

The Impact of COVID-19 Pandemic across ASEAN-6 Countries: The Case of Tourism Industry

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COVID-19 세계적 대유행의 ASEAN-6 국가들에 대한 영향 : 관광산업의 사례

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Abstract

As the global impact of coronavirus (COVID-19) pandemic has continued to evolve since January 2020, Southeast Asia was one of the first regions hit hard by the contagious disease due to its close geographical proximity to China and heavy dependency on tourism. In this paper, we examine the impact of COVID-19 pandemic across ASEAN-6 countries focusing on tourism industry. For empirical analysis, we use various unit root tests to check whether the time series for international inbound visitors to ASEAN-6 countries satisfy the random walk hypothesis (Shiller & Perron, 1985). If inbound visitors show a unit root (random walk, or non-stationary process), it implies that the shocks to visitor arrivals are permanent. On the other hand, if the visitor arrivals do not reveal a unit root (or stationary process), it indicates that the shocks to visitor arrivals are temporary (Bhattacharya & Narayan, 2005). We find that the effects of COVID-19 on reduction of inbound tourists are transitory for Indonesia and Thailand. While the negative effects of COVID-19 in most of tourist groups of Singapore are permanent. For Malaysia, the temporary effects are revealed on the international visitors from Indonesia, whereas the permanent effects are reported for the inbound tourists from Singapore and China.

Key words: COVID-19, Pandemic, ASEAN-6, Tourism, Inbound arrivals, Permanent and transitory effects

I . Introduction

On January 30, 2020, the World Health Organization (WHO) declared the outbreak of the novel coronavirus (COVID-19) case in Wuhan China a global health emergency. Since April 2020, the number of confirmed cases and death tolls have soared exponentially worldwide. For example, as of

April 3, the cases multiplied 10-fold from 0.1 million to 1 million in 27 days (for details, see <Table 1>).

Southeast Asia was one of the first regions impacted by the contagious disease because of its close geographical proximity and business travel, tourism and supply chain links to China. As China accounts for 17% of global GDP, 11% of world

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<Table 1> Chronology of COVID-19 Pandemic

| Date | Year | Key Events | Confirmed cases (deaths)* |
|---------|------|---|---------------------------|
| Dec. 31 | 2019 | Cases of pneumonia detected in Wuhan China were first reported to the World Health Organization (WHO) | 0 (0) |
| | | Chinese health authorities closed the Huanan Seafood Wholesale Market after it was discovered that the wild animals sold there may be the source of the virus | |
| Jan. 20 | | Chinese health authorities confirmed human-to-human transmission of the coronavirus. | |
| | | WHO declared the COVID-19 a global health emergency. | |
| Feb. 23 | | Italy placed almost 50,000 people under strict lockdown in an attempt to control the outbreak after its first death from coronavirus on February 22, 2020. | |
| | 2020 | WHO characterized COVID-19 as a pandemic. The US President announced a travel ban on EU countries. | |
| | | Cases increased from zero to 0.1 million in 67 days. | 0.1 million (3,493) |
| Mar. 13 | | The US President declared the COVID-19 outbreak a national emergency. | |
| | | The 2nd worst day ever of the Dow Jones Industrial Average Index happened. The Chicago Board Option Exchange Volatility Index (CBOE VIX) surged past the prior all-time peak. | |
| | | The US Federal Reserve Board announced major interventions in the corporate bond market. | |
| Apr. 03 | | Cases multiplied 10-fold from 0.1 million to 1 million in 27 days. | 1 million (55,746) |
| Jun. 28 | | Cases grew 10-fold from 1 million to 10 million in 86 days. | 10 million (504,897) |
| Aug. 10 | | Cases mounted 2-fold from 10 million to 20 million in 43 days. | 20 million (733,607) |

Note: *The number of global cases and deaths of COVID-19.

Sources: Ramelli & Wagner (2020), pp. 8-10; Worldometer; WHO.

trade, 9% of global tourism and over 40% of global demand of some goods, negative spillovers transmit to the rest of the world, especially to Southeast Asia. International tourism is further affected by lockdown and social containment measures implemented across the globe, leading to the slowdown of economic activities in many sectors of economy (OECD, 2020, p. 2).

