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THE TRIANGULAR CAUSAL RELATIONSHIP BETWEEN ECONOMIC GROWTH, TOURISM, AND FOREIGN DIRECT INVESTMENT: A CASE STUDY IN CENTRAL VIETNAM

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ABSTRACT

The article proposes a method to broach the complication and mixture of the triangular causal nexus among gross domestic product (GDP), foreign direct investment (FDI), and foreign tourist arrivals (FTA) in Thua Thien Hue (TTH) province that has not yet been studied. FDI into TTH province fluctuates unpredictably, so the study investigates the causal relationship between the triangular variables over the whole period (1995–2019) and the shortened period (2003–2019). The ARDL model is the most optimal choice due to the heterogeneity of stationary characteristics and short time series data. The shortened period has established more statistically significant short- and long-term Granger causal relationships, excluding the economic crisis effect. The Granger causality test only underlined a unidirectional short-term relationship running from FTA to FDI in the shortened period. Policies for economic development in TTH province need to strengthen the coordination between foreign investment and tourism so that all economic sectors can jointly create spillover effects on economic growth.

Contribution/Originality: The fluctuation of FDI in TTH province promotes the first ever study of the causal relationship between the three variables of FDI, FTA and GDP using the ARDL model. This acts as a basis for formulating policies to promote the relationship between FDI and FTA, and simultaneously promotes economic growth.

1. INTRODUCTION

Global liberalization has led to the reduction or elimination of barriers in the movement of goods, services, people, and capital in the world market (Perić & Radić, 2016). This liberalization has also improved the development of the tourism sector and attracted investment capital to host countries, boosting economic growth. Tourism is considered an important sector in the world economy and has become a big industry that impacts the overall growth of the economy (Lashkarizadeh, Keshmir, Gashti, & Rafat, 2012). The contribution of the tourism sector to economic growth has been discussed in various previous studies, including its significant contribution to foreign exchange earnings, national income, and employment opportunities on host countries (Khoshnevis, Nateghian, & Sheikh, 2017; Salleh, Othman, & Sarmidi, 2011). There has been a rapid increase in the number of tourist arrivals and income for many developing countries in recent years (Khoshnevis et al., 2017).

An economy's ability to profit from tourism depends on the availability of capital to invest in infrastructure development, particularly in the development of transport and accommodation services (Endo, 2006; Khoshnevis et al., 2017; Proença & Soukiazis, 2008). For this reason, the tourism sector requires capital to develop and expand, hence foreign direct investment (FDI) is considered to be an important factor that contributes to further tourism development (Tang, Selvanathan, & Selvanathan, 2007). Theoretically, the location-based approach puts international firms within the context of interacting with the internal and external environments in the host country; hence, business tourism promotes FDI. FDI allows host countries to be integrated into international tourism networks, which will lead to an increase in the tourist flow and generate more income from tourism-related activities (Endo, 2006). Tourism-related FDI, according to Tomohara (2016), not only boosts exports but also creates jobs in the service sector and develops the local economy. Thus, tourism-related FDI is assumed to be a primary channel for economic development. FDI is one of the tools through which developing countries can enhance and expand their tourism sector, but the impact of FDI on this growing sector has been relatively under-studied. Thua Thien Hue (TTH) is a province in Vietnam's North Central Coast region called the Hue ancient capital. TTH is a location with five world cultural heritages along with many natural tourism resources; thus, this place is considered a destination with a comprehensive overall structure that meets all critical conditions for tourism development. The economic growth rate of TTH province reached 7.18% in 2019, ranking first among the five provinces in the central key economic region and higher than the growth rate of the whole country (Portal of Thua Thien Hue, 2019). Despite good economic growth, the amount of FDI into TTH province has been low in the past 30 years, reaching only 3510.46 million USD, accounting for 1.08% of the total inward FDI capital in Vietnam, ranking 22nd (Tan, 2018). Moreover, the disbursement rate of investment capital was only 27.1%, much lower than the national disbursement rate of 55.5% (Tan, 2018). According to Resolution No. 54/NQ-TW, dated December 10, 2019, the GRDP of the tourism industry is expected to contribute 15% of the TTH province's GRDP in 2030 (Government Electronic Newspaper, 2021). The uneven growth rates of the GDP, tourism, and FDI variables provided the incentive for this research on their reciprocal relationship. There are numerous studies on the multivariate causal relationships among GDP, FDI, and tourism at the country or region level, but very few studies have been carried out within a province. All provinces in the country have similar investment attraction policies; however, each local government has its own preferential policies regarding operating approach and method. In addition, the characteristics of geographical location and available resources in each province create different investment attractions. Up to now, there have been few studies analyzing the current state of the local tourism industry and FDI over a short period, and there is no existing research verifying the nexus between GDP, FDI, and tourism at the provincial level. Therefore, this study attempts to explore the triangular causal relationship among GDP, FDI, and tourism in Thua Thien Hue province from 1995–2019. The study applies the autoregressive distributed lag (ARDL) model and the error correction model (ECM) to examine these pairwise Granger relationships. Therefore, if provincial-level causality nexuses are fully identified, local policymakers will be able to develop policies that promote the reciprocal relationship between variables to achieve high economic growth. Based on the above objectives, the remainder of this paper is structured as follows. The next section reviews the literature on the relationships between FDI, tourism, and economic growth; Section 3 describes an overview of tourism, FDI, and economic growth in Thua Thien Hue province; Section 4 presents the data and methodology; and Section 5 discusses the Granger causality between three variables.

