North America with 8 countries (6%) and Oceania with 7 countries (5%). The smallest continent is South America with only 4 countries represents by 3%. According to the World Bank List of Economics, July 2004, using Gross National Income (GNP) per capita as the indicator, these 134 importer countries can be categorized into 4 income groups. The low-income countries with an income of US$765 or less are the biggest importer with value 40%. Second in the rank are the lower middle-income countries with an income of US$766 to US$3,305 with 28%. The rest are high-income countries with an income of US$9,386 or more (22%) and upper middle-income countries with an income of US$3,036 to US$9,385 countries share the balance 10% of the total importers.

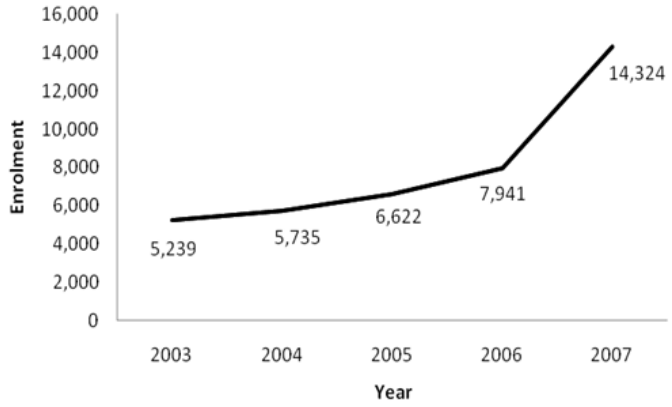


Fig. 5: International Student Enrolments in Malaysian Public Higher Education Institutions (2003-2007).

With reference to the Trade Sim Gravity Model, the distance is based on the shortest possible line between two points on a sphere or other curved surface called geodesic distance. Therefore, the importer countries can be divided into five groups based on the distance between their capital city and Kuala Lumpur, Malaysia. Very Closed countries with a range of less than 1,000 km contributes 2% of the total number, Relative Closed countries (1,001 km to 4,000 km) with 11%, Average countries (4,001 km to 7,000 km) with 22%, Relative Far countries (7,001 km to 10,000 km) with 40% and Very Far (more than 10,000 km) share the balance 25% of the total importers countries.

Results:

The descriptive statistics related to the dependent variable and independent variables are shown in Table 1. The statistics are inclusive of mean, standard deviation, variance, and coefficient of variations (CV). The CV (standard deviation / mean) for a single variable seeks to describe the dispersion of the variable in a way that does not depend on the variable's measurement unit.

Table 1: Descriptive Statistics

	student	gnipc_im	cpi_im	exp_im	dist_im	d_ASEAN	d_OIC
mean	60.79897	47313413	1.007747	1140000000	8530.164	0.06701	0.386598
sd	225.8677	78284665	0.079996	3670000000	3886.21	0.250255	0.487389
variance	51016.2179	6.12849E+15	0.00639936	1.34689E+19	15102628.16	0.062627565	0.237548037
cv	3.714992211	1.654597714	0.079381035	3.219298246	0.455584441	3.734591852	1.260712678

The higher the CV, the greater the dispersion in the variable is. The CV for a model aims to describe the model matching the terms of the relative sizes of the squared residuals and outcome values. The lower the CV, the smaller the residuals relative to the predicted value are. This is suggestive of a good model fit (UCLA, 2009). The highest CV was recorded by the ln(CPI_{im}) while the lowest one was by the ln($DIST_{im}$).

Using the POLS, the independent variables were regressed against the dependent variable. Based on the Table 2, four independent variables [(ln*(*$GNIPC_{im}$*)*, ln*(*EXP_{im}*)*, ln(DIS_{im}*)* and (*D-OIC)*] are significant at 1% and ln(CPI_{im}) is significant at 5%. At the same time, *(D-ASEAN)* is not significant at 1%, 5% or 10%. Based on the adjusted R^2 value, 48.63% of total variation in ln$STUDENT_{im}$ can be explained by the changes in the independent variables. Overall, the model is significant at 1% based on the p-value.

The Breusch and Pagan Lagrangian multiplier test is conducted to test whether to employ POLS or REM method. With a null hypothesis to employ the POLS, the following results in Table 3 are obtained. Based on the values of Chi^2 and p-value, it is shown that the model is significant, thus supports for rejection of the null hypothesis. REM will be conducted and explored further.