Tourism is an incredibly important sector for Southeast Asia, Thailand in particular. Tourism makes up to 20% of GDP in Thailand. The tourism authority of Thailand estimated that number of tourists may reduce by six million because of the COVID-19 pandemic (<https://www.reuters.com>). In the early beginning stage of the COVID-19 pandemic, the Chinese government put a group

travel ban on Chinese. This travel restriction had an immediate impact on Southeast economy since the Chinese account for 17% of all inbound visitors (ASEAN Secretariat, 2020). For example, 28% of all inbound visitors to Thailand were Chinese. Travel restrictions imposed by some Southeast Asian countries on travel to and from Europe and North America further reduced their tourism trade.

For empirical analysis, we select the large six countries out of 10 ASEAN members based on the value of GDP (gross domestic product). We call the selected six countries ASEAN-6, namely Indonesia, Thailand, Singapore, Malaysia, Philippines and Viet Nam. The ASEAN-6 hold 95.53% of ASEAN's total GDP (ASEAN Statistics Division).

In this paper, we aim to explore the impact of COVID-19 pandemic on tourism industry across ASEAN-6 countries. Following Bhattacharya and Naryan(2005), and Lean and Smyth(2009), we employ unit root tests to examine whether the reduction of inbound visitors to ASEAN-6 countries caused by the shocks from COVID-19 pandemic is permanent or transitory.

The rest of this paper is organized as follows. Chapter II presents literature review on previous epidemics and COVID-19 pandemic across the globe. Chapter III provides the economic importance of tourism industry to ASEAN-6 countries. Chapter IV explains empirical analysis. Chapter V concludes this paper with policy implications.

II. Literature Review

There are growing number of studies on tourism demand regarding the SARS (severe acute respiratory syndrome), the H1N1 influenza and COVID-19. The SARS (severe acute respiratory syndrome) in 2003 created incredible negative economic impact on global economy, especially the tourism industry. Not only the occupancy rate of six Korean five-star hotels decreased around 14% during February to July in 2003(Kim et al. 2005), but the number of visitors in Hong Kong also decreased from 1,347,386 (March) to 493,666 (April) in 2003(Lee and Warner, 2005). In Singapore, hotel occupancy rate dropped from 72% to 42% and the total numbers of unemployed people were 102,000. For Hong Kong, the SARS epidemic may generate permanent effect on the number of tourist arrivals from the US, Japan, the UK, and Taiwan(Au et al. 2005). Nonetheless, they gave only short term effect in the case of India

(Bhattacharya and Narayan, 2005). In terms of economic growth, the SARS crisis created about 50,000-89,000 unemployed workers in Taiwan, lowering the GDP growth rate by 0.43-0.77%. In addition, it could lower East Asian economic growth by 0.40-0.50% of total GDP(Brahmbhatt and Dutta, 2008).

The H1N1 influenza in 2009 also created incredible economic impacts, especially on tourism industry. While the H1N1 outbreak lowered European tourists in Mexico and led to losses of about USD 2.80 billion(Rassy and Smith, 2013), it caused the decline in number of tourists temporarily in Sarawak(Solarin, 2015) and Malaysia in general (Lean and Smyth, 2009). It reduced employment by 0.70-4.10 % and GDP by 0.90-6.20% in Australia, respectively(Verikios et al. 2012). For Korea, the socioeconomic costs (medical and non-medical cost combined) from H1N1 influenza in 2009 were USD 1.09 billion, approximately 0.14% of Korea's GDP (Kim et al. 2013).

Currently, the COVID-19 pandemic has caused unprecedented negative economic impact on many sectors, tourism in particular mainly due to the international travel restrictions around the world. The outbreak can cause the decline in number of foreign tourists in either short-run or long-run. It is predicted that the number of international arrivals will be reduced by approximately 20-30%, creating losses of receipts around USD 300-450 billion in the global tourism industry. The decrease in the number of international passengers might lead to the revenue losses for airlines approximately USD 252 billion and for the airports by USD 77 billion in 2020(Gössling et al. 2020). The pandemic may reduce arrivals of Chinese tourists to the USA and Australia and it will take 6 to 12 months to recover to the pre-crisis levels(Polyzos et al. 2020),

leading to unfavorable downturn on the tourism and related industries in both countries. For the air travel, Gallego and Font(2020) employed big data analysis during May-September 2020. They argued that the COVID-19 might reduce the desire to travel by 30% in Europe and the Americas and by 50% in Asia. For travelling by sea, the number of arrival of mega-cruise ships is expected to drop due to the differences in health-related restrictions across countries. Consequently, promotion of niche cruise with small ships could be the solution for tourism industry(Renaud, 2020). Moreover, the post-pandemic tourists may prefer to travel to nearby destination where are considered as lower risky places(Romagosa, 2020).

