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Abstract

This study aims to test a hypothesis that postulate a positive inter-relationship between international flows of tourist, trade and economic growth. Although tourism is one of the major components in the trade of services, and it has been certified by large number of literatures on the strong correlation between tourism industry and economic development, yet not much is known on the dynamic inter-relationship between these three variables. Closing-up this gaping hole, this study employs the cointegration tests under autoregressive distributed lag (ARDL) structure to investigate a dynamic inter-relationship between economic development, total trade (import and export) and number of tourist arrival for Malaysia and her major tourism partners ((ASEAN countries) . The estimated result based on the long run time series behavior for number of tourist arrival, volume of total trade and economic development's indicator shows that these three variables are moved in tandem. Interestingly, in the analysis of short run behavior, we find that number of tourist arrival has significantly Granger caused total trade flows at least for some countries. At the same time, in the short-run, we find that both growth in total trade (export and import) and international tourists' arrival to Malaysia have uni-directionally Granger caused real income growth and there is statistical evidence for international trade to lead tourist arrival.

Keywords: economic growth, trade, tourism, cointegration, and Malaysia

1. Introduction

Malaysian is a trading economy. Since the end of 1980s Malaysia total trade exceeded more than 100 percent of her Gross Domestic Product (GDP) and become more than 200 percent after 2000s. A lot of strategies and incentives including trade agreement (for example AFTA, FTA between Malaysia-Pakistan, Malaysia-US and Malaysia-GCC) have been or being proposed by the Malaysian government to strengthen international trade competitiveness and then to boost-up export in goods as well as in services industry. As a consequence, for years, product markets especially electronic and electrical products, petroleum and gas, and vegetable oil and fat produce have contributed more than half of the income in export industry. However, due to slowing down in the global demand especially for electronic and electrical market in most of

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Malaysian major export partners, new strategies to divert export concentration from goods market to services industries is intensified. Therefore, enhancing export of services for selected industries that we have comparative advantage such as tourism is a strategic move and then may diversify our export portfolio.

Malaysia has extensively developed her tourism industry after the establishment of Ministry of Culture, Arts and Tourism in 1987. And later, this ministry have been upgraded it to the Ministry of Tourism in 2004 to manage, monitor, synchronize and ensure all tourism development activities and programs are in line with the National Tourism Master Plan. Various attractive incentives and assistances have been given to private operators to encourage them to be directly involved in the tourism industry. The government also allocated substantial amount of fund to tourism industry besides providing necessary and sufficient infrastructure. To further promote tourism, the government actively pioneering in various marketing strategies such as launching many Visit Malaysia Years.

As a result, the growth of Malaysian tourism was very good in the last two decades. For instance, in 1985, the total tourist arrivals were 3.11 million and increased to about 16.43 million in 2004. In terms of growth, within the last 20 years tourist arrivals to Malaysia had increased an average of 14.9 per cent annually. According to WTO (2005), Malaysia was ranked as the thirteen world's top tourist destinations while within ASEAN region Malaysia was the leading country in receiving inbound tourists by controlling about 32.37 percent of total arrivals in 2004 (WTO, 2006). Increasing in total tourist arrivals result in more tourist receipts. From 1985 to 2005, tourist receipts had increased at an annual average of 16.4 per cent or from RM1.543 billion to RM31.954 billion. In 2006, tourism was the second largest contributor of foreign exchange earnings to the country, as well as the contribution of the trade industry.

Even though their significant importance to the national income accounting, not many researches either theoretical or empirical has been carried out to analyze the dynamic linkages between economic growth, tourism industry and international trade together. Existing researches are concentrated on investigating the relationship either between trade and growth (including export-led growth, Bahmani-Oskooee and Alse 1993, import-led growth Deme 2002, or trade-led growth, Jin 1995, and Hatemi and Irandoust 2001, among others), tourism and growth (Balaguer and Jorda (2002), and Oh 2005) or tourism and trade (Al-Qudair 2004 and Fischer and Gil-Alana 2005). Generally, these researchers are unanimously agreed on the solid relationship between trade and economic growth, or tourism and growth, while no strong ties can be drawn from the trade and tourism relationship[2]. This study move one step ahead by combining these two

[2] For instance, Al-Qudair (2004) investigated the dynamic causal relationship between the number of tourists and total trade in a number of Muslims developing countries using cointegration and Granger causality techniques. He found that the existence of a long run equilibrium relationship between the number of tourists and total trade for some countries while not for others. In the case of Granger causality analysis there exist uni-directional and bi-directional relationship between trade and tourism only for two countries out of nine sample countries under studies. Kulendran and Wilson (2001) investigated the relationship between international trade and international travel between developed countries and found that although the results on the causal relationship from number of tourist arrival to total or component of trade are mixed, but generally there are long run relationships between these variables across markets. Another example was Shan and Wilson (2001) who investigated the causality

industries together and examine their impact on the economic growth. Thus, this study tries to unravel the inter-relationship between tourist arrival, trade and economic growth for Malaysia case.

