THE SUSTAINABILITY OF TOURIST ARRIVALS INDEX UNDER NON-LINEAR DYNAMICS: EVIDENCE FROM PANEL SMOOTH TRANSITION APPROACH

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ABSTRACT

In this paper, we investigate the degree of sustainable growth rates in terms of number of tourists to Taiwan. By using foreign exchange rate as transition variable, we employ panel smooth transition regression (PSTR) model to estimate the threshold effects of changes in foreign exchange rate at different times to the growth rate of number of tourists to Taiwan in a dynamic and ever-changing environment. Firstly, our findings support the use of nonlinear model to explain the sustainability of growth rates in terms of number of tourists to Taiwan. Secondly, to prove the values of sustainable growth rates in a smooth transition process is dependent on the foreign exchange rate changes, the result that cannot be capture by conventional linear model. Finally, if period lagged tourist growth rates are selected as the explanatory variable, this implies meaningful top-down observation significance, and its highest degree of persistence in terms of tourist growth rate reached 88.29%. This phenomenon can be further interpreted as the willingness and efforts offered and spent by both public and private sectors in promoting tourist from all over the world to Taiwan.

Keywords: Continuity, Stepwise Regression, Transition Variables, PSTR, Threshold Value

JEL classification numbers: L83, E37, C52

INTRODUCTION

In recent years, no matter the advanced economies or the emerging economies, all of the countries are by all means to develop tourism industry, because this industry has characteristics of high economic efficiency but no pollution problems. The effect of foreign exchange earnings created by tourism industry on the economic growth for every countries become increasingly important, because most literature evidence that international tourism bring significant effect on economic growth, and contribute positively to GDP (Brida and Risso, 2009; Akinboade and Braimoh, 2010; Brida et al., 2010; Brida et al., 2011; Belloumi, 2010; Bouzahzah and Menyari, 2013; Singh, 2014). In 2008, US subprime mortgage financial crisis triggered a world-wide financial turmoil and thus tremendous negative effects on global economies, but the global sight-seeing activities are still keep booming, activate tourism industry growth worldwide, and therefore mitigate the impact caused by the world-wide financial turmoil. According to the latest UNWTO World Tourism Barometer, in 2013, revenues from expenditure spent by international visitors on accommodation, food and beverage, entertainment, shopping and other services and goods in their destinations worldwide, reached an historic high of estimated US $ 1,159 billion. The 5% growth rate in real terms (taking into account foreign exchange rate fluctuations and inflation) in 2013 exceeded the long- term growth trend. The growth rate in revenues just matched the increase in international tourist arrivals, also up by 5%, reaching 1,087 million in 2013, from 1,035 million in 2012. Such results confirm the increasingly important role of the tourism sector in stimulating economic growth, and also in contributing to the expansion of international trade.

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In relevant literature, researchers have demonstrated that foreign exchange rate is an important factor affecting sight-seeing activities (Lim and Mcaller, 2002; Brida et al., 2008; Brida and Risso, 2009; Brida and Monterubbianesi, 2010; Chang and McAleer, 2012; Ekanayake et al., 2012; Bouzahzah and Menyari, 2013; Lin and Lee, 2013; Kilic and Bayar, 2014), and thus foreign exchange rate policy has been considered an important means for the government to improve overall economic growth. Therefore, the central bank of each country will carefully manipulate exchange rate to ensure low inflation and financial stability, in order to reach economic growth. For example, after the outbreak of global financial turmoil in 2008, the central banks of European countries and US Federal Reserve have implemented monetary policy of quantitative easing (QE), in order to effectively strengthen the competitiveness in exports, as well as to promote the willingness to travel abroad and attract tourists to its country by bringing down the exchange rate synchronously through QE. Because almost all of countries in the world follow this model, travelling abroad becomes a fashion globally, accelerating global economic recovery in these few years.

