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Elasticity of tourism demand by income and price: evidence from domestic tourism of countries in ASEAN

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Abstract: In recent years, there have been many publications about the elasticity of international tourism market demand by income and prices, but there is still quite little about domestic tourism demand. This article studies the domestic tourism demand to find the role of income, own price and cross price in the most countries of Association of Southeast Asian Nations. These are developing countries and have great tourism potential. The results show that domestic tourism in these countries is still a luxury service. Price related to domestic tourism is also an important factor and negatively affects domestic tourism demand in these countries. Outbound tourism to countries having shared borders are substitute destinations for domestic tourism. When the same level of tourist income and level of prices related to domestic tourism, Indonesians travel inland highest, followed by Vietnamese, Cambodian, Filipino, Thai people, Malaysian and the people of Laos are the lowest. These findings complement the empirical studies on tourism demand and are the basis for making policy implications for the development of domestic tourism in most countries of the Association of Southeast Asian Nations.

Subjects: Tourism Management; Tourism Research Methods; Economics of Tourism

Keywords: Tourism demand; income and prices; domestic tourism; ASEAN

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PUBLIC INTEREST STATEMENT
In the context of the Covid-19 epidemic seriously affecting the international tourism industry, domestic tourism is playing the key role in maintaining the survival of the tourism industry in many countries. Unlike international tourism, so far, studying on domestic tourism in general and the elasticity of domestic tourism demand in particular is still quite a few. This paper examines the elasticity of domestic tourism demand by income, domestic tourism service price (own price) and international tourism service price (substitute price). The paper not only examines the domestic tourism demand of a country, but also for the Association of Southeast Asian Nations as a regional domestic. The findings suggest the different roles these factors in domestic tourism demand as well as the different in countries. In the end, appropriate recommendations have been presented in this paper.

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1. Introduction

Tourism industry in the world has a long history of development. Tourism scholars have closely followed its progress and have provided a rich collection of literature, that ranges from the overview of the industry evolution, development and organizational structure to the examination of specific issues such as policies and plans, social and cultural impacts, service quality, and marketing (Cai & Knutson, 1998). So far, there have been many publications related to the tourism industry, in which the research on tourism demand elasticity has been of interest to researchers and practitioners. Song et al. (2010) provided two main reasons for studying tourism demand. First, these elasticities reflect how tourists respond to changes in the influencing factors of tourism demand in terms of direction and magnitude. Second, they provide useful information for tourism policy, as tourism providers can manipulate determinants such as the tourism price and marketing expenditures to increase demand for the tourism service under consideration. The publications of tourism demand elasticities have enriched the theory and methods of measuring tourism demand elasticity by prices and income in different contexts. However, these publications are mainly in the international market (tourists traveling between countries). The publications of domestic market demand are still small, with some case studies such as analyzing domestic tourism demand in China through behavioral model of Cai and Knutson (1998); comparison of econometric modeling of demand for domestic and international tourism by Swedish data of Salman et al. (2007); foreign and domestic tourism demand in Galicia, Spain of Garín-Muñoz (2009); impacts of climate change on domestic tourism in the United Kingdom of Taylor and Ortiz (2009); estimating the long-run effects of socioeconomic and meteorological factors on the domestic tourism demand for Galicia, Spain of Otero-Giráldez et al. (2012) … In which, there are also only a few publications about domestic tourism demand impacted by income and own price or income, own price and some other factors (Garín-Muñoz, 2009; Otero-Giráldez et al., 2012; Salman et al., 2007) or impacted by income and other factors (Cai & Knutson, 1998). This is the motivation for this study to consider not only the impact of income, own prices but also the impact of cross price on domestic tourism market demand.

Association of Southeast Asian Nations (ASEAN) is a political, economic, cultural and social union of countries in Southeast Asia, established on 8 August 1967, originally composed of five countries namely Indonesia, Malaysia, Philippines, Singapore and Thailand, then Brunei Darussalam, Vietnam, Laos PDR, Myanmar and Cambodia joined the 1990s. ASEAN has a land area of 4.46 million km², accounting for 3% of the total area of the Earth and has a population of about 600 million people, accounting for 8.8% of the world’s population. These are developing countries with similar cultural backgrounds and great potential for tourism development.

According to published data by Knoema¹ (Knoema, 2019), in 2018, the contribution of travel and tourism to GDP for Brunei was 0.9 billion USD (account for 6.7% of GDP). The corresponding figures for Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam are respectively USD 8.0 billion (accounted for 32.8%), USD 62.6 billion (accounted for 6.0%), USD 2.2 billion (accounted for 12%), 4.7 billion USD (accounted for 13.3%), 5.0 billion USD (accounted for 6.8%), 81.5 billion USD (accounted for 24.7%), 14 billion USD (accounted for 10%), 109.5 billion USD (accounted for 21.6%) and 22.4 billion USD (accounted for 9.2%). These figures show that the tourism industry has played the key role for the countries in ASEAN, which have an important role in domestic tourism, especially countries with a large population namely Indonesia, Philippines, Vietnam, Thailand and Malaysia. Therefore, domestic tourism has been interesting and statistics by many countries in ASEAN recently. Academically, there have been some studies for domestic tourism in several countries, such as in Indonesia (Gunawan, 1996), in Thailand (King & Parnwell, 2011), in Malaysia (Chiu et al., 2015) … However, there have been no studies on the elasticity of domestic tourism demand in ASEAN countries.
Currently, there are 7/10 countries in ASEAN which are annually published by the World Tourism Organization about domestic tourists, namely Cambodia, Indonesia, Laos, Malaysia, the Philippines, Thailand and Vietnam. Brunei Darussalam, Myanmar and Singapore do not have annual statistics of domestic tourists. The reason Brunei Darussalam and Singapore have not statistics may be that they have a small area and population (the area and population in 2018 are 5770 km² and nearly 430 thousand people; 697 km² and nearly 5640 thousand people), so the number of domestic tourists is not large and they do not make these statistics.

Also, from the data of Knoema (2019) shows that in 2018, tourism and travel industry of seven countries published data on domestic tourism in ASEAN contributed more than 333 billion USD to GDP, accounting for 13.3% of GDP. The contribution of tourism and travel industry to a country is mainly inbound tourism and domestic tourism because they generate revenue for national tourism activities. Table 1 presents the domestic tourists in 2018 of seven countries in ASEAN namely Cambodia, Indonesia, Laos PDR, Malaysia, Philippines, Thailand and Vietnam. Data show that domestic tourists make up 86% of total tourists and 92% of total tourists use travel services in countries (inbound tourism and domestic tourism). Therefore, domestic tourism plays an important part in the contribution of tourism and tourism to GDP. With a population of more than 594 million in 2018 (The World Bank, 2019), domestic tourism will continue to have great potential for development for these countries. This is also the reason why this article selects countries in ASEAN to study.

The above contents show that domestic tourism plays an important and can not be overlooked in the countries of ASEAN. Determining the elasticity of domestic tourism demand not only enriches the theory but also allows countries and tourism businesses making business policies for developing and operating the tourism market as well as resources in each country effectively. The aims of this study is to determine the importance of factors such as income, own price and substitute price for domestic tourism demand in most countries in ASEAN.

The next section, this paper presents a theoretical basis and proposes a research model; followed by data collection and descriptive statistics about the variables, which help characterize it. Then the paper presents data analysis methods, results of estimating the parameters in the model, and discussing research results. The paper finished with conclusions.

2. Theoretical basis and research models

2.1. Research background

Studying the elasticity of tourism demand has been done by many researchers for decades. Most of these studies are empirical studies for international tourism demand. The results of these studies have helped to provide evidence of the general rule of demand and their expression in different markets and stages.