2. LITERATURE REVIEW

Economic growth depends on the aggregate function of a multitude of economic activities. In addition to the direct impact of each industry on economic growth, multisectoral linkages promote mutual development between sectors and simultaneously promote economic growth. Networks often contain both strong and weak heterogeneous relationships (Granovetter, 1973) focusing on the relationship's materiality within the scope of the study (Law, 1992). The tourism industry is relatively weak in networking than traditional manufacturing (Hjalager, 2000). Some literature exists on the causal relationship between FDI, tourism, and economic growth; however, the empirical research yielded mixed outcomes depending on the choice of country group, the study period, and the applied methodology. In this section, this research provides a summary of studies on the relationship between these three variables, which is divided into four main groups: (1) the relationship between FDI and economic growth, (2) the relationship between tourism and economic growth, (3) the relationship between FDI and tourism, and (4) the overview of research in Vietnam and the research gaps.

2.1. FDI and Economic Growth

FDI is implemented based on capital arbitrage in international capital theory, primarily flowing from capital-abundant countries to capital-scarce countries. There are some theories on the beneficial effect of FDI on economic development. However, empirical studies have found mixed results of the relationship between FDI and economic growth. Khoshnevis, Homa, and Soheilzad (2017) investigated the relationship between FDI and economic growth in Iran by using time series data from 1985–2013. By applying the ARDL model and the ECM, the study showed that an increase in FDI will result in a greater output level, thus confirming that FDI promotes economic growth in Iran. In addition, Iamsiraroj and Ulubaşoğlu (2015) employed an informed econometric analysis to explore the global FDI–growth relationship in a sample of 140 countries from 1970–2009. They conducted an econometric investigation using the benchmark specification suggested by the meta-regression analysis results and found a positive relationship between FDI and economic growth. This link is as strong in the developed world as it is in the developing world in detail.

In contrast, the study by Sokhanvar (2019) examined the effect of FDI on the economic growth of seven European Union countries from 1995–2014. The study employed the vector autoregression (VAR) for each country to detect the relationship between variables. Their findings showed that FDI has a negative impact on the economic growth of five countries (Bulgaria, Estonia, Hungary, Iceland, and Spain). In addition, Sokhanvar (2019) breaks down the long period to assess the impulse response of each short period; each stage's linkage varies based on the shock and recovery speech of each country. Othman, Salleh, and Sarmidi (2012) showed causal multi-relationships between GDP, tourism, and FDI in different countries. In Canada, France, Greece, Hong Kong, Portugal, Spain, Thailand, Turkey, United Kingdom, Netherlands, and Singapore, FDI and GDP do not establish a causal relationship due to the low ratio of FDI to GDP (Othman et al., 2012). This low index might be attributable to the fact that the amount of FDI in those nations is insufficient to encourage economic growth.

However, a few studies found a causality relationship running from economic growth to FDI. Kaur and Sarin (2016) used the Granger causality test to examine the relationship among GDP, FDI, and tourism in India in the 1991–2014 period. The results of the study indicated that there is a unidirectional relationship running from GDP to FDI. The authors concluded that growing GDP in the economy could attract FDI in India. The study by Yu-Chi and Lin (2018) focused on investigating the causality relationship between FDI, tourism, and economic growth in Taiwan during the 1976–2016 period. The study employed the augmented Dickey–Fuller test, Johansen's cointegration test, Granger causality test, and the vector autoregression model. The results revealed that the only unidirectional causality runs from GDP to FDI.

2.2. Tourism and Economic Growth

The contribution of tourism to national economic growth has been extensively studied thanks to the influence of tourism on the balance of payments, employment, and production (Durbarry, 2002; Lee & Chang, 2008), and it significantly improves the standard of living for Portuguese people (Proença & Soukiazis, 2008). Previous studies have investigated the relationship between tourism development and economic growth in both developed and developing countries. These studies all show that tourism is a factor that strongly influences economic development and is an essential component of economic growth. The positive role of the tourism sector in economic development has been reported by Dritsakis (2012); Lee & Brahmasrene (2013); Khoshnevis et al. (2017); Yu-Chi & Lin (2018) and Rasool, Maqbool, & Tarique (2021).

Some empirical studies provide evidence of the unidirectional relationship running from economic growth to tourism. Kaur and Sarin (2016) found a long-run unidirectional causality from tourism activities to economic growth in India. In the case of the United Arab Emirates (UAE), Shadab (2018) examined the relationship between the tourism sector and economic growth from 1995–2014. The analysis results showed a unidirectional relationship from economic growth to tourism that supports the growth-led tourism hypothesis in the UAE.

Moreover, some studies explored the mutual causal nexus between tourism and economic growth. Applying the Granger causality test, the results of the study by Yu-Chi and Lin (2018) showed that there is mutual causality between GDP and FTA in Taiwan. Rasool et al. (2021) studied the relationship between inbound tourism and economic growth by using the panel data over the period from 1995–2015 for five BRICS countries (Brazil, Russia, India, China, and South Africa). The results of the Granger causality analysis demonstrate that the causality between inbound tourism and economic growth is a bidirectional relationship in these five countries. The study concluded that tourism is not only an engine for economic growth, but the economic outcome itself can play an important role in providing growth potential to the tourism sector.

