Determinants of Tourism Demand in Sarawak: An Augmented Gravity Model

MENG-CHANG JONG
Faculty of Economics and Business
Universiti Malaysia Sarawak
Jalan Datuk Mohammad Musa, 94300 Kota Samarahan, Sarawak, MALAYSIA

CHIN-HONG PUAH
Faculty of Economics and Business
Universiti Malaysia Sarawak
Jalan Datuk Mohammad Musa, 94300 Kota Samarahan, Sarawak, MALAYSIA

MOHAMMAD AFFENDY ARIP
Faculty of Economics and Business
Universiti Malaysia Sarawak
Jalan Datuk Mohammad Musa, 94300 Kota Samarahan, Sarawak, MALAYSIA

ANN-NI SOH
Faculty of Economics and Business
Universiti Malaysia Sarawak
Jalan Datuk Mohammad Musa, 94300 Kota Samarahan, Sarawak, MALAYSIA

Abstract: - This study investigates the determinants affecting tourism demand in Sarawak. An augmented gravity model is employed and analysed using a static panel approach covering the period of 2010 through 2018. An interesting finding reveals that tourists' income levels negatively affects tourism demand in Sarawak, which contradicts findings of previous studies, and thus contributes to the current literature gap. In addition, the income level in Sarawak positively influences tourism demand. Meanwhile, higher transportation costs and tourism prices will discourage tourists from visiting Sarawak. These findings can inform feasible strategic plans by the Sarawak government for tourism development in the long term.

Key-Words: - Tourism demand, geographical distance, origin income, tourism price, augmented gravity model, panel analysis.

1 Introduction

Tourism has gained recognition as a strong pillar of sustainable economic development and has flourished as a powerful engine of country revenue. The success and continuous development of the tourism sector can further strengthen economic growth and employment creation as it plays a significant role as a foreign exchange earner for most developed and developing countries. In 2018, world tourist arrivals increased by 6% to 1.4 billion, two years ahead of the United Nations World Trade Organization (UNWTO)'s 2010 forecast that this figure would be reached in 2020 [1]. The Asia-Pacific region received 343 million (24.5%) international tourist arrivals in 2018. The Pacific

Asia Travel Association (2019) [2] stated that Malaysia is one of the strongest Asian generators of additional visitor arrivals. Malaysian tourism contributed 15.2% (RM220.6 billion) of gross value, sustaining a double-digit growth, and also contributed 23.5% to tourism employment in 2018.

In 2018, tourist arrivals in Sarawak increased by 35.5% to 4.4 million as compared to 3.3 million tourists in 2010 [3]. The growth in tourist arrivals has grown tourism receipts from RM5.8 billion in 2010 to RM8.0 billion in 2018. The phenomenal growth of tourism in Sarawak has been associated with several factors. One of the factors is the uniqueness of Sarawak in terms of culture and heritage, attracting the curiosity of foreigners.