Only one study is found in the case of ASEAN-6 countries: Malaysia. Foo et al.(2020) asserted that the reduction in number of tourists leads to cancellation of 170,084 hotel room bookings during January 2020 to March 2020, which generated loss of revenue about 68,190,364 Malaysian ringgit. In addition, foreign airlines are permitted to have only one flight per week to China, forcing three major airlines of Malaysia (Malaysia Airlines, AirAsia and Malindo Air) to face with the risk of bankruptcy.

III. Economic Importance of Tourism to ASEAN-6 Countries

1. International Inbound Tourists

The number of international inbound tourists to ASEAN-6 countries shows a consistent increase during the last two decades(1995-2018). Thailand and Malaysia are the top two destinations for the

international tourists, followed by Singapore, Indonesia, Vietnam and the Philippines. The foreign tourist arrivals to Thailand and Malaysia in 2018 were 38.18 and 25.83 million, respectively (World Development Indicators, World Bank).

The top 10 international tourist arrivals for ASEAN-6 countries are reported in Table 2. The lion's share of inbound visitors come from Asia, especially East Asia (China, Japan and Korea), and the Southeast Asia itself including Singapore, Malaysia, and Indonesia. The Chinese tourists account for 27.44 and 26.75% of total inbound arrivals of Thailand and Vietnam, respectively. Singaporean tourists constitute 47.74% of total foreign visitors of Malaysia and Indonesian. Malay arrivals are the largest tourist groups for Singapore and Indonesia, respectively. On the other hand, for the Philippines, the visitors from Korea (23.23%) and USA (15.38%) are the first two major groups. The Asian visitors are followed by those from Europe, America and Oceania regions in terms of international tourists arrivals.

2. International Tourism Receipts

International tourism receipts which are the revenues earned by ASEAN-6 countries from inbound tourism are shown in <Table 3>. The numbers indicate that the receipts from international tourism are important for ASEAN-6 countries. They account for 19.86, 10.77, 8.83 and 7.36% of total exports for Thailand, the Philippines, Malaysia and Indonesia, respectively. Although they hold approximately 3% of total exports for Singapore and Vietnam, the nominal values of incomes are also significantly high.

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<Table 2> Top 10 International Tourist Arrivals