Crouch (1992) considered 44 published from 1960 to 1990 on the elasticity of tourism demand in countries and different periods with usable income elasticity estimates and 1227 usable price elasticity estimates. Crouch (1992) pointed out that most studies in this period had used ordinary least—square regression (OLS) or least—square regression by a linear (additive) or log-log (multiplicative) model specification. Some studies, however, tested both forms of specification to find the model best fit to the data. For income elasticity, about 5% of the estimates are negative. However, about 63% of the estimates are income elastic (i.e., the income elasticity exceeds unity) implies that most international tourism is considered luxury. The mean income elasticity is +1.76 and the standard deviation is 1.80. Besides, about 60% of the price elasticity estimates have a negative sign. The mean price elasticity is −0.39 and the standard deviation is 3.70.

Next, song et al. (2010) reviewed the result of 17 studies from 2000 to 2009 and pointed out that in general, the income elasticities of tourism demand, especially the international tourism demand, is often greater than one, thus indicating that tourism is luxury. The own price elasticity
| Country     | Area (1000 km²) | Population (million) | Contribution to GDP (2) | Tourist (million) (3) | % domestic tourists in Total tourist | Using domestic services |
|-------------|-----------------|----------------------|-------------------------|-----------------------|-------------------------------------|-------------------------|
|             |                 |                      | Billion USD | % GDP | Inbound | Outbound | Domestic |                           |                        |
| Cambodia    | 181.04          | 16.25                | 8.0        | 32.8  | 6.20    | 1.96     | 11.06    | 57.6                        | 64.1                    |
| Indonesia   | 1,905.00        | 267.66               | 62.6       | 6.0   | 15.81   | 9.47     | 30.34    | 92.3                        | 95.0                    |
| Laos PDR    | 236.80          | 7.06                 | 2.2        | 12.0  | 4.19    | 2.80     | 2.82     | 28.7                        | 40.2                    |
| Malaysia    | 329.85          | 31.53                | 47.2       | 13.3  | 25.83   | 13.95    | 30.24    | 88.4                        | 92.1                    |
| Philippines | 300.00          | 106.65               | 81.5       | 24.7  | 7.13    | 8.14     | 111.35   | 87.9                        | 94.0                    |
| Thailand    | 513.12          | 69.43                | 109.5      | 21.6  | 38.28   | 9.97     | 227.77   | 82.5                        | 85.6                    |
| Vietnam     | 331.21          | 95.54                | 22.4       | 9.2   | 15.50   | 10.00    | 80.00    | 75.8                        | 83.8                    |
| Total       | 594.12          | 333.4                | 112.93     | 56.27 | 1,038.82| 86.0     | 90.2     |                             |                         |

Number of domestic tourists are identified as trips of visitors (overnight visitors and same-day visitors).

Source: (1) The World Bank (2019).
(2)Knoema (2019).
(3)World Tourism Organization (2020).
is normally negative, but the magnitudes vary considerably depending on the type of tourism (long or short haul) and the duration of demand being considered (long term versus short term).

From 2010 to 2019, there have been some more publications about the elasticity of tourism demand by authors such as Chaiboonsri et al. (2010), Lee (2011), Seetaram (2012), Cheng (2012), Gatta and Falzon (2014), Álvarez-Díaz et al. (2015), and Lin et al. (2015), and Untong et al. (2015), and Seetaram et al. (2016), and Dogru et al. (2017), Ramos et al. (2017), Shafiullah et al. (2018), and Kumar et al. (2019). Table 2 below summarizes 31 publications from 2000 to 2019 relate to the elasticity of tourism demand. These studies mainly used meta data and used ordinary least-squares regression (OLS) or autoregressive distributed lag model (ADLM) or Autoregressive Distributed Lag (ARDL). Other techniques which have been tried include, for example, time-varying parameter (TVP) approach, augmented Dickey—Fuller (ADF) auxiliary regression tests.

2.2. The role of income and price

2.2.1. The role of income

Consumer income changes may cause changes in demand for products. Increase in real income provides consumers with greater spending power. The income elasticity of demand provides a means to distinguish between these different types of products. Income elasticity is measured by the percentage change in demand divided by the percentage of income changes.

According to Crouch (1992), inferior tourist destinations would have a negative income elasticity. A positive income elasticity indicates normal travel destinations, which can be considered a luxury destination if their income elasticity exceeds unity. Therefore, it is expected to find an estimated range of elasticities from previous research, varying from negative values to positive values greater than unity.

The value of 155 estimates of income elasticity summarized in Table 1 shows that only about 1.9% of the estimates have a negative sign implying inferior tourist destinations. While about 81.9% of the income elasticity is estimated with a coefficient greater than one. The value of the income elasticity is between -4.72 and 19.19 with the mean of +2.10 and a standard deviation of 0.17. Overall, compared to the period 1960–1990, in the 2000–2019 period the mean of income elasticity increased by 20%, the elasticity of income with a coefficient greater than 1 increased by more than 30%. These results lend support to the fact that most international tourism is considered luxurious and tends to increase.

2.2.2. The role of own price

The price elasticity of demand is measured as the percentage change in demand divided by the percentage change in price. Traditional economic theory assumes that demand for a product decreases as the price of the product rises (i.e., a downward sloping demand curve, known as the law of demand).

For a product like tourism, own price consists of numerous components. The costs of goods and services purchased at the destination(s) would normally account for the major portion of the total price. The cost of the transportation to the destination(s) may also be quite significant, particularly in the case of long-haul air travel. There are also other costs or factors, such as travel insurance, or the opportunity cost of travel time. Therefore, price is a much more complicated structure than income, especially in the case of international tourism (Crouch, 1992). Because of this complexity and the suitable with available data, researchers used a variety of price data to represent tourism price variables. In case of not collecting tourism price, published Consumer Price Indices (CPI) is a fairly appropriate choice because it has been argued either that the mix of goods and services consumed by tourists is not too different from the mix constituting the CPI, or that the changes in the CPI fairly reflect changes in the prices of goods and services consumed by tourists (Crouch, 1992). 31 publications from 2000 to 2019 in Table 1 are examples of this issue.
Table 2. Publications from 2000 to 2019 relate to the elasticity of tourism demand