The objective of this article is to explore the effects of dynamic changes in the foreign exchange rate on tourists' willingness to travel, and hope that the empirical results of this study can be referenced by governmental units in monitoring foreign exchange rate, as well as be served as basis for investors predict the future development of tourism-related industries.

Taiwan is an island nation with small economy scale, and the transportation hub between Asian countries, with tight-knit aviation network. Coupled with natural sight-seeing resources and governmental units' continuous efforts in building the infrastructure for the tourism industry, leveraging cultural and creative industries' resources, providing VAT refund, visa-free travel system, and other related policies, Taiwan has made an excellent performance in promoting and enhancing its international visibility, and attracting more and more foreign

tourists to Taiwan. Therefore, Taiwan is an ideal sample country for the study on the topic mentioned above.

Due to the difficulty in measuring infrastructure construction achievements and government's promotion policy effectiveness, which are related with and contribute to provoking tourists' willingness to travel, the models used in most of existing literature studying on tourists' willingness to travel to a specific host country are focused on more bottom-up approaches by employing various Macro-economic variables. But the effects of infrastructure construction achievements and relevant government's policy thus always be ignored, be summarized as the residuals, and hence causing information not fully disclosed. In this paper, the growth rate of tourist arrivals is treated as explained (dependent) variable while the period lagged growth rate of tourist arrivals as explanatory (independent) variable. This model represents a holistic method consolidating the efforts and thus effects of public sectors' infrastructure construction achievements and tourism policy to encourage private investment in promoting tourism industry. By employing this model, the conventional bottom-up thinking can be replaced with an overall performance assessment model on continuous basis. In other words, if the tourism policy of public and private sector investment and publicity advertisement has positive results, the number of tourists will have a higher growth rate sustained. But if the policy implementation is just in paper or unfavorable, the numbers tourists will not be growing up and also unsustainable.

In reviewing previous relevant literature on this topic, although many researchers use econometric models and time series analysis method as research tools, but almost limited to the linear models, such as unit-root test, cointegration test, error correction model and causal model, in order to study dynamic time series data about the number of tourists(Fernandes et al., 2008; Tang, 2011 ; Brida and Risso , 2010; Bouzahzah and Menyari, 2013; Gasmi, 2013; Nanthakumar et al., 2013; Kilic and Bayar, 2014). But in the real-world economy and

society, non-linear relationships exist between most variables. Once the non-linear factors are ignored, and a linear model is used to estimate, it will be very likely an average or bias conclusions are reached. Therefore, we must in advance judge whether a nonlinear relationship exists between variables to be tested, and nonlinear models shall be applied to assess the relationships between the variables. We have checked few nonlinear time series models that have been proposed, such as: the threshold autoregression (TAR) model; neural network (NN) and Markov regime-switching model. In our opinions, TAR and Markov regime-switching model, with the more extreme range of conversion, are appropriate for high frequency data, while using NN model often produce irregularity in second-root predictive values of the variable , and thus is often difficult to explain the relationships between variables in the model. Therefore, this study adopts Panel Smooth Transition Regression (PSTR) Model developed by González et al. (2004, 2005). By using PSTR model, not only the presence of non-linear relationship between the variables can be detected, but also the analysis of non-linear smooth movements between variables under different cross-section data and at low frequencies of time series can be considered and implemented. In addition, PSTR model can further solve the problem of heterogeneity under different cross-section data (Nieh, 2013). It is believed that the estimate results through PSTR model is more relevant and proper than those derived from traditional linear and other non-linear models.

The remainders of this paper are organized as follows: Section 2 and 3 briefly introduces general panel smooth transition regression model and selection of variables .Section 4 displays the empirical results, and Section 5 draws conclusions from the empirical results.

