ANALYSIS OF THE RELATIONSHIP BETWEEN INTERNATIONAL TOURIST ARRIVALS, TOURISM FDI, AND TOURISM GDP IN INDONESIA

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ABSTRACT

This study aims to investigate whether the international tourist arrivals affect tourism FDI and tourism GDP in Indonesia during the period 2004 – 2020. In addition, this study also aims to estimate how much and how long the impact of the decline in international tourist arrivals due to the COVID-19 pandemic on the long-term equilibrium between international tourist arrivals, tourism FDI and tourism GDP. By using the Granger Causality Test and Vector Error Correction Model (VECM), this study found that the international tourist arrivals affect tourism FDI and tourism FDI affects tourism GDP. Furthermore, the results showed that in the long term, the in-crease of international tourist arrivals by one percent will increase tourism FDI by 0.55 percent. Then, one percent increase of tourism FDI will increase tourism GDP by 0.10 percent. In the short term (monthly analysis), if there is a "shock" in the increase of international tourist arrivals, tourism FDI will increase for the next 5 months, and tourism GDP will also increase for 2 months and 16 months after the increase of inter-national tourists. This study also found that the long-term equilibrium between international tourist arrivals, tourism FDI, and tourism GDP will recover within 38 months after the pandemic COVID-19. This means the tourism sector will need three years to recover after the pandemic ends if there is no policy intervention to accelerate tourism recovery.

Keywords: International Tourist Arrivals, Tourism FDI, Tourism GDP, VECM

INTRODUCTION

Before the COVID-19 pandemic hit the world, the world tourism sector experienced significant developments from 1980 to 2019. If calculated, the arrival of international tourists worldwide increased by 3.3 per cent on average per year during the period 2010-2030. If there was no COVID-19 pandemic, international tourist arrivals are projected to reach 1,800 million visits by 2030 worldwide (United Nations World Tourism Organization/UNWTO, 2017). The above conditions are not much different from Indonesia. As an archipelagic country endowed with natural beauty and diverse cultures, Indonesia has succeeded in becoming one of the most attractive tourist destinations in the eyes of international tourists.

Figure 1 shows the development of the number of international tourist arrivals to Indonesia each year. In 2008, the number of international tourist arrivals was recorded at 6,234,497 international tourists from all entrances in Indonesia. Then, it was recorded that in 2019, the number of international tourist arrivals increased to 16,106,954 international tourists. Based on researchers' calculations, this number has grown almost two and a half times compared to 2008, with an average growth of 10-15 per cent per year in the last ten years. Therefore, it is not surprising that before the COVID-19 pandemic, the tourism sector became one of the largest economic sectors with the fastest growth in Indonesia.
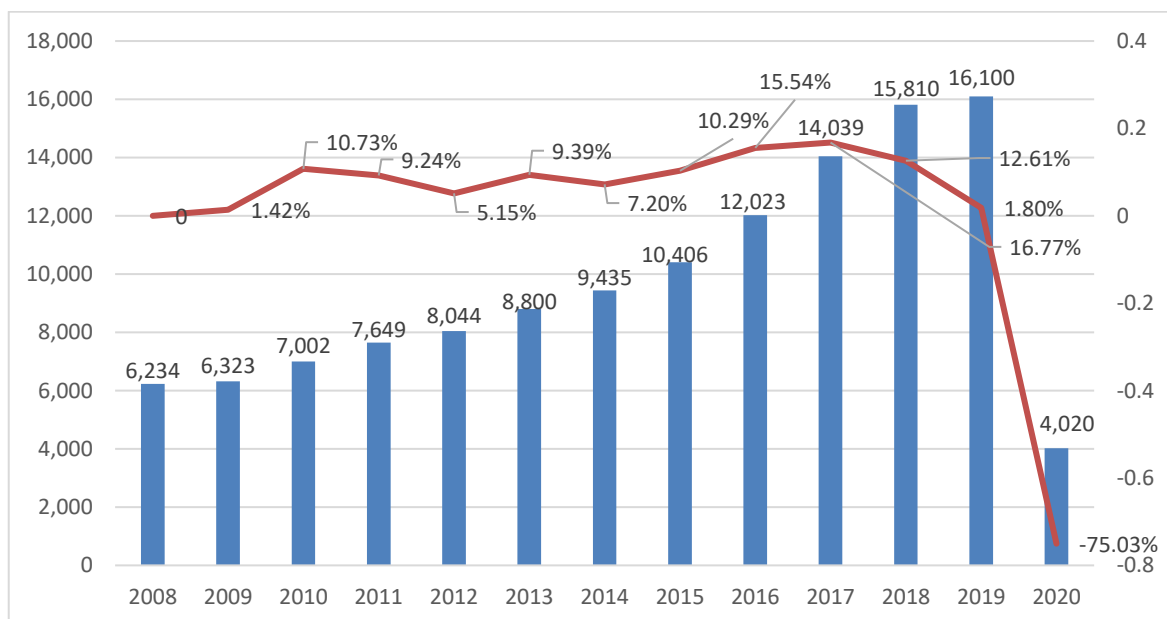

Figure. 1. Number of International Tourist Arrivals from All Entrances in Indonesia in 2008-2020

Source: Central Bureau of Statistics/BPS (2019a), processed by researchers.

However, entering 2020, the arrival of international tourists experienced an anomaly due to the outbreak of the COVID-19 pandemic. The total number of international tourists who came to Indonesia in 2020 was only 4.02 million arrivals or decreased by 75.04 per cent (yoy) due to the COVID-19 pandemic (see figure 1) (Ministry of Tourism and Creative Economy/Kemenparekraf, 2020). One of the causes of the decline in international tourist arrivals to Indonesia is the Indonesian government implementing a policy restricting flights from and to Indonesia to other countries. Not only Indonesia, but many other countries have also implemented a policy prohibiting flying out of their countries, such as the United States, Europe, and countries in the Southeast Asian region.

However, along with the rapid flow of international tourists coming to Indonesia before the pandemic, it is suspected that it will impact the flow of investment, especially the flow of foreign investment in the tourism sector, such as hotels and restaurants in Indonesia. Along with the increasing flow of international tourists, foreign investors are interested in investing in the tourism sector, such as investing in the construction of hotels or inns, restaurants, purchasing equipment and so on. In addition, international tourists who visiting Indonesia are also potential investors who want to experience firsthand the environment of the country they are visiting and get information about available investment opportunities. By visiting Indonesia directly, investment opportunities can be identified (Sanford & Dong, 2000).