| Author(s) | Income | Price | Cross price |
|-----------|--------|-------|-------------|
|           | Number of usable | Mean of elasticity | Number of usable | Mean of elasticity | Number of usable | Mean of elasticity |
| Song et al. (2000) | 11 | 2.23 | 11 | −0.54 |
| Vanegas and Croes (2000) | 5 | 1.51 | 3 | −0.14 |
| Kulendran and Witt (2001) | 6 | 1.06 | 4 | −4.45 | 2 | −2.14 |
| Greenidge (2001) | 3 | 2.30 | 1 | −0.18 |
| Song et al. (2003a) | 3 | 3.50 | 5 | −2.41 | 7 | 1.49 |
| Song and Witt (2003) | 2 | −0.73 | 3 | −3.03 | 4 | 2.07 |
| Song et al. (2003b) | 14 | 1.95 | 13 | −1.03 | 7 | 0.92 |
| Song and Wong (2003) | 6 | 1.92 | 6 | −0.55 | 6 | 0.61 |
| Dritsakis (2004) | 2 | 4.10 |
| Lim (2004) | 1 | 19.19 | 1 | 19.68 |
| Croes and Vanegas (2005) | 3 | 4.42 | 3 | −0.63 |
| Li et al. (2006) | 5 | 2.12 | 5 | −1.14 | 5 | −0.04 |
| Mervar and Payne (2007) | 5 | 4.60 |
| Munáz (2007) | 1 | 5.40 | 1 | −2.16 |
| Ouferelli (2008) | 6 | 2.06 | 6 | −2.72 | 5 | 0.13 |
| Lim et al. (2008a) | 3 | 1.47 |
| Lim et al. (2008b) | 3 | 1.00 |
| Song et al. (2010) | 9 | 1.32 | 9 | −0.10 | 9 | 0.39 |
| Chaiboonsri et al. (2010) | 6 | 1.54 | 4 | −0.13 |
| Lee (2011) | 4 | 2.32 | 4 | −0.47 | 1 | 1.75 |
| Seetaram (2012) | 1 | 2.90 | 1 | −1.90 | 1 | 0.67 |
| Cheng (2012) | 2 | 1.77 | 2 | 0.43 |
| Gatta and Falzon (2014) | 7 | 0.80 | 7 | −2.04 |
| Álvarez-Díaz et al. (2015) | 4 | 1.23 | 4 | −1.00 |
| Lin et al. (2015) | 11 | 1.08 | 10 | −2.07 |
| Umtong et al. (2015) | 1 | 1.37 | 1 | −3.66 | 1 | 5.33 |
| Seetaram et al. (2016) | 1 | 2.39 | 1 | −1.07 |
| Dogru et al. (2017) | 4 | 2.02 | 4 | 1.13 | 1 | 0.54 |
| Ramos et al. (2017) | 8 | 1.58 | 8 | −2.38 | 3 | 3.37 |
| Shaflullah et al. (2018) | 6 | 2.55 | 3 | −0.42 |
| Kumar et al. (2019) | 14 | 2.69 | 11 | −0.61 | 7 | −0.32 |
| Total | 155 | 2.10 | 131 | −1.36 | 59 | 0.76 |

* Substitute price.
Only 4/31 publications had tourism price data; 18/26 publications used CPI to represent the price of tourism service (CPI at the destination or the ratio between the CPI at the original and the destination with the adjustment of the exchange rate between original and destination), the remaining used other data such as living expenses for tourists or related to living costs, tourism prices, exchange rates . . .

Although the tourism price variable has not been used in the same way, the results of estimating the price elasticity of own price in the period from 2000 to 2019 in Table 1 still show the role of own price. The results of 131 estimates of own price elasticity summarized from 2000 to 2019 show that more than 87% of estimates have negative signs. The elasticity value of the own price ranges from $-19.68$ to $6.64$ with a mean of $-1.36$ and standard deviation of 0.22. Compared to the period 1960–1990, mean of own price elasticity decreased by 3.5 times in the period 2000–2019. This suggests that own prices tend to have a strong impact on tourism demand.

According to Crouch (1992) in the case own price defined which relate destination prices to origin prices and the origin price varies while the destination price remains constant (particularly if the origin price is measured by the CPI), the income effect may be quite large compared to the substitution effect which leads to price elasticity that will show positive signs in this situation. In case the own price is measured in absolute terms, own price elasticities ought to have a negative sign, unless an exception occurs which results in an income effect that exceeds the substitution effect.

2.2.3. The role of cross price
Cross price elasticity of demand is measured as the percentage change in the quantity demanded of a product and divided by the percentage change in the price of the other product. The cross-price elasticity can be either positive or negative, depending on whether the product is complements or substitutes. If the two products are complementary, the increase in demand for a product is accompanied by an increase in the demand of the other. In contrast, the positive cross price elasticity value indicates that the two products are substitutes. For substitute products, as the price of one product rises, the demand for the substitute product increases also.

Table 1 above summarizes 59 usable cross price elasticity estimates, of which 43 cross price elasticity has positive value, representing substitute price. Value of substitute price elasticity is between 0.003 and 5.33 with the mean of $+1.37$ and standard deviation of 0.22. Previous studies show that overall tourism demand is sensitive to its own price than substitute price and the variation of own price elasticity is also higher than substitute price elasticity.

2.3. Research models
According to Song and Witt (2000), the tourism demand for a particular destination can be defined as the quantity of a tourism product (i.e., a combination of tourism goods and services) that consumers are willing to purchase during a specified period under a given set of conditions. Most frequently, this time period is a month, a quarter or a year. According to Song et al. (2010), the majority of relevant studies use time series data to examine the demand for tourism. The conditions related to the quantity of a tourism product demanded include the tourism prices in the destination (tourists’ living costs in the destination and their travel costs for that product); the tourism prices in competing (substitute) destinations; potential consumers’ income levels; and other social, cultural, geographic and political factors. The demand function for a tourism product in a particular destination by the residents of an origin country is given by Equation (1) below.

\[ D_t = f(Y_t, PT_t, PS_t) + U_t \]  

(1)

where

- \( D_t \): The quantity of the tourism product demanded at time \( t \).
\( Y_t \): Tourists’ level of income at time \( t \).

\( PT_t \): The price of the tourism product/service at time \( t \).

\( PS_t \): The price for substitute destinations at time \( t \).

\( U_t \): The disturbance term that captures all of the other factors that may influence the quantity of the tourism product demanded at time \( t \).

**Equation (1)** is a general statement of demand function and shows that tourism demand is determined by its influencing factors. According to Vanegas and Croes (2000), there are a large number of qualitative that influence the decision to consume international tourism such as special events, political instability and social conflict, airlift problems, travel restrictions, economic recessions and other factors are well-known demand characteristics. Normally, dummy variables are introduced to explain the effect of special events or different areas that may have a transitory influence on tourism demand. The purpose of this study is to estimate the elasticity of the tourist market demand based on income and price, so the influencing factors only consider income, own price and cross prices and ignore the factors except for different regions (different countries). According to Song et al. (2000), the price of the substitute destination in international tourism is often the price of domestic tourism. Thus, the price of international tourism can be considered a cross price of domestic tourism. A potential tourist instead of traveling in the country, they can replace it with a vacation abroad or both, especially neighboring countries, have relatively similar travel costs. Therefore, the travel prices of these international destinations may strongly influence domestic tourism demand.

To estimate the elasticity of tourism demand, this study uses multivariate regression analysis. Multivariate regression analysis is a method of determining the degree of influence exerted upon the demand by each of several variables (Uysal & Crompton, 1985). There are many types of multiple regression models, but the fact that the log-log model is the one commonly used to estimate the elasticity of tourism demand. Log-log function is conventionally used in demand models as then the demand elasticities can be directly obtained from the estimated coefficients (Song et al., 2009; Witt & Witt, 1995). Moreover, natural logarithm conversion also alleviates variance instability of data (Enders, 2004; Studenmund, 2006). In fact, most studies have used a log-log model to estimate the elasticity of tourism demand (Croes & Vanegas, 2005; Dritsakis, 2004; Greenidge, 2001; Kulendran & Witt, 2001; Li et al., 2006; Lim, 2004; Munáez, 2007; Ramos et al., 2017; Song et al., 2000, 2003b, 2010; Song & Witt, 2003; Song & Wong, 2003; Vanegas & Croes, 2000). Therefore, from **Equation (1)**, the model of tourism demand in this study was specified by the following **Equation (2).**

\[
\ln DT_t = \beta_0 + \beta_1 \ln YT_t + \beta_2 \ln PT_t + \beta_3 \ln PS_t + \varepsilon_t
\]

**Equation (2)**

where

\( DT_t \): Demand of domestic tourists at time \( t \) (annual number of person trips).

\( YT_t \): Income of tourists at time \( t \).

\( PT_t \): Tourism service prices at time \( t \).

\( PS_t \): Price of substitute tourism destinations at time \( t \).

\( \beta_0, \beta_1, \beta_2 \) and \( \beta_3 \): Parameters to be estimated.