2. METHODOLOGY

By referencing general panel smooth transition regression (PSTR) model developed by González et al. (2004, 2005), we extend it to predict the growth rate of the number of tourists

to Taiwan, and take the period lagged growth rates as explanatory variables, the foreign exchange rate as a transition variable, which is defined as follows:

$$TITAI_{it} = \mu_i + \sum_{j=1}^{n} \alpha_j TITAI_{it-j} + \sum_{j=1}^{n} \beta_j TITAI_{it-j} G\ q_{t-d}; \gamma, c_j + \varepsilon_{it} \quad (1)$$

Where i = 1, ..., N, and t = 1, ..., T. $TITAI_{it}$ is the growth rates in number of tourists from various countries to Taiwan, $TITAI_{it-j}$ is the k-dimensional vector of explanatory variables. By using backward stepwise regression to filter the optimum period lagged μ_i , proxies the fixed individual effect, and the error term is denoted by it ε_{it} . $G\ q_{t-d}; \gamma, c_j$ is a continuous and bounded function of the transition variable q_{t-d} . This article allows the period lagged foreign exchange rate as a transition variable, in order to illustrate the possibility that the appreciation or depreciation of foreign exchange rate may drive changes on the growth rates in number of tourists from various countries to Taiwan, which is ignored by previous researchers here in Taiwan.

By modifying Hansen's (1999) panel threshold regression model with leaping in the process, González et al. (2004, 2005) corrected the leaping process a smooth transition, then proposed a panel smooth transition regression equation. This model adds a transition function, which mainly describes, in the threshold nearby, the effect of a smooth conversion process interval due to transition function generated. Considered the following logistic transition function:

$$G\ q_{it-d}; \gamma, c_j = \left[1 + esp\ -\gamma \prod_{j=1}^{m} (q_{t-d} - c_j\ \right]^{-1} \quad with \quad \gamma > 0 \quad and \quad c_1 \le ... \le c_m \quad (2)$$

Where e is an m-dimensional vector of location parameters, and the slope of transition function is denoted by γ , which proxies the smoothness of transitions. Generally, considering $m = 1$ or $m = 2$ is sufficient because these values allow for the commonly encountered types of variation in the parameters[1] When $m = 1$, $\gamma \to \infty$, due to the fast

[1] m=1 corresponds to a logistic function with an S-shape, and m=2 corresponds to a exponential function with a

conversion speed, the function $G(\bullet)$ is leaving very fast, and the graphics becomes more steep, resulting its structural changes, similar to Hansen (1999) model as a single point of leaping. When $\gamma \to 0$, the function $G(\bullet)$ is approximately linear function, its structural change is not obvious. When the function value is between 0-1, the threshold effect of smooth transition exists.

When $m = 2$, $\gamma > 0$, this function is used to describe symmetrical effect, and we callit the exponential function. When $\gamma \to \infty$ and $c_1 \le c_2$, then converting function will produce different conversion rate, and the results from the model can be divided into three sections.

3. SELECTION OF VARIABLES

In this paper, Taiwan International Tourist Arrivals Index (TITAI) is selected as explained variable. The inputs to the variable are retrieved from statistics data-base provide by Taiwan Directorate-General of Budget, Accounting and Statistics, covering immigrants from 15 countries[2] during the period from January 2009 to December 2013. In addition, the exchange rate (EX) between US dollar and NT dollar is chosen and one-period lagged exchange rates as the transition variable. By doing so, the degree of sustainable growth rates, as well as its changes, in terms of number of tourists to Taiwan under the dynamic effects derived from changes in the exchange rate can be observed. The period lagged growth rates in the number of tourists to Taiwan are used as the explanatory variables. We believe this model can exclude the mistake that important variables in the model not be unobservable and measured, also can fully expose the sustainability information regarding tourist growth rate. In order to obtain the best explanation ability for this study, the period lagged between one to twelve months of growth rate in the number of tourists to Taiwan, with panel stepwise regression were screened and used. Our empirical results show that after the exclusion the information

U-shape.