Furthermore, the contribution of Sarawak tourism in supporting the state's economy was 6.9% of the GDP. The top ten inbound tourist countries included Brunei, Indonesia, the Philippines, Singapore, China, United Kingdom, India, Australia, Thailand and Japan in 2018 [3]. These ten countries comprised 94.1% of international tourist arrivals in Sarawak. Realising the prominent role of these ten market sources, it is vital to identify the fundamental determinants for tourism demand in Sarawak.
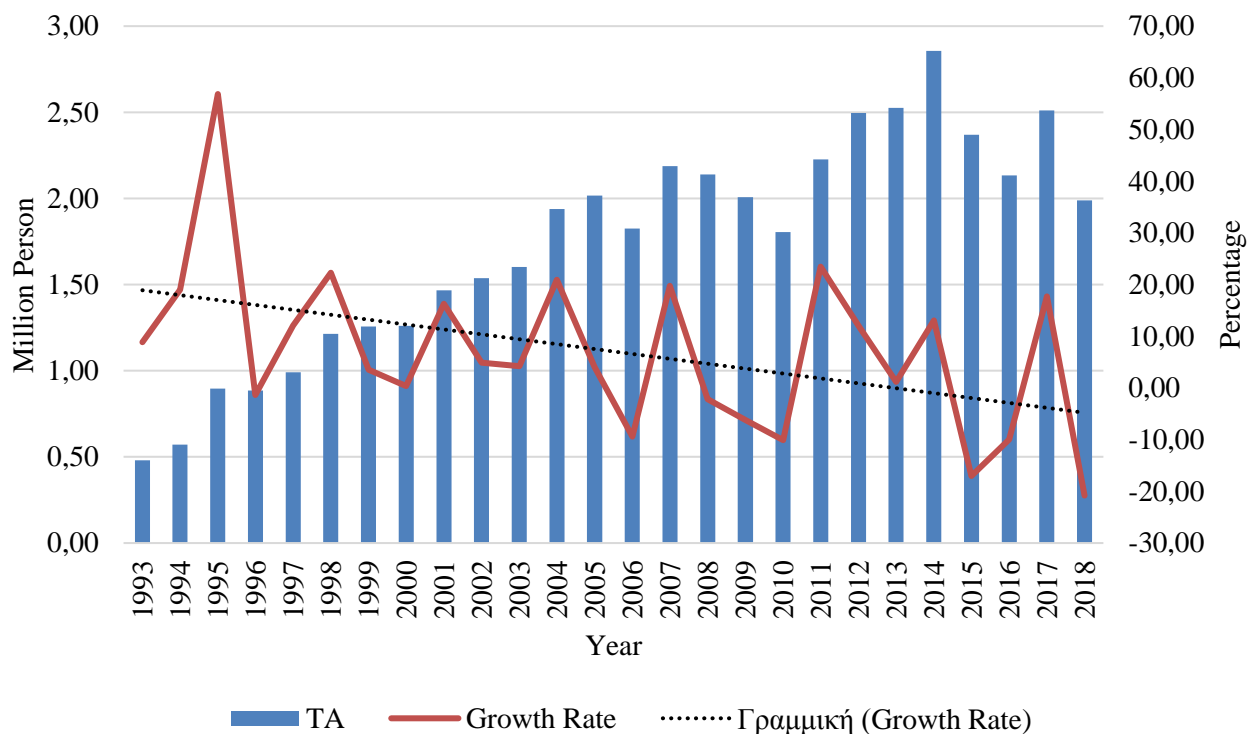
Source: MTACYS, 2019.

Figure 1: Total Top Ten Inbound Tourist Origin Countries and Growth Rate in Sarawak, 1993-2018

Sarawak is a unique state with 27 ethnic groups and it is home of cultural and natural heritage to explore in the island of Borneo. Despite the significant role of Sarawak tourism to its economy and its diverse tourist profile, empirical study on tourism demand related to Sarawak is scant. Therefore, this study sets out to investigate the determinants affecting tourism demand in Sarawak. The empirical findings can fill the research gap and contribute to the extant tourism literature. An augmented gravity model is employed to identify the relationship between tourism demand for Sarawak with a vector of explanatory variables. Figure 1 reveals the numbers of the top ten tourist inbounds and the growth rate in Sarawak from 1993 to 2018. Overall, the number of tourist arrivals is increasing over time while its growth rate fluctuates and showed a downward trend since 1993 through 2018. This illustrates that the growth of tourist arrivals is diminishing in rate. Extra attention is needed by the government to figure out the factors affecting tourism fluctuations in Sarawak. This critical issue furthers motivated this study's goal to investigate the determinants affecting tourism demand in Sarawak. In sum, this study contributed to extant tourism literature and identify the significant factors affecting tourism demand in Sarawak, and thus design the strategic policies for long term sustainable growth in tourism of Sarawak.