2.3. FDI and Tourism Development

The behavioral theory of location deals with a matrix of site selection criteria developed by Smith (1991). The information matrix can include profits, natural resources, the market structure, labor, political and cultural environment, and so on. Choosing an investment destination through tourism is based not only on profit but also on other goals. Therefore, the more quality information the matrix provides, the more likely a business is to choose an investment location close to the optimal location. Otherwise, FDI is one of the routes through which countries can carry out tourism. The literature review shows that the relationship running from FDI and tourism to GDP is more significant than the nexus between FDI and tourism. Since the scope of the study is a small central province of Vietnam, this paper selected some studies in developing countries with lower per capita incomes than Vietnam.

The study by Salleh et al. (2011) analyzed the relationship between the development of tourism and FDI in five Asian countries (Malaysia, Singapore, Thailand, China, and Hong Kong) in the period from 1978–2008. The study found that Singapore and China have no causality relationship between FDI and tourism growth in both the long and short runs. Similarly, Samimi, Sadeghi, and Sadeghi (2013) and Yu-Chi and Lin (2018) conceded no causality between FDI and tourism in the short run in 20 developing countries, and Taiwan, respectively.

Some evidence from developing countries with a lower per capita income than Vietnam (such as India, Pakistan, and Bangladesh) showed mixed results regarding the FDI–tourism nexus. Kaur and Sarin (2016) found unidirectional causality running from FTA to FDI in India. Siddiqui and Siddiqui (2019) investigated the relationship between tourism and FDI inflows in Pakistan over the period from 1979 to 2017. The results of the vector error correction model (VECM) Granger causality test show unidirectional causality running from tourism to FDI in the short run.

While in Bangladesh, the study by Amin, Al Kabir, Nihad, and Khan (2020) found the reverse relationship compared to the two previous countries. This study applied various standard econometric techniques, dynamic ordinary least squares (DOLS) and autoregressive distributed lag (ARDL) estimation methods, using time series data from 1972–2017. The results indicate a unidirectional causal relationship running from FDI to tourism in both the short and long runs.

2.4. Literature on Vietnam and Research Gaps

Some studies show that the open-door policy to attract investment and FDI has a positive impact on economic growth in Vietnam (Dinh et al., 2019; Doanh, 2002; Haley & Haley, 1997; Nguyen & Nguyen, 2007; Nguyen, 2020). There exists a two-way causal relationship between FDI and GDP when using the provincial statistics in Vietnam in the period 2010-2014 and 1996-2005 of two papers (Luu, Trinh, & Vu, 2017) and Anwar and Nguyen (2010) but this result is not accurate for all regions in Vietnam (Anwar & Nguyen, 2010). Tourism has a positive and significant effect on economic growth in the short term from 1980–2010 (Kumar, 2014). Otherwise, Liu and Chokethaworn (2020) study the 3-variable causal relationship including FDI, tourism, and economic growth within 6 ASEAN countries from 2005 to 2019, these pairs of causal relationships have different points in these countries. Particularly in Vietnam, there is a clear-cut unidirectional causality relationship from FDI and GDP to tourism, whilst no further causal links have been discovered (Liu & Chokethaworn, 2020). Investment in tourism infrastructure has a strong and favorable impact on attracting international visitors; nonetheless, investment in transportation and communication infrastructure has the most significant impact (Nguyen, 2021). FDI promotes the development of tourist destinations and lodging facilities, as well as the tourism industry as a whole (Haley & Haley, 1997; Suntikul, Butler, & Airey, 2010).

At the national level, the aforementioned studies on FDI, tourism, and economic growth have mainly applied descriptive statistical methods or studied each pair of causal relationships. However, there are no studies about the triangular causal nexus among FDI, tourism, and economic growth in Vietnam, especially in TTH province, so this research aims to fill the gap.

3. OVERVIEW OF TOURISM, FDI, AND ECONOMIC GROWTH IN TTH PROVINCE

Table 1 shows a growth overview of GDP, total capital investment, FDI, tourists and FTA in Thua Thien Hue province in the 24-year period from 1995–2019. The economic growth rate of this province reached 14.7% per year in the whole period and tended to increase over the following periods: 1995–2000, 2001–2005, and 2006–2010; however, this figure declined in the next five years, reaching only 8.2% per year due to the impact of the Asian financial crisis from 2006–2010. From 2010 onward, Vietnam has pushed back high inflation and decreased the consumer price index. The inflation rate and the consumer price index were 1.84% and 0.60%, respectively, in the period from 2011 to 2015 (GSO, 2016). Therefore, together with the general trend of the country, the economy of Thua Thien Hue province recovered from 2016 to 2019, with an average economic growth of 11.5%.

Table 1. The growth of GDP, investment capital, tourists.