| Indonesia | | | | Malaysia | | | | | |
|--------------|-------------|------------|-------------|-----------|--------------|------------|-------|-------------|--------|
| No | Nationality | Tourist | % | No | Nationality | Tourist | % | | |
| 1 | Malaysia | 9,121,842 | 14.30 | 1 | Singapore | 99,551,305 | 47.74 | | |
| 2 | China | 8,777,946 | 13.77 | 2 | Indonesia | 23,306,535 | 11.18 | | |
| 3 | Singapore | 8,049,314 | 12.62 | 3 | China | 17,130,257 | 8.21 | | |
| 4 | Australia | 5,979,294 | 9.38 | 4 | Thailand | 12,478,663 | 5.98 | | |
| 5 | India | 2,375,878 | 3.73 | 5 | Brunei | 10,493,282 | 5.03 | | |
| 6 | Japan | 2,585,463 | 4.05 | 6 | India | 5,361,446 | 2.57 | | |
| 7 | USA | 1,736,432 | 2.72 | 7 | Philippines | 3,845,321 | 1.84 | | |
| 8 | UK | 1,688,823 | 2.65 | 8 | Japan | 3,645,538 | 1.75 | | |
| 9 | Korea | 1,777,287 | 2.79 | 9 | Korea | 3,584,344 | 1.72 | | |
| 10 | Germany | 1,229,643 | 1.93 | 10 | Australia | 3,541,296 | 1.70 | | |
| Top-10 Total | | | 43,321,922 | 67.94 | Top-10 Total | | | 182,937,987 | 87.72 |
| ROW* Total | | | 20,445,223 | 32.06 | ROW* Total | | | 25,607,736 | 12.28 |
| Global Total | | | 63,767,145 | 100.00 | Global Total | | | 208,545,723 | 100.00 |
| Philippines | | | | Singapore | | | | | |
| No | Nationality | Tourist | % | No | Nationality | Tourist | % | | |
| 1 | Korea | 12,194,638 | 23.23 | 1 | Indonesia | 32,072,386 | 18.18 | | |
| 2 | USA | 8,076,379 | 15.38 | 2 | China | 26,033,497 | 14.75 | | |
| 3 | China | 5,214,390 | 9.93 | 3 | Malaysia | 13,301,609 | 7.54 | | |
| 4 | Japan | 4,975,350 | 9.48 | 4 | India | 12,217,555 | 6.92 | | |
| 5 | Australia | 2,232,552 | 4.25 | 5 | Australia | 12,153,893 | 6.89 | | |
| 6 | Taiwan | 1,929,993 | 3.68 | 6 | Japan | 8,740,991 | 4.95 | | |
| 7 | Singapore | 1,657,381 | 3.16 | 7 | Philippines | 7,803,220 | 4.42 | | |
| 8 | Canada | 1,583,220 | 3.02 | 8 | USA | 6,033,094 | 3.42 | | |
| 9 | UK | 1,461,168 | 2.78 | 9 | Korea | 5,974,761 | 3.39 | | |
| 10 | Hong Kong | 1,311,700 | 2.50 | 10 | UK | 5,907,106 | 3.35 | | |
| Top-10 Total | | | 40,636,771 | 77.40 | Top-10 Total | | | 130,238,112 | 73.81 |
| ROW* Total | | | 11,862,223 | 22.60 | ROW* Total | | | 46,214,486 | 26.19 |
| Global Total | | | 52,498,994 | 100.00 | Global Total | | | 176,452,598 | 100.00 |
| Thailand | | | | Vietnam | | | | | |
| No | Nationality | Tourist | % | No | Nationality | Tourist | % | | |
| 1 | China | 40,093,868 | 27.44 | 1 | China | 27,091,919 | 26.75 | | |
| 2 | Malaysia | 15,176,772 | 10.39 | 2 | Korea | 16,300,674 | 16.09 | | |
| 3 | Korea | 6,857,744 | 4.69 | 3 | Japan | 7,038,589 | 6.95 | | |
| 4 | Laos | 6,580,112 | 4.50 | 4 | USA | 5,539,257 | 5.47 | | |
| 5 | Japan | 6,446,393 | 4.41 | 5 | Taiwan | 5,356,461 | 5.29 | | |
| 6 | India | 6,203,567 | 4.25 | 6 | Malaysia | 4,131,193 | 4.08 | | |
| 7 | Russia | 5,392,663 | 3.69 | 7 | Australia | 3,321,300 | 3.28 | | |
| 8 | USA | 4,322,181 | 2.96 | 8 | Russia | 3,270,109 | 3.23 | | |
| 9 | Singapore | 4,126,900 | 2.82 | 9 | Thailand | 3,176,073 | 3.14 | | |
| 10 | UK | 3,979,972 | 2.72 | 10 | Cambodia | 2,776,578 | 2.74 | | |
| Top-10 Total | | | 99,180,172 | 67.89 | Top-10 Total | | | 78,002,153 | 77.01 |
| ROW* Total | | | 46,916,994 | 32.11 | ROW* Total | | | 23,284,047 | 22.99 |
| Global Total | | | 146,097,166 | 100.00 | Global Total | | | 101,286,200 | 100.00 |

Note: *ROW stands for rest of the world.

Sources: Statistics Indonesia (2015-2019), Malaysia Tourism Promotion Board (2012-2019), Department of Tourism of the Philippines (2008-2018), Singapore Tourism Board (2008-2019), Ministry of Tourism and Sports of Thailand (2016-2019), Vietnam National Administration of Tourism (2009-2019).

