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Dynamic Panel Data Analysis of European Tourism Demand in Malaysia

Fateh Habibi*
Hossein Abbasinejad**

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Abstract

The purpose of this study is to identify and measure the impact of the main determinants of the international tourist arrivals to the Malaysia. The annual panel data set includes the number of arrivals from the 19 most important European countries during the period 1998–2007, and a number of possible explanatory variables. Taking into account the changing structure of consumer preferences, a dynamic model is estimated. The results suggest that the habit persistence (word-of-mouth), income, accommodation capacity (hotel rooms) and political stability have positive effects on European tourism demand in Malaysia. One of the main conclusions of the study is the significant value of the lagged dependent variable (0.52), which may be interpreted as a major word-of-mouth effect on tourism demand in Malaysia. In addition, the dynamic panel data estimation highlights the importance of the accommodation capacity as the most important factor in attracting more tourism to Malaysia.

Keywords: Tourism demand, Panel data, Dynamic model, Europe, GMM estimator.

1- Introduction

The international tourism has developed rapidly for the last two decades and today tourism has grown significantly in economic importance. Tourism demand positively affects the economy and increases production and income, employment, foreign exchange earnings, high investment and

* Assistant Professor of Department of Business Administration, Faulty of Literature and Human science University of Kurdistan , Sanandaj, Iran, (Corresponding Author).
** Professor of Economics, Faculty of Economics, University of Tehran, Tehran, Iran.

growth. The Malaysian government is seriously determined to develop the tourism industry after the decrease in oil and the world economic recession in the mid-1980s. The 'Ministry of Culture, Arts and Tourism' (MOCAT) was established in 1987 and was later upgraded to the 'Ministry of Tourism' in 2004. The government also allocated an amount of fund to tourism industry besides providing sufficient basic infrastructure. In 2006, tourism Malaysia received 30 percent more funding for advertising, upgrading tourist destinations and infrastructure, as well as on marketing promotions in major source markets and other promotions in preparation for Visit Malaysia Year in 2007 (Government Malaysia, 2006).

According to the World Travel and Tourism Council in 2008 (WTTC, 2008), Malaysian travel and tourism industry is expected to contribute about 13.2 percent (US$ 26.5 billion) to the Gross Domestic Product (GDP) increased to 14 percent (US$ 58.7 billion) in 2018. The contribution of the travel and tourism industry in total employment is about 1,257,000 jobs (11.6 percent of total employment) in 2008 increased to 1,627,000 jobs (12.5 percent) in 2018. In addition the contribution of travel and tourism to export is also very important. Export earnings from international visitor and tourism goods are expected to generate 10.7 percent of total exports (US$ 23.2 billion) in 2008 increased to US$ 53.5 billion (10.3 percent of the total export) in 2018. In 2006, tourism industry was the second largest contributor of foreign exchange earnings to the country after the manufacturing sector. The total number of forging tourists rose by an accumulative yearly average of 11.5 percent between 1998 and 2007. Figure1 shows the international tourist arrivals to the Malaysia during 1998-2007. In fact, tourism increased between 1998 and 2007 but also a two year decline is observed in 1999 and 2003. The most important decline took place in 2003 due to the SARS crisis with a -31.61 percent drop in the numbers.

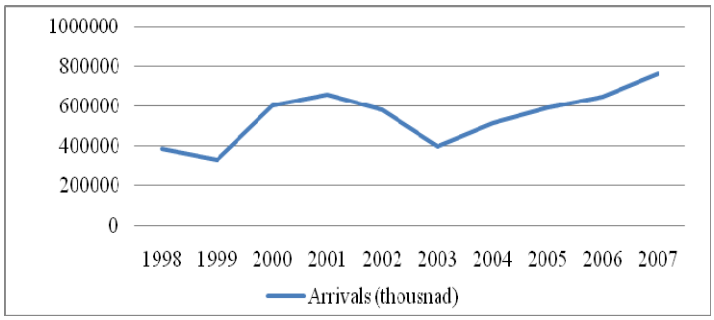

Figure 1: European Tourist Arrivals to the Malaysia (1998-2007)