Based on the findings from a study conducted by the Institute for Economic and Community Research, University of Indonesia/LPEM UI (2018), the average growth of Foreign Direct Investment (FDI) in the tourism sector grew by 35.5 per cent during 2015-2017. In addition, in general, the realization of investment in the tourism sector is also largely dominated by foreign investment. The proportion of foreign investment (FDI) reaches 77 per cent compared to domestic investment (DDI). Then, the latest data compiled from the Investment Coordinating Board/BKPM (2021) shows that the realized value of FDI in the hotel and restaurant sector in 2019 was US$625,891 with 3,974 projects. Thus, it can be said that foreign investment in the tourism sector, especially hotels and restaurants, plays an essential role in the development of the tourism sector in Indonesia.

In addition, the rapid influx of international tourists is also suspected of having a positive impact on tourism GDP, as seen from the performance of the hotel and restaurant sector in Indonesia. Based on BPS data (2019c), international tourists' average length of stay in Indonesia is 7-8 days during the 2009-2019 period. Then, in terms of international tourists spending, in general, the average spending of international tourists per visit from 2009-2019 also increased. In 2009 the average expenditure per international tourist per visit was US$995.93 (BPS, 2009). This figure has increased to US$1,150 in 2019 (BPS, 2019c) or 15 per cent. When viewed from the type of expenditure, the expenditure of international tourists during their stay in Indonesia is mainly used for accommodation (by 38.55 per cent) and food and beverages (by 21.15 per cent) (BPS, 2019b). Of course, this will have a positive impact on the hotel and restaurant sector. Thus, it is not surprising that tourism GDP managed to rank 9th as a source of Indonesia's GDP growth, with a contribution of 0.17-2 per cent annually. Furthermore, it was recorded that in 2019, Tourism GDP managed to record a direct contribution of IDR 299.248 billion or grew by 5.79 per cent (year on year / yoy). If it is calculated, in the 2015-2019 period, the GDP of the tourism sector can record a contribution of 5-6 per cent of GDP every year (BPS, 2019d).

The narrative above seems to place the tourism sector as a factor causing the inflow of tourism FDI and Tourism GDP in Indonesia. However, Figure 2 shows that in the period 2010 to 2019, the relationship between these three variables shows a relationship that is still not clear. The relationship pattern between international tourist arrivals, tourism FDI, and tourism GDP has not been mapped. There is a period when international tourist arrivals increase, tourism FDI also shows an increasing pattern. However, there was a period when international tourist arrivals increased, but toruism FDI declined. Then, it can also be noted that the pattern of increasing tourism FDI experienced a rapid increase first compared to the number of international tourists in 2015, which then saw an increase in the number of international tourists only in 2016.
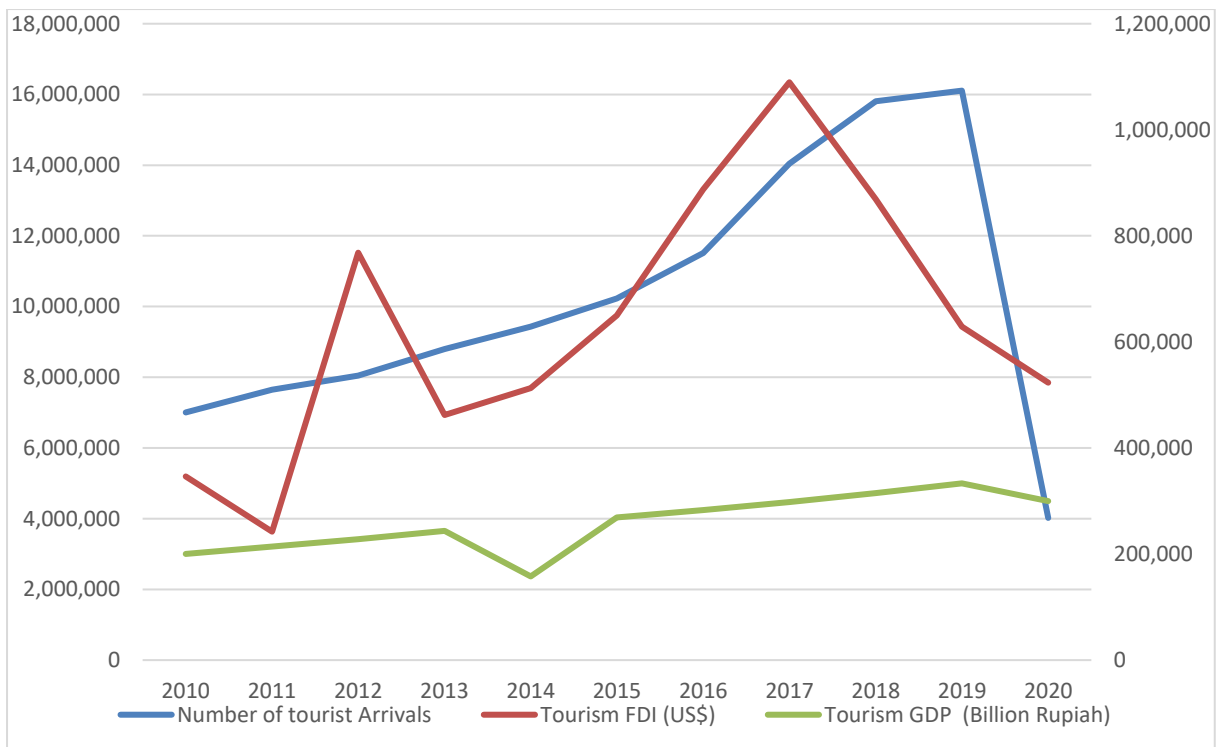
Figure. 2 Number of international tourists, Tourism FDI and Tourism GDP in 2010 – 2020
Source. BPS (2020), the data is processed.

Meanwhile, regarding the relationship between international tourist arrivals and tourism GDP, there is a consistent pattern in which an increase in the number of international tourist arrivals is followed by a pattern of increasing tourism GDP. However, as with tourism FDI, there are times when the arrival of international tourists increases, but tourism GDP decreases, as in 2013-2014. Then, if we look at the relationship between tourism GDP and tourism FDI, it also shows ambiguity, where when tourism FDI decreased in 2017, tourism GDP showed an increase. Thus, the relationship between the three variables above needs to be further validated which variables become tools and targets in a policy.

Furthermore, Figure 2 is related to the situation of the COVID-19 pandemic, where when the arrival of international tourists decreased, followed by a decrease in tourism FDI and tourims GDP. It shows that the COVID-19 pandemic has had a significant impact on the decline in international tourist arrivals, which also resulted in a decrease in the flow of tourism FDI and tourism GDP in Indonesia. Along with the decrease in international tourist arrivals, the number of potential investors who come to Indonesia to invest their capital will also decrease. As a result, the flow of tourism FDI will also decrease. On the other hand, reduced international tourist arrivals will also reduce demand for accommodation, hotels, and food and beverages. Thus, it is not surprising that the decline in international tourist arrivals led to tourism FDI and tourism GDP.