<Table 3> International Tourism Receipts for ASEAN-6 Countries, 2014-2018

| Country | Unit | 2014 | 2015 | 2016 | 2017 | 2018 |
|-------------|--------------------|-------|-------|-------|-------|-------|
| Indonesia | billion USD | 11.57 | 12.05 | 12.57 | 14.69 | 15.60 |
| | % of total exports | 5.82 | 7.03 | 7.49 | 7.56 | 7.36 |
| Malaysia | billion USD | 24.47 | 19.19 | 19.68 | 20.31 | 21.77 |
| | % of total exports | 9.81 | 9.16 | 9.79 | 9.08 | 8.83 |
| Philippines | billion USD | 6.06 | 6.41 | 6.29 | 8.35 | 9.73 |
| | % of total exports | 8.04 | 8.88 | 8.51 | 9.64 | 10.77 |
| Singapore | billion USD | 19.16 | 16.62 | 18.94 | 19.89 | 20.42 |
| | % of total exports | 3.17 | 3.02 | 3.60 | 3.41 | 3.08 |
| Thailand | billion USD | 38.45 | 44.85 | 48.46 | 57.06 | 65.24 |
| | % of total exports | 13.80 | 16.52 | 17.48 | 18.73 | 19.86 |
| Vietnam | billion USD | 7.41 | 7.35 | 8.50 | 8.89 | 10.08 |
| | % of total exports | 4.60 | 4.24 | 4.50 | 3.90 | 3.90 |

Sources: TCdata360, The World Bank.

3. Impact of COVID-19 on International Tourist Arrivals

Since the first discovery of confirmed case in December 2019, the COVID-19 pandemic caused unprecedented shocks to international tourist arrivals across ASEAN-6 countries. The changes in international arrivals of the major tourists groups for the ASEAN-6 countries before and after the closure of borders are reported in <Table 4>.

As shown in <Table 4>, the international tourist arrivals have significantly decreased after the outbreak of COVID-19. This is mainly due to the tourist's concern about their health risks and their governments' travel restriction policies. Indonesia and Singapore closed their borders on 18 March 2020, followed by the Philippines and Malaysia (March 19), Vietnam (March 22), and Thailand (March 26).

By comparing the numbers of inbound visitors in February 2019 versus February 2020, Chinese tourists significantly reduced in all countries, especially for Vietnam (-166.27%), Singapore (-98.17%) and Thailand (-94.45%). Korean tourists

in Thailand also dropped by 72.59%. The intra-travelling across the ASEAN countries also declined considerably. While Malay tourists decreased by 35.64% in Indonesia, visitors to Malaysia from Singapore shrank by 39.17% and visitors to Singapore from Indonesia dropped by 46.10%. The same situations are occurred with the inbound tourists from USA, Australia and Europe.

IV. Empirical Analysis

1. Methodology

Following Bhattacharya and Narayan(2005) and Lean and Smyth(2009), we employ unit root tests to examine whether the reduction of inbound visitors to ASEAN-6 countries caused by the shocks from COVID-19 pandemic is permanent or transitory. If the time series follows stationary processes (or the unit root null hypothesis is rejected), we can conclude that the effects of shocks to visitor arrivals are transitory. On the other hand, if the time series are nonstationary processes (or the unit root null hypothesis is not rejected),

<Table 4> Changes of International Tourist Arrivals in Feb. 2019 versus Feb. 2020