2 Literature Review

In previous studies, tourism demand has been extensively discussed. One important area of the literature focused on the application of the gravity model. Gravity model has been utilized by numerous studies such as ([4]; [5]; [6]) to identify the determinants affecting tourism demand. This model was developed by [7] and further extended by [8] based on Newton's universal law of gravitation to illustrate the international trade patterns. Also, the

gravity model has been extensively utilized in the study of international trade ([9]; [10]), and migration ([11]; [12]). Song and Li (2008) [13] concluded that tourist arrivals are the leading measurement in measuring tourism demand, followed by tourism receipts and length of stay. Tourist arrivals were utilized by ([14]; [15]; [16]) to provide concrete findings regarding tourism demand. Meanwhile, tourism receipts have been employed by ([17]; [18]; [19]) to proxy tourism demand. Income variable is used to represent tourists' income level and is usually determined by the GDP of the tourists' home countries. The income level is found in the studies of ([20]; [21]; [22]) as an explanatory variable. This variable is expected to have a positive relationship with tourism demand where higher tourists' income levels will stimulate arrivals to a tourism destination due to higher purchasing power.

Transportation cost is a significant determinant found in tourism demand study. Previous studies implied that transportation cost is usually proxied by oil price or geographical distance between both tourism destinations. Both proxies have been taken into consideration in this study. Transportation cost was adopted by ([23]; [4]; [24]). A negative relationship between transportation cost and tourism demand is anticipated because higher transportation implies that the travelling cost becomes higher and reduces the tourists' motivation to abroad. Furthermore, tourism price is also employed by ([25]; [26]; [19]; [27]) to identify the price impact on tourism demand. Their empirical findings show that tourism price has an adverse impact on tourism demand because some tourists prefer cheaper prices for similar products, and hence this will discourage them from traveling abroad. In the current study, a more detailed formula in computing tourism price has been employed by including the ratio of *CPI* and exchange rates. By taking exchange rate into consideration, the accuracy rate of calculating tourism price will be increased.

3 Data Description and Methodology

The information about international tourist arrivals into Sarawak from the top ten tourist-generating countries was gathered from MTACYS. The sources of data for independent variables were obtained from CEIC and Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). The data employed in this study comprise a balanced panel of 10 origin countries with 90 observations from 2010

to 2018 to capture the most recent tourism trend in Sarawak. An augmented gravity model is employed to identify the factors affecting tourism demand in Sarawak. The core gravity model is based on Newton's law of gravity theory which stated that two objects are attracted by each other, written as:

$$T_{ijt} = \beta_0 \frac{(GDP_{it}) \times (GDP_{jt})}{Dist_{ijt}} \varepsilon_{ijt} \qquad (1)$$

where *T* denotes the tourism flow between origin and destination countries; *GDP* refers to the economic size; *Dist* is the great circle distance between the capitals of the countries; β_0 is the constant term; ε is the error term; *i* refers to origin country; *j* proxies destination country: and *t* denotes time. Next, Equation (1) will regress into the following equation:

$$T_{ijt} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP_{jt} + \beta_3 Dist_{ijt} + \varepsilon_{ijt} \qquad (2)$$

Seetaram et al. (2016) [28] stated that the tourism price (*TP*) is a fundamental requirement in tourism demand function because it can determine the reaction of tourists toward price changes in the destination country. Thus, an additional variable (*TP*) has been included in the core gravity model to gather extra tourism information in Sarawak. The augmented gravity model for Sarawak tourism demand is expressed in Equation (3), and transformed into logarithm form for estimation purpose.

$$LTD_{ijt} = \beta_0 + \beta_1 LGDP_{it} + \beta_2 LGDPSWK_{jt} + \beta_3 LTC_{ijt} + \beta_4 LTP_{ijt} + \varepsilon_{ijt} \qquad (3)$$

where *LTD* represents the arrivals from the top ten tourist countries into Sarawak, *LGDP* proxies the tourists' income, and *LGDPSWK* indicates the income level in Sarawak. Both income levels are proxied by their nominal *GDP*. *LTC* is the transportation cost which is obtained by multiplying the crude oil price with the geographical distance between the capitals of the countries, and lastly *LTP* denotes the tourism price which is measured by multiplying the ratio of *CPI* between the origin countries and Sarawak with exchange rate. A positive relationship is expected for *LGDP*, indicating that a higher tourist income level will inspire more tourists to visit Sarawak and vice versa. Similarly, *LGDPSWK* is also expected to have a positive relationship with *LTD*. This

illustrates that economic performance in Sarawak influences tourists' intention to visit Sarawak. Improved economic performance shows that the Sarawak government has more capital allocation to further develop tourism spots. Meanwhile, *LTC* and *LTP* are predicted to have an adverse relationship with tourism demand in Sarawak. Higher transportation cost and tourism price will increase the total travel cost and thus reduce tourists' intention to travel to Sarawak.