The rapid growth of international tourist arrivals to a country is attractive because tourism tends to be relatively stable and often countercyclical as a source of external funding for developing countries. However, some recent empirical literature in developed and developing countries that discusses the relationship between international tourist arrivals, tourism FDI, and tourism GDP, in general, gives different results. Several studies try to analyse the relationship between international tourist arrivals and tourism FDI, such as Katirciogiu (2011), Tomohara (2016), Chen (2017), and Arain et al. (2020). These studies indicate that an increase in the tourism sector through international tourist arrivals can contribute to an increase in FDI inflows to tourism-related industries.

Meanwhile, some literature gives different results (see, for example, Tang et al., 2007; Selvanathan and Viswanathan, 2012; Perić and Radić, 2017, Ravinthirakumaran et al., 2019). These studies find a causal relationship in the opposite direction where tourism FDI is precisely what causes the arrival of international tourists to the country. This group argues that foreign direct investment into the tourism sector, such as constructing five-star hotels, restaurants, and tourism supporting infrastructure, causes international tourists to come to tourist destination countries.

Unlike the group above, some groups find that these two variables interact dynamically (see, for example, Salleh, Redzuan, and Tamat, 2011; Othman, Salleh, and Sarmindi, 2012; Samimi, Sadeghi, and Sadhegi, 2013; Fereidouni and Al-mulali, 2014). These studies find that the rapid arrival of international tourists will encourage the inflow of tourism FDI in the destination country, while at the same time, the increasing inflow of tourism FDI will attract international tourists to the destination country given the availability of adequate infrastructure facilities to create interest in the tourism sector.

Then, related to the relationship between international tourist arrivals and GDP, many studies have dexamined the relationship between international tourist arrivals and GDP in general. The studies that conducted investigations in this regard also have not found a clear consensus and are still being debated. Several studies state that international tourist arrivals encourage an increase in GDP in tourist destination countries (Brida, Carrera and Risso, 2008; Terzi, 2015; Anggraeni, 2017; and Fadilah, Kuncoro, and Sebayang, 2018). Contrary to the studies above, there are also studies that state that it is precisely the increase in GDP in the

destination country that drives the arrival of international tourists (Oh, 2005; He and Zheng, 2011; Lean, Chong, and Hooy, 2014; and Kum, Aslan, Gungor, 2015). Meanwhile, several studies have found that GDP and international tourist arrivals have a reciprocal relationship (Lee and Chang, 2008; Nizar, 2011; Shakouri, Yazdi and Nategian, 2017; and Badulescu et al., 2020).

Finally, the relationship between FDI and GDP is also interesting to observe. Like the variables above, the relationship between these two variables has not yet received a clear consensus. Several studies have shown that FDI causes an increase in GDP (Baharumslah and Thanoon, 2006; Kundan and Gu, 2010; Abbes et al., 2015; Sothan, 2017). Meanwhile, on the other hand, several studies have found that GDP causes an influx of FDI flows (Ang, 2008; Supriyadi and Satria, 2017; Ludosean, 2017; Sarker and Khan, 2020). On the other hand, several studies have found that the two are reciprocally related (Srinivasan, Kalaivani and Ibrahim, 2011; Umoh, Jacob, and Chukwul, 2012; Shaari et al., 2012).

However, the whole study does conclude that there is a positive relationship between tourism (through international tourist arrivals), FDI, and GDP, especially in the long-term aspect. However, there does not seem to be a clear consensus on the dynamics and direction of the relationship between research results on this issue, especially those directly related to tourism FDI and tourism GDP in developing countries, such as Indonesia. Therefore, this dynamic relationship is also interesting to study more deeply. In addition, so far, no research has been conducted on the flow of international tourist arrivals, tourism FDI, and tourism GDP, and the interactions of the three that may occur in the context of developing countries, especially in Indonesia. For this reason, a comprehensive study is needed to examine how the actual direction of the relationship between the three for the case of Indonesia is needed.

This research is also essential when the flow of international tourist arrivals is growing, such as conditions before the COVID-19 pandemic and when the tourism sector experiences shock due to the decline in international tourist arrivals during the COVID-19 pandemic. So, in the context of the COVID-19 pandemic, this research is very relevant to analyse the impact of the decline in international tourist arrivals on FDI flows and the growth of the hotel and restaurant sector. In the end, this study seeks to provide policy recommendations based on knowledge-based policymaking to relevant policymakers, such as the Coordinating Ministry for Economic Affairs, Kemenparekraf, and BKPM in formulating policies in the Tourism and FDI sectors. This aims to create a comprehensive policy to encourage the Indonesian economy through the tourism sector and recovery efforts that the government can take in the event of a shock in the tourism sector, such as the current COVID-19 situation.

LITERATURE REVIEW

In recent years, various studies have attempted to validate the hypothesis that the arrival of international tourists encourages FDI flows, tourism FDI encourages an increase in international tourist arrivals, or even that both have a positive reciprocal relationship. Several studies conducted by Katircigiu (2011) in Turkey, Chen (2017) in China, and Arain et al. (2020) in 10 countries with the highest number of international tourists using several methods such as autoregressive distributed lag (ARDL), vector error correlation model (VECM), generalized method of moments (GMM), Granger causality test, and quantile-on-quantile (2020). QQ) shows a one-way relationship of the variable arrival of international tourists to the flow of tourism FDI in tourist destination countries.

These studies show that the influx of international tourists positively correlates with an increase in tourism FDI, particularly in the hotel and restaurant sector. It is because the influx of international tourists will indirectly act as potential investors in the destination country. That way, international tourists can see firsthand the situation and conditions in the destination country to see the business, economic, and political potential before investing in the country. Studies from Tomohara (2015) in Japan and Chen (2017) in China show that the tourism sector has associations with FDI in all sectors, not only in tourism FDI but also FDI in other sectors. It shows that the arrival of international tourists encourages the development of the tourism sector and encourages the development of the non-tourism sector.

Several studies support the hypothesis that it is not the arrival of international tourists that affects the level of tourism FDI but the level of tourism FDI that drives the arrival of international tourists. These studies were conducted by Tang, Selvanathan, and Selvanathan (2007) in China, Selvanathan and Viswanathan (2012) in India, Peric and Radic (2016) in the Republic of Croatia, Ravinthirakumaran et al. (2019) in Sri Lanka. Using several methods, such as the Granger and Toda-Yamamoto causality tests and Vector Autoregression (VAR), these studies using data on international tourist arrivals and tourism FDI show a one-way causality relationship from the tourism FDI variable to the international tourist arrivals variable. The inflow of tourism FDI sector makes tourists more comfortable because they do not have to worry about finding accommodation where they stay during their trip. In addition, the tourism FDI will also result in the development of new tourist attractions (hotels) and facilities which, in turn, attract more tourists. So that the tool to make tourists come is tourism FDI, which will ultimately make destinations in tourist areas more attractive for tourists to visit.