| Indonesia | | | | Malaysia | | | |
|--------------|-----------|-----------|--------|-------------|-----------|-----------|---------|
| Nationality | Feb. 2019 | Feb. 2020 | Δ (%) | Nationality | Feb. 2019 | Feb. 2020 | Δ (%) |
| Malaysia | 255,407 | 164,372 | -35.64 | Singapore | 813,186 | 494,638 | -39.17 |
| China | 199,960 | 11,091 | -94.45 | Indonesia | 297,666 | 256,212 | -13.93 |
| Singapore | 143,220 | 84,669 | -40.88 | China | 295,150 | 70,137 | -76.24 |
| Australia | 76,762 | 90,602 | 18.03 | Thailand | 162,595 | 126,191 | -22.39 |
| India | 53,577 | 41,488 | -22.56 | Brunei | 102,571 | 45,998 | -55.15 |
| Japan | 41,642 | 41,463 | -0.43 | India | 51,447 | 59,488 | 15.63 |
| USA | 29,100 | 27,245 | -6.37 | Philippines | 30,512 | 22,474 | -26.34 |
| UK | 24,635 | 24,718 | 0.34 | Japan | 34,750 | 32,963 | -5.14 |
| Korea | 31,847 | 25,223 | -20.80 | Korea | 64,366 | 30,679 | -52.34 |
| Germany | 17,494 | 17,062 | -2.47 | Australia | 24,602 | 19,330 | -21.43 |
| Philippines* | | | | Singapore | | | |
| Nationality | Nov. 2019 | Dec. 2019 | Δ (%) | Nationality | Feb. 2019 | Feb. 2020 | Δ (%) |
| Korea | 176,185 | 203,965 | 15.77 | Indonesia | 213,991 | 115,351 | -46.10 |
| USA | 82,617 | 109,488 | 32.52 | China | 339,550 | 6,222 | -98.17 |
| China | 126,785 | 117,000 | -7.72 | Malaysia | 88,705 | 40,829 | -53.97 |
| Japan | 53,784 | 59,379 | 10.40 | India | 88,926 | 52,946 | -40.46 |
| Australia | 23,068 | 36,935 | 60.11 | Australia | 66,199 | 54,790 | -17.23 |
| Taiwan | 23,350 | 21,703 | -7.05 | Japan | 69,885 | 53,425 | -23.55 |
| Singapore | 14,738 | 13,016 | -11.68 | Philippines | 52,211 | 32,073 | -38.57 |
| Canada | 20,405 | 30,651 | 50.21 | USA | 56,240 | 37,568 | -33.20 |
| UK | 18,210 | 22,042 | 21.04 | Korea | 62,241 | 16,195 | -73.98 |
| Hong Kong | 7,970 | 10,464 | 31.29 | UK | 62,481 | 49,475 | -20.82 |
| Thailand | | | | Vietnam | | | |
| Nationality | Feb. 2019 | Feb. 2020 | Δ (%) | Nationality | Feb. 2019 | Feb. 2020 | Δ (%) |
| China | 1,064,806 | 160,564 | -84.92 | China | 516,351 | 193,923 | -166.27 |
| Malaysia | 324,724 | 196,099 | -39.61 | Korea | 383,205 | 321,967 | -19.02 |
| Korea | 184,406 | 50,549 | -72.59 | Japan | 70,841 | 73,879 | 4.11 |
| Laos | 137,264 | 136,089 | -0.86 | USA | 77,423 | 58,505 | -32.34 |
| Japan | 161,839 | 136,045 | -15.94 | Taiwan | 77,916 | 93,758 | 16.90 |
| India | 123,272 | 86,779 | -29.60 | Malaysia | 43,369 | 42,199 | -2.77 |
| Russia | 191,559 | 214,315 | 11.88 | Australia | 30,286 | 24,515 | -23.54 |
| USA | 96,064 | 72,484 | -24.55 | Russia | 70,774 | 84,516 | 16.26 |
| Singapore | 70,649 | 32,929 | -53.39 | Thailand | 34,877 | 44,372 | 21.40 |
| UK | 92,111 | 83,056 | -9.83 | Cambodia | 13,696 | 44,280 | 69.07 |

Note: For the Philippines, the changes in visitors are calculated using the statistics of November and December 2019, due to the unavailability of data. Therefore, the results must be interpreted cautiously.

Sources: Statistics Indonesia, Malaysia Tourism Promotion Board, Department of Tourism of the Philippines, Singapore Tourism Board, Ministry of Tourism and Sports of Thailand, Vietnam National Administration of Tourism.

we can conclude that the effects of shocks to visitor arrivals are permanent.

There are many tests for determining whether a series is stationary or nonstationary. Examples include the augmented Dickey and Fuller(ADF; 1979, 1981) test, the Phillips and Perron(PP, 1988) test, and Kwiatkowski et al.(KPSS, 1992) test. We

use the ADF, PP and KPSS unit root tests for empirical analysis as in Lee and Choi(2016) and Son and Nam(2016).