Table 2: POLS Regression

Source	SS	df	MS	Number of obs =	490
				F(6, 483) =	78.16
Model	883.003824	6	147.167304	Prob > F =	0.0000
Residual	909.480652	483	1.88298272	R-squared =	0.4926
				Adj R-squared =	0.4863
Total	1792.48448	489	3.66561243	Root MSE =	1.3722

lnstudent	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngnipc_im	-.2665582	.0476913	-5.59	0.000	-.3602662	-.1728501
lncpi_im	-1.739002	.8132266	-2.14	0.033	-3.336901	-.141103
lnexp_im	.2901253	.027226	10.66	0.000	.2366293	.3436214
lndist_im	-1.031484	.1488755	-6.93	0.000	-1.324008	-.7389608
d_ASEAN	-.0068778	.3672119	-0.02	0.985	-.7284079	.7146523
d_OIC	1.241229	.1339261	9.27	0.000	.9780792	1.504379
_cons	10.03349	1.463825	6.85	0.000	7.157239	12.90974

Table 3: Breusch and Pagan Lagrangian Multiplier Test for Random Effect

lnstudent[code,t] = Xb + u[code] + e[code,t]

Estimated results:

	Var	sd = sqrt(Var)
lnstudent	3.665612	1.914579
e	.18863	.4343156
u	1.7235	1.312822

Test: Var(u) = 0

chi2(1) = 634.45

Prob > chi2 = 0.0000

Table 4: Hausman Fixed Test

	Coefficients (b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lngnipc_im	.462883	.1835962	.2792867	.0433296
lncpi_im	-.0331324	-.6416409	.6085085	.0822854
lnexp_im	.0494979	.109051	-.0595531	.0211664

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 44.88

Prob>chi2 = 0.0000

(V_b-V_B is not positive definite)

In the next step, a Hausman Fixed test is performed to recognize the appropriateness of employing either REM or FEM. The result, as illustrated in Table 4 shows that the model succeeds to meet asymptotic assumptions of the test. The null hypothesis is rejected, which means that the differences between the FEM and REM coefficients are systematic. This shows that the coefficients for FEM are efficient. Therefore the FEM-Two Way Estimation is performed due to the significant p-value in the Hausman Fixed test.

The result is quite surprising since all independent variables are not significant as presented in Table 5. Plus, three independent variables have to be dropped due to the serious collinearity problem. However, according to Kiyung (2010), he stressed that even though FEM can estimate individual and/or time-specific effects from time- and individual-variant variables, in contrast, it cannot detect the individual-specific effects regarding the individual-variant but time-invariant variables such as the distance variable between two trade partners in the Gravity Model. He continued that this model cannot capture time-specific effects for variables which are variant over time but invariant across individuals. Thus, respective time or individual specific effects for the invariant variables are subsumed under the intercept term. An alternative FEM model expresses the specific effects for time- or individualinvariant variables as random variables (error terms) in the equation, instead of expressing the fixed intercept as the unobserved effects in FEM. This is the so-called Random Effects Model (REM) or Error Components Model (ECM).

Table 5: FEM-Two Way Estimation

Random effects u_i ~ **Gaussian** Wald chi2(7) = **174.38**
corr(u_i, X) = **0** (assumed) Prob > chi2 = **0.0000**

lnstudent	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngnipc_im	-.0552807	.076948	-0.72	0.473	-.206096	.0955345
lncpi_im	-.0241256	.3327538	-0.07	0.942	-.676311	.6280598
lnexp_im	.1113583	.0324913	3.43	0.001	.0476765	.17504
lndist_im	-1.235953	.2968811	-4.16	0.000	-1.817829	-.6540768
d_ASEAN	.3640656	.7671012	0.47	0.635	-1.139425	1.867556
d_OIC	1.266403	.2672462	4.74	0.000	.7426102	1.790196
year	.1194139	.0247546	4.82	0.000	.0708957	.1679321
_cons	-228.0716	48.92068	-4.66	0.000	-323.9544	-132.1888
sigma_u	1.3187285					
sigma_e	.43442251					
rho	.90210288	(fraction of variance due to u_i)				