In addition to the studies above, previous studies show that the variable arrival of international tourists has a reciprocal relationship with the FDI variable. Thus, the relationship between the two variables is not one-way as research conducted by Salleh, Redzuan, Tamat. (2011) in Malaysia, Thailand, Singapore, China and Hong Kong, Othman, Salleh, and Sarmindi (2012) in 18 major international tourist destinations, Samimi, Sadeghi, and Sadeghi (2013) in 20 developing countries, Fereidouni and Al-mulali (2014) in several OECD member countries. Using the Granger, VECM, and ARDL causality test methods, these studies found that the inflow of tourism FDI in the tourism sector at the same time will also encourage the inflow of international tourists to tourist destinations. That way, the policies implemented in the country must support the inflow of tourism FDI and tourism promotion policies so that international tourist arrivals increase rapidly.

Then, empirical studies on international tourist arrivals with GDP, various studies also attempt to validate the hypothesis that tourism encourages an increase in GDP or GDP encourages tourism, even though the two are mutually related. Several studies from Brida, Carrera, and Risso (2008) in Mexico, Terzi (2015) in Turkey 8 ASEAN countries Indonesia, Malaysia, Singapore, Philippines, Thailand, Vietnam, Cambodia, and Laos, Fadilah, Kuncoro, and Sebayang (2018) in Indonesia. Using the Granger

causality test method by Toda and Yama, and VAR found that the arrival of international tourists was the cause of increasing GDP in tourist destination countries. This is due to the arrival of international tourists through the expenditure of international tourists to determine the increase in GDP in tourist destination countries.

Contrary to the studies above, several studies have found an inverse relationship in which an increase in GDP causes the arrival of international tourists. Oh (2002) in Spain, Turkey, and Mexico, He and Zheng (2011) in the provinces of Sichuan, China, Lean, Chong, and Hooy (2014) in Singapore, Kum, Aslan, Gungor (2015) in 11 countries (Bangladesh, Egypt, Indonesia, Iran, South Korea, Mexico, Nigeria, Pakistan, Philippines, Turkey, and Vietnam). Using the Engle and Granger two-stage approach, bivariate VAR, FMOLS and Dynamic OLS (DOLS) methods, these studies show that GDP in tourist destination countries causes the arrival of international tourists to the country. A high and stable level of GDP makes international tourists tend to be more interested in visiting a country because the level of GDP can indicate that the economic situation in the country is in good condition so that high and stable economic growth also leads to an increase in physical and human capital and the environment. An economy that encourages tourism growth, especially economic growth, will encourage tourism sector development, such as infrastructure and excellent quality of tourism services (Antonakakis, Dragouni, and Filis 2015).

Contrary to the two groups above, some studies support that tourism and economic growth both have a mutually beneficial relationship or bi-directional causalities, such as Lee and Chang (2008) in non-OECD countries, Nizar (2011) in Indonesia, Shakouri, Yazdi, and Nategian (2017) in Asia, and Badulescu et al. (2020) in Romania. Using the Granger causality panel, VAR, and VECM methods, these studies show that the number of international tourists' arrivals and tourism sector revenues find a one-way causal relationship from tourism sector growth to economic development (GDP increase) in developing countries.

Like the relationship between the arrival of international tourists and tourism FDI, relationship between FDI and GDP, which still has not found a clear consensus on the direction of the relationship between these variables, several studies also show different conclusions and often lead to debates regarding the relationship between FDI and GDP. On a practical level, several studies support the view that FDI generally drives GDP in FDI destination countries, such as Baharumshah and Thanoon (2006) in East Asian countries, Kundan and Gu (2010) in Nepal, Abbes et al. (2015) in Asia and Oceania, such as the Middle East, North America, North Africa, and Central Africa, Sothan (2017) in Cambodia. Using the dynamic generalized least square (DGLS), ordinary least square, Granger causality methods, and VECM, these studies find that FDI helps boost the economy by increasing domestic physical capital. These studies also confirm that there is a one-way causal relationship between FDI to GDP growth.

Contrary to the studies above, several empirical studies support the hypothesis that GDP drives FDI, such as studies from Ang (2007) in Malaysia, Supriyadi and Satria (2017) in ASEAN countries, Ludosean (2012) in Romania, and Sarker and Khan (2020) in Bangladesh. Using several methods, such as VAR, Toda-Yamamoto granger causality, augmented autoregressive distributed lag (augmented ARDL) bounds, error correction model (ECM), these studies show a one-way relationship from GDP to FDI. Thus, this study concludes that FDI does not have a causal effect on increasing GDP. Stable and relatively high economic growth for several periods often makes foreign investors expect a faster return on investment. Thus, the GDP argument encourages FDI. In addition, macroeconomic variables such as economic growth/GDP tend to be high and stable, which makes investors feel safer investing their capital in the hope of getting high returns.

Different from the two views above, there is a view that states that FDI and GDP interact. Zhang's (2001) study states that the hypothesis of FDI and GDP being mutually determinant of each other can be achieved because countries that have a significant increase in GDP attract more FDI to come and provide good profit opportunities. On the other hand, FDI flows can help increase the GDP of recipient countries through direct and indirect effects. Several studies support this view, such as Srinivasan, Kalaivani, and Ibrahim (2011) in the South Asian Association for Regional Cooperation (SAARC) countries, Umoh, Jacob, Chukwu (2012) in Nigeria, Shaari et al. (2012) in Malaysia. Using VAR, Granger causality, and VECM methods, these studies show a two-way relationship between FDI and GDP in the study countries.

METHODOLOGY

Based on the framework developed by the researcher, this research uses a vector autoregressive (VAR) analysis approach. This is since this study aims to examine the dynamic interaction between international tourist arrivals, tourism FDI, and tourism GDP. The VAR model is a non-structural approach model that describes a "mutually causal" relationship (causality) between variables in the system (Gujarati, 2004). Furthermore, based on the historical side, the VAR approach was first developed by Christopher Sims in 1980. A practical analytical framework in this model will provide systematic information and correctly estimate information in equations formed from time-series data (Sutawijaya and Lestari, 2013).

The VAR approach also makes researchers not have to worry about distinguishing which variables are endogenous because this model assumes that all variables in the model are endogenous (defined in the model), so this approach is called an a-theoretical approach (not based on theory). Because in this case, it is often found that economic theory cannot capture the dynamic relationship accurately and ultimately between variables. In addition, the VAR approach also has certain advantages: in the VAR approach, the dependent variable is expressed as a function of itself, and the respective lag values and all variables are allowed to influence each other.