[2] The fifteen countries are Australia, Canada, China, France, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, Germany, United Kingdom, United States, Hong Kong & Macao. The percentage of the number of tourists from these fifteen countries on total number of tourist to Taiwan is as high as 95%.

of certain period lagged with low explanatory power, the optimal period lagged are 1,3,12 month(s), which are the appropriate explanatory variables for our model with the most explanatory power to TITAI (Table 1).

Table 1 TITAI Panel Stepwise Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob
TITAI (-1)	0.2059	0.0232	8.8614	0.0000
TITAI (-3)	00845	0.0201	4.2035	0.0000
TITAI (-12)	0.7872	0.0245	32.1819	0.0000

4. EMPIRICAL RESULTS

To avoid possible bias in the empirical results, the Panel unit root tests are carried out to detect the convergence scenarios of variables. With the unit root test results expressed in Table 2, variables under normal distribution have given normality. After determining the variables can be converged, it is determined that PSTR model can be applied to future research.

Table 2 Panel unit root tests

	LLC		IPS	
	level	Pvalue	level	Pvalue
$TITAI_{it}$	-6.5214***	0.0000	-10.0112***	0.0000
EX_t	-9.4080***	0.0000	-7.2164***	0.0000

Notes:

1. $TITAI_{it}$ represents international tourist arrivals index(2010=100), EX_t represents exchange rate between New Taiwan dollar against US dollar.

2. LLC and IPS represent the Levin et al (2002) and Im et al (2003) panel unit root techniques. The 10%, 5%, and 1% critical values for LLC and IPS are: ... -1.65, -1.96, and -2.58. *, **, and *** denote significance at 10%, 5% and 1% levels, respectively.

In PSTR model, we first examine whether there is a nonlinear relationship, as well as to detect whether the existence of the threshold values. When the null hypothesis is rejected, it indicates that there exist a nonlinear relationship, and having one or more threshold values. We continue to test until increase in the number of threshold values is rejected. The test results in Table 3 show no remaining nonlinearity when our empirical model takes current period and one-period lagged exchange rate as transition variable.

Table 3 LM Test for Remaining Nonlinearity

EX_{t-d}	d=0		d=1	
Number of Location Parameters	m=1	m=2	m=1	m=2
H_0: r=0 , H_1: r=1	12.307*** (0.006)	-	8.749** (0.033)	32.254*** (0.000)
H_0: r=1 , H_1: r=2	3.121 (0.373)	-	2.599 (0.458)	27.211*** (0.000)
H_0: r=2, H_1: r=3	-	-	-	-

Notes:

1.In EX_{t-0}, m = 2, the test results found that at least one threshold value falls outside of all observed values of all transition variables. Therefore, the test results are bias, and will not be used.

2.*, **, and *** denote significance at 10%, 5% and 1% levels, respectively.

After examining whether a linear relationship exists in our model, and then explicitly rejected, it is clearly proved that there is a nonlinear relationship between TITAI with EX_{t-0}, EX_{t-1}, and one-period lagged TITAI respectively. In transition variable for EX_{t-0} model, the empirical results in Table 3 show that nonlinear relationship exists only when m = 1, r = 1. However, the transition variable to EX_{t-1} model, that nonlinear relationship exists when m = 1, r = 1 and m = 2, r = 2. Next, we select two locational parameters, and use AIC (Akaike

criterion) and BIC (Schwartz's Bayesian) to evaluate and select the optimal model. We consider m = 1, r = 1 has better explanatory power. Finally, we compare the two models, and find that when transition variable is EX_{t-1} , the explanatory power to TITAI is higher than the explanatory power to TITAI when transition variable is EX_{t-0} . This result is in line with the pattern behave by the most people that plan traveling in advance, and thus changes in the exchange rate one month before traveling will be more likely to affect willingness to travel. The Results are depicted in Table 4.