4 Empirical Findings

The summary statistics of Sarawak tourism demand model using a static linear panel approach is shown in Table 1. The empirical findings show that the *F*-test is statistically significant at 1% level, signifying that the data can be pooled together in this study. Next, the Breusch-Pagan Langarian Multiplier test

is applied, and it statistically significant at 1% level, indicating that the RE model is preferable over the POLS model. Then, we will proceed with Hausman test to identify whether the RE or FE model is preferable in this study. The empirical result shows that the null hypothesis for Hausman test is rejected at 1% significant level, indicating that the FE model is the best model to identify the determinants affecting tourism demand in Sarawak. Next, a series of diagnostic tests are conducted to ensure the goodness-of-fit of the model. The empirical findings show that the model does not suffer from a multicollinearity problem, whereas it encounters heteroskedasticity and serial correlation problems. However, these issues can be rectified by using panel-corrected standard errors. After rectifying these problems, the final model is shown in the last column of Table 1.

Table 1: Results of Static Linear Panel Data Models for Sarawak

Dependent Variable: LTA			
Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	-12.28 (27.79)	-11.18* (5.96)	-12.26** (5.49)	-12.28 (10.20)
LGDP	-0.54*** (0.10)	-0.14 (0.12)	0.11 (0.13)	-0.54*** (0.03)
LGDPSWK	1.68 (1.15)	1.04*** (0.28)	0.71** (0.27)	1.68*** (0.42)
LTC	-0.22 (0.18)	0.02 (0.08)	0.15* (0.08)	-0.22*** (0.04)
LTP	-0.13*** (0.04)	-0.35*** (0.10)	-0.64*** (0.13)	-0.12*** (0.01)
F-Test [*p*-value]		32.88*** [0.00]		
Breusch-Pagan LM Test [*p*-value]		328.47*** [0.00]	-	-
Hausman Test [*p*-value]	-	24.02*** [0.00]		-
Multicollinearity	-	2.16	-	-
Heteroskedaticity [*p*-value]		324.57*** [0.00]		
Serial Correlation [*p*-value]	-	28.54*** [0.00]	-	-

Notes: Asterisk ***, ** and * represent 1, 5 and 10 percent levels of significance, respectively. The figures in brackets are standard error.

Surprisingly, the estimated coefficient for tourists' income negatively affected tourism demand in Sarawak, which contradicts with previous studies. The empirical finding shows that the number of tourist arrivals decreased by 0.54% when *LGDP*

rose by 1%. The negative sign suggests that Sarawak might be considered as an inferior tourism destination. This finding is in line with the studies of ([29]; [30]) which stated that the income level has a negative impact on the tourism demand, implying

that the tourism destination was considered an inferior good, and they preferred a more high-end destination. In addition, the negative sign for transportation cost is detected in this study. The finding proves that 1% increase in *LTC* discourages 0.22% of tourists from visiting Sarawak, signifying that the lower the transportation cost, the more attractive the destination. Lack of international flights further threatening the tourism industry in Sarawak. The tourists with higher income will divert their travel decision to other attractive destination with lower transportation cost. These findings provide important insights for the government to purify the tourism plans and policies.

A positive relationship is detected between tourism demand and income level in Sarawak. This illustrates that Sarawak has more capital in developing tourism infrastructure and facilities, and also offers more tourism products to attract more tourist arrivals. By offering variety tourism products and attractions, Sarawak will become an attractive tourism destination. The empirical result suggests that a 1% rise in *LGDPSWK* will attract another 1.68% of tourist arrivals into Sarawak. As expected, the tourism price is negatively affecting tourism demand in Sarawak and statistically significant at 1% level. The empirical outcome shows that a 1% increase in *LTP* will discourage 0.12% of tourists to visit Sarawak. This is because higher tourism price will increase their travelling cost and reduce their willingness to spend in Sarawak, which may reduce their motivation to visit Sarawak.