\( \varepsilon_t \): Error term.
3. Data and methods

3.1. Data

3.1.1. Data on domestic tourists’ demand

The above empirical studies show that the majority of tourist demand is measured by the number of tourist arrivals (Álvarez-Díaz et al., 2015; Croes & Vanegas, 2005; Dogru et al., 2017; Dritsakis, 2004; Greenidge, 2001; Lee, 2011; Lim, 2004; Lim et al., 2008a, 2008b; Mervar & Payne, 2007; Munóz, 2007; Ramos et al., 2017; Song et al., 2010; Song & Witt, 2003; Song et al., 2003a; Song & Wong, 2003; Song et al., 2003b; Vanegas & Croes, 2000). Besides, there are also several studies measured by per capita tourists (Li et al., 2006; Gatta & Falzon, 2014) or expenditure—real tourism spending per capita in destination (Li et al., 2006; Gatta & Falzon, 2014). Similar to previous publications, the international tourist demand for this study is also measured by the number of tourists.

Data on domestic tourists from ASEAN countries was collected from the World Tourism Organization (2020), Cambodia Ministry of Tourism (2019), Laos Ministry of Information, Culture and Tourism (2019), and Vietnam National Administration of Tourism (2019). The annual number of observations about domestic tourists is 114 including 7 countries over the period 2000–2018. They are divided into two groups: Group 1 is the countries joining ASEAN from the beginning and having higher income per capita namely Indonesia, Malaysia, Philippines and Thailand; group 2 is the countries joining ASEAN later and having lower income per capita namely Cambodia, Laos and Vietnam. Number of observations for countries is presented in Table 3.

3.1.2. Data on income levels of domestic tourists

Because it is difficult to obtain the exact income level of tourists, studies often use data for the level of tourist income related to GDP such as real GDP (Cheng, 2012; Croes & Vanegas, 2005; Dogru et al., 2017; Greenidge, 2001; Lim et al., 2008a, 2008b; Mervar & Payne, 2007; Munóz, 2007; Ramos et al., 2017; Song et al., 2010; Song & Witt, 2003; Song et al., 2003a, 2003b; Vanegas & Croes, 2000); real GDP per capita (Dritsakis, 2004; Kulendran & Witt, 2001; Lee, 2011; Lim, 2004; Song et al., 2000); GDP per capita by purchasing power parity (PPP) (Seetaram, 2012); index of GDP (Song & Wong, 2003); index income per capita (Li et al., 2006).

This study uses PPP per capita income (source market) to represent the income level of domestic tourists, for the following reasons: Firstly, using income per capita is more meaningful than using GDP because it reflects not only GDP but also reflects the annual population size. Secondly, this study examines the demand for domestic tourists from different countries in ASEAN, so it is

| No. | Country     | Group | Observations | From to    |
|-----|-------------|-------|--------------|-----------|
| 1   | Cambodia    | 2     | 17           | 2002-2018 |
| 2   | Indonesia   | 1     | 18           | 2001-2018 |
| 3   | Laos        | 2     | 17           | 2002-2018 |
| 4   | Malaysia    | 1     | 11           | 2008-2018 |
| 5   | Philippines | 1     | 19           | 2000-2018 |
| 6   | Thailand    | 1     | 13           | 2006-2018 |
| 7   | Vietnam     | 2     | 19           | 2000-2018 |
|     | Total       |       | 114          |           |
necessary to use GDP by PPP. Income per capita by PPP is collected from data published by The World Bank (2019).

3.1.3. Data on own price
As mentioned above, price is a much more complex construct than income and in case there is no data on tourism price, CPI is often used as a basis for building tourism price data (Song et al., 2000; Vanegas & Croes, 2000; Song et al., 2003a; Song & Witt, 2003; Croes & Vanegas, 2005; Gang Li et al., 2006; Munãoz, 2007; Seetaram, 2012; Álvarez-Díaz et al., 2015; Seetaram et al., 2016; Dogru et al., 2017). However, there are some cases of obtaining data directly related to tourism prices such as price tourism (Dritsakis, 2004; Lee, 2011; Lim, 2004; Song et al., 2003b); living expenses for tourists in the destination country (Kulendran & Witt, 2001; Song & Wong, 2003); living expenses for tourists (Song et al., 2010); price tour (Greenidge, 2001).

For international tourism, when using CPI as a basis for developing tourism price data, the tourist price variable at the destination is usually built based on CPI of the country of origin (source market), CPI of the country of arrival and exchange rate between country of origin and arrival country (Cheng, 2012; Dogru et al., 2017; Gatta & Falzon, 2014; Munãoz, 2007; Ramos et al., 2017; Seetaram, 2012; Seetaram et al., 2016). However, this study only considers domestic tourism (departure and destination in the same territory), so it is only necessary to get prices related to tourism services in the country and the exchange rate factor is removed. Because there are no full tourism prices for countries, this study uses CPI as the basis for own price data and takes 100 as the base year price to calculate the prices for the next year (the base year is 2000). This calculation has been done by many previous studies (Cai & Knutson, 1998; Li et al., 2006; Otero-Giraldez et al., 2012; Ramos et al., 2017; Seetaram et al., 2016; Song et al., 2000; Song & Witt, 2003). The CPI of the countries is collected from data published by The World Bank (2019).

3.1.4. Data on cross price
A potential tourist instead of traveling in the country, they can replace it with a vacation abroad or both, especially neighboring countries with relatively similar trip costs. Therefore, the tourism prices of these international destinations can strongly affect domestic tourism demand and are considered a cross price of domestic tourism. Cross price is measured by a weighted average price index of substitute destinations relative to the tourism price in the origin country and adjusted by the appropriate exchange rate (Li et al., 2006; Song et al., 2003a; Song & Wong, 2003). Geographic and cultural characteristics are considered when selecting the substitute destinations (Song & Wong, 2003).

This study took countries having shared borders as criteria to select as tourist destinations to replace domestic tourism. In case the country does not have land borders like the Philippines and Indonesia, the country with a shared maritime boundary is chosen as the substitute destinations. Because the number of tourists from Laos to Myanmar in the past time is very small (no statistics\textsuperscript{2}), the substitute destinations for domestic tourism of Laos are only four countries namely China, Cambodia, Thailand and Vietnam. The countries identified as substitute destinations for domestic tourism are presented in Table 4 below.

The formula for cross-price calculation of domestic tourism is based on the formula of Song and Wong (2003) and is presented in Equation (3) below.

\[
P_{SL} = \sum_{i=1}^{n} W_{i1} \cdot \frac{CPI_{1i}}{ER_{1i}}
\]

where
The weight of substitute destination i in year t.  

CPI\textsubscript{i,t}: CPI of substitute destination i in year t.  

ER\textsubscript{i,t}: The exchange rate between the currency of the study of tourism domestic and the currency of substitute destination i in year t.

The market share of tourist arrivals is used to create the weights (Mangion et al., 2005; Ramos et al., 2017; Song & Li, 2008) in Equation (4) as follows:

\[ W_{i,t} = \sum_{j=1}^{m} \frac{TA_{j,i,t}}{TA_{i,t}} \]  

(4)

where

TA\textsubscript{j,i,t}: The tourists from country i traveling to country j in year t.

TA\textsubscript{i,t}: The total number of outbound tourists to substitute destinations from country i in year t.

Like own price, tourism prices at substitute destinations are also used CPI at substitute destinations and take 100 as the price of base year to calculate the prices for the next year. The base year for calculation is 2000. The CPI of the countries and their currency exchange rates with the US dollar is collected from data published by The World Bank (2019). The exchange rate between the currencies of countries and the currencies of the substitute destinations is calculated based on the exchange rate between their currency and the US dollar.