The GLS-Two Way Estimation is conducted with an effort to examine a time effect onto the international student enrolments. The time has become the seventh independent variable and taken into the model. The results including the time variable (collectively) is shown in Table 6. Based on the p-values of the z-test, four independent variables [ln(EXP_{im}), ln(DIS_{im}), (*D-OIC)* and *TIME*] are significant at 1%. Compared to the earlier POLS model, the In($GNIPC_{im}$) and ln(CPI_{im}) variables are no more significant. The results suggest that the Malaysia Export and Time are positively related to the dependent variable. On the other hand, Distance plays a negative role in determining the dependent variable. In addition, there are more students from OIC countries compared to the non-OIC countries. From the results in Table 6, the time series is found to be significant. As the time pass by, the time variable is unchanged and stable through time, in explaining the movement of the international student enrolments in Malaysia. The relationship is in a positive magnitude. According to (Rizal and Mansor, 2010), for a more specific time-effect, the study divides the time based on a year time series and tests each individually and the result is obtained in the Table 7.

The result of significance independent variables is as same as the result presented in Table 7. What is more interesting is that the regression result suggests a positive relationship between individual yearly time series and the movement of the international student enrolments in Malaysia from the first year until the fourth year. Please be noted that the year 5 has been dropped due to the collinearity problem. Based on the significant p-values of the z-test, during this period (2003-2006), the results suggest that there is a significant impact of the selected independent variables (Malaysian export, Distance and OIC membership), and is unchanged and stable when the timing factor is accounted for.

The joint significance of the time series, as proven by the values of Chi^2 and p-value, in the Table 8, shows that the individual time factors do explain most of the movement of the international student enrolments in Malaysia.

Table 6: GLS-Two Way Estimation

Random effects u_i ~ **Gaussian** — Wald chi2(7) = **174.38**
corr(u_i, X) = **0** (assumed) — Prob > chi2 = **0.0000**

lnstudent	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngnipc_im	-.0552807	.076948	-0.72	0.473	-.206096	.0955345
lncpi_im	-.0241256	.3327538	-0.07	0.942	-.676311	.6280598
lnexp_im	.1113583	.0324913	3.43	0.001	.0476765	.17504
lndist_im	-1.235953	.2968811	-4.16	0.000	-1.817829	-.6540768
d_ASEAN	.3640656	.7671012	0.47	0.635	-1.139425	1.867556
d_OIC	1.266403	.2672462	4.74	0.000	.7426102	1.790196
year	.1194139	.0247546	4.82	0.000	.0708957	.1679321
_cons	-228.0716	48.92068	-4.66	0.000	-323.9544	-132.1888
sigma_u	1.3187285					
sigma_e	.43442251					
rho	.90210288	(fraction of variance due to u_i)				

Table 7: GLS-Two Way Estimation (include individual yearly time series).

Random effects u_i ~ **Gaussian** — Wald chi2(**10**) = **184.70**
corr(u_i, X) = **0** (assumed) — Prob > chi2 = **0.0000**

lnstudent	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngnipc_im	-.0377302	.0770541	-0.49	0.624	-.1887534	.1132931
lncpi_im	-.0258039	.330907	-0.08	0.938	-.6743697	.622762
lnexp_im	.1040957	.032457	3.21	0.001	.0404813	.1677102
lndist_im	-1.25083	.2965408	-4.22	0.000	-1.83204	-.669621
d_ASEAN	.3671544	.7662313	0.48	0.632	-1.134631	1.86894
d_OIC	1.281954	.2670157	4.80	0.000	.7586131	1.805295
yr1	-.4826109	.1040945	-4.64	0.000	-.6866324	-.2785894
yr2	-.4744227	.0861792	-5.51	0.000	-.6433309	-.3055145
yr3	-.3406811	.0738064	-4.62	0.000	-.4853391	-.1960232
yr4	-.2699864	.0676762	-3.99	0.000	-.4026293	-.1373435
_cons	11.63284	2.944221	3.95	0.000	5.862275	17.40341
sigma_u	1.3120786					
sigma_e	.42931092					
rho	.90329402	(fraction of variance due to u_i)				

Discussion:

Malaysia Export:

All significant parameter estimates are consistent with theoretical expectations and past studies. A 1% increase in Malaysian export will contribute to 0.10% student arrivals. This is expected as education tourism is one of the key export industries for Malaysia. For instance, based on the Malaysian Top 10 Export Markets in 2006, all top 10 countries were the importers of Malaysian education tourism. For example, China as the fourth biggest trading partner with value of 7.2% export from Malaysia, has became the sixth biggest importer of Malaysian education tourism products with an amount of 373 students enrolled in the Malaysian public higher education institutions in year 2006. Other than bilateral trade between countries, Malaysia attracted a lot of importer counties from its regional trade relationship such as Asia-Pacific Economic Cooperation (APEC)

Table 8: Test of Overall Significance of the GLS regression (include individual yearly series).

```
(1)  yr1 = 0
(2)  yr2 = 0
(3)  yr3 = 0
(4)  yr4 = 0
          chi2 (4)   = 32.41
     Prob > chi2     = 0.0000
```

Table 9: Flight Departure Frequency.

Country	Day	Date	Daily Frequency
Singapore	Monday	27th July 2010	7 times
	Tuesday	28th July 2010	
	Wednesday	29th July 2010	
	Thursday	30th July 2010	
	Friday	31st July 2010	
	Saturday	1st August 2010	
	Sunday	2nd August 2010	
Cape Town	Wednesday	5th August 2010	Twice
	Sunday	9th August 2010	

and Asia-Europe Meeting *(ASEM). For example,* Malaysia recorded an average RM 74,893.2 million trade balances per year in 2006 with its APEC bloc partners. This was 69% of the total balance of trade surplus. At the same time, the number of students from this bloc contributed around 41.9% in year 2006. Success is evident when 18 out of 20 APEC countries have consistently imported this service for 2003-2007 periods. In addition, Malaysia exported this educational service to other economic blocs such as the Group of 8 (G8) and European Union (EU) blocs even though Malaysia is not one the members. In order to attract more international students from these blocs, more promotions should be done. Since Malaysia does not have any special offices in the foreign countries promoting this education tourism and relies more on seasonal educational promotions, permanent facilities is needed to secure continuous promotion on this tourism. As education tourism consists of three main components; education, tourism and trade, authorities related to this three can carry out the promotion using their own facilities.

For example, Malaysia through its Malaysia External Trade Development Corporation (MATRADE) has about 40 representatives or economic commissioners worldwide in promoting and managing matters regarding Malaysian's export. At the same time, Malaysian Ministry of Tourism has allocated its promotion office in more than 20 countries in promoting its fascinating places to the international tourists. It is strongly suggested that any promotion on education tourism share these facilities in the short-term due to the financial and time constraints. In the long-term, Malaysia can established its own agency under MOHE using the same system applied by the British Council to promote this education tourism.

Distance:

A 1% increase in distance will decrease 1.25% of international student enrolments. Distance is the most elastic variable among the significance independent variables. The absolute value of the distance coefficients reflecting the transportation cost such as air ticket fare for international students. In this figure, we use the distance and air ticket fare to six major cities in six different continents from 29th of July to 4th of August 2006 provided by Malaysian Airlines. For example, Malaysian Airline one-way ticket for Kuala Lumpur-Beijing costs RM1,230 with a distance of 4,335 kilometres, while it pays RM 2,225 for Kuala Lumpur-New York one-way ticket at a distance of 15,134 kilometres. This shows a positive relationship between distance and transportation cost.

Another good example in explaining the distance barrier is the frequency of flight departures daily or weekly. Since there are students from Singapore and South Africa enrolled in Malaysian public higher