5 Conclusion

This study aims to identify the determinants affecting tourism demand in Sarawak. An augmented gravity framework was used to model tourism demand for Sarawak, employing panel data on 10 countries from 2010 through 2018. The selected determinants include tourists' income, income level in Sarawak, transportation cost and tourism price. The empirical results show that all selected determinants are significantly affecting tourism demand in Sarawak. A positive relationship is detected for the income level of Sarawak, while transportation cost and tourism price negatively influenced tourism demand in Sarawak, consistent with the previous studies. In contrast to the prior studies that found that income level in the origin country positively affects tourism demand, here we found that income level in origin country negatively influenced tourism demand in the case of Sarawak. This implies that Sarawak is considered an inferior

tourism destination, and high-income tourists preferred to travel to higher-end destinations. Therefore, the empirical result in this study contributes to the current literature.

The findings of this study have a number of practical implications. Firstly, significant promotion and tourism development are essential to ensure Sarawak's competitiveness and attractiveness. The government has to further upgrade its infrastructure and offer more special tourism products to ensure its sustainable growth. With strong promotions and more special tourism products, Sarawak tourism can be elevated into a potential world-class eco-tourism destination that will attract more high-income tourists. The Sarawak government needs to collaborate closely with the airline industry to create more international direct flights to reduce travelling cost and time for long-haul tourists. Lastly, a proper pricing strategy is important to ensure the Sarawak tourism is market-competitive. Tourists will be more willing travel to Sarawak when they feel their money is well-spent. Further research investigating Sarawak tourism demand using different determinants is highly encouraged, so that more useful information can be obtained regarding long-term sustainable growth.

References:
[1] UNWTO. International tourist arrivals reach 1.4 billion two years ahead of forecasts. 2019. https://www2.unwto.org/press-release/2019-01-21/international-tourist-arrivals-reach-14-billion-two-years-ahead-forecasts
[2] Pacific Asia Travel Association. Asia Pacific visitor forecasts 2019-2023. 2019. https://www.pata.org/asia-pacific-visitor-forecasts-2019-2023-full-report-now-available/#sthash.5LMVUdyF.dpuf
[3] MTACYS. *Sarawak Visitor Arrivals 2018*. Ministry of Tourism, Arts, Culture, Youth and Sports Sarawak, Sarawak, 2019.
[4] Kaplan, F., & Aktas, A. R., The Turkey tourism demand: A gravity model, *The Empirical Economics Letters*, Vol.15, No.3, 2016, pp. 265-272.
[5] Gouveia, S., Rebelo, J., Lina, L. G., & Guedes, A., International demand for the Douro (Portugal) river cruises: A gravity model approach, *Tourism Economics*, Vol.23, No.8, 2017, pp. 1679-1686.
[6] Chaney, T., The gravity equation in international trade: An explanation. *Journal of*

Political Economy, Vol.126, No.1, 2018, pp. 150-177.

[7] Tinbergen, J., *Shaping the world economy: Suggestions for an international economic policy*, The Twentieth Century Fund: New York, 1962.

[8] Poyhonen, P., A tentative model for the volume of trade between countries. *Review of World Economics*, Vol.90, 1963, pp. 93-100.

[9] Santana-Gallego, M., Ledesma-Rodríguez, F. J., & Pérez-Rodríguez, J. V., International trade and tourism flows: An extension of the gravity model, *Economic Modelling*, Vol.52, 2016, pp. 1026-1033.

[10] Zhang, H. Y., Xi, W. W., Ji, Q., & Zhang, Q., Exploring the driving factors of global LNG trade flows using gravity modelling, *Journal of Cleaner Production*, Vol.172, 2018, pp. 508-515.

[11] Karemera, D., Oguledo, V. I., & Davis, B., A gravity model analysis of international migration to North America, *Applied Economics*, Vol.32, No.13, 2000, pp. 1745-1755.