By using the model VAR(p): $Xt = GXt_{-p} + et$ formed are as follows:

$$Logy_t = \alpha a + \alpha a_p \Sigma Logy_{t-p} + \beta a_p \Sigma Logx_{t-p} + \pi a_p \Sigma LogZ_{t-p} + \varepsilon a_t \qquad (3a)$$

$$Logx_t = \alpha b + \alpha b_p \Sigma Logx_{t-p} + \beta b_p \Sigma Logy_{t-p} + \pi b_p \Sigma LogZ_{t-p} + \varepsilon b_t \qquad (3b)$$

$$Logz_t = \alpha c + \alpha c_p \Sigma Logz_{t-p} + \beta c_p \Sigma Logx_{t-p} + \pi c_p \Sigma Logy_{t-p} + \varepsilon c_t \qquad (3c)$$

Based on equation (3), y, x, and z each represent international tourist arrivals, tourism FDI, and Tourism GDP.

This study will also examine the long-term relationship between three variables (tourist arrivals, Tourism FDI, and Tourism GDP) using the Johansen Cointegration test method. If the three variables are cointegrated, then the VAR model will be restricted by the cointegration equation. This VAR model, which is restricted by the cointegration equation, is known as the VECM model, which can be written as follows:

$$\Delta y_t = \alpha e_{t-1} + \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + ... + \beta_p \Delta y_{t-p+1} + \varepsilon_t \qquad (3d)$$

Furthermore, to see the direction of the relationship between the three variables, this study will test it with the Granger-Causality test framework, which is based on the optimal VAR (p) model. In addition, to identify which variables are the most exogenous in the VAR system, this study uses Forecast Error Variance Decomposition (FEVD) analysis. Furthermore, to see the mechanism of influence of each variable of international tourist arrivals, tourism FDI, and the Tourism sector's performance on each of these variables, Impulse Response Function (IRF) with an ordering (orthogonal innovation) analysis will be used.

This study uses time-series data for the variable arrival of international tourist, tourism FDI in (proxy with FDI in the hotel and restaurant sector), and tourism GDP data for the hotel and restaurant sector starting from 2004 (1) to 2020 (1) monthly. The selection of this data was carried out considering that there had been a shock in the form of the COVID-19 pandemic when entering February, which made the data anomaly. The data is secondary data that comes from various sources. Data on international tourist arrivals was obtained from BPS and *Kemenparekraf*. Then, this research tourism FDI uses data on foreign investment (PMA) in the hotel and restaurant sector from the National Single Window for Investment (NSWI) Indonesia. Finally, Tourism GDP data is obtained from BPS using Tourism GDP data using constant prices with the base year 2010. GDP data published by BPS is quarterly data. To become monthly data, the researcher interpolated, breaking down the quarterly data into monthly data by dividing the quarterly data into twelve monthly data.

STUDY CASE

Based on the Augmented Dicky-Fuller (ADF) test and the Phillip-Perron PP test, which are summarized in table 4.1 below, the variables LOGWISMAN and LOGPDB_PARIWISATA are not stationary in degrees with a significance level of 1%. Meanwhile, LOGFDI_TOURISM is stationary at the degree level. However, in the VAR model, data in the form of levels are maintained (either in the form of logarithms or not), provided that the model meets the stability test. Thus, in the form of further data processing using LOGWISMAN, LOGFDI_PARIWISATA, and LOGPDB_PARIWISATA data which are at the level.

Table 4.1 Root Test Results with ADF Test and PP. Test

Variables	ADF			PP		
	t-test	Prob.	Level	t-test	Prob.	Level
LOGWISMAN	0.340	0.9798		-0.779	0.8223	I
LOGFDI_ PARIWISATA	-5.452	0.0000	I	-4.059	0.0014	I
LOGPDB_ PARIWISATA	-2.413	0.1394	I	-2.208	0.2039	I

Source. Eviews, processed data.

The next step is to test the optimal lag length. The optimal lag test is one of the essential procedure steps in time series data analysis. It is because the cointegration test and other advanced tests are susceptible to the lag length. The selection of a lag length that is too short will result in a serial correlation, while the selection of a lag that is too long causes a decrease in the degree of freedom of the resulting equation, and the number of estimated parameters becomes more and more so that it becomes inefficient (Enders, 2004).

Table 4.2 Optimal Lag Length Determination Results

| Lag	LogL	LR	FPE	AIC	SC	HQ
0	-373.8599	NA	0.012340	4.118688	4.171302	4.140015
1	303.6140	1325.331	8.29e-06	-3.187038	-2.976580	-3.101729
2	359.3592	107.2258	4.97e-06	-3.697915	-3.329613	-3.548624
3	380.5828	40.12762	4.35e-06	-3.831506	-3.305360	-3.618233
4	407.1752	49.40671	3.59e-06	-4.023773	-3.339784*	-3.746518
5	425.2830	33.04923	3.25e-06	-4.123312	-3.281479	-3.782076*
6	432.0010	12.04099	3.34e-06	-4.098372	-3.098696	-3.693154
7	441.7818	17.20993	3.32e-06	-4.106905	-2.949385	-3.637705
8	454.4174	21.81880	3.19e-06	-4.146638	-2.831275	-3.613457
9	463.4652	15.32685	3.20e-06	-4.147160	-2.673954	-3.549997
10	476.1102	21.00598*	3.08e-06*	-4.186997*	-2.555947	-3.525852

Source. Eviews, processed data.

Based on table 4.2 shows that the optimal lag length is lag 10. where lag 10 has the most asterisks on several test criteria such as LR. FPE. and AIC. For this reason, the next test will use Lag 10 based on the optimal lag length test results for this study. Furthermore, the stability test of the model is carried out, where this stability test is carried out to test the stationarity simultaneously for each variable by entering the optimal lag into the regression equation. Based on the previous optimal lag test, it was found that the optimal lag for the VAR model uses a lag of 10 periods or VAR (10). Furthermore, the basis for deciding to test the stability of the model is the value of the inverse root of the polynomial AR characteristics. A VAR system is stable (stationary) if all its roots have a modulus less than one (Lutkepohl, 1991). In this study, table 4.7 shows the modulus values for the VAR model ranging from 0. 0.786272 - 0.972959. Based on these results, it is stated that the modulus value obtained does not exceed one. In addition, based on Figure 4.3, no point comes out of the circle. Thus, the VAR model is declared stable with a lag set at 10.

Table 4.3 VAR Model Stability Test Results

	Modulus
0.891387 - 0.294897i	0.938901
0.891387 + 0.294897i	0.938901
0.908210 - 0.032749i	0.908800
0.908210 + 0.032749i	0.908800
0.701039 - 0.529560i	0.878573

No root lies outside the unit circle.
VAR satisfies the stability condition.