education institutions, a comparison on flight departure frequency for both countries is made in Table 9. This comparison is based on schedule from 27th July to 9th August 2009 by Malaysian Airlines. The distance between Kuala Lumpur–Singapore is around 312 kilometres and Kuala Lumpur–Cape Town is about 9,199 kilometres. For the Kuala Lumpur–Singapore route, its flight frequency is seven times per week and departs seven times per day. In consideration of the distance, flight frequency for the Kuala Lumpur–Cape Town route is only twice a week and departs two times per day. Again, there is a positive relationship between distance and transportation cost, which currently defined as flight departure frequency as suggested by Isard (1960). Other than having student special rate and seasonal special rate, service offered by air low cost carriers has become the main preference. Air Asia X for example, a Malaysian long-haul budget airline operated by AirAsia X Sdn. Bhd. commenced its operations on 2 November 2007, has secured 36 rights to international destinations (Wikipedia, 2009). Air Asia X offers as low as RM1,492 ticket fare compare to the Malaysian Airlines, the national carrier which offers at RM8,649 for Kuala Lumpur-London one-way trip. This will ease the burden of the current and prospective international students especially those come from the country under the Low Income and Very Far categories. Though it offers lower ticket fare, several problems such as hidden cost, flight delay, flight cancellation and below par terminal facilities have become obstacles for usage of this low cost carrier's service. However, according to The Star (2010) less logistic problems is expected in the future since Malaysia will have the world's first mega terminal dedicated to and designed for low cost carriers. Scheduled to be completed in 2012, the terminal would be known as KLIA2. The low cost terminal had been given development priority due to booming budget travel and KLIA2 was estimated to meet low cost travel needs for the next 10 to 15 years. This was a variation from the original KLIA master plan as low cost travel and its extraordinary boom in this part of the world was not previously envisioned or anticipated. This action hopefully will woo more international students to be enrolled in Malaysia.

Socio-Economic Bloc (OIC Countries):

International student enrolments from the OIC countries are 360% or 3.6 times ($e^{1.282}$) higher than non-OIC countries. This ratio can be explained since out of 135 importer countries in this 5 year period, 52 of them are OIC members. One of the reasons expected is insufficient number of universities among OIC members. OIC members have an average of 10 universities each, with a total of less than 600 universities for the entire 1.3 billion Muslim people. In contrast, United States with a population of 250 million people has 5,758 universities (Abdullah, 2004). This has become one of the major challenges in the Muslim world in securing higher education places for their qualified students. One of the relevant indicators is the Human Development Index (HDI). It is a summary composite index that measures a country's average achievements in three basic aspects of human development that is health, knowledge, and a decent standard of living. About 58% of OIC members suffered from low HDI where Nigeria ranks in the last place with index 0.3 (Human Development Indicator, 2007).

Another reason expected is the Islamophobia among the non-Muslims caused by misinformation on the September 11. The attack has changed the world climate where Muslims have been discriminated and harassed worldwide. For example, some of the visa applications by the Muslim students have either been delayed for a long period of time or rejected without a concrete reason. Muslims especially the Arab citizens have become the main suspects in any terrorist activity. London and Bali bombings were another attack on the Western and as usual, the Muslims have been accused as the responsible party in this attack. This bias accusation will deny chances for prospective students to further their studies in both United States and United Kingdom. This bias treatment however generated a golden opportunity for Malaysian education tourism industry. Increasing in number of promotions especially in the Middle East region, together with enlarging the enrolment quota for international students are two immediate actions that must be taken by public universities. Promotions should take place in Arab High Income countries with GNI per capita of more than US$10,000 (World Bank, 2008). Their enrolments may increase the university income, as nearly all of them are full-fee paying students. Other than that, alumni can play a big role in promoting their alma mater. Series of talks and promotion programs through knowledge and experience sharing can be organized with their locals.

Conclusion and Recommendation:

It is apparent that the Gravity Model is applicable in explaining the international student enrolments in the Malaysian public higher education institutions. Pull and push factors are well elucidated using this model. By using the Pooled OLS model, 5 variables are found to be significant at 1% and 5%. In addition, 4 variables including the time are significant using the Random Effects Model. However, the Gravity Model is not suitable to be utilized with the Fixed Effects Model due to the reason given by the Kiyung (2010). Therefore, it is

suggested that the same theoretical framework can be operated together with panel data analysis (Random Effect Model) in explaining the international student enrolments in other educational institutions, locally or internationally. This crisis must be fully exploited by Malaysia, by placing its name as one of the major exporter in the educational tourism industry. Other than concentrating on social obligation, this kind of tourism can be Malaysian next engine for upcoming economic growth. It is also parallel with the Malaysian government's policy to be a centre of excellence for education at regional and international level beyond year 2020. More employment opportunities for locals in the academic fields are created and more international brains are attracted to be working here. The increasing numbers may also contribute to the assimilation of cultures and civilization among the foreign and local students. Indirectly, there will be closer relationships between Malaysia and other countries; especially those resulting from the twinning program, exchange students program and inter nations' financial assistance.