Data on tourists from Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand and Vietnam to substitute destinations are collected from World Tourism Organization’s data on outbound tourism of each country.

Descriptive statistics (logarithm of domestic tourists, per capita income, tourism-related prices and price of substitute tourism destinations) of the sample and groups are presented in Table 5 below.

3.2. Research methods
Tourism demand is sensitive to uncertainties arising from crises such as political unrest, natural disasters, and epidemic outbreaks (Araña & León, 2008; Faulkner, 2001; Ritchie, 2004). Therefore,
| Variable | Group          | Mean  | Std. dev. | Maximum | Minimum | Observations |
|----------|----------------|-------|-----------|---------|---------|--------------|
| lnDT     | All countries  | 10.2439 | 1.8797    | 12.6228 | 5.4523  | 114          |
|          | Group 1        | 11.5828 | 0.9189    | 12.6228 | 9.5879  | 61           |
|          | Group 2        | 8.7030  | 1.4768    | 11.2898 | 5.4523  | 53           |
| lnYT     | All countries  | 8.7029  | 0.7523    | 10.3667 | 7.1387  | 114          |
|          | Group 1        | 9.1852  | 0.6208    | 10.3667 | 8.1201  | 61           |
|          | Group 2        | 8.1478  | 0.4453    | 8.9157  | 7.1387  | 53           |
| lnPT     | All countries  | 5.1225  | 0.3317    | 5.8147  | 4.6008  | 114          |
|          | Group 1        | 5.0556  | 0.2969    | 5.8092  | 4.6052  | 61           |
|          | Group 2        | 5.1994  | 0.3550    | 5.8147  | 4.6008  | 53           |
| lnPS     | All countries  | 5.3130  | 4.7802    | 12.8366 | −3.5684 | 114          |
|          | Group 1        | 6.1280  | 6.3473    | 12.8366 | −3.5684 | 61           |
|          | Group 2        | 4.3749  | 1.2220    | 6.6363  | 2.5662  | 53           |
the stationarity and cointegration tests should be carried out to prevent the phenomenon of spurious regression (Ramos et al., 2017). Therefore, the process of estimating parameters and selecting models is carried out through two steps.

3.2.1. Step 1: panel stationarity and cointegration test
Prior to conducting panel data analysis, the variables’ series needs to be investigated to screen whether they have a stationary process to avoid spurious regression problems. The unit root test is the most common stationarity test and applied in this study. If the series are nonstationary at the level but stationary at the same difference, they are eligible to test for cointegration to consider the long run association among variables. When there is a long run association among variables, it will avoid leading to the phenomenon of spurious regression.

3.2.2. Step 2: estimation of coefficients and model selection
If the series are non-stationary at the level but stationary at the same difference and cointegration, the next step will estimate the parameters in the model as in Equation (2) for the cases: All countries, group 1 and group 2. Suitable for the panel data, parameters are estimated by fixed effects (FE) model and random effects (RE) model. These models are more reliable than pool OLS because they allow control of unobserved factors. The FE model assumes that the unobserved individual effects may be correlated with regressor and allows each observation to process its own intercept by building a set of dummy variables while the RE model captures the individual difference through error variance. Specifically, the random effect model assumes the unobserved effects are independent from regressor and has the same intercept. From Equation (2), the FE model for each group (sample) can be formulated in Equation (5) as follows:

\[ \ln DT_i = \beta_0 + \beta_1 \ln YT_i + \beta_2 \ln PT_i + \beta_3 \ln PS_i + \epsilon_i \] (5)

where: \( \beta_0 \) is country specific constant, \( \epsilon_i \) is the error term.

If the individual specific constant \( (\nu_i) \) is regarded as randomly distributed term, formulation of the RE model can be expressed in Equation (6) as follows:

\[ \ln DT_i = \beta_0 + \beta_1 \ln YT_i + \beta_2 \ln PT_i + \beta_3 \ln PS_i + \nu_i + \epsilon_i \] (6)

After estimating by FE model and RE model, testing “Redundant Fixed Effects” and “Correlated Random Effects—Hausman Test” will be conducted to compare FE model with Pool OLS and select appropriate model. The estimation process will use the backward elimination method. The backward elimination method starts with all the predictor variables in the model and removes one variable at a time using a \( p \) value. In the first step, the \( p \) value is calculated for all the predictor variables, and the variable with \( p \) value that exceeds the critical \( p \) value is deleted. The process is iterated until the highest \( p \) value of a variable is less than the critical \( p \) value, indicating that the corresponding variable is not redundant in the presence of the other variables in the model (Haque et al., 2018).

4. Research results and discussion

4.1. Results of panel unit root and cointegration tests
Panel unit root tests were conducted for all three patterns are possible such as both a trend and an intercept exist, only an intercept exists or neither exists using the testing methods of Im et al. (2003), Fisher type test using Augmented Dickey Fuller (ADF) and Phillips Perron (PP) test. These unit root tests are appropriate methods for unbalanced panel data. The lag lengths are automatically chosen by Schwarz Information Criterion (SIC) with Newey-West automatic bandwidth selection and Bartlett kernel. The panel unit root tests results are represented in Table 6 for all countries, 6b for group 1 and Table 8 for group 2.

IPS is not applied to cases where both trend and intercept do not exist.
| Variable | Test in | Intercept | Intercept and trend | None |
|----------|---------|-----------|---------------------|------|
|          | IPS     | ADF       | PP                  | IPS  | ADF  | PP  | ADF  | PP  |
| lnDT     | Level   | 1.72      | 16.90               | 25.96*| −1.41 | 24.20*| 24.59*| 0.38 | 0.08 |
|          | 1st difference | −9.38** | 74.22**               | 50.74** | −5.22** | 52.98** | 46.32** | 37.59** | 48.26** |
| lnYT     | Level   | 0.9642    | 0.7282               | 0.9970 | −5.12** | 40.47** | 25.0* | 0.19 | 0.00 |
|          | 1st difference | −6.96** | 55.26**               | 49.50** | −5.24** | 49.66** | 42.40** | 8.34 | 10.74 |
| lnPT     | Level   | −1.35     | 29.42**               | 33.33** | 0.88   | 11.28   | 20.79   | 0.03 | 0.01 |
|          | 1st difference | −4.89** | 47.65**               | 52.14** | −3.71** | 43.84** | 53.69** | 29.93** | 35.72** |
| lnPS     | Level   | −0.81     | 18.34                | 29.26  | −0.16  | 15.01   | 7.09    | 6.13 | 5.92 |
|          | 1st difference | −3.32** | 37.34**               | 43.15** | −2.40** | 32.71** | 37.75** | 64.43** | 73.86** |

**IPS is Im, Pesaran and Shin W-stat; ADF is ADF—Fisher Chi-square; PP is PP—Fisher Chi-square; 
* and ** for statistically significant at the 0.05 and 0.01 levels, respectively.**
Table 7. Results of panel unit root tests for group 1

| Variable | Test in | Intercept | Intercept and trend | None |
|----------|---------|-----------|---------------------|------|
|          | IPS     | ADF       | PP                  | IPS  | ADF  | PP  | ADF | PP |
| lnDT     | Level   | 1.30      | 12.54               | 14.40| -0.51| 9.59| 21.34**| 0.32| 0.01|
|          | 1st difference | -8.55** | 46.46**            | 26.44**| -4.36**| 34.53**| 17.48*| 19.62*| 28.37**|
| lnYT     | Level   | 3.29      | 2.06                | 0.41 | -5.06**| 26.19**| 23.57**| 0.02| 0.00|
|          | 1st difference | -8.09** | 45.79**            | 41.10**| -5.23**| 36.77**| 34.88**| 4.82| 7.43|
| lnPT     | Level   | -0.48     | 13.30               | 17.12*| 0.87  | 7.21   | 17.43*| 0.03| 0.00|
|          | 1st difference | -3.65** | 26.90**            | 30.77**| -2.67**| 26.24**| 34.12**| 13.79| 14.61|
| lnPS     | Level   | -0.90     | 13.69               | 25.62*| -1.034| 12.46  | 6.37  | 3.13| 2.83|
|          | 1st difference | -3.27** | 25.61**            | 25.11**| -1.29  | 16.02* | 20.73**| 40.51**| 40.26**|