Figure 4.1 *AR Roots*

Inverse Roots of AR Characteristic Polynomial
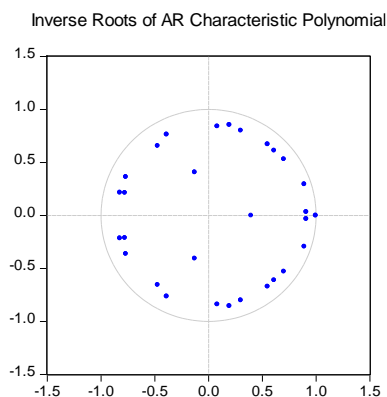
Source. Eviews, processed data.

The next test is cointegration testing with the Johansen Test of Cointegration test to test the long-term relationship in the analysis that will use the VAR model. The relationship of mutual influence can be seen from the cointegration that occurs between the variables themselves. If there is cointegration between variables, then the mutually influencing relationship runs, and information is spread in one direction.

Table 4.4 is the cointegration test with the assumption that no trend determinant shows rejection of Ho where from the 3 equations, 2 equations are cointegrated in the long run. Thus, because the model at the level meets the rules of stability and there is cointegration between variables in the VAR model, the model was chosen for analysis is the VECM model.

Table. 4.4 Cointegration Test Results

Hypothesized		Trace	0.05	
No. of CE (s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.218890	66.34265	29.79707	0.0000
At most 1 *	0.106350	21.13438	15.49471	0.0053
At most 2	0.003043	0.557723	3.841466	0.4552
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level.				
* Denotes rejection of the hypothesis at the 0.05 level				

Source. Eviews, processed data.

The following analysis is a test of determining exogenous variables using the Granger causality test and FEVD. Based on table 4.5, the results of the Granger causality test using the VECM equation with a lag of 9 (optimal lag – 1).

Table. 4.5 Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
LOGFDI_PARIWISATA does not Granger Cause LOGWISMAN	184	1.19072	0.3041
LOGWISMAN does not Granger Cause LOGFDI_PARIWISATA		2.12163	0.0303
LOGPDB_PARIWISATA does not Granger Cause LOGWISMAN	184	1.31107	0.2346
LOGWISMAN does not Granger Cause LOGPDB_PARIWISATA		1.75631	0.0803
LOGPDB_PARIWISATA does not Granger Cause LOGFDI_PARIWISATA	184	3.25728	0.0011
LOGFDI_PARIWISATA does not Granger Cause LOGPDB_PARIWISATA		2.14672	0.0283

Source. Eviews, processed data.

Table 5 shows that there is a one-way causal relationship between the variables LOGWISMAN and LOGFDI_PARIWISATA. The null hypothesis which states that LOGWISMAN has no causal relationship with LOGFDI_PARIWISATA is rejected, and Ha is accepted (probability F-Statistics 0.030 < 0.05). Meanwhile, the null hypothesis which states that LOGFDI_PARIWISATA has no causal relationship with LOGWISMAN is accepted and Ha is rejected (Probability F-statistics 0.304 > 0.05). Thus, the inflow of FDI in the tourism sector does not cause the arrival of international tourists to Indonesia. On the contrary, the arrival of international tourists is the cause of the inflow of FDI in the tourism sector. These results are in line with the research of Katirciogiu, 2011; Tomohara, 2016; Chen, 2017; and Arain et al, 2020.

The test results also show that there is no causal relationship between the variables LOGWISMAN and LOGPDB_HOTEL and vice versa (probability of both F-statistics > 0.05). This finding confirms that these two variables are not determinants of each other. Furthermore, there is a bidirectional causal relationship between LOGFDI_TOURISM and LOGPDB_TOURISM. The null hypothesis which states that the variables LOGFDI_PARIWISATA and LOGPDB_PARIWISATA have no causal relationship with LOGPDB_HOTEL is rejected, and Ha is accepted (probability F-Statistics 0.001 < 0.05). The opposite also occurs with LOGPDB_PARIWISATA with LOGFDI_PARIWISATA where the null hypothesis which states that the variable LOGPDB_PARIWISATA has no causal relationship with LOGFDI_PARIWISATA is rejected, and Ha is accepted (probability F-Statistics 0.028 < 0.05).

Analysis of variance decomposition is often referred to as Forecast Error Variance Decomposition (FEVD) analysis. FEVD analysis aims to estimate the percentage contribution of variance of a variable in the VAR/VECM/SVAR system due to shocks (Enders. 2010). FEVD is used to estimate the variance error of a variable. i.e., how big is the difference between the variance before and after the shock. Both shocks originating from the variable itself and other variables. FEVD procedure. Namely by measuring the percentage of surprises for each variable. Not only that but FEVD can also be used to find out which variables are purely exogenous.

Table. 4.6 Decomposition of Variance

Variance Decomposition of LOGWISMAN:				
Period	S.E.	LOGWISMAN	FDI_PARIWISATA	PDB_PARIWISATA
1	0.085187	100.0000	0.000000	0.000000
2	0.095024	99.12601	0.724228	0.149759
3	0.096682	99.10396	0.745955	0.150082
4	0.101529	99.16792	0.680814	0.151261
5	0.105290	96.64902	1.684520	1.666459
6	0.107828	95.48832	2.469188	2.042492
7	0.109183	94.14671	2.812720	3.040572
8	0.110909	93.26221	2.863038	3.874754
9	0.112332	92.65625	2.996623	4.347129
10	0.114948	92.91149	2.869615	4.218894
Variance Decomposition of FDI_PARIWISATA:				
Period	S.E.	LOGWISMAN	FDI_PARIWISATA	PDB_PARIWISATA
1	0.556075	1.662757	98.33724	0.000000
2	0.832770	3.024345	96.41465	0.561007
3	0.938826	2.555635	96.41705	1.027314
4	0.946864	2.512753	96.43382	1.053426
5	0.952554	2.754867	96.19852	1.046610

6	0.971174	4.771538	93.84421	1.384247
7	0.983796	5.855674	91.51140	2.632921
8	0.996430	5.712054	89.55383	4.734118
9	1.005227	5.714052	87.99407	6.291875
10	1.013873	6.187447	86.62141	7.191142
Variance Decomposition of PDB_PARIWISATA:				
Period	S.E.	LOGWISMAN	FDI_PARIWISATA	PDB_PARIWISATA
1	0.029649	0.722079	1.19E-05	99.27791
2	0.055516	0.456055	0.260154	99.28379
3	0.083109	1.845589	0.703408	97.45100
4	0.097178	5.629818	1.546533	92.82365
5	0.106592	7.653027	1.850818	90.49615
6	0.112234	8.179757	1.983259	89.83698
7	0.117483	7.524982	1.835496	90.63952
8	0.121806	7.003837	1.718634	91.27753
9	0.125511	6.749633	1.765583	91.48478
10	0.129049	6.534977	1.831680	91.63334

Source. Eviews, processed data.