Recommendation for Future Studies:

Moderate rate of adjusted R^2 (0.48), advocates for another use of quantitative independence variables such as financial assistance, exchange rate and the number of population. Financial assistance per capita for instance, can be portrayed as a "life support" since financial fee is a "burden" for most of the students especially in the tertiary level. In China, there are six types of financial aids for students: scholarships, grants, loans, specially targeted grants for financial emergency, reduction or exemption of tuition fees, and work-study (Li and Min, 2001). To show its importance, the Australian Labour Government abolished charges in 1973 as an alternative to provide the financial assistance for its students. Its main objective is to remove perceived barriers to participation in higher education by the poor (Chapman and Ryan, 2003). The framework can also include the qualitative independent variable such as study program (science and non-science program) and war (affected country and non-affected country). As for qualitative variable, Paulsen and Pogue (1988) observe that, when economic conditions are improving, students tend to enrol in U.S. colleges that emphasize traditional arts and science programs. However, when economic conditions are worsening, students prefer colleges that emphasize occupational programs. Study by King (1993), discovers that students are inclined to have a short term program in mind when considering whether to attend university or not, contrary to the forward-looking permanent income model which suits the long term program. In the case of an undergraduate program, a short duration program refers to a 3 year program, which is related to an art stream program. Whereas, a long time program refers to a 4-6 year program which is more related to science stream program.

REFERENCES

Abdul, H.J., O. Redzuan and K. Fatimah, 2003. International Tourist Arrivals in Malaysia: Analysis of Tourism Demand Using the Gravity Model. Paper presented at the International Seminar on Sustainable Economic, Business and Social Development in An Era of Globalization. 13-14 October, Bangi, Selangor.

Abdullah, A.B., 2004. The Oxford Centre for Islamic Studies Speech Series, Magdalen College, University of Oxford. Retrieved September 13, 2009 from www.pmo.gov.my/.../PMMain.nsf/ 8b5b580b84fee6b248256db300306a24/cba26328a1c7cc3948256f230002ab65?OpenDocumment.

Amran, H., 2004. Policy and Planning of Tourism Product Development in Asian Countries. Paper presented at the 6th ADRF General Meeting, Bangkok. Retrieved May 15, 2009 from http://adrf.trf.or.th/Archive_data/Amran_paper. pdf.

Anderson, J.E., 1979. A Theoretical Foundation for the Gravity Equation. American Economic Review, 69: 106-116.

Ankomah, P.K. and R.T. Larson, 2004. Education Tourism: A Strategy to Strategy to Sustainable Tourism Development in Sub-Saharan Africa. Retrieved April 30, 2009 from http://unpan1.un.org/intradoc/groups/public/documents/IDEP/ UNPAN002585.pdf.

Association of Southeast Asian Nations, 2005. ASEAN overview. Retrieved May 13, 2009 from http://www.aseansec.org/64.htm.

Bali Indonesia Travel Portal, 2009. Distance between Kuala Lumpur and Country's i Capital. Retrieved April 27, 2009 from http://www.indo.com/ distance/index.

Bergstrand, J.H., 1985. The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence. Review of Economic and Statistics, 67: 474-481.

Bodger, D., 1998. Leisure, Learning and Travel.

Chapman, B. and C. Ryan, 2003. Higher Education Financing and Student Access: A Review of the Literature. Statement and Commentary Paper No. 2003-6. Retrieved April 24, 2009 from

http://www.avcc.edu.au/documents/policies_programs/statements/Chapman_HECS_study_Oct03.pdf.

Chaynee, W., 2001. Boosting economic development through tourism. MIER Scope Articles 2001, Kuala Lumpur: MIER. Retrieved May 20, 2009 from http://www.mier.org.my/mierscan/archives /pdf/chaynee22_12_2001.pdf.

Christin, L. and M. McAleer, 2003. Modelling International Travel Demand from Singapore to Australia. CIRJE Discussion Paper March 2003. Retrieved April 18, 2009 from www.e.u-tokyo.ac.jp/cirje/research/dp/2003/2003cf214.pdf.

Data/Macroeconomics/Data/HistoricalCPIsValues.xls -

David, R., 2009. Fixed and Random Effects Models Retrieved December 15, 2009 from http://www. uncg.edu/bae/people/ribar/teaching/ECO721/Notes/PANEL.pdf.