Period	GDP		Total capital investment		FDI		Tourists		FTA	
	g	+/-	g	+/-	g	+/-	g	+/-	g	+/-
1995–2000	11.7	294.5	6.1	66.1	-100	-105.2	11.1	38,342	8.2	12,628
2001–2005	16.0	797.5	20.6	460.4	65.3	60.6	17.0	122,423	11.6	32,013
2006–2010	23.3	2,786.3	21.2	1,355.9	5.5	43.6	6.0	77,068	7.4	237,787
2011–2015	8.2	2,351.5	9.0	1,258.5	0.3	3.2	1.4	22,633	0.8	5,048
2016–2019	11.5	4,901.6	7.8	1,564.5	-4.9	-65.1	8.8	168,019	13.5	114,818
1995–2019	14.7	2,119.3	14.2	931.8	3.5	28.1	9.1	82,106	9.2	40,051

Notes: g: annual growth (%); +/-: annual increase (in billions of Vietnam dong, and number of tourists).
Unit: billions of Vietnam dong, %, tourists.

To achieve the economic growth of 14.7% in the period from 1995–2019, the corresponding average growth rate in the investment capital was 14.2% per year (Table 1). Meanwhile, the average annual growth rate of FDI was only 3.5% per year, showing that FDI capital attracted to the province is not a principal and stable source of investment capital for economic development (Table 1). In particular, FDI inflows in 2000 were zero, so the average annual growth rate of FDI from 1995 to 2000 dropped to -100% (Figure 1, Table 1). The reasons for this decline were: (1) the impact of the Asian financial crisis, which led to a sharp decrease in FDI inflows into Vietnam, (2) the investment environment in Vietnam has become less attractive than that of other countries in the region, and (3) the Foreign Investment Law amended in 1996 has reduced some incentives for foreign investors. The FDI into TTH province greatly fluctuated for a short period from 2000 to 2002, as per the general situation of Vietnam in the study by Nguyen, Vu, Tran, & Nguyen (2006), but generally, there was an upward trend in this figure.

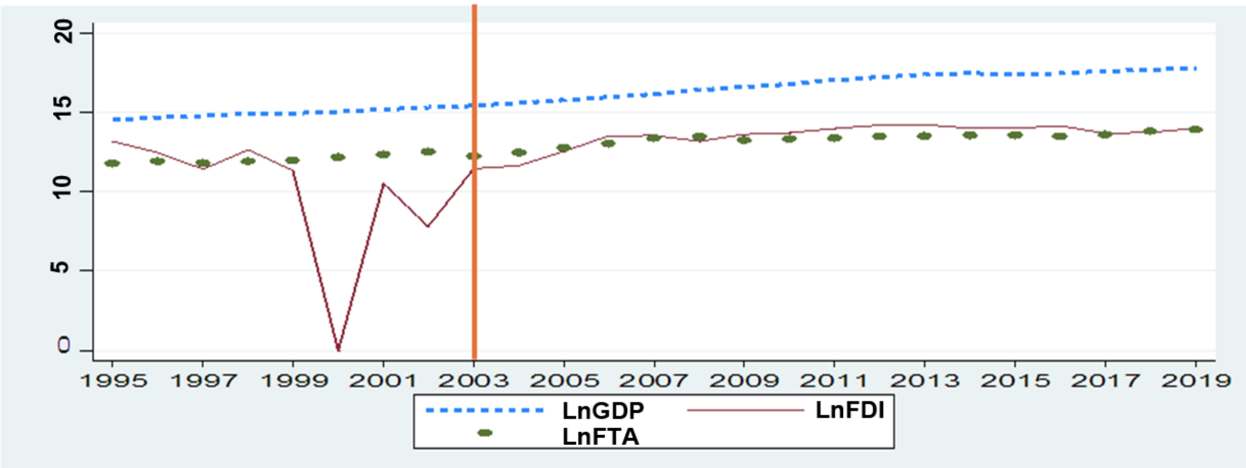


Figure 1. LnGDP, LnFDI, and LnFTA (1995–2019).

To build and turn tourism into a spearhead economic sector, Thua Thien Hue province has focused on investment to attract tourists. From 1995 to 2019, the number of tourists to Thua Thien Hue recorded an average annual growth rate of 9.1%, in which the growth rate of FTA was 9.2% per year. From 2016 to 2019, the growth rate of FTA to the province was the highest among the five periods; this period's average annual growth rate was 13.5%, corresponding to an average increase of 114,818 foreign visitors per year. In short, the growth rate of tourists still maintained a positive trend despite the impact of the economic crisis. Table 1 and Figure 1 indicate that FDI capital fluctuated wildly from 1995 to 2002. As such, this study will evaluate the causal nexus among GDP, FDI, and tourism in the whole period (1995–2019), as well as in the shortened period (2003–2019).

4. DATA AND ARDL ANALYSIS FRAMEWORK

4.1. Data and Unit Root Test

a. Data

The study collected secondary data for the 1995–2019 period in the Statistical Yearbook of TTH province. Some Statistical Yearbook indicators have been altered to match statistical objectives, so some indicators for 1995 through 2019 are missed or interrupted. To conduct a time series study, this research focuses on three main variables: GDP, FDI, and FTA. The GDP and FDI indicators are taken at current prices in billions of Vietnam dong. GDP, FDI, and FTA are transformed into natural logarithms (ln) to reduce data instability, which has been applied in most previous studies (Dritsakis, 2012; Kaur & Sarin, 2016; Khoshnevis et al., 2017; and Sokhanvar, 2019).

b. Unit Root Test

The augmented Dickey–Fuller (ADF) unit root test (Dickey & Fuller, 1979) was utilised in this study to test the stationarity of the data series to ensure that the model does not have spurious regression problems. The two stationary series hypotheses are:

H_0: There is a unit root for a series.