The paper is organized as follows. Section 2 explains the empirical model, econometric methodology and the data employed in the analysis. Section 3 reports and discusses the results from the model estimation. Finally, Section 4 summarizes and concludes.

2. Data and Methodology

Empirical analysis was carried out using set of quarterly data for 1997:01 to 2007:04. The data used are real GDP that are linearly interpolated from annual to quarter, real trade volume (exports plus imports), real exports of goods and services, real imports of goods and services and total number of international tourist visiting and accommodating in tourist establishment of Malaysia. All of these data are in ringgit Malaysia and were obtained from the Department of Statistics, Malaysia.

In investigating the dynamic inter-relationship between economic growth, trade and number of tourist, we employ three stage testing. **In the first stage** the order of integration of the data time series was tested using the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests. The PP procedures, which compute a residual variance that is robust to auto-correlation, are applied to test for unit roots as an alternative to ADF unit root test.

The second stage is dealing with testing for the existence of a long-run equilibrium relationship either between real income and real exports, or real income and real import, or real income and total trade, or real income and number of tourist arrival, or tourist arrival and real import, tourist arrival and real export, or tourist arrival and total trade (macroeconomic variables) within a bivariate framework utilizing the ARDL cointegration procedure proposed by Pesaran et al. (2001). The most highlighted advantage of this testing and estimation approach is that it can be applied irrespective of whether the regressors are *I(0)* or *I(1)* which avoids the well-known pre-testing problems associated with conventional methods. In their influential paper, Pesaran and Shin (1999) demonstrated that the appropriate lags in the ARDL model corrected both serial correlation and endogeneity problems and that it performs well in small samples. The ARDL procedure can distinguish between dependent and explanatory variables. In our case, the error correction representation of the ARDL specification model of Eq. (x) is given by:

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between trade and tourism using time series data for Chinese economy. Their findings suggested a bi-directional Granger causality between international travel and international trade. Further, Habiballah and Lin (2002) have explored the nature of the relationship between international trade and tourism flows between Singapore and its major partners. Results of the study gave support for a systematic relationship between business travel and total trade. The direction of the causality shows that there is a bi-directional causality between business arrivals and trade but no causality between holiday travel and trade. In general, there is a constant evidence of long run relationship between number of tourist arrival and total trade but the evidence for causality tests is mix and country specific in nature.

$$\Delta lnY_t = a_{o_Y} + \sum_{i=1}^{n} b_{i_Y} \Delta lnY_{t-i} + \sum_{i=1}^{n} c_{i_Y} \Delta lnX_{t-i} + \sigma_{i_Y} lnY_{t-i} + \sigma_{2_Y} lnX_{t-i} + \varepsilon_{1_t} \quad \text{Eq.1}$$

$$\Delta lnX_t = a_{o_X} + \sum_{i=1}^{n} b_{i_X} \Delta lnX_{t-i} + \sum_{i=1}^{n} c_{i_X} \Delta lnY_{t-i} + \omega_{i_X} lnX_{t-i} + \omega_{2_X} lnY_{t-i} + \varepsilon_{1_t} \quad \text{Eq. 2}$$

In Equation 1 and 2, where Δ is the difference operator, Y_t is the log of dependent variable, X_t is the log of independent variable, a_{o_Y} is the drift component and ε_{1_t} and ε_{2_t} are serially independent random errors with mean zero and finite covariance matrix. Equation 1 and 2 above are traditional ARDL model with the (n) specification based on AIC which is commonly used to determine the orders of lags in the ARDL model.