Durbarry, R., 2000. Tourism Expenditure in the UK: Analysis of Competitiveness Using A Gravity-Model Based. Discussion Paper No. 2000-1, Christin DeHaan Tourism and Travel Research Institute, University of Nottingham. Retrieved April 18, 2009 from www.nottingham.ac.uk/ ttri/pdf/2000_1.pdf.

Elayne, K., 2008. Pushing Tourism to the Forefront. Retrieved September 15, 2009 from http://www. mier.org.my/newsarticles/archives/pdf/elayne28_7_2008.pdf.

Fadli Fizari, A.H.A, J. Nurmadihah and H.A.K. Raudhah Anis, 2010. A Proposed Econometrics Modelling for Education Tourism in Malaysia: With Selected Macroeconomics and Microeconomics Variables. Paper presented at the Second Terengganu International and Business Conference 2010. 5-7 August 2010, Kuala Terengganu, Terengganu.

Gross National Income per capita, 2003-2007. Retrieved June 15, 2009 from http://databank. worldbank.org/ ddp/home.do?Step=12&id=4& CNO=2.

Head, K., 2000. Gravity for Beginners. Paper presented at the Rethinking the Line: The Canada-U.S. Border Conference, Vancouver, British Columbia, October 22.

Hisham, M.B. and M.D. Norzaidi, 2009. Strategic Alignment of Strategies Information System Planning (SISP) Success: An Exploratory Study in Public University in Malaysia, International Journal of Scientific Research in Education, 2: 76-87.

Human Development Index, 2007. Retrieved June 15, 2009 from http:// databank.worldbank.org/ ddp/home.do?Step=12&id=4&CNO=2.

Isard, W., 1954. Location theory and trade theory: Short-run analysis. The Quarterly Journal of. Economics, 68: 305-320.

Isard, W., 1960. Methods of Regional Analysis: An Introduction to Regional Science. New York: John Wileyand Sons.

Journal of Physical Education. Recreation and Dance, 69: 28-31.

King, J., 1993. The Demand for Higher Education in Puerto Rico. Economics of Education Review, 12: 257-65.

Kiyong, K., 2010. Tourism Flows and Trade Theory: A Panel Data Analysis with the Gravity Model. Ann Reg Sci (2010) 44:541–557. Retrieved August 15, 2010 from http://www.springerlink.com/content/ v1m4913l01n533x6/fulltext.pdf).

Li, W. and W. Min, 2001. Tuition, Private Demand and Higher Education in China. Retrieved from http://www.teacherscollege.edu/ centers/coce/ pdf_files/v4.pdf.

Lim, C., 1997. Review of International Tourism Demand Models. Annals of Tourism Research, 24: 835-849.

Malaysia, External Trade Development Corporation, 2010. Worldwide OfficesRetrieved Oct 25, 2008 from http://www.matrade.gov.my/ cms/ content.jsp?id=com.tms.cms.section.Section_OurWorldwideOffice.

Malaysia, Ministry of Higher Education, 2008. Jadual 1.4: Enrolmen Pelajar Antarabangsa Di Institusi Pengajian Tinggi Awam Dan Swasta Mengikut Negara Asal, Tahun, 2003-2007. Retrieved June 25, 2008 from www.mohe.gov.my/web_statistik/ statistik_pdf.../data_makro_1-4.pdf.

Malaysia, Ministry of Higher Education, 2010. Information. Retrieved August 15, 2010 from http://www.portal.mohe.gov.my/portal/page/portal/ExtPortal/ MOHE_ MAIN_PAGE/Information.

Malaysia, Ministry of International Trade and Indiustry, 2006. Statistics 2005-2006. Retrieved May 15, 2010 from http://www.miti. gov.my/cms/content. jsp?id=com.tms.cms.section.Section_6df776f4-c0a81573-66466646-b91319a3&rootid=com. tms.cms.section.Section_ 8ab62a70-7f000010-72f772f7-b27db7d5.

Malaysia, Tourism, 2008. Malaysia Tourist Arrivals by Country 2007/Jan-Sep 2008. Retrieved February 6, 2009 from http://www.tourism.gov.my/ tourismmalaysia_ corpx/ rpt1_arrival .cfm?rpt=1.

Malaysian Airline booking website, 2010. Malaysian Airline Ticket Fare and Departure Schedule for selected destinations. Retrieved August 15, 2010 from http://www.malaysia airlines.com.