H_1: There is no unit root for a series, or the series is stationary.

The ADF tests are formalized through two types of unit root test equations as per the below formulas:

$$Trend: Y_t = \beta_1 t + dY_{t-1} + a_i + e_t$$
$$Trend\ \&\ Intercept: Y_t = \beta_1 + \beta_1 t + dY_{t-1} + a_i + e_t$$

4.2. ARDL Specification Model

The testing of the multivariate causal relationship among GDP, FDI, and FTA will be carried out using the ARDL and ECM, which examine both short-run and long-run Granger causality relationships. Using the ARDL model brings the following advantages: (1) a small sample size is suitable for the cointegration test statistic, which is different from Johansen's cointegration test, which requires a large sample to achieve reliability; (2) the ARDL method does not estimate the system of equations like the Johansen and Granger methods do, but it evaluates a single equation to identify the short-run and long-term relationships simultaneously; (3) the regressors can include different optimal lags (Hamuda, Šuliková, Gazda, & Horváth, 2013); (4) time series variables can be stationary at I(0) and I(1) or a mix. In addition, applying the ARDL technique provides unbiased estimates of the long-run models (Harris & Sollis, 2003).

ARDL model (p,q,...,q)

$$Y_t = c_0 + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{i=0}^{q} \alpha_i{}' X_{t-i} + \varepsilon_t \qquad (1)$$

Where Y_t is the dependent variable; the X' variables are allowed to be I(0), I(1), or a mix; β and α are coefficients; c is the constant; $i = \overline{1, \dots, k}$; p, q are optimal lag orders (p ≥ 1, q ≥ 0) (p lags are used for the dependent variable; q lags are used for the exogenous variables); and ε_t is a vector of the error terms.

a. Applying ARDL Equations

Based on the general ARDL model (Equation 1) and the objectives of studying the multivariate causal relationship between the three non-fixed time series variables (LnGDP, LnFDI, and LnFTA), the ARDL model can be constructed using the following formulas:

$$\Delta LnGDP_t = c_{01} + \beta_{11} LnGDP_{t-i} + \beta_{21} LnFDI_{t-i} + \beta_{31} LnFTA_{t-i} + \sum_{i=1}^{p} \alpha_{1i} \Delta LnGDP_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta LnFDI_{t-i} + \sum_{i=0}^{q} \alpha_{3i} \Delta LnFTA_{t-i} + e_{1t} \qquad (2)$$

$$\Delta LnFDI_t = c_{02} + \beta_{12} LnGDP_{t-i} + \beta_{22} LnFDI_{t-i} + \beta_{32} LnFTA_{t-i} + \sum_{i=0}^{q} \alpha_{1i} \Delta LnGDP_{t-i} + + \sum_{i=1}^{p} \alpha_{2i} \Delta LnFDI_{t-i} + \sum_{i=0}^{q} \alpha_{3i} \Delta LnFTA_{t-i} + e_{2t} \qquad (3)$$

$$\Delta LnFTA_t = c_{03} + \beta_{13} LnGDP_{t-i} + \beta_{23} LnFDI_{t-i} + + \beta_{33} LnFTA_{t-i} + \sum_{i=0}^{q} \alpha_{1i} \Delta LnGDP_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta LnFDI_{t-i} + \sum_{i=1}^{p} \alpha_{3i} \Delta LnFTA_{t-i} + e_{3t} \qquad (4)$$

b. Optimal Lags and Bound Test

ΔLnGDP, ΔLnFDI and ΔLnFTA are the first differences of the three variables LnGDP, LnFDI, and LnFTA. The optimal lags (p, q_1, q_2) are the ones at which variables modeled over lagged variables give the most reliable results. The cointegration test will be applied after the determination of the optimal number of lags. The cointegration theory deals with the long-run relationship between the time series variables, which are stationary or non-stationary at level or mutually cointegrated (Pesaran, Shin, & Smith, 2001). Although these variables in the model might individually be non-stationary, if the linear combinations of these variables are stationary, the combination of these variables constitutes a significant and stable long-term relationship. The bound test hypotheses regarding the cointegration relationship between the variables are proposed as below:

H_0: $\beta_{1i} = \beta_{2i} = \beta_{3i} = 0$: There is no cointegration relationship between variables, which means no long-run relationship between variables.

H_1: $\beta_{1i} \neq \beta_{2i} \neq \beta_{3i} \neq 0$: A cointegration relationship exists between variables; that is, a long-run relationship exists between variables.

Where *i* receives values, namely 1, 2 and 3, corresponding to the dependent variables LnGDP, LnFDI, and LnFTA, respectively. To test hypothesis H_0, this research compares the value of the calculated F-statistics with the two asymptotic critical values (lower bound critical value is I(0), upper bound critical value is I(1)) (Pesaran et al., 2001):

- Case 1: If the value of the F-statistic is greater than the upper bound critical value I(1), H_0 is rejected. So, the variables of this equation are cointegrated.
- Case 2: If the value of the F-statistic lies between the two asymptotic critical values, no conclusions can be drawn. The error correction model will be applied to determine cointegration.
- Case 3: If the value of the F-statistic is less than the lower bound critical value I(0), H_0 is accepted. This means that there is an absence of cointegration or a long-run relationship between the variables.

c. Error Correction Model

The short-run dynamics are explained through the coefficient of each variable with its owned lag. If the estimated coefficients α and β are non-zero and statistically significant in Equations 2 and 3, it can be concluded that FDI Granger-causes GDP and GDP Granger-causes FDI, respectively. Cointegration represents a causal relationship among variables, yet it does not reveal the direction of the causal relationship.