Pesaran et al. (1996) provide two sets of asymptotic critical values for the *F*-test. One set assumes that all the variables are *I*(0) and another assumes they all are *I*(1). The null hypothesis of the non-existence of a long-run relationship, denoted by $H_0 = \sigma_{1_Y} = \sigma_{2_Y} = 0$ against $H_1 = \sigma_{1_Y} \neq \sigma_{2_Y} \neq 0$. If the test statistic is higher than the upper bound critical value, the null of no cointegration is rejected in favour of the presence of cointegration. On the other hand, an *F*-statistic lower than the lower bound critical value implies the absence of cointegration. In the event that the calculated *F*-statistic lies between the two critical values, there is no clear indication of the absence or existence of a cointegrating relationship and prior information about the order of integration of the variables is necessary to make a decision on long-run relationships.

The third stage is about constructing standard Granger-type causality tests with additional of lagged error-correction term only where the series are cointegrated. If the variables in the models are cointegrated, then there must be Granger causality in at least one direction (short run or long run) even though it does not indicate the direction of temporal causality between the variables. In view of the above considerations, we relied on the error correction models of cointegration to examine the short-run inter-relationship between Malaysian economic development indicator (GNP) and Malaysia's export to, import from, total trade with and total number of tourist arrival from top four ASEAN tourism partners – Singapore, Thailand, Indonesia and Brunei Darussalam. Therefore, error correction models of cointegration can be specified as follows:

$$\Delta lnY_t = \alpha_0 + \varphi_{1_1}^{p}(L)\Delta lnY_t + \varphi_{1_2}^{q}(L)\Delta lnX_t + \delta ECT_{t-1} + u_{1t} \quad \text{Eq. 3}$$

$$\Delta lnX_t = \alpha_1 + \varphi_{2_1}^{p}(L)\Delta lnX_t + \varphi_{2_2}^{q}(L)\Delta lnY_t + \delta ECT_{t-1} + u_{2t} \quad \text{Eq. 4}$$

Where $\varphi_{ij}^{p}(L) = \sum_{n=1}^{P_{ij}} \varphi_{ijn} L^{n}$ and $\varphi_{ij}^{q}(L) = \sum_{n=1}^{Q_{ij}} \varphi_{ijn} L^{n}$

As before Δ is difference operator, $(L)\Delta lnY_t = \Delta lnY_{t-1}$ is lag operator, ECT_{t-1} is lag error correction term derived from long run cointegration model and u_{1t} is a serially independent random error with mean zero and finite covariance matrix.

3. Results and Discussion

Table 1 reports the results of the unit root tests. The ADF and PP statistics for the levels of Malaysian real export, real import, total trade, number of tourist arrival and real income do not

exceed the critical values (in absolute terms). However, when we take the first difference of each of the variables, the ADF and PP statistics are higher than their respective critical values (in absolute terms). Therefore, we conclude that all variables are each integrated of order one *I(1)*.
[INSERT TABLE 1 ABOUT HERE]

The second stage involves investigating the existence of a long-run relationship using unrestricted error-correction model (UECM). The *F* test is used to determine whether a long-run relationship exists between the variables through testing the significance of the lagged levels of the variables.
Table 2a to 2d clearly show that there are long run relationship amongst the real income and total trade (Y-T and T-Y), number of tourist arrival and real income (Tour-Y and Y-Tour) for Singapore; real income and total trade (Y-T and T-Y), total trade and number of tourist arrival (T-Tour), real income and number of Thai tourist visiting Malaysia (Y-Tour), and real import and tourist arrival (M-Tour) for case of Thailand; real income and total trade (Y-T and T-Y), total trade and number of tourist arrival from Indonesia (T-Tour and Tour-T), real income and tourist arrival (Y-Tour), real export and number of tourist arrival (X-Tour), and number of tourist arrival and real import (Tour-M and M-Tour) for Indonesia; and real income and total trade (Y-T and T-Y), real income and number of tourist arrival from Brunei (Y-Tour), real export and number of tourist arrival (X-Tour), and real import and number of tourist arrival (Tour-M and M-Tour) for Brunei Darussalam because their *F*-statistic is higher than the upper bound critical value at the 10 per cent level. This implies that the null hypothesis of no cointegration among the variables in Equation (1) and (2) are being rejected or in other words the bounds testing approach provides evidence for the existence of cointegration relationships.
[INSERT TABLE 2a, 2b, 2c AND 2d ABOUT HERE]