Malaysian Total Export to Other Countries. Retrieved May 25, 2009.

Mátyás, L., 1997. Proper Econometric Specification of the Gravity Model. The World Economy, 20: 363-68.

Md, F.I., 2005. Education Sector: Opportunities among OIC Countries. Paper presented at the 30th Annual Meeting of the Board of Governors of the Islamic Development Bank (IDB), Kuala Lumpur, Malaysia, June 23-24.

Mohd Hafiz, M.H. and M.H. Mohd Fauzi, 2010. Tourism Demand in Malaysia: A Cross Sectional Pool Time-Series Analysis. International Journal of Trade, Economics and Finance, 1(1): 2010.

Mohd Rizal, M. and W.M. Wan Mansor, 2010. The impact of macroeconomic variables on the stock market movements in 5 ASEAN countries: A panel data analysis. Paper presented at the Second Terengganu International and Business Conference, 2010: 5-7, Kuala.

Mueller, R.E. and D.W. Rockerbie, 2004. Issues in Education Demand: The Ontario Experience. Paper presented at Higher Education In Canada, John Deutsch Institute for the Study of Economic Policy, Queen's University, February 13-14, 2004. Mueller, German. Retrieved April 25, 2009 from jdi.econ.queensu.ca/Files/Conferences/PSEc onferencepapers/muellerrockerbieconferencepaper.pdf.

Norzaidi, M.D. and M. Intan Salwani, 2009. Evaluating Resistance and Technology Satisfaction on Students' Performance, Campus Wide Information Systems, 26: 298-312.

Norzaidi, M.D., M. Jaafar and M. Zulkifli, 2010. Study Guide to Portfolio Management, University Publication Centre, Selangor.

Organization of the Islamic Conference, 2010. OIC in Brief. Retrieved May 15, 2010 from http://www.oic-oci.org.

Paulsen, M. and T. Pogue, 1998. Higher Education Enrollment: The Interaction of Labor Market Conditions, Curriculum, and Selectivity. Economics of Education Review, 7(1988): 275-290.

Resina, K. and G. Aruna, 2004. Modeling Tourism Demand in Fiji. Working paper No. 2004-1, Economics Department, Reserve Bank of Fiji, Suva, Fiji. Retrieved April 18, 2009 from www.reservebank.gov.fj/docs/2004_01_wp.pdf.

Rodrigue, J.P., 2004. The Gravity Model Formulation. Retrieved April 27, 2009 from http://www.people. hofstra.edu/geotrans/eng/ch5en/meth5en/ch5m2en.html.

The Star, 2010. PM: M'sia to have world's first mega low cost carrier terminal. Retrieved August, 2010 from http://thestar.com.my/news/story.asp?file =/2010/8/30/nation/20100830164245&sec=nation.

Thomson Reuters *Datastream* Database, 2009.

UCLA, Academic Technology Services, 2009. FAQ: What is the coefficient of variation? Retrieved December 15, 2009 http://www. ats.ucla.edu/stat/ mult_pkg/faq/general/coefficient_of_variation.htm.

UNCTAD and WTO, 2003. *TradeSim (second version), a Gravity Model for the Calculation of Trade Potentials for Developing Countries and Economies in Transition: Explanatory Notes*. Market Analysis Section, International Trade Center, UNCTAD / WTO, May. Retrieved April 18, 2009 from www.intracen.org/countries/tsim3/ tsim3_paper_v6.pdf.

United States, Department of Agriculture, 2009. Historical Consumer Price Indices for Baseline Countries/Regions (in percent) 1969-2008. Retrieved May 30, 2009 from www.ers.usda.gov.

Vera, T., 2009. Principles of Econometrics, 3rd Edition Powerpoint Notes.

Wikipedia, 2009. Air Asia-X. Retrieved April 24, 2010 from http://en.wikipedia. org/wiki/ AirAsia_X.

World Bank, 2004. Country Classification by Income Group. Retrieved April 27, 2009 from http://www.worldbank.org/data/databytopic/CLASS.XLS.

World Bank, World Development Indicator, 2007.

World Bank, World Development Indicator, 2008.

World Trade Organization, 2003. Prospects for International Tourism Getting Steadily Better. WTO World Tourism Barometer, 1.