Assuming the results of the F-statistics test of these formulas (Equation 2) belong to case 1 and case 2 above, there must be at least a one-way causality to maintain the presence of a long-run equilibrium (Granger, 1986). The study applies the ECM to predict the long-run causality; therefore, the lagged error correction term (ECT) is an additional dependent variable.

Moreover, the negative sign and statistically significant denotes ECT(-1) coefficient The negative and statistically significant ECT(-1) coefficient represents a convergence back to the long-run equilibrium association regardless of any long-run shocks among the dependent and independent variables. So, the ECM formula derived from Equation 2 is as follows:

$$\Delta LnGDP_t = c_{01} + \lambda_1 ECT_{t-1} + \sum_{i=1}^{p} \alpha_{1i} \Delta LnGDP_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta LnFDI_{t-i} + \sum_{i=0}^{q} \alpha_{3i} \Delta LnFTA_{t-i} + e_{1t} \qquad (5)$$

The details of the coefficients in Equation 5 are as follows:

λ_1: the speed of adjustment parameter is a negative sign which is

$$ECT = (LnGDP_{t-i} - \theta X_t), the\ error\ correction\ term$$

$$\lambda_1 = \frac{\sum_{i=0}^{q} \beta_{i1}}{\alpha_{i1}}\ is\ the\ long\ run\ parameter$$

$\alpha_{1i}, \alpha_{2i}, \alpha_{3i}$: are the short-run dynamic coefficients of the model's adjustment equilibrium.

5. GRANGER CAUSALITY RELATIONSHIP AMONG GDP, FDI, AND FTA

5.1. Unit Root Test

The results in Table 2 show the ADF test results in the two periods, 1995–2019 and 2003–2019, which have some different points. In the 1995–2019 period, LnGDP and LnFTA are stationary at the first differences, while LnFDI is stationary at its level form. All variables have the same significance at the 1% level. However, for the 2003–2019 period, the ADF test strongly supports that all three-time series variables are stationary at the 5% and 1% significance levels. All data series of the two periods, including LnGDP, LnFDI and LnFTA, are homogeneously stationary at I(0) and I(1) and have a small sample size, so the application of the ARDL model is reasonable.

Table 2. ADF unit root test results.

Variable	At level			First difference			Results
	Trend	Intercept and Trend	Intercept	Trend	Intercept and Trend	Intercept	
1995–2019							
LnGDP	-0.81	-0.66	-0.66	-2.88	-2.93**	-2.93***	I(1)
LnFDI	-4.10**	-3.18**	-3.18***	-8.08***	-8.21***	-8.21	I(0)
LnFTA	-1.75	-0.79	-0.79	-4.00**	-4.59***	-4.59***	I(1)
2003–2019							
LnGDP	-0.460	-2.573*	-2.573**	-2.987	-2.274	-2.274 **	I(0)
LnFDI	-2.055	-3.135**	-3.135***	-9.217***	-8.930***	-8.930***	I(0)
LnFTA	-2.648	-2.887**	-2.887***	-3.982***	-3.701***	-3.701***	I(0)

Notes: P-values: *** p < 0.01, ** p < 0.05, and * p < 0.1.

5.2. Optimal Lags and Integration Test

The optimal lag is the lag at which variables modeled over lagged variables give the best results. The optimal lag is the lag at which the lagged model built is the most accurate. Based on comparing the minimum values of the criteria, including LR, FPE, AIC, HQIC, and SBIC, the model's specification to determine the appropriate lag length of each variable in these models is shown in Table 3. Due to the small sample size, the maximum lag length of these models is only 2.

Table 3. Optimal lag length and bounds test for each model.

Model number	Optimal lag length						Bound test		Next step
	Dependent variable		Independent variables				F-statistic	Conclusion	
1995–2019									
1.1	LnGDP	1	LnFDI	0	LnFTA	0	4.940**	Inconclusive	ECM
1.2	LnFDI	1	LnGDP	0	LnFTA	0	5.913****	Inconclusive	ECM
1.3	LnFTA	1	LnGDP	1	LnFDI	0	1.482	No cointegration	Short-term
2003–2019									
2.1	LnGDP	1	LnFDI	0	LnFTA	0	3.328*	Inconclusive	ECM
2.2	LnFDI	2	LnGDP	0	LnFTA	1	12.459****	Cointegration	ECM
2.3	LnFTA	2	LnGDP	0	LnFDI	1	5.792****	Inconclusive	ECM

Notes: I(0) – I(1): 90%: (3.17–4.14); 95%: (3.79–4.85); 97.5%: (4.41–5.52); 99%: (5.15–6.36).
*, **, and **** denote 90%, 95%, and 99%, respectively.

There are different techniques for conducting cointegration analysis for time series variables. There are several well-known methods that could be used for this stage, consisting of the residual test by Engle and Granger (1987) and the maximum likelihood method by Johansen and Juselius (1990). This study uses the ARDL bound to test the cointegration between the variables in the model. This is because the bound cointegration test can be performed with different stationary time series, which are stationary at level and first level.