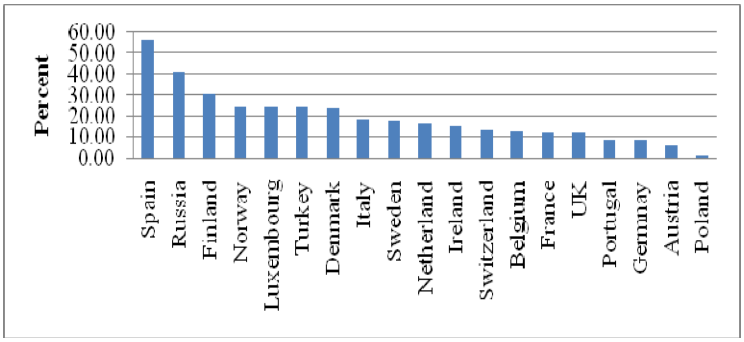

Figure 2: Yearly Average Rates of growth of Arrivals (1998-2007)

Figure2 shows the rates of growth for the 19 origin countries from Europe during the period 1998–2007. The most positive evolution of tourist arrivals corresponds to Spain with an accumulative yearly average of 56.70 percent, and at the end is Poland with a 1.03 percent. Differences in the rates of growth have also been observed between the two main generating markets (UK and Germany). Tourist arrivals from both countries show a positive evolution, but the rates of growth were larger for tourists from the UK (36%) than for tourists arriving from Germany (10.31%).

Table 1: Tourist Arrivals by Country of Origin (2007)

Country	Arrivals (Thousand)	Share of Total (percent)
UK	276213	36.22
Germany	78598	10.31
France	59456	7.80
Netherland	55604	7.29
Sweden	44746	5.87
Finland	34144	4.48
Italy	31576	4.14
Portugal	27981	3.67
Switzerland	20662	2.71
Denmark	19773	2.59
Spain	19256	2.53
Russia	16868	2.21
Norway	14954	1.96
Ireland	14464	1.90
Poland	14344	1.88
Austria	12052	1.58
Turkey	9580	1.26
Belgium	9513	1.25
Luxembourg	811	0.11
Total	760595	100

Table 1 shows the relative importance of each of the origin countries according to 2007 data on numbers of arrivals. In terms of composition, it can be observed that international tourism is highly concentrated in a few countries of origin. UK, Germany and France represent more than 50 percent of international arrivals. When the next three markets are added (Netherland, Sweden and Finland), they represent up to 17 percent of the tourist arrivals.

Tourism industry is very important to the economy and is identified as one of the major sources of economic growth. Therefore serious attention should be given in studying the factors that affect international tourist

arrivals to Malaysia. In this paper, a dynamic demand model is used to identify and estimate the income, tourism price, substitute tourism price, accommodation capacity (hotel rooms) and political stability for tourism demand in Malaysia from European countries. The results obtained may be valuable for helping professionals and policy-makers in the decision making process. The rest of the paper is organized as follows: In Section 2, literature review is presented. Section 3 focuses on methodology and data used for estimation while section 4 presents the empirical results. Conclusion and policy implication are presented in section 5.

2- Literature Review

In general, the literature on modeling tourism demand focuses either on analysis of the effects of the various determinants and/or on the accurate forecasting of tourism demand. During the past two decades, advanced econometric techniques have also played an important role in the understanding of tourists' behavior and their demand for tourism products/ services. A large number of empirical studies on international tourism demand are found in the literature and are divided into two main categories. The first category consists of studies that estimate the determinants of international tourism demand using classical multivariate regressions. See for example, Lim (1997, 1999), Crouch (1994, 1995), and Witt and Witt (1995). The second category includes of studies that use modern time series and cointegration techniques. See, for example, Ouerfelli (2008), Kulendran and Drivisekera (2007), Li et al. (2006), Dritsakis (2004), Narayan (2004), Song et al. (2003), Kulendran and Witt (2001). Most of the existing empirical studies have used tourist arrivals/departures for example, Ouerfelli (2008), Mervar (2007), Dritsakis (2004) and tourism receipts/expenditures as dependent variables Hanly and Wade (2007), Algieri (2006), Mervare (2002). The number of overnight stays and the average length of stay have also been studied, but much less frequently for example, George and Hyndman (2007) and Tresa Mounoz (2007).