Furthermore, table 4.6 shows that the decomposition of the variance of the LOGWISMAN variable has a relatively significant contribution to changes in other variables, which is in the range of 96-99 percent compared to other variables that are shaken. Therefore. These three variables indicate that the contribution of the LOGWISMAN variable itself is the variable that has the most significant percentage contribution when compared to other variables. Therefore, the exogenous variable in this study is the LOGWISMAN variable according to the Granger causality test.

Table. 4.7 Results of Long-Run Estimation of the Effect of Logwisman and LogFDI_Priwisata on LogPDB_Tourism

Variable	Coefficient	t-Statistic	t-Table	Conclusion
LOGWISMAN	0.976159	13.531***	1.972	Significant
LOGFDI_PARIWISATA	0.107866	6.4398***	1.972	Significant

Description: ***Significant at 1% alpha.

Source. Eviews, processed data.

Table. 4.8 Results of Long-Run Estimation of the Effect of Logwisman and LogPDB_Priwisata on LogFDI_Tourism

Variable	Coefficient	t-Statistic	t-Table	Conclusion
LOGWISMAN	0.551200	1.396	1.972	Not Significant
LOGPDB_PARIWISATA	1.661008	6.439	1.972	Significant

Description: ***Significant at 1% alpha.

Source. Eviews, processed data.

This result is then restricted to the VECM model with a lag (9), as shown in table 4.9 below:

Table 4.9 VECM Estimation Results

Error Correction:	D(LOGPDB_ PARIWISATA)	D(LOGFDI_ PARIWISATA)	D(LOG WISMAN)
CointEq1	-0.026250	0.157960	0.069381
	(0.00939)	(0.18434)	(0.02643)
	[-2.79502]	[0.85689]	[2.62552]
CointEq2	0.000875	0.104477	-0.006381
	(0.00165)	(0.03238)	(0.00464)
	[0.53068]	[3.22685]	[-1.37488]

*Numbers in brackets are standard errors.
******Numbers in [elbow] are t-statistics
Source. Eviews, processed data.

The long-term estimation results in Tables 4.7 and 4.8 show that a 1 percent increase in WISMAN positively affects FDI_pariwisata. This means an increase of 1 percent of WISMAN will increase FDI_PPARIWISATA by 0.55 percent. Then, FDI_TOURISM has a positive and significant effect on PDB_TOURISM. This means that a 1 percent increase in FDI_TOURISM will increase GDP_TOURISM by 0.107 percent. Meanwhile, furthermore, the coefficient of coint1 = -0.026 means that if a shock occurs, the process of returning to long-term equilibrium takes about 38 months or more than 3 years after the shock.

Impulse Response Function (IRF) Orthogonal Innovation: Impact of Shock Tourists Arrivals on Tourism FDI and GDP in Tourism Sector

In the short term further analysis of the VECM model can be performed using Impulse Response Function (IRF) analysis. The IRF analysis aims to see how each variable responds in the short term, such as FDI in the Tourism sector and GDP in the Tourism sector due to shocks in the arrival of international tourist in the future. Because the results of causality analysis and FEVD are known, it can be concluded that LOGWISMAN is the most exogenous variable, so the transmission path is determined to change starting with changes in LOGWISMAN, then spreading to affect LOGFDI_PARIWISATA and finally having an impact on LOGPDB_PARIWISATA. The next part is the IRF Orthogonal Innovation analysis of the arrival of international tourist to the FDI of the Tourism sector and the cumulative GDP of the Tourism sector.

Figure. 4.2 Impulse Response Function (IRF) Orthogonal Innovations shock from the Tourist Arrivals

Accumulated Response to Cholesky One S.D. (d.f. adjusted) InnovationsAccumulated Response to Cholesky One S.D. (d.f. adjusted) Innovations

(A)

(B)

Accumulated Response to Cholesky One S.D. (d.f. adjusted) Innovations

(C)
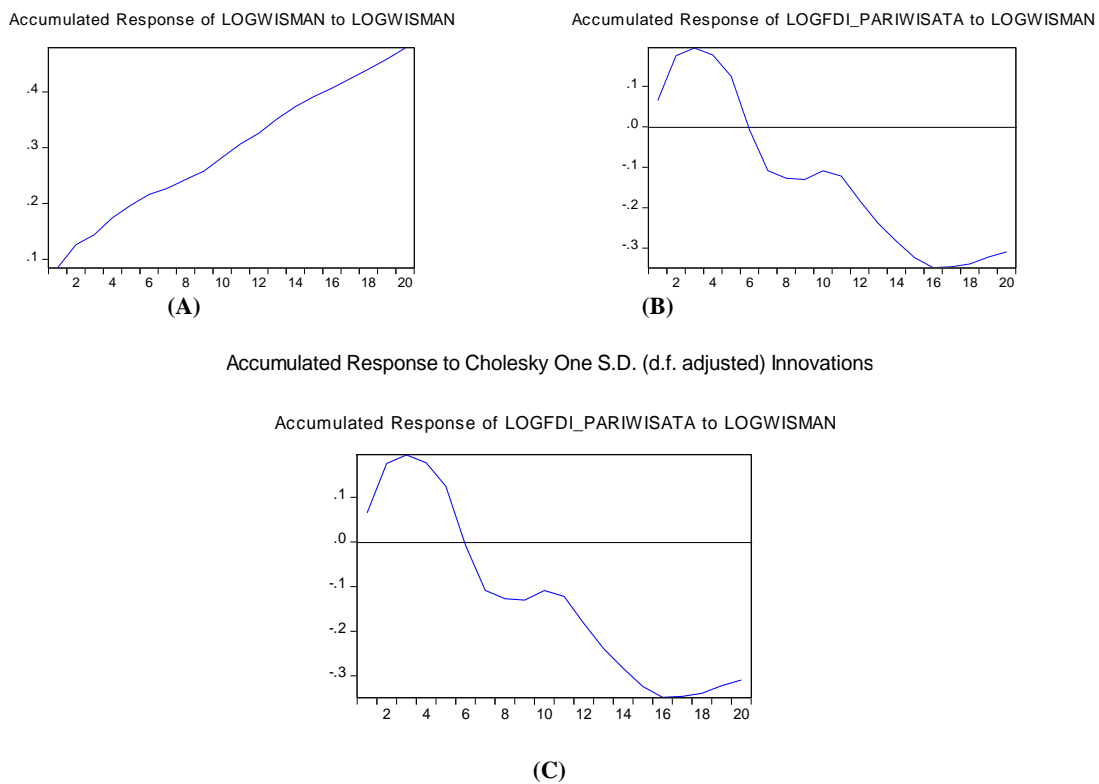
Period	LOGWISMAN	LOGFDI_ PARIWISATA	LOGPDB_ PARIWISATA
1	0.084946	0.065187	0.002694
	(0.014747)	(0.016131)	(0.020505)
2	0.126011	0.176175	0.000481
	(0.011872)	(0.008359)	(0.020661)
3	0.143714	0.194905	-0.009080
	(0.010631)	(0.007041)	(0.021331)
4	0.174596	0.177775	-0.027822
	(0.008469)	(0.008247)	(0.022641)
5	0.196705	0.125147	-0.044962
	(0.006922)	(0.011932)	(0.023842)
6	0.216247	-0.007238	-0.056812
	(0.005554)	(0.021201)	(0.024672)
7	0.227154	-0.108477	-0.059085
	(0.00479)	(0.028289)	(0.024831)
8	0.242961	-0.127080	-0.057434
	(0.00363)	(0.029591)	(0.024715)