In the third stage, only Equation 1 and Equation 2 that show of having long run cointegration properties will be tested for Granger-type causality tests which include the lagged error-correction term. In the analysis the lag length *p* and *q* are set to 3.[3] Table 3 shows the short run and long run Granger causality within the Error-Correction Mechanism (ECM). The *F* statistics on the explanatory variables in each of the equations indicates the statistical significance of the short-run causal effects while the *t*-statistic on the coefficient of the lagged error-correction term indicates the statistical significance of the long-run causal effect. Having statistically significant on both *F* and *t* ratios for *ECTt-1* in Equations 3 and 4 would be enough condition to have causation from X to Y and from Y to X, respectively. The Granger-type causal relationship between trade, income and number of tourist visiting Malaysia are summarized as follows:

Malaysia-Singapore relationship: Base on the bound cointegration tests, only two models (1 and 3) have long run relationship and would be potential candidates for VECM-Granger causality relationship. The statistical tests show that there exist a bidirectional relationship between real

[3] We use 3 lags in the analysis is due to the lack of number of observations. Alternatively we may use other information criterian such as AIC (Akaike Information), SIC (Schwartz Information Criterion) and Hsiao's sequential procedure (which combines Granger's definition of causality and Akaike's minimum final prediction error (FPE) criterion).

GNP and trade ($Y \Leftrightarrow T$)and unidirectional relationship from real GNP to a number of Singaporean visiting Malaysia ($Y \Rightarrow TOUR$).

Malaysia-Thailand relationship: Table 3 shows that there is a unidirectional relationship from real income to total Malaysian trade with Thailand ($Y \Rightarrow T$), and bidirectional relationship between real income and number of Thai visiting Malaysia ($Y \Leftrightarrow TOUR$).

Malaysia-Indonesia relationship: There exists a unidirectional relationship from real income to total trade with Indonesia ($Y \Rightarrow T$), from real income to total number of Indonesian tourist visiting Malaysia ($Y \Rightarrow TOUR$), and from number of Indonesian tourist visiting Malaysia to Malaysian real export to Indonesian economy ($TOUR \Rightarrow X$).

Malaysia-Brunei Darussalam relationship: The bidirectional causal relationships exist between total trade and number of tourist arrival from Brunei, real income and number of tourist arrival and total export and number of tourist arrival ($T \Leftrightarrow TOUR$), ($Y \Leftrightarrow TOUR$) and ($X \Leftrightarrow TOUR$). While there exists a unidirectional relationship from real income to total trade and number of Brunei tourist visiting Malaysia and total import ($Y \Rightarrow T$) and ($TOUR \Rightarrow M$).

Our results generally agree with the trade and growth literature where there exists a unidirectional relationship from income (Y) to total trade (T). Besides new evidence in trade and tourism relationship, our results seem to be consistent with previous papers. For instance, we found that there are bidirectional causation for ($T \Leftrightarrow TOUR$) Malaysia-Brunei Darussalam which similar to Shan and Wilson (2001) for the case of China. Another instances are ($Y \Rightarrow TOUR$) for Malaysia-Singapore and Malaysia-Indonesia relationship which similar to (Katirchioglu (2009).
[INSERT TABLE 3 ABOUT HERE]

4. Conclusion

In general this study tries to investigate whether there are any dynamic inter-relationships between the economic growth, trade and number of tourist arrivals. The short- and long-run relationships are either: between real income and real exports, or real income and real import, or real income and total trade, or real income and number of tourist arrival, or tourist arrival and real import, tourist arrival and real export, or tourist arrival and total trade. The ARDL approach developed by Pesaran et. al (2001) has been utilized.

If the chosen variables are cointegrated, then there must be Granger causality between the variables. Thus, the Granger causality tests also have been conducted between Malaysia economic development indicator and the top four ASEAN tourism partners i.e: Singapore, Thailand, Indonesia and Brunei Darussalam. The result from the study shows that there are evidences of long-run relationship amongst the macroeconomic variables. Further, on the short run analysis, there are some unidirectional and bidirectional relationships between the trade, economic growth and tourism amongst Malaysian and the top four ASEAN countries. Therefore, the positive effect of promoting Malaysia as a tourist destination is not limited to the tourism industry only but on the international trade as well.