A number of study in tourism demand have used panel data analysis for example, Naude and Saayman (2005) used static panel data regression, using a generalized least squares method (GLS) and dynamic panel data regression, using the Arellano-Bond first-step GMM estimator to investigate the determinants of tourist arrivals in 43 African countries. The cross

sectional data results indicated that the communication infrastructure and marketing (measured by internet) are important consideration for tourists from all continents and political stability seems to be more relevant for international tourists especially so for American tourists. They also indicated that there are a positive relationship between tourist arrivals and level of development in a country (as measured by the urbanization rate), health risk (Malaria) and tourism infrastructure (hotel capacity) are a tough determinant of tourism demand to Africa. Teresa and Martin (2007) investigate international tourist arrivals to the Balearic Islands from the 14 major origin countries during the period 1991–2003 using the panel data approach. They implied that after the terrorist attacks of September 11, the international tourists changed long-haul for short-haul destinations, and destinations accessible by car were preferred over destinations including air travel. Sequeira and Nunes (2008) investigated the effect of country risk on tourism demand (tourist arrivals, tourism receipts as a percent of export, and tourism receipts as a percent of GDP) using the dynamic panel data approach namely system generalized Method of Moment (system-GMM). They indicated that the value of the coefficient on country risk is relatively stable across regressions, meaning that a 1 per cent increase in the risk rating (decrease in the country risk) will allow for a near 0.2 per cent increase in specialization. In addition their results showed that in poor countries with an increase in risk, international visitors decrease but returns it seems not to be affected.

On researching the literature, one finds that there exist few empirical studies that have analyzed tourism demand for Malaysia using both the traditional and modern econometric techniques, for example Anaman and Animah Ismail (2002) analyzed the tourism demand from Brunei to Eastern Malaysia. Their results indicated that the main factors included personal income, exchange rate, the availability of cheaper price and better quality of goods and services in Malaysia relatively to Brunei, and provided a better place to rest and relax and to get away temporarily from stress and pressure. Tan et al. (2002) examined the determinants of tourist arrivals to Malaysia and Indonesia. They found that the income per capita is an important factor that influences the decisions of tourists to travel to Indonesia and Malaysia. Mohd Salleh et al. (2007) investigated the tourism demand to Malaysia from 10 major markets, and results show that the world of mouth has a positive relationship in long-run, the 1997 economic crisis (D97) and the outbreak of

SARS (D03) have an negative relationship in the short-run. Lean and Smyth (2008) examined the converging tourist arrivals from ten major markets. Their results demonstrated that the tourist arrivals from ten markets are converging with total tourist arrivals, and marketing strategies targeted at these markets are effective. Habibi et al. (2009) investigate tourism demand to Malaysia using the Generalized Method of Moment (GMM), and the results indicate that the coefficient of tourism price variables are statistically significant and negative sign, indicates that an increase in price of tourism goods and services result to decrease tourist arrivals to Malaysia. The results confirm the expected negative sign and show that it is significant for explaining the decrease number of arrivals in year 2003 due to the SARS crisis.