IPS is Im, Pesaran and Shin W-stat; ADF is ADF—Fisher Chi-square; PP is PP—Fisher Chi-square; * and ** for statistically significant at the 0.05 and 0.01 levels, respectively.
| Variable | Test in   | Intercept |          | Intercept and trend |          | None |
|---------|-----------|-----------|----------|---------------------|----------|------|
|         |           | IPS       | ADF      | PP                  | IPS      | ADF  |
| InDT    | Level     | 1.12      | 4.36     | 11.56               | -1.58    | 14.61*|
|         | 1st difference | -4.34** | 27.75** | 24.30**             | -2.87** | 18.45**|
| InYT    | Level     | 0.19      | 0.21     | 0.77                | -2.04*   | 14.28*|
|         | 1st difference | -3.72** | 24.30** | 20.98**             | -2.74** | 17.30**|
| InPT    | Level     | -1.52     | 16.12*   | 16.21*              | 0.34     | 4.07  |
|         | 1st difference | -3.28** | 20.75*  | 21.39*              | -2.88** | 17.60**|
| InPS    | Level     | -0.23     | 4.65     | 3.64                | 1.28     | 2.55  |
|         | 1st difference | -1.24    | 11.73    | 18.03**             | -2.68** | 16.69*|
|         | IPS       | ADF       | PP       | IPS                | ADF      | PP   |
|         |           |           |          |                     |          |      |

IPS is Im, Pesaran and Shin W-stat; ADF is ADF—Fisher Chi-square; PP is PP—Fisher Chi-square;
*and ** for statistically significant at the 0.05 and 0.01 levels, respectively.
Group 2 consists of Cambodia, Laos and Vietnam.
IPS is not applied to cases where both trend and intercept do not exist.
Group 1 consists of Indonesia, Malaysia, Philippines and Thailand.

IPS is not applied to cases where both trend and intercept do not exist.

Tables 6–8 above indicate that most of the tests are not statistically significant at the 0.05 level for the lnDT, lnYT, lnPt and lnPS variables in all three cases such as all countries, group 1 and group 2. Therefore the null hypothesis of a unit root is not rejected, indicating that the variables are non-stationary at the level I(0). However, when converting these series at first difference, most tests are statistically significant at the 0.01 level for all variables in the cases (all countries, group 1 and group 2). This allows reject the null hypothesis of a unit root. In other words, all variables are stationary at the first difference I(1) so they are eligible for a cointegration test to determine the long run association-ship between variables. The test results of panel cointegration analysis in Table 9 show a statistical significance of 0.05 in the case of all countries and group 2; at 0.01 in the case of group 1. This allows reject the null hypothesis of no cointegration relation. In other words, the alternative hypothesis is accepted. It means that there is a cointegration relationship in all models. Thus, the lnDT, lnYT, lnPT and lnPS have long-run associationhip for all three cases (all countries, group 1 and group 2). This result allows us to avoid spurious regression phenomenon or meaningless.

4.2. Estimating the coefficients
Firstly, the analysis of the entire sample is carried out. Next is the analysis of subgroups to explore whether the coefficient of elasticity of domestic tourism demand by prices and income differs across subgroups (group 1 and group 2). Because RE estimation requires number of cross sections > number of coefficients, RE model does not apply in case of 3 independent variables lnYT, lnPT and lnPS of group 2 (number of cross sections = 3, so the number of independent variables max = 2 in the RE model).

The estimation results are presented in Tables 10 and 11 with specifications for the FE model and RE model respectively. The F statistic values and adjusted R-squared in FE model for three groups (all countries, group 1, group 2) are 770.66, 499.20, 366.84 and 98.39%, 98.03%, 97.24%, respectively; in RE model for two groups (all countries, and group 1) are 158.77, 191.60 and 80.73%, 90.49%, respectively. These indicate that the model is appropriate for both FE model and RE model in all groups. In which, the F statistic value and adjusted R-squared of FE models are higher than RE models in each group.

Redundant Fixed Effects test results in FE estimates for all groups gives significance in the statistics of cross-section F and cross-section Chi-square at 0.01 level. This allows strongly reject the null hypothesis that the effects are redundant and shows that the cross-section fixed effects are statistically significant. This means that estimation for models is necessary and more reliable than pooled OLS estimation for all three groups (all countries, group 1 and group 2).

The Hausman test results for the case of all countries and group 1 indicate that the Chi-square statistics of the cross-section random are 12.49 and 221.36, respectively, with both statistical significance at 0.01 level, so it allows reject null hypothesis and accept the alternative hypothesis. It means that FE model is more appropriate than RE model for these both cases. Since the FE models are selected for both cases so only, they are displayed in the final model.

| Table 9. Results of panel cointegration analysis |
|-----------------------------------------------|
| **Method** | **Group** | **t-Statistic** | **Prob.** |
| Kao (Engle-Granger based) | All countries | −1.8046* | 0.0356 |
| | Group 1 | −5.2403** | 0.0000 |
| | Group 2 | −1.8985* | 0.0288 |

* and ** for statistically significant at the 0.05 and 0.01 levels, respectively.
Table 10: Estimation results for all countries

| Variables | FE          | RE          | FE (revised) |
|-----------|-------------|-------------|--------------|
| LnYT      | Coefficient | 2.3507      | 2.3561       | 2.3732       |
|           | t-Statistic | 9.4845**    | 10.804**     | 10.957**     |
|           | Std. error  | 0.2479      | 0.2181       | 0.2166       |
| lnPT      | Coefficient | −0.9807     | −0.9443      | −0.9980      |
|           | t-Statistic | −3.7345**   | −4.0264**    | −4.0739**    |
|           | Std. error  | 0.2626      | 0.2345       | 0.2450       |
| lnPS      | Coefficient | 0.0125      | −0.0640      |              |
|           | t-Statistic | 0.1896      | −1.2797      |              |
|           | Std. error  | 0.0662      | 0.0500       |              |
| Constant  | Coefficient | −5.2574     | −5.1927      | −5.2976      |
|           | t-Statistic | −6.2835**   | −6.1799**    | −6.5756**    |
|           | Std. error  | 0.8367      | 0.8403       | 0.8057       |
| Observations | 114      | 114         | 114           |
| R-squared     | 0.9852    | 0.8124      | 0.9852       |
| Adj R-squared | 0.9839    | 0.8073      | 0.9841       |
| F-statistic   | 770.6628**| 158.7680**  | 875.0253     |
| Effects test  | F-Statistic | 388.9304**  |              |
|              | Chi-square | 359.5983**  |              |
| Hausman test  |           | 12.4875**   |              |
| Number of countries | 7 | 7 | 7 |

lnYT is dependent variable; ordinary coefficient covariance method.
**and * for statistically significant at 0.01 and 0.05 levels, respectively.

For the case of all countries (seven countries), the variable lnYT, lnPT and constant are statistically significant at the 0.01 level. The lnPS variable is not statistically significant at 0.05 level, so it is deleted and the FE model is revised. The statistical value of F and adjusted R-squared in FE model revised are 875.03 and 0.9841, respectively, indicating fit model.