Table 4 Determination of the Number of Location Parameters

EX_{t-d}	d=0		d=1	
Number of Location Parameters	m=1	m=2	m=1	m=2
Optimal Number of Thresholds γ *(m)	1	0	1	2
Residual Sum of Squares	145044	-	144676	136024
AIC Criterion	5.3404	-	5.2378	5.3055
Schwarz Criterion	5.3912	-	5.3887	5.4009

In viewing Table 5 PSTR Models when using EX_{t-0} as transition variable for empirical test, no significant relationship is found within three-period lagged EX. This represents the deferred effect to TITAI from three-period lagged EX is not obvious, but the deferred effect to TITAI from twelve-period lagged EX appears important and significant. Just a single period, its sustainability can be up to 71.29% in maximum, or 59.02% in minimum. This also proves that the annual tourism promotion and marketing activities sponsored by the public or private sectors already has in substance scale effectiveness. When using EX_{t-1} as transition variable to the model, every period-lagged Ex has significant relationship with ITTAI, and still the deferred effect to TITAI from twelve-period lagged EX sustained the highest, up to 72%, representing with the dynamic changes in the exchange rate , the results of our empirical study is still consistent.

Table 5 Parameter Estimates for the Final PSTR Models

EX_{t-d}	d=0		d=1	
(m,r*)	(1,1)		(1,1)	
Variables	Coefficient estimate	t-statistic	Coefficient estimate	t-statistic
α_1	0.1196***	3.6524	0.1158***	3.9362
α_2	0.0280	1.0629	0.0471*	1.8918
α_3	0.7129***	16.1540	0.7200***	17.7092
β_1	0.0074	0.1315	0.1456*	1.9197
β_2	0.0522	1.2835	0.0536	1.0979
β_3	-0.1227**	-2.2330	-0.2656***	-3.7957
C	32.0692		32.7602	
γ	1191.7		576.7330	
Sustainability	79.74		81.65	

Notes:

1. α * and β * representing the various phases of the corresponding coefficient TITAI's behind.

2. C represents the threshold; slope γ representative model, also called transition speed.

3. *, **, And *** denote significance at 10%, 5% and 1% levels, respectively.

When using current foreign exchange rate as transition variable to the model, the deferred sustained effects to TITAI are presented in two intervals, and can be divided into the low-threshold interval (c≤32.0692) and high-threshold interval (c> 32.0692), depending on threshold value. The empirical results are depicted in Table 6. These two intervals represent that 1% increase in last month's number of tourists will result in the current period TITAI positively effect, with a 11.96 percent increase in low-threshold interval, and with a 12.7 percent increase in high-threshold interval. When the number of international tourist arrivals

in previous three months shows 1% increase, this will cause increases in international tourist arrivals in the current period: a 2.80% increase in low-threshold interval, and a 8.02% increase in high-threshold interval. When international tourist arrivals in past 12 months shows 1% increase, this will cause increases in international tourist arrivals in the current period: a 71.29% increase in low-threshold interval, and a 59.02% increase in high-threshold interval. Our empirical results also show that when the exchange rate is equal or below (≤) 32.0692, the overall deferred sustainable effects to TITAI amounted to 86.05%, and when the exchange rate is above (>) 32.0692, deferred sustainable effects fell to 79.74%.

When the transition variable EX is one-period lagged, the deferred sustainable effects to TITAI will still remain two intervals, with threshold value of 32.7602. However when the exchange rate is equal or below (≤) 32.7602, the deferred sustainable effects to TITAI is up to 88.29%, while the exchange rate is above (>) 32.7602, the deferred sustainable effects fell to 81.65%, with higher sustainable effect, compared to taking current exchange rate as the transition variable.

Generally speaking, TITAI reveals high degree of sustained effect, and from one hand, can be used to explain the executive ability and significant achievement through the endeavors made by both public and private sectors in planning and integration of tourism resources, in promoting the overall strength in tourism industry, and in improving facilities and service quality to tourists. On the other hand, it can be used as the representative for other exogenous variables in general. It can be used to interpret the only 11% unexplained in this model, highlights the strength TITAI self-explanatory power, and but also the original contribution of this study.