The cointegration test results give different results in the two periods Table 3. In the 1995–2019 period, the F-statistics of the models with the LnGDP and LnFDI dependent variables are 4.94 and 5.913, respectively, which are higher than the lower bound critical value (I(0)) and lower than the upper bound critical value (I(1)) at the 5% and 2.5% significance level, respectively. The null hypothesis (H_0) is rejected; models (1.1) and (1.2) may exist in long-run models being in steady-state; however, it is necessary to test the cointegration relationship when using the ECM. In contrast, the (1, 1, 0) ARDL model with the dependent variable LnFTA, whose F-statistic value is 1.482, is smaller than the lower bound values at all significance levels. Hence, only model 1.3 shows us the short-term relationship between three variables and does not imply a long-term working of the parameters in the model. Accepting the null hypothesis means there is no cointegration relationship between the variables, or in other words, no long-term causality from GDP and FDI to FTA, which is clearly mentioned in the studies conducted by Salleh et al. (2011); Yu-Chi & Lin (2018) and Amin et al. (2020). Two models (2.1 and 2.3) need to conduct a further ECM to determine the multiple long-run relationships among these variables. Additionally, the F-statistic in model 2.2 is higher than the upper critical value at 99%, so H_1 is accepted. The cointegration between three variables (GDP, FTA, and FDI) is a potential condition for establishing a long-term relationship between GDP and FTA to FDI. A causal relationship in this direction has been identified by Kaur and Sarin (2016); Yu-Chi and Lin (2018); and Siddiqui and Siddiqui (2019).

Table 4. Short-term and long-term results of the ARDL model.

Model	Model 1.1	Model 1.2	Model 1.3	Model 2.1	Model 2.2	Model 2.3
ECT(-1)	-0.148**** [-3.83]	-0.901**** [-4.19]		-0.142**** [-2.73]	-0.842*** [-4.15]	-0.723**** [-3.62]
	Long-run results: 1995-2019			2003-2019		
ΔLnGDP					0.611** [2.37]	0.347*** [3.60]
ΔLnlnFTA	1.478*** [9.80]					
	Short-run results: 1995-2019			2003-2019		
ΔLnGDP			1.284** [2.83]		0.514* [2.23]	0.251** [2.54]
$\Delta Ln\text{GDP}_{-1}$	0.852**** [22.03]		-1.038* [-2.58]	0.858**** [16.43]		
ΔLnFDI						
$\Delta Ln\text{FDI}_{-1}$					0.746*** [3.77]	
$\Delta Ln\text{FDI}_{-2}$					0.514** [-2.38]	
ΔLnlnFTA	0.219*** [3.62]				-1.393** [-2.30]	
$\Delta Ln\text{FTA}_{-1}$			0.615*** [3.52]		1.248* [1.95]	0.782*** [3.30]
$\Delta Ln\text{FTA}_{-2}$						-0.506** [-2.36]
Cons	-0.356 [-1.26]	-13.574 [-1.11]	0.907 [1.32]	0.223 [0.26]	4.843 [1.15]	5.545*** [3.99]
Adj. R-squared	0.426	0.391	0.958	0.318	0.723	0.885
Log-likelihood	35.062	-55.374	15.791	21.918	6.110	18.076
Root MSE	0.062	2.663	0.141	0.071	0.208	0.094

Notes: * p < 0.1; ** p < 0.05; *** p < 0.01; **** p < 0.001.
Statistically insignificant coefficients are not included in this table.

5.3. ARDL Model and Diagnostic Test

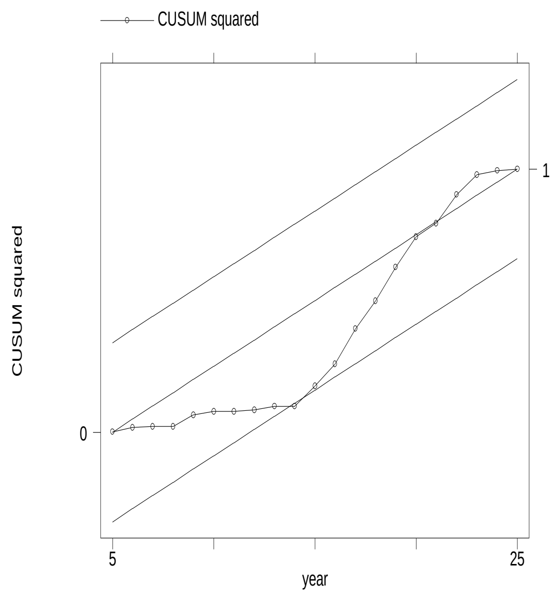
In order to choose a reasonable ARDL model to analyze the Granger relationships, a series of statistical diagnoses were carried out, as shown in Table 5. First, the Lagrange Multiplier (LM) autocorrelations are: H_0

means the model has no autocorrelation, while H_1 means that autocorrelation exists in the model. The P-value in the LM test of all five models in Table 5 is more significant than the 5% level of significance, so H_0 is accepted, or five models indicate no building error between variables. Second, the Breusch–Pagan–Godfrey heteroskedasticity test raises the two following hypotheses: H_0: heteroskedasticity does not exist in the model; H_1: heteroskedasticity exists in the model. If the P-value of all five models is over a 5% level of significance, and then H_0 cannot be rejected, or these models present no heteroskedasticity. Third, these five models are not spurious because the Durbin–Watson values in Table 5 are more significant than the adjusted R-squared in Table 4.