For group 1 (four countries namely Indonesia, Malaysia, Philippines and Thailand), the FE model gives all independent variables and constants are statistically significant at the 0.01 level, indicating fit model and the model does not need to be modified.

For group 2 (three countries merged with Cambodia, Laos and Vietnam), lnPT and lnPS variables are not statistically significant at 0.05 level, so they are deleted in the original FE model. In the case of lnYT and lnPT being independent variables, the REM model gives the result that lnPT variable is not statistically significant at the 0.05 level, so the lnYT variable was deleted. Besides, if the independent variable is lnYT and lnPT, the RE model gives F statistic value of 0.7274, does not reach statistical significance at 0.05, so the model is not appropriate. Thus, the RE model is only appropriate for the case where the independent variable is lnYT and it is selected between FE model revised and RE model revised. Estimated results show that the F statistic value and adjusted R-squared for FE model revised and RE model revised are 622.68, 97.29% and 342.51, 86.79%, respectively, indicating fit model for both. The lnYT variable is statistically significant at the 0.01
level for both FE model revised and FE model revised. The Hausman test result gives the Chi-square statistic of the cross-section random is 0.1895 with the statistical significance not reached at 0.05 level, so the null hypothesis can not be reject. It means that the RE model revised model is more appropriate than FE model revised in case of group 2 and the RE model revised is selected. However, the difference between coefficients of lnYT in FE model revised and RE model revised is negligible.

The above estimation results show that the income of tourists, prices related to tourism and prices of substitute destinations (outbound tourism to countries sharing the border) are factors affecting domestic tourism demand of the most countries in ASEAN. In which the income of tourists has a positive impact on the domestic tourism demand for all 3 study samples. To be more specific, a 1% increase in tourist income increases domestic demand by 2.3732%, 3.1064% and 1.6302% respectively for the sample of seven countries (Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand and Vietnam), four countries (Indonesia, Malaysia Philippines and Thailand) and three countries (Cambodia, Laos and Vietnam).

### Table 11: Estimation results for groups

| Variables | Group 1 | | Group 2 | |
| --- | --- | --- | --- | --- |
| | FE | RE | FE | RE (revised) |
| LnYT Coefficient | 3.1064 | 1.429973 | 1.8014 | 1.6308 | 1.6302 |
| t-Statistic | 10.621** | 44.5360** | 6.1272** | 18.364** | 18.3594** |
| Std. error | 0.2925 | 0.0321 | 0.2940 | 0.0888 | 0.0888 |
| lnPT Coefficient | −2.4474 | −0.2289 | −0.1642 | |
| t-Statistic | −8.7171** | −2.9077** | −0.5131 | |
| Std. error | 0.2808 | 0.0787 | 0.3199 | |
| lnPS Coefficient | 0.2482 | −0.1170 | −0.0861 | |
| t-Statistic | 3.3646** | −29.4254** | −1.0089 | |
| Std. error | 0.0738 | 0.0040 | 0.0854 | |
| Constant Coefficient | −6.0983 | 0.3223 | −4.7442 | −4.5845 | −4.6276 |
| t-Statistic | −5.6205** | 0.8281 | −5.2943** | −6.3293** | −3.1347** |
| Std. error | 1.0850 | 0.3891 | 0.8961 | 0.7243 | 1.4762 |
| Observations | 61 | 61 | 53 | 53 | 53 |
| R-squared | 0.9823 | 0.9097 | 0.9750 | 0.9744 | 0.8704 |
| Adj R-squared | 0.9803 | 0.9049 | 0.9724 | 0.9729 | 0.8679 |
| F-statistic | 499.2043** | 191.3997** | 366.8408** | 622.6809** | 342.5108** |
| Effects test F-Statistic | 73.7861** | 819.9313** | |
| Chi-square | 99.3744** | 189.7653** | |
| Hausman test | 221.3582** | 0.1895 | |
| No of countries | 4 | 4 | 3 | 3 | 3 |

Note: LnDT is dependent variable; ordinary coefficient covariance method.

**and * for statistically significant at 0.01 and 0.05 levels, respectively.
Prices related to tourism have a negative impact on domestic tourism demand under the general rule in FE models but they are only statistically significant in the case of the sample of seven countries and four countries. Specifically, a 1% increase in domestic tourism price decreases domestic demand by 0.9807% and 2.4474% respectively for the sample of seven countries (Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand and Vietnam) and four countries (Indonesia, Malaysia Philippines and Thailand).

The price of substitute destinations also has a positive impact on domestic tourism demand according to the general rule in the FE model of the study sample of seven countries and four countries. However, these impacts are only statistically significant in case the sample of four countries. Specifically, a 1% increase in price of substitute tourism destinations is associated with 0.2482% rise in the domestic demand.

Finally, the FE model revised in case of all countries is considered for the different intercept coefficients of countries through cross-section fixed effects test. The results of the cross-section fixed effects test are presented in Table 12 below and indicate that Indonesia has the highest intercept coefficient, followed by Vietnam, Cambodia, Philippines, Thailand, Malaysia and finally Laos.

### 4.3. Discussion

The results of this study show that income has an important and positive role in prompting the increase of domestic tourism demand in ASEAN. Although the coefficient of elasticity of domestic tourism demand by income in different study samples (2.3732 for all countries, 3.1064 for the group of more developing countries and 1.6302 for the group of less developing countries), but they are all larger 1, implying that domestic tourism in ASEAN is still a luxury service, especially in group of more developing countries namely Indonesia, Malaysia, Philippines and Thailand. This is also consistent with the fact that the countries in this study are still developing countries, real income per capita is still low, tourism in general and domestic tourism in particular are still a high-level demand. This finding supports the conclusion of many previous studies that most tourism is considered a luxury service (Álvarez-Díaz et al., 2015; Chaiboonsri et al., 2010; Cheng, 2012; Croes & Vanegas, 2005; Dogru et al., 2017; Dritsakis, 2004; Greenidge, 2001; Kulendran & Witt, 2001; Kumar et al., 2019; Lee, 2011; Li et al., 2006; Lim, 2004; Lim et al., 2008a; Lin et al., 2015; Mervar & Payne, 2007; Munoz, 2007; Ouerfelli, 2008; Ramos et al., 2017; Seetaram, 2012; Seetaram et al., 2016; Shafiullah et al., 2018; Song et al., 2010, 2000, 2003a; Song & Wong, 2003; Song et al., 2003b; Untong et al., 2015; Vanegas & Croes, 2000).

Price related to domestic tourism is also an important factor and negatively affects domestic tourism demand in ASEAN. With the coefficient of domestic tourism demand by price for all countries is −0.9807 (almost equal to −1), it shows that coefficient of domestic tourism demand is elastic in unit by tourism price. With an elasticity coefficient of −2.4474, domestic tourism demand is much elastic

| Country      | Effect | Range |
|--------------|--------|-------|
| Cambodia     | 0.5909 | 3     |
| Indonesia    | 1.6552 | 1     |
| Laos         | −2.1659| 7     |
| Malaysia     | −1.7162| 6     |
| Philippines  | 0.3453 | 4     |
| Thailand     | −0.7464| 5     |
| Vietnam      | 1.0000 | 2     |
and sensitive to tourism prices in more developing countries such as Indonesia, Malaysia, Philippines and Thailand. This result is consistent with the general rule that the negative relationship between demand and price as well as consistent with most empirical studies on the elasticity of tourism demand. This evidence lends support to the view that tourism demand is elastic by own price (Álvarez-Díaz et al., 2015; Dogru et al., 2017; Gatta & Falzon, 2014; Kulendran & Witt, 2001; Li et al., 2006; Lim, 2004; Lin et al., 2015; Munóz, 2007; Ouerfelli, 2008; Ramos et al., 2017; Seetaram, 2012; Seetaram et al., 2016; Song & Witt, 2003; Song et al., 2003a, 2003b; Untong et al., 2015).