The early and pioneering work on testing for a unit root in time series was performed by Dickey and Fuller(1979). The basic objective of the test is to examine the null hypothesis that $\phi = 1$ in

$y = \Phi y_{t-1} + u_t$ against the one-sided alternative $\Phi < 1$ (Brooks, 2014, pp. 361-364).

$$H_0 : \Phi = 1$$

$$H_1 : \Phi < 1$$

Thus the null hypothesis (H0) is the time series contains a unit root (or the series is nonstationary). And the alternative hypothesis (H1) is the series does not contain a unit root (or the series is stationary).

2. Data

The data used in this study are inbound visitors to the ASEAN-6 countries from the top 10 source markets. Monthly data are employed for the analysis. The data are obtained from various sources such as Statistics Indonesia (2015-2019), Malaysia Tourism Promotion Board (2012-2019), Department of Tourism of the Philippines (2008-2018), Singapore Tourism Board (2008-2019), Ministry of Tourism and Sports of Thailand (2016-2019) and Vietnam National Administration of Tourism (2009-2019). The selection of the sample span for the empirical analysis is dictated by data availability.

3. Unit Root Tests for Stationarity

We employ the ADF, PP and KPSS unit root tests to examine whether the reduction of inbound visitors to ASEAN-6 countries resulting from the shocks of COVID-19 pandemic is permanent or temporary. The results are reported in <Table 5>.

While the transitory effects of COVID-19 on reduction of inbound tourists are found in Indonesia and Thailand, the permanent effects are revealed in most of tourist groups of Singapore. For Malaysia, the temporary effects are present on the visitors from Indonesia, whereas the permanent effects are

reported for the tourists from Singapore and China. For the Philippines, the COVID-19 has short-term effect on Korean tourists, whereas it has long-term effect on visitors from USA and China. For Vietnam, while the short-term effects are detected on the visitors from China and Japan, the long-term effects are found with the tourists from Korea, USA and Taiwan.

V. Conclusions and Policy Implications

In this paper, we examine the impact of COVID-19 pandemic across ASEAN-6 countries focusing on tourism industry. For empirical analysis, we employ various unit root tests to check if the time series for international inbound visitors to ASEAN-6 countries satisfy the random walk hypothesis. If the time series for inbound visitors follows a random walk (or revealing a unit root), it implies that the series is non-stationary process, meaning that the shocks to visitor arrivals are permanent. On the other hand, if the visitor arrivals do not reveal a unit root (or stationary process), it indicates that the shocks to visitor arrivals are temporary.

We find that the effects of COVID-19 on reduction of inbound tourists are transitory for Indonesia and Thailand. On the other hand, the negative effects of COVID-19 in most of tourist groups of Singapore are permanent. Singapore is relatively a small city state and its Changyi International Airport is one of the busiest airport in the world. These facts combined make Singapore more vulnerable from the impact of COVID-19. For Malaysia, the temporary effects are revealed on the international visitors from Indonesia, whereas the