Table 6 Estimation of Coefficients of Control Variables in PSTR Models

EX_{t-d}	d=0	
	Low regime (c≤32.0692)	High regime (c>32.0692)
ITA (-1)	0.1196	0.1270
ITA (-3)	0.0280	0.0802
ITA (-12)	0.7129	0.5902
EX_{t-d}	d=1	
	Low regime (c≤32.7602)	High regime (c>32.7602)
ITA (-1)	0.1158	0.2614
ITA (-3)	0.0471	0.1007
ITA (-12)	0.7200	0.4544

5. CONCLUSION

As we all know, the output from tourism industry is of high economic value and without pollution problems. All of countries in the world are actively investing substantial resources in constructing multi-faceted tourism environment, and in developing ecologically diversified tourism activities in the local community, in order to improve competitive advantage in attracting international tourists. For example, by strengthening training in tourism hospitality, upgrading quality in leisure industry, maintaining cultural relics, and making travel tours consulting services more popular, in order to attract more foreign tourists. In particular, it is set as paramount and urgent goal by every host countries to increase the number of international tourist visit by all means, while the continuing changes in growth rate of tourists is the focus observed by the ruling authorities and the investors interested in tourism-related industries. Therefore, the performance in creating a favorable investment and tourism business environment to attract private investments will stake a country's future economic development and sustainability of tourism industry.

In this paper, panel smooth transition regression (PSTR) model is employed to investigate the dynamic changes of sustainable growth rate in the number of international tourists to Taiwan. The empirical results of this study show that the pattern of sustainability in the number of international tourists to Taiwan is a nonlinear and smooth transition process, and is determined by the changes of foreign exchange rate. This result is the one cannot be captured by the traditional linear model. In other words, using a linear model to estimate will cause estimate bias, due to ignoring the nonlinear adjustment information implicit in the estimate.

Secondly, the effects of either low or high threshold intervals are positive and highly sustained related. This may be the significant effects in the promotion of tourism brought by the ruling authorities, but may also illustrate that both the investments in establishing sound operating environment and setting up market order for the tourism industry are the main reasons in effectively expanding the international tourism market. With continuing improvement in the quality of tourism, catering to the needs of sight-seeing for different levels of people, expanding the depth and breadth of sight-seeing, it is believed that Taiwan can continuously attract international travelers to Taiwan.

Finally, it is appropriate by using foreign exchange rate to assess the threshold effect on its international tourist arrivals, and the sustained volatility scenario of TITAI also can be reasonably explained. Overall sustained effect to TITAI is up to the range between 86.05% and 88.29%. When exchange rate depreciation exceeds the threshold value, the deferred sustained effect is in the range of 79.74% and 81.65%.

But with highly sustained growth in the willingness to travel to Taiwan, in 2013 Taiwan's overall tourism revenue is accounted for only 4.39% GDP. This is clearly evident that there is still a lot of room and opportunity for expansion in Taiwan tourism market.