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Table 1: ADF and PP unit root tests

		lnX	lnM	lnT	lnTOUR	ly
Singapore						
Level	ADF	-1.49(0)	-0.92(2)	-1.35(0)	-1.50(1)	-
	PP	-1.45(5)	-1.18(6)	-1.32(5)	-1.06(2)	-
1stΔ	ADF	-6.15*(0)	-5.82*(1)	-5.44*(1)	-6.52*(3)	-
	PP	-6.65*(8)	-6.48*(12)	-6.16*(10)	-3.99*(2)	-
Thailand						
Level	ADF	-0.36(0)	-0.63(0)	-0.28(0)	-1.62(1)	-
	PP	-0.09(6)	-0.64(1)	-0.28(0)	-1.17(4)	-
1stΔ	ADF	-4.87*(3)	-4.35*(2)	-4.65*(3)	-3.57*(3)	-
	PP	-8.24*(5)	-6.20*(2)	-5.86*(1)	-3.01*(4)	-
Indonesia						
Level	ADF	-0.13(2)	-0.90(2)	-0.59(2)	-0.97(1)	-
	PP	-0.33(42)	-1.57(13)	-1.05(15)	-0.44(4)	-
1stΔ	ADF	-10.02*(1)	-5.72*(1)	-8.09*(1)	-3.14*(0)	-
	PP	-13.08*(23)	-8.26*(27)	-8.47*(23)	-3.10*(1)	-
Brunei						
Level	ADF	-1.14(3)	-2.52(0)	-0.28(3)	-0.08(1)	-
	PP	-2.65	-2.41(1)	-1.95(2)	0.76(2)	-
1stΔ	ADF	-6.33*(5)	-5.40*(2)	-6.14*(2)	-4.04*(3)	-
	PP	-27.70*(4)	-12.86*(4)	-22.72*(8)	-3.76*(3)	-
Malaysia						
Level	ADF	-	-	-	-	-0.18(1)
	PP	-	-	-	-	0.13(2)
1stΔ	ADF	-	-	-	-	-10.41*(3)
	PP	-	-	-	-	-3.98*(2)

Notes: lnX is natural logarithm of real export, lnM is natural logarithm of real import, lnT is natural logarithm of total trade, lnTOUR is natural logarithm of total number of tourist arrivals and ly is real GNP. Number in brackets are lag lengths used in ADF test (as determined by AIC set to maximum three) to remove serial correlation in the residuals. Both in ADF and PP tests, unit root tests were performed by intercept across the model. When using PP test, number in brackets represent Newey-West Bandwith (as determined by Bartlett-Kernel). Tests for unit roots have been carried out in E-VIEWS 6. * denote rejection of the null hypothesis at the 5% levels.

Table 2a: The bound test for Malaysia-Singapore bilateral cointegration

	With deterministic trends			Without deterministic trends		
Variables	1 Lag	2 Lag	3 Lag	1 Lag	2 Lag	3 Lag
(1) Y and T						
F_Y(Y/T)	3.12	4.02	4.29	9.55	17.65	22.65
F_T(T/Y)	5.36	4.13	3.80	4.97	6.88	5.49
(2) T and TOUR						
F_T(T/TOUR)	2.42	1.51	0.92	3.60	2.32	2.51
F_{TOUR}(TOUR/T)	2.18	2.55	2.92	3.63	4.68	4.29
(3) Y and TOUR						
F_{TOUR}(TOUR/Y)	7.33	8.25	8.86	4.51	4.73	3.73
F_Y(Y/TOUR)	4.99	4.68	3.56	38.39	45.58	42.29
(4) X and TOUR						
F_X(X/TOUR)	2.29	3.18	3.44	3.77	3.07	2.54
F_{TOUR}(TOUR/X)	2.66	1.89	1.02	3.54	4.59	4.35
(5) M and TOUR						
F_{TOUR}(TOUR/M)	2.22	1.35	0.85	3.75	4.92	4.09
F_M(M/TOUR)	2.02	1.99	2.31	3.35	1.85	2.41

Notes: Akaike Information Criteria (AIC) was used to select the number of lags required in the cointegration test. The coefficients in bold style are statistically significant at least at 10 percent level. The critical value ranges of *F*-statistics with two variables are 3.17 – 4.14 at 10% level of significances, respectively. See Pesaran et al. 2001, p.p. 300 -301, Table CI, Case III. The critical value ranges of *F*-statistics with two variables are 4.19 – 5.06 at 10% level of significances, respectively. See Pesaran et al. 2001, p.p. 300 -301, Table CI, Case V.