[12] Arpaia, A., Kiss, A., Palvolgyi, B., & Turrini, A., The effects of European integration and the business cycle on migration flows: A gravity analysis, *Review of World Economics*, Vol.154, No.4, 2018, pp. 815-834.

[13] Song, H., & Li, G., Tourism demand modeling and forecasting: A review of recent research, *Tourism Management*, Vol.29, 2008, pp. 203-220.

[14] Ooi, C. A., Hooy, C. W., & Som, A. P. M., Tourism crises and state level tourism demand in Malaysia, *International Journal of Business and Society*, Vol.14, No.3, 2013, pp. 376-389.

[15] Puah, C. H., Huan, S. H., & Thien, F. T., Determinants of Chinese demand for tourism in Malaysia, *Business and Economic Horizons*, Vol.14, No.3, 2018, pp. 501-512.

[16] Auzar, H., Bani, Y., & Ishak, S., Modelling tourism demand from United Kingdom to Maldives: A cointegration analysis, *Journal of Sustainability Science and Management*, Vol.15, No1, 2020, pp. 26-36.

[17] Song, H., Li, G., Witt, S. F., & Fei, B., Tourism demand modelling and forecasting: How should demand be measured? *Tourism Economics*, Vol.16, No1, 2010, pp. 63-81.

[18] Yazdi, S. K., & Khanalizadeh, B., Tourism demand: A panel data approach, *Current Issues in Tourism*, Vol.20, No.8, 2017, pp. 787-800.

[19] Husein, J., & Kara, S. M., Nonlinear ARDL estimation of tourism demand for Puerto Rico from the USA, *Tourism Management*, Vol.77, 2020, pp. 1-4.

[20] Kadir, N., Nayan, S., & Abdullah, M. S., A panel data analysis of international tourist arrivals from ASEAN countries to Malaysia, *Procedia Economics and Finance*, Vol.7, 2013, pp. 80-85.

[21] Thien, F. T., Puah, C. H., Hassan, M. K., & Arip, M. A., An ECM analysis of Thai tourism demand in Malaysia, *Mediterranean Journal of Social Sciences*, Vol.6, No.3, 2015, pp. 162-168.

[22] Wakimin, N. F., Azlina, A. A., & Hazman, S., Tourism demand in Asean-5 countries: Evidence from panel data analysis, *Management Science Letters*, Vol.8, 2018, pp. 677-690.

[23] Priego, F. J., Rossello, J., & Maria, S. G., The impact of climate change on domestic tourism: A gravity model for Spain, *Regional Environment Change*, Vol.15, No.2, 2015, pp. 291-300.

[24] Takahashi, K., Tourism demand and migration nexus in Small Island Developing States (SIDS): Applying the tourism demand model in the Pacific region, *Island Studies Journal*, Vol.14, No.1, 2019, pp. 163-174.

[25] Puah, C. H., Thien, F. T., & Arip, M. A., Singaporean demand for tourism in Malaysia, *Economic Annals-XXI*, Vol.11-12, 2014, pp. 32-36.

[26] Tanjung, A. F., Thien, F. T., Puah, C. H., Brahmana, R. K., & Sianturi, R. H., Macroeconomic determinants of Indonesian tourism demand in Malaysia, *Advanced Science Letters*, Vol.23, No.4, 2017, pp. 3155-3158.

[27] Nonthapot, S., & Thomya, W., The effect of the marketing mix on the demand of Thai and foreign tourists, *Management Science Letters*, Vol.10, 2020, pp. 2437-2446.

[28] Seetaram, N., Forsyth, P., & Dwyer, L., Measuring price elasticities of demand for outbound tourism using competitiveness indices, *Annals of Tourism Research*, Vol.56, 2016, pp. 65-79.

[29] Candela, G., & Figini, P., *The economics of tourism destinations. In The economics of tourism destinations*, Springer, Berlin, Heidelberg, 2012.

[30] Borhan, N., & Arsad, Z., *Determining factors affecting tourism demand for Malaysia using*

ARDL modeling: A case of Europe countries. In AIP Conference Proceedings. AIP Publishing LLC, 2016.