9	0.258061	-0.130046	-0.050762
	(0.002626)	(0.029799)	(0.024248)
10	0.282728	-0.108666	-0.042730
	(0.000899)	(0.028302)	(0.023686)
11	0.306728	-0.121735	-0.034843
	(0.000781)	(0.029217)	(0.023134)
12	0.325827	-0.182159	-0.029237
	(0.002118)	(0.033448)	(0.022741)
13	0.351554	-0.238234	-0.025194
	(0.003919)	(0.037373)	(0.022457)
14	0.373629	-0.283025	-0.019009
	(0.005465)	(0.04051)	(0.022025)
15	0.391400	-0.323939	-0.010493
	(0.006709)	(0.043374)	(0.021429)
16	0.406882	-0.348203	0.000608
	(0.007793)	(0.045073)	(0.020651)
17	0.423750	-0.346104	0.011448
	(0.008974)	(0.044926)	(0.019893)
18	0.441036	-0.338868	0.022807
	(0.010185)	(0.04442)	(0.019097)
19	0.458757	-0.322053	0.034173
	(0.011425)	(0.043242)	(0.018301)
20	0.478713	-0.309075	0.046241
	(0.012823)	(0.042334)	(0.017457)
Cholesky Ordering: LOGWISMAN LOGFDI_PARIWISATA LOGPDB_PARIWISATA			

*Numbers in brackets are standard errors.

From the cumulative IRF Orthogonal Innovation results above, if there is an accumulative increase in international tourist arrivals of 0.084 per cent, the tourism FDI in the first period will increase by 0.065 per cent accumulatively. The positive response of tourism FDI due to the increase in international tourist arrivals continued until the 5th period last month as if experiencing a weakening from the 5th to the 20th period. Furthermore, the increase in tourism FDI in the first period, increasing the tourism GDP for the next 2 two months and negative after that. However, after entering the 16th period, the influence of tourism FDI on the tourism GDP increased again until the 20th period.

The following analysis will discuss the impact of the decline in international tourist arrivals on tourism FDI and tourism GDP. This study found that international tourist arrivals decreased by 75 per cent YoY due to COVID-19. Based on the cumulative analysis of IRF Orthogonal Innovation, it is known that if there is a shock from LOGWISMAN of 0.084 per cent in the first period, tourism FDI changes by 0.065 per cent and tourism GDP changes by 0.002 per cent. As a result,, using this model, it can be estimated that if there is a shock of 75 per cent (a COVID-19 pandemic situation) from LOGWISMAN, LOGFDI_PARIWISATA will decrease by 57.55 per cent accumulatively, and LOGPDB_PARIWISATA will decrease by 2.4 per cent.

Meanwhile, using the long-term analysis model, the results show that in the long run, if there is a 1 per cent change in WISMAN, FDI_PARIWISATA will change by 0.55 per cent; thus, if there is a 75 per cent decrease in WISMAN, FDI_PARIWISATA will decrease by 41.25 per cent. If there is a 1 per cent change in FDI_PARIWISATA, then PDB_PARIWISATA will change by 0.10 per cent. So, if there is a 75 per cent decrease in WISMAN, which causes a decrease in FDI_PARIWISATA by 41.25 per cent, then LOGPDB_PARIWISATA will decrease 4.12 per cent.

Meanwhile, referring to the actual data used in this study, it shows that if there is a shock, a decline of 75 per cent of international tourist arrivals in 2020 will reduce tourism FDI by 16.79 per cent. Meanwhile, tourism GDP decreased by 10.01 per cent. The calculation based on the model and actual data shows a difference between the actual data and the model's data. It is natural and can happen because the built model only photographed the conditions until 2021 first month, while the conditions in 2020 were not captured in the model. It means that the shocks in 2020 were not recorded in 2020 until first month. Thus, this model is only able to explain when conditions occur if they are similar. In addition, in the model, there are also known errors. However, the model built in this study can still estimate how significant the impact of the COVID-19 pandemic will be.

CONCLUSION

This study found that international tourists' arrival led to an inflow of tourism FDI. At the same time, tourism FDI flows are a determinant of Tourism GDP, and vice versa; tourism GDP is a determinant for attracting FDI flows. Then, based on the long-term equation, it shows that international tourists' arrival can increase tourism FDI. Then, the increase in tourism FDI will increase tourism GDP. A short-term analysis using IRF Orthogonal Innovation shows that if there is a shock from international tourists' arrival, it will be responded positively by the arrival of international tourists. However, this response continues to weaken until the end of the period, which then transmits towards a positive tourism FDI response during the first 5 periods of shocks and is responded to negatively at some point. Then, the tourism FDI response due to the shock of international tourist arrivals also affected tourism GDP. The tourism GDP response positively to the increase in tourism FDI at the beginning of the shock and then responded negatively for 12 periods. However, the tourism GDP turned into a positive response again. It shows that the influence of tourism FDI on tourism GDP has a positive impact even though there is some time lag.

Based on a short-term analysis using IRF Orthogonal Innovation, it was found that the impact of a 75 per cent decline in international tourist arrivals in 2020 on tourism FDI sector was 57.55 per cent and tourism GDP decreased by 2.4 per cent accumulatively. Meanwhile, based on the long-term equation, if there is a 75 per cent decrease in international tourist arrivals, then tourism FDI will decrease by 41.25 per cent. Then, this will reduce tourism GDP by 4.12 per cent. Because there are differences in long-term and short-term responses, if a shock occurs in the short term, the relationship between these three variables will return to long-run equilibrium, which takes about 38 months or more than 3 years after the shock. So, when the pandemic ends, the recovery of the tourism sector, which is marked by an increase in international tourist arrivals, tourism FDI, and tourism GDP will take a long time.

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