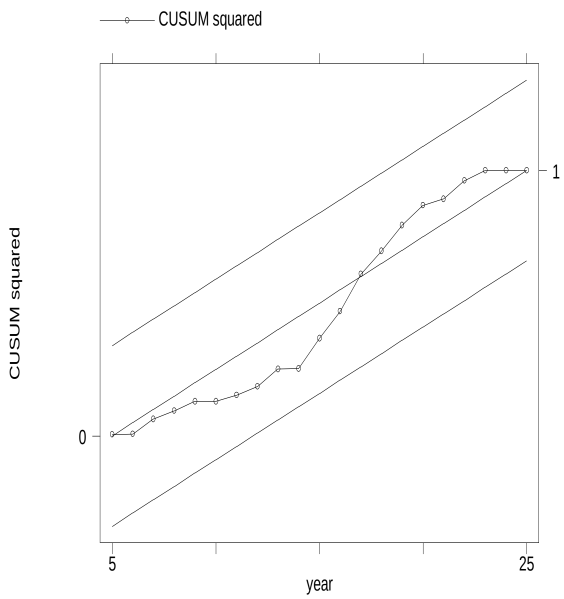
Table 5. Four diagnostics tests for the ARDL model.

Model	Model 1.1	Model 1.2	Model 2.1	Model 2.2	Model 2.3
Autocorrelation (Breusch–Godfrey LM Test)	Chi2 = 0.168 Prob > chi2 0.6822	Chi2 = 1.722 Prob > Chi2 0.1895	Chi2 = 0.267 Prob > Chi2 0.605	Chi2 = 0.803 Prob > chi2 0.3702	Chi2 = 0.032 Prob > chi2 0.8576
Heteroskedasticity Test (Breusch–Pagan–Godfrey)	Chi2 = 2.54 Prob > Chi2 0.111	Chi2 = 1.75 Prob > Chi2 0.1865	Chi2 = 1.88 Prob > Chi2 0.170	Chi2 = 0.97 Prob > Chi2 0.324	Chi2 = 0.60 Prob > Chi2 0.440
Durbin–Watson d-statistics	(4, 24) = 1.830	(4, 24) = 2.110	(4, 16) = 1.741	(6, 15) = 2.329	(6, 15) = 1.760
Specification (Ramsey RESET test)	F(3,17) = 2.70 Prob > F = 0.078	F(3,12) = 1.31 Prob > F = 0.304	F(3,9) = 2.18 Prob > F = 0.160	F(3,6) = 1.17 Prob > F = 0.395	F(3,6) = 1.57 Prob>F = 0.291

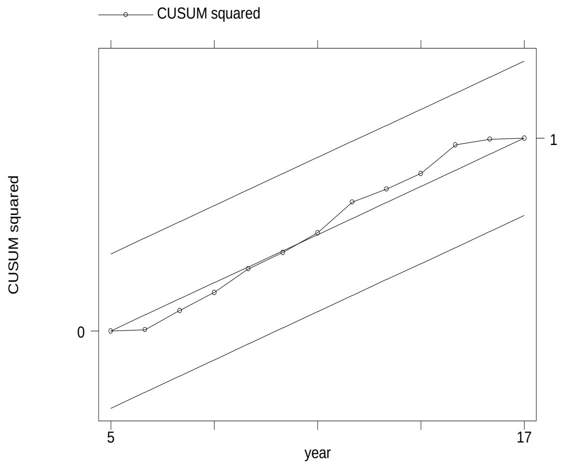
Fourth, from evaluating the correct functional forms using the Ramsey RESET, the two hypotheses are: H_0: The model does not lack variables and has correct function form; H_1: The model lacks variables and wrong functional form. The test results in Table 5 show that all models have no missing variables and have correct functional form at the 5% significance level. The p-value of the secluded model (1.1) is equal to 7.8%, and there is no marked difference at the 5% level of statistical significance. However, since all other tests of model 1.1 are satisfied, the model is accepted and continues to be used to analyze the cause-and-effect relationship. The final adjusted cumulative sum of the residuals (CUSUMSQ) test is applied in Figure 2. Meanwhile, the recursive residuals tests stay within the interval band of a 5% level of significance that suggests no structural instability in the residuals of the models in Table 5.



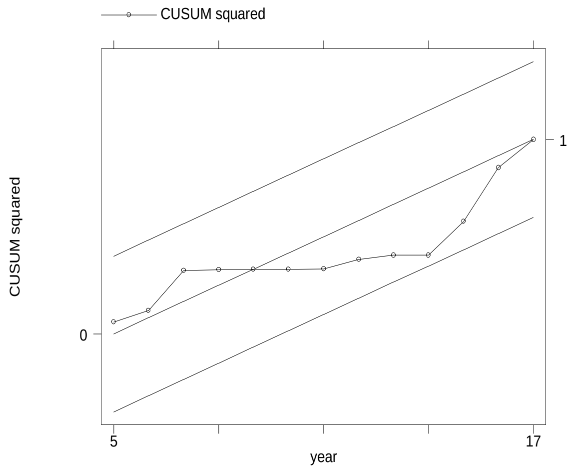
Model 1.1