3- M0del Specification and Data

In this study, we are going to consider a dynamic specification of international tourism demand and thus the empirical model will be the following:

$$TA_{i,t}=f(TA_{i,t-1}, GDP_{i,t}, TP_t, TPS_{j,t}, HR_t, PS_{,t}, Dum) \quad (1)$$

where $TA_{i,t}$ is the number of tourists arriving to the Malaysia from country i during year t, $TA_{i,t-1}$ is the number of tourist arriving to the Malaysia from country i during the last period, $GDP_{i,t}$ is the gross domestic product in each of the origin country, TP_t is the relative cost of living of tourists in Malaysia, $TPS_{j,t}$ is the price of tourism goods and services in alternative destination, HR_t is the accommodation capacity (number of hotel rooms) in Malaysia, PS_t is the political stability in Malaysia, and DUM is dummy variable. It is important to pay attention in this study there are two more variables include in the model. Firstly, is the exchange rate is used for elaborating the cost of living of tourism in Malaysia. Secondly, is the population is used for measuring the income per capita. Thus the GDP variable is expressed in per capita terms. The tourism demand model has adopted the double-logarithmic form. The model to be estimated would be

$$\ln TA_{i,t} = \beta_0 + \beta_1 \ln TA_{i,t-1} + \beta_2 \ln GDP_{i,t} + \beta_3 \ln TP_t + \beta_4 \ln TPS_{j,t} + \beta_5 \ln HR_t + \beta_6 \ln PS_t + \beta_7 D_{2000} + \beta_8 D_{2003} + {}_{i} + {}_{it} \quad (2)$$

Where, $_i$ is an unobserved country-specific effect and $_{it}$ is the error term. The two dummy variables (D2000 and D2003) were included to capture the affect on tourism demand of the visit Malaysia year in 2000 and the SARS crisis in 2003, respectively. D2000 takes the value of 1 in Malaysia for the year 2000 and 0 otherwise. D2003 takes the value of 1 in Malaysia for the year 2003 and 0 otherwise.

When lagged dependent variables are included as regressors, the simple estimation procedures are asymptotically valid only when there are a large number of observations in the time dimension (T). The current available response to this problem Arellano and Bond (1991), Holtz-Eakin (1988) and Hsiao (2003) implied that to remove the individual effects and then estimate by instrumental variables (IV), using as instruments the values of the dependent variable lagged two or more periods. This treatment leads to consistent but not efficient estimates, because it does not make use of all the available moment conditions (Garin-Munoz, 2007). In order to avoid the inconsistency problem in equation (2), we use the Generalized Method of Moments (GMM) estimators introduced by Arellano and Bound (1991). The GMM estimate also controls for endogeneity by using the lagged values of the levels of the endogenous and the predetermined variables are instruments. They dynamic model to be estimated will therefore be:

$$\Delta \ln TA_{i,t} = \beta_1 \Delta \ln TA_{i,t-1} + \beta_2 \Delta \ln GDP_{i,t} + \beta_3 \Delta \ln TP_t + \beta_4 \Delta \ln TPS_{j,t} + \beta_5 \Delta \ln HR_t + \beta_6 \Delta \ln PS_t + \beta_7 \Delta D_{2000} + \beta_8 \Delta D_{2003} + {}_{i,t} \quad (3)$$

Where i = 1, …, 19; t = 1998, …, 2007; and all the variables are in first differences. That means $\Delta \ln TA_{i,t} = \ln TA_{i,t} - \ln TA_{i,t-1}$ and, analogously, for the other variables. There are several advantages in using this type of data. First, the use of annual data avoids the problems due to seasonality. Second, by using the different origin countries as observational units, an increase in the range of variation of the variables is considered. Finally, the utilization of a pooled time-series/cross-sectional data set enables us to have more degrees of freedom than, and reduce the problem of multicollinearity, hence improving the accuracy of parameter estimates (Garin-Munoz and Martin Montero, 2007). Table 2 shows the sample statistics for the data used in this paper, while Table 3 provides the source of data.