<Table 5> Results of Unit Root Tests

| Indonesia | | | | Malaysia | | | |
|-------------|----------|----------|---------|-------------|----------|----------|---------|
| Nationality | ADF | PP | KPSS | Nationality | ADF | PP | KPSS |
| Malaysia | -3.62 s | -3.55 s | 0.19 ns | Singapore | -0.98 ns | -7.29 s | 0.25 ns |
| China | -4.89 s | -4.05 s | 0.17 ns | Indonesia | -7.59 s | -7.58 s | 0.08 s |
| Singapore | -8.19 s | -8.22 s | 0.18 ns | China | -1.57 ns | -4.91 s | 0.30 ns |
| Australia | -5.36 s | -6.71 s | 0.04 s | Thailand | -5.90 s | -5.99 s | 0.16 ns |
| India | -6.18 s | -6.06 s | 0.08 s | Brunei | -2.47 ns | -8.45 s | 0.13 s |
| Japan | -6.14 s | -5.99 s | 0.05 s | India | -0.70 ns | -6.03 s | 0.18 ns |
| USA | -4.72 s | -4.85 s | 0.10 s | Philippines | -4.72 s | -4.90 s | 0.18 ns |
| UK | -5.49 s | -5.52 s | 0.05 s | Japan | -6.22 s | -6.20 s | 0.16 ns |
| Korea | -6.31 s | -6.40 s | 0.08 s | Korea | -1.14 ns | -5.58 s | 0.10 s |
| Germany | -6.85 s | -3.07 ns | 0.04 s | Australia | -0.89 ns | -8.65 s | 0.14 s |
| Philippines | | | | Singapore | | | |
| Nationality | ADF | PP | KPSS | Nationality | ADF | PP | KPSS |
| Korea | -2.40 ns | -5.62 s | 0.07 s | Indonesia | -2.38 ns | -8.63 s | 0.39 ns |
| USA | -0.47 ns | -5.34 s | 0.20 ns | China | -2.96 ns | -8.03 s | 0.15 ns |
| China | -1.50 ns | -5.29 s | 0.3 0ns | Malaysia | -2.83 ns | -8.05 s | 0.33 ns |
| Japan | -4.27 s | -8.16 s | 0.30 ns | India | -1.43 ns | -6.77 s | 0.17 ns |
| Australia | -0.63 ns | -7.44 s | 0.04 s | Australia | -1.31 ns | -12.48 s | 0.28 ns |
| Taiwan | -4.67 s | -4.54 s | 0.10 s | Japan | -1.59 ns | -8.50 s | 0.34 ns |
| Singapore | 0.47 ns | -5.03 s | 0.32 ns | Philippines | -2.38 ns | -6.21 s | 0.19 ns |
| Canada | 0.36 ns | -5.15 s | 0.11 s | USA | 0.87 ns | -6.57 s | 0.29 ns |
| UK | -1.70 ns | -9.36 s | 0.16 ns | Korea | -3.62 s | -9.12 s | 0.10 s |
| Hong Kong | -10.17 s | -10.3 s | 0.03 s | UK | -0.84 ns | -5.07 s | 0.24 ns |
| Thailand | | | | Vietnam | | | |
| Nationality | ADF | PP | KPSS | Nationality | ADF | PP | KPSS |
| China | -3.59 s | -3.83 s | 0.15 ns | China | -4.12 s | -3.92 s | 0.33 ns |
| Malaysia | -2.44 ns | -7.59 s | 0.07 s | Korea | 0.75 ns | -0.47 ns | 0.34 ns |
| Korea | -3.33 s | -5.46 s | 0.08 s | Japan | -2.32 ns | -8.91 s | 0.08 s |
| Laos | -5.87 s | -5.25 s | 0.09 s | USA | -0.06 ns | -7.33 s | 0.35 ns |
| Japan | -6.38 s | -5.61 s | 0.30 ns | Taiwan | 1.92 ns | -5.42 s | 0.30 ns |
| India | -1.66 ns | -4.34 s | 0.29 ns | Malaysia | -1.65 ns | -5.75 s | 0.11 s |
| Russia | -1.27 ns | -3.64 s | 0.09 s | Australia | -11.28 s | -11.28 s | 0.05 s |
| USA | -3.72 s | -3.04 ns | 0.04 s | Russia | -2.29 ns | -5.16 s | 0.07 s |
| Singapore | -4.29 s | -7.66 s | 0.04 s | Thailand | -4.72 s | -5.94 s | 0.08 s |
| UK | -0.87 ns | -4.58 s | 0.04 s | Cambodia | -4.16 s | -4.00 s | 0.21 ns |

Notes: 1. ADF, PP and KPSS are the test statistics for the Dickey and Fuller (1979), and the Phillips and Perron (1988) unit-root tests, and the Kwiatkowski *et al.* (1992) stationarity test, respectively. 2. s = stationary, ns = nonstationary at 5% level of significance.

permanent effects are reported for the inbound tourists from Singapore and China. Indonesia and Thailand might recover easily from the effects of COVID-19 on the numbers of visitors once the pandemic ends. However, Singapore may suffer in the long-term period regarding the decrease in foreign tourists. For the Philippines, Malaysia and Vietnam, both the short- and long-term effects are

present in certain tourist groups.

The findings suggest that the government authorities in Singapore, the Philippines, Malaysia and Vietnam should take source-country-specific policy to cope with the long-term effect of COVID-19 over the number of international tourists.

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