REFERENCES

1. Akinboade, O. A. and Braimoh, L. A., 2010, International tourismand economic development in South Africa. A Granger causality test, *International Journal of Tourism Research*, 12(2), pp.149–163.
2. Belloumi,M., 2010, The relationship between tourism receipts, real effective exchange rate and economic growth in Tunisia, *International Journal of Tourism Research*. 12(5), pp.550–560.
3. Bouzahzah, M. and Menyari, Y. El., 2013, International tourism and economic growth: the case of Morocco and Tunisia, *The Journal of North African Studies*, 18(4) pp.592-607.
4. Brida, J. G., Carrera, E. J. S. and Risso, W. A., 2008, Tourism's impact on long-run Mexican economic growth, *Economics Bulletin*, 3(21), pp.1-8.
5. Brida, J. G. and Risso, W. A., 2009, The contribution of tourism to economic growth: An empirical analysis for the case of Chile, *European Journal of Tourism Research*, 2(2), pp.178-185.
6. Brida, J. G., Lanzilotta, B., Lionetti, S. and Risso, W. A., 2010, The tourism-led-growth hypothesis for Uruguay, *Tourism Economics*, 16(3), pp.765-771.
7. Brida, J. G. and Risso, W. A., 2010, Tourism as a determinant of long run economic growth, *Journal of Policy Research in Tourism, Leisure and Events*, 2(1), pp.14–28.
8. Brida, J. G. and Monterubbianesi, P. D., 2010, Causality between economic growth and tourism expansion: empirical evidence from some Colombian regions, *Journal of Tourism Challenges and Trends*, 3(1) pp.153-164.
9. Brida, J. G., Punzo, L. F. and Risso, W. A., 2011, Tourism as a factor of growth: the case of Brazil, *Tourism Economics*, 17(6), pp.1375-1386.

10. Chang, C. L. and McAleer, M., 2012, Aggregation, heterogeneous autoregression and volatility of daily international tourist arrivals and exchange rates, *Japanese Economic Review* , 63(3), pp.397-419 .
11. Ekanayake, E. M. Halkides, M. and Ledgerwood, J. R., 2012, Inbound international tourism to the United States: A panel data analysis, *International Journal of Management and Marketing Research*, 5(3), pp.15-27.
12. Fernandes, P., Teixira, j., Ferreira, J. M. and Anevedo, S. G., 2008, Modelling tourism demand: a comparative study between artificial neural networks and the Box-Jenkins methodology, *Romanian Journal of Economic Forecastin*g, 9(3), PP.30-50.
13. Gasmi, A. 2013, Seasonal adjustment versus seasonality modelling: effect on tourism demand forecasting, *Advances in Management and Applied Economics*, 3(4), PP.119-132.
14. Gonzalez, A. Teräsvirta, T. and van Dijk, D., 2004, Panel smooth transition regression model and an application to investment under credit constraint, *NBER Working Paper*.
15. Gonzalez, A., Terasvirta, T. and van Dijk, D., 2005, Panel smooth transition regression models, *SSE/EFI Working Paper Series in Economics and Finance*, No. 604.
16. Hansen, B. E., 1999, Threshold effects in non-dynamic panels: estimation, testing, and inference, *Journal of econometrics*, 93(2), pp.345-368.
17. Kilic, C. and Bayar, Y., 2014, Effects of real exchange rate volatility on tourism receipts and expenditures in Turkey, *Advances in Management and Applied Economics*, 4(1), PP.89-101.
18. Lim, C. and McAller, M., 2002, Time series forecasts of international travel demand for Australia, *Tourism Managemen*t, 23, pp.389-396.

19. Lin, C. J. and Lee, T. S., 2013, Tourism demand forecasting: econometric model based on multivariate adaptive regression splines, artificial neural network and support vector regression, *Advances in Management and Applied Economics*, 3(6), PP.1-18.
20. Nanthakumar, L., Han, A. S. and Kogid, M., 2013, Demand for Indonesia, Singapore and Thailand Tourist to Malaysia: Seasonal unit root and multivariate analysis, *International Journal of Economics and Empirical Research*, 1(2), pp.15-23.
21. Nieh, C.C. and Yao H.C., 2013, Threshold effects in the capital asset pricing model using panel smooth transition regression (PSTR) Evidence from net oil export and import groups, *Advances in Management and Applied Economics*, 3(2), pp.179-192.
22. Singh, D., 2014, Analysis of medical tourism, *International Journal of Research in Finance and Marketing*, 4(7), pp.36-43.
23. Tang, C. F., 2011, Old wine in new bottles: Are Malaysia's tourism markets converging? *Asia Pacific Journal of Tourism Research*, 16(3), pp.263–272.