Table 2: Summery of Descriptive Variable Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	Obs.
LTA	9.5668	1.212	5.4638	12.5289	190
LY	9.9727	0.8223	7.1915	11.5355	190
LTP	0.7577	1.2334	-2.8717	3.6068	190
LTPS	4.2354	0.3699	3.1122	4.5677	190
LHR	11.82459	0.137855	11.58795	11.98497	550
LPS	4.043259	0.055631	3.961244	4.143135	550

Table 3: Variables and Sources

Variable	Proxy	Description	Source
Tourist arrivals	**TA**	Annual tourist arrivals from origin country	Ministry of tourism Malaysia (2008)
Income	**GDP**	The real GDP per capita in the origin country in US$	International Financial Statistics (IFS, 2008)
Tourism price	**TP**	The relative CPI Malaysia divided by CPI in origin country adjusted by exchange rate	International Financial Statistics (IFS, 2008)
Substitute Price	**TPS**	The weighing consumer price index of each of the five substitute destinations	World Tourism Organization (WTO, 2008)
Hotel room	**HR**	The number of hotel rooms	Ministry of tourism Malaysia (2008)
Political stability	**PI**	The political stability, absence of violence and terrorism	Kaufmann (2008)

4- Emprical Results

We have used STATA v.10.0 econometric software to obtain the Arellano-Bond dynamic panel estimates of the model (3) describe above. The consistency of the estimation depends on whether the lagged values of the endogenous and exogenous variables are valid instruments in our regression. We have also conducted a test for autocorrelation and the Sargan test of over-identifying restrictions as derived by Arellano and Bond (1991). Failure to reject the null hypothesis in both tests gives support to our model.

The results show that habit persistence (word- of- mouth) is important for explaining foreign tourism demand in the Malaysia. For example the coefficient of the lagged dependent variable in DIFF-GMM is 0.528; it means that 50 percent of total international arrivals are attributable to habit persistence (word-of-mouth) effects on tourist arrivals to Malaysia. This result is consistent with our expectations because of the according of profile of tourist by select markets in 2006, more than 55 percent of tourist arrivals to Malaysia for twice time or more visit Malaysia. The estimated coefficient for the income variable has the expected sign and insignificant. According to the estimated elasticity value (0.364), tourism to the Malaysia is considered by foreigners as a non-luxury service.

The estimated coefficient for the hotel room's variable suggests that the demand for tourism in Malaysia is heavily dependent on the accommodation capacity in Malaysia. In addition, the positive and significant relationship between tourism demand and political stability provide evidence to support the importance of stability on the tourism industry. These results are consistent with some previous studies which also found a significant positive effect on tourist arrivals (Kulendran and Drivisekera, 2007; Mohd Salleh et al, 2007; Naude and Saayman, 2005; Song et al, 2003 Teresa Munoz, 2007; Teresa and Martin, 2007).

The price of tourism product (service) is also an important factor that determines the European tourist arrivals to Malaysia. The estimated coefficient for the tourism price (LTP) and tourism price in alternative destination (LTPS) are negative sign which have (-0.251, -0.747) statistically significant at the 5 percent and 1 percent level respectively. Thus, suppliers must be careful with prices in order to maintain the competitiveness of their products. In this respect, there are several competitor destinations that are making major efforts to improve the quality/price relationship of their products.

According to the results, the estimated coefficient for dummy variable of Visit Malaysia Year in 2000 (D2000) and the outbreak of Severe Acute Respiratory Syndrome (SARS, 2003) show there are a positive (0.591) and negative (-0.281) sign which have statistically significant at the 1 percent level respectively. These results are consistent with some previous studies which also found a significant effect for tourist arrivals (Hesiao et al, 2008; Lean and Smyth, 2008; Mohd Salleh et al, 2007; Song and Witt, 2003). The results of Table 3 show that the model performs is satisfactorily. Based on

the Sargan test statistic for all model, the high p-value suggests that the null hypothesis of no over-identifying restrications is failed to reject. Therefore, the Sargan test supports the validity of the first differenced GMM and system GMM estimator.