Price elasticity of demand at substitute destinations (outbound tourism to countries having share borders) is only statistically significant for the group of more developing countries (Indonesia, Malaysia, Philippines and Thailand) and has a value of 0.2482. This value is evidence to show that outbound tourism to countries with shared border is a substitute destination for domestic tourism of these countries. This impact level is quite small and this result is quite similar to the studies of Ouerfelli (2008) or Song et al. (2010).

The intercept coefficients from this study results imply that at the same income levels of tourists and prices related to domestic tourism, Indonesians travel inland the highest, followed by Vietnamese, Cambodian, Filipino, Thai people, Malaysian and finally Lao people. This implies that the domestic tourism choice of tourists in each country depends not only on income and prices, but also on other potential factors of domestic tourism such as population size (source of domestic tourists) or factors that create the attraction of a destination such as infrastructure, tourism resources, hospitality, culture …. The possible reasons for the different intercept coefficients of countries are as follows:

Indonesia has the largest population and area of the studied countries with many archipelagos so it has the largest source of domestic tourists and many attractive tourist destinations. Popular destinations in Indonesia include Bali, Nusa Dua beach, Toba lake, Bromo volcano, Komodo National Park, Tanjung Puting, Baliem Valley, Bunaken diving pool, Gili islands, temples Borobudur, the ancient city of Yogyakarta, Dieng plateau …. These characteristics can be considered as the reasons contributing to the highest intercept coefficient of Indonesia.

Vietnam has a quite high intercept coefficient because Vietnam has the third area and population of the studied countries, so Vietnam has great potential for domestic tourism. In addition, Vietnam has many famous historical sites and famous attractions, which attract not only inbound tourism but also domestic tourism. Especially Vietnam has eight UNESCO World Heritage sites including: Trang An Scenic Landscape Complex, Citadel of the Ho Dynasty, The Imperial Citadel of Thang Long, The Complex of Hue Monuments, Halong Bay, Hoi An Ancient Town, My Son Holy Land and Phong Nha—Ke Bang National Park. In addition, Vietnam also has many beautiful islands such as Cat Ba, Phu Quoc, Con Dao … as well as long and beautiful beaches such as Sam Son, Nha Trang, Phan Thiet, Vung Tau ….

Although not a country with a large population and area, Cambodia is a famous country with temples like Angkor Wat, Wat Phnom, Banteay Chhmar, Beng Mealea, Banteay Srei, Wat Banan, temples in Sambor Prei Kuk …. On the other hand, Cambodia has many attractive tourist destinations such as Koh Rong island, Koh Trong island, Phnom Penh capital with the Royal Palace of Cambodia, long and beautiful beaches in Sihanoukville … so attract tourists including domestic tourists. Another reason may be that Cambodia’s current per capita income is still very low (lowest among the research countries), so they do not have much capacity to travel outbound but focus on domestic tourism. These reasons contribute to the explanation that although the potential of domestic tourists’ source is not really high, the intercept coefficient of Cambodia is also quite good, only after Indonesia and Vietnam.

With the second largest population in the studied countries, the Philippines has a lot of potential for domestic tourists. However, the area is not large (only ranked 5th in the studied countries) and
tourism resources are mainly sea, so the intercept coefficient of the Philippines is only average. By contrast, although the population size is only four among the studied countries, Thailand has a large area (ranked second) and has many attractive tourist destinations, so the intercept coefficient of Thailand is also not too low. Attractive destinations of Thailand must be mentioned as Pattaya entertainment area; Royal Palace, Vimanmek; Golden Buddha Temple, Jade Buddha, Doi Suthep; beautiful beaches such as Koh Lam, Koh Samui, Krabi; Koh Phi island; Phang Nga Bay …

Although there are quite a number of tourist attractions such as Malacca, Kuantan, Kuching, Putrajaya, Kota Kinabalu; Langkawi, Perhentian, Tioman islands; Cameron Highlands; Danum Valley … but with a small population size (ranked 5th among the studied countries), Malaysia does not have much potential source of domestic tourists. On the other hand, Malaysia's per capita income is the highest in studied countries so they have more opportunities to travel outbound. In addition, the area of Malaysia is not large, so it is also limited for exploring tourism of Malaysians. These reasons contribute to the reason why the intercept coefficient of Malaysia is quite low.

Finally, Laos’ lowest intercept coefficient can be explained by the very small population size (Laos has the smallest in the studied countries). On the other hand, although there are also tourist attractions such as Pha That Luang and Tat Fane Towers, Vang Vieng Town, Blue Lagoon, Buddha Statue Garden, Wat Xieng Thong Pagoda, jars field … but with the small area (only larger than Cambodia) and no sea so Laos is also less attractive for both inbound tourism and domestic tourism.

5. Conclusion
Income and prices are the basic elements of demand theory. The role of income and prices in explaining the demand for tourism has also been demonstrated by a large number of empirical studies over the past several decades, but mainly the studies of international tourist demand. So far, studies on domestic tourism demand have been not much and there has been no studies on the elasticity of domestic tourism demand in ASEAN. This is the driving force for this study to estimate the elasticity of domestic tourism demand by income, own price and cross price in countries in ASEAN of this study.

After summarizing the theoretical basis, the article has built a model to estimate the elasticity of tourism demand by own price and cross prices (prices of outbound tourism to countries having share borders) by FE model and RE model. This study point out that domestic tourism in ASEAN countries is a luxury service. Own price is also an important factor and negatively affects domestic tourism demand in ASEAN under the general rule on the relationship between demand and prices. In addition, this study found that domestic tourism demand in the group of more developed countries is more sensitive to income and own price than in the rest countries. Outbound tourism to countries having share borders with Indonesia, Malaysia, Philippines and Thailand are substitute destinations for domestic tourism in these countries. However, the price of these substitute destinations affects domestic tourism demand in these countries not too strong. In the same terms of income levels of tourists and prices related to domestic tourism, Indonesians travel the highest inland, followed by Vietnamese, Cambodian, Filipino, Thai people, Malaysian and finally Lao people. This is a sign that in addition to income and prices there are other factors affecting domestic tourism demand that need further study.

The contribution of this study to the academic literature can be summarized into two aspects. From a theoretical perspective, this study adds to the evidence showing the role of income and prices for domestic tourism demand. From a practical perspective, the study points out the elasticity of domestic tourism demand in most countries in ASEAN by income, own price and price of substitute destinations as well as the difference in domestic tourism demand among the countries in ASEAN. The paper not only examines the domestic tourism demand of a country, but also for the ASEAN as a regional domestic. This new “regional domestic” terminology performed in the novelty of the paper. These results are the basis for setting up tourism business management policies for these countries. With a luxury and price-sensitive service like domestic tourism,
businesses and governments of ASEAN countries need to have appropriate business policies to exploit sustainably the potential of domestic tourism in each country.

Recently, the Covid-19 pandemic has seriously affected the world tourism industry, especially international tourism, due to the border closure. In general, ASEAN countries have quite good disease control, so domestic tourism is saving these countries’ tourism industries and it shows the stability as well as the importance of domestic tourism. The findings from this study are still valid during the Covid-19 pandemic, unless countries adopt a policy of social distancing and social isolation. After Covid-19, when international tourism activities have been restored, the findings from this study will continue to fully promote its values.

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Notes
1. Knoema is organizations to provide custom data, dashboards, and visualizations at Washington, DC, US.
2. See at https://tourism.gov.mm/statistics/ https://www.ceicdata.com/en/indicator/myanmar/visitor-arrivals

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