Table 2b: The bound test for Malaysia-Thailand bilateral cointegration

	With deterministic trends			Without deterministic trends		
Variables	1 Lag	2 Lag	3 Lag	1 Lag	2 Lag	3 Lag
(1) Y and T						
F_Y(Y/T)	14.61	19.79	18.37	14.05	21.86	28.39
F_T(T/Y)	6.24	5.88	4.64	7.06	5.54	4.39
(2) T and TOUR						
F_T(T/TOUR)	0.16	0.29	0.53	6.86	8.27	5.43
F_{TOUR}(TOUR/T)	1.84	1.89	1.40	0.82	1.65	1.2814
(3) Y and TOUR						
F_{TOUR}(TOUR/Y)	3.10	3.75	3.94	1.11	0.81	0.55
F_Y(Y/TOUR)	4.49	4.72	6.07	28.90	32.706	38.12
(4) X and TOUR						
F_X(X/TOUR)	0.26	0.234	0.15	4.86	4.72	3.69
F_{TOUR}(TOUR/X)	1.68	1.68	1.48	0.85	1.52	1.37
(5) M and TOUR						
F_{TOUR}(TOUR/M)	2.04	2.23	1.64	0.70	1.62	1.10
F_M(M/TOUR)	0.92	1.13	1.42	7.43	9.69	4.97

Notes: refers to note in Table 2a.

Table 2c: The bound test for Malaysia-Indonesia bilateral cointegration

	With deterministic trends			Without deterministic trends		
Variables	1 Lag	2 Lag	3 Lag	1 Lag	2 Lag	3 Lag
(1) Y and T						
F_Y(Y/T)	11.09	20.21	57.30	10.03	21.56	112.52
F_T(T/Y)	9.58	8.37	7.03	10.07	8.75	7.13
(2) T and TOUR						
F_T(T/TOUR)	0.21	0.04	0.12	8.40	7.98	5.45
F_{TOUR}(TOUR/T)	3.46	4.42	5.34	3.31	4.20	5.14
(3) Y and TOUR						
F_{TOUR}(TOUR/Y)	3.90	3.89	3.41	3.33	3.63	3.28
F_Y(Y/TOUR)	8.05	7.66	6.99	25.72	32.49	44.31
(4) X and TOUR						
F_X(X/TOUR)	0.98	0.18	0.01	15.95	13.26	5.60
F_{TOUR}(TOUR/X)	3.00	3.26	3.10	2.83	3.24	2.95
(5) M and TOUR						
F_{TOUR}(TOUR/M)	3.63	5.32	7.05	3.46	5.07	6.79
F_M(M/TOUR)	0.48	0.14	0.44	7.12	5.15	4.77

Notes: refers to note in Table 2a.

Table 2d: The bound test for Malaysia-Brunei Darussalam bilateral cointegration

	With deterministic trends			Without deterministic trends		
Variables	1 Lag	2 Lag	3 Lag	1 Lag	2 Lag	3 Lag
(1) Y and T						
F_Y(Y/T)	4.82	7.92	8.46	8.83	16.35	55.55
F_T(T/Y)	11.92	6.19	3.92	12.72	6.59	4.09
(2) T and TOUR						
F_T(T/TOUR)	5.57	1.79	2.13	15.08	7.46	1.49
F_{TOUR}(TOUR/T)	5.59	4.93	3.42	5.05	4.88	3.31
(3) Y and TOUR						
F_{TOUR}(TOUR/Y)	2.71	3.21	3.08	2.32	2.76	2.47
F_Y(Y/TOUR)	2.60	3.17	2.42	48.06	63.78	78.09
(4) X and TOUR						
F_X(X/TOUR)	4.25	2.92	1.57	11.46	11.54	3.96
F_{TOUR}(TOUR/X)	2.97	2.86	2.59	2.62	2.53	2.02
(5) M and TOUR						
F_{TOUR}(TOUR/M)	2.69	1.85	0.87	5.40	5.25	3.25
F_M(M/TOUR)	9.87	8.88	6.47	9.36	7.30	4.71

Notes: refers to note in Table 2a.