Table 4: Estimation Results for the Dynamic Model, DIFF- GMM

Dependent Variable: LTA (European countries)					
Variables	**Panel 1**	**Panel 2**	**Panel 3**	**Panel 4**	**Panel 5**
Constant	0.715	-7.576*	-8.558*	-11.745*	-9.994*
	(1.34)	(3.59)	(-5.64)	(-3.37)	(-5.64)
LTA (t-1)	0.331*	0.181*	-0.074	0.402*	0.528*
	(12.50)	(5.04)	(-1.43)	(3.93)	(5.60)
LY	0.192*	-0.039	0.041	0.176	0.364*
	(3.69)	(-0.83)	(0.41)	(1.34)	(2.80)
LTP	-0.608**	-0.401	-0.565**	-.150	-0.251**
	(-2.41)	(-0.94)	(-2.44)	(-0.29)	(-2.01)
LTPS	0.856*	0.012	-1.085*	-0.423	-0.747*
	(8.69)	(0.06)	(-4.79)	(-1.43)	(-2.80)
LHR	-	1.317*	0.520**	0.568	0.994*
		(5.67)	(2.25)	(1.53)	(7.56)
LPS	-	-	4.11*	2.638*	0.610**
			(18.90)	(8.61)	(1.80)
D2000	-	-	-	0.600*	0.591*
				(10.16)	(8.93)
D2003	-	-	-	-	-0.281*
					(-5.64)
Diagnostic Test					
Wald test	437.91	320.32	941.76	1564.26	2980.43
	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Sargan test	18.446	18.211	17.809	17.118	15.803
	[0.9903]	[0.9914]	[0.9930]	[0.9952]	[0.9978]
AR(1) test	-2.404	-2.004	0.494	-2.553	-2.798
	[0.0162]	[0.0451]	[0.6209]	[0.0113]	[0.0051]
AR(2) test	-1.475	-1.678	3.280	-0.506	1.696
	[0.1402]	[0.0933]	[0.0010]	[0.6127]	[0.0899]
No. of Obs.	152	152	152	152	152

Notes: The Sargan Chi-square statistic tests the null hypothesis of no correlation between the instrumental and Residuals. The Arellano and Bond Z-statistic tests the null hypothesis that the residuals are first order correlated (AR(1)) and the residuals are not second order correlated (AR(2)). The figures in the parentheses are Z-statistic, while in the brackets are probability value (p-value).
*, ** and *** The coefficient is significant at 1%, 5% and 10% levels, respectively.

5- Conclusion and policy Implication

The purpose of this study is to identify and measure the impact of the main determinants of the international tourist arrivals to the Malaysia form European countries using dynamic panel data. The model was used to assess the performance of tourist arrivals from nineteen European countries to the Malaysia between 1998 and 2007, and it was estimated by using the GMM-DIFF estimator proposed by Arellano and Bond (1991) for the case of dynamic panel data models.

The estimated elasticities obtained for the income variable is positive sign and less than 1. Thus, tourism in Malaysia is considered by foreigners as a non-luxury service. One of the main conclusions of the study is the significant value of the lagged dependent variable (0.52), which may be interpreted as high consumer constancy to the destination and/or as an important word-of-mouth effect on consumer decision of the destination. The policy implication of this result is that, in order to attract more tourists to the Malaysia, the suppliers of tourism products/services should improve their service quality and upgrade their brand image.

Tourists seem to be highly sensitive to the price variable. Hence, policy makers and suppliers must closely monitor all tourism service providers such as hotels, restaurants, tourist operators, and transportation companies such as airport taxis and tourist buses to ensure that they do not charge 'unreasonable' prices for their services. The negative sign of substitute tourism price indicates that alternative destinations are complementary destinations to Malaysia. Therefore policy maker and supplier must available package tour for tourist to visit complementary destination (ASEAN countries). The results indicate that the coefficient of hotel room is positive. As far as policy implications are concerned government should integrate policies into tourism planning, especially for developed of hotels and supported privet sector to invest in this industry. In addition our analysis suggests that policy makers in tourist destinations are rightly concerned about safety and stability. Policy-makers should be aware of the negative effect of political instability on tourism demand. Therefore increasing the political stability of a country is significantly dependent on governments' actions.

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