Table 3: Granger causality tests for Malaysia and her trading partners

Lag Level	1		2		3		
null hypothesis	*F*-Stat	t_{ECT-1}	*F*-Stat	t_{ECT-1}	*F*-Stat	t_{ECT-1}	Result
Malaysia-Singapore							
(1) Y and T							
lnY does not Granger cause lnT	5.70*	-0.09*	5.14*	-0.14*	2.93*	-0.16*	Y-T
lnT does not Granger cause lnY	1.53	-0.27*	2.41	-0.28*	2.74*	-0.32*	T-Y
(3) Y and TOUR							
lnY does not Granger cause lnTOUR	2.69*	-0.12*	0.18	-0.15*	0.13	-0.18*	Y-TOUR
lnTOUR does not Granger cause lnY	12.99	-0.03	5.38*	-0.06	3.80*	-0.08	
Malaysia- Thailand							
(1) Y and T							
lnY does not Granger cause lnT	1.08	-0.21*	2.01	-0.34*	2.68*	-0.55*	Y-T
lnT does not Granger cause lnY	4.49	-0.10*	10.31*	-0.11	9.35*	-0.03	
(3) Y and TOUR							
lnY does not Granger cause lnTOUR	4.7*	-0.11*	0.86	-0.12	0.76	-0.11*	Y-TOUR
lnTOUR does not Granger cause lnY	6.26*	-0.03	4.11*	-0.06	2.98*	-0.08*	TOUR-Y

Continue Table 3: Granger causality tests for Malaysia and her trading partners

Lag Level	1		2		3		
null hypothesis	*F*-Stat	t_{ECT-1}	*F*-Stat	t_{ECT-1}	*F*-Stat	t_{ECT-1}	Result
Malaysia- Indonesia							
(1) Y and T							
lnY does not Granger cause lnT	3.24*	-0.18*	1.95	-0.31*	0.76	-0.58*	Y-T
lnT does not Granger cause lnY	6.83*	-0.13	7.68*	-0.12	9.41*	-0.06	
(2) T and TOUR							
lnT does not Granger cause lnTOUR	4.68*	-0.07	3.58*	0.01	2.80*	0.04	
lnTOUR does not Granger cause lnT	0.77	-0.11*	0.4	-0.14*	0.23	-0.17*	
(3) Y and TOUR							
lnY does not Granger cause lnTOUR	3.76*	-0.09*	2.4	-0.11*	1.5	-0.13*	Y-TOUR
lnTOUR does not Granger cause lnY	9.2*	0.01	4.16*	0.01	2.84*	0.01	
(4) X and TOUR							
lnX does not Granger cause lnTOUR	4.01*	-0.16	2.48*	-0.01	1.69	0.04	
lnTOUR does not Granger cause lnX	1.84*	-0.1*	1.02	-0.12*	1.57	-0.14*	TOUR-X
(5) M and TOUR							
lnM does not Granger cause lnTOUR	4.41*	-0.09	4.06*	-0.04	3.55*	0.02	
lnTOUR does not Granger cause lnM	1.69	-0.11*	0.65	-0.15*	0.12	-0.19*	
Malaysia-Brunei Darussalam							
(1) Y and T							
lnY does not Granger cause lnT	13.11*	-0.11*	6.45*	-0.21*	3.81	-0.30*	Y-T
lnT does not Granger cause lnY	0.45	-0.66*	3.28*	-0.67*	4.19	-0.66	T-Y
(2) T and TOUR							
lnT does not Granger cause lnTOUR	15.80*	-0.67*	5.9*	-0.49	4.02*	-0.16	T-TOUR
lnTOUR does not Granger cause lnT	8.29*	-0.10*	3.48*	-0.13*	2.02	-0.14*	TOUR-T
(3) Y and TOUR							
lnY does not Granger cause lnTOUR	3.16*	-0.16*	2.37	-0.2*	2.06	-0.20*	Y-TOUR
lnTOUR does not Granger cause lnY	2.86*	-0.09*	3.63*	-0.13*	2.68*	-0.16*	TOUR-Y
(4) X and TOUR							
lnX does not Granger cause lnTOUR	11.52*	-0.53*	3.52*	-0.55*	2.27*	-0.32	X-TOUR
lnTOUR does not Granger cause lnX	5.43*	-0.05*	1.85	-0.06*	1.28	-0.08*	TOUR-X
(5) M and TOUR							
lnM does not Granger cause lnTOUR	2.29	-0.72*	1.66	-0.84*	1.28	-0.98*	M-TOUR
lnTOUR does not Granger cause lnM	10.73*	-0.05	5.67*	-0.05	4.30*	-0.04*	TOUR-M

*Significance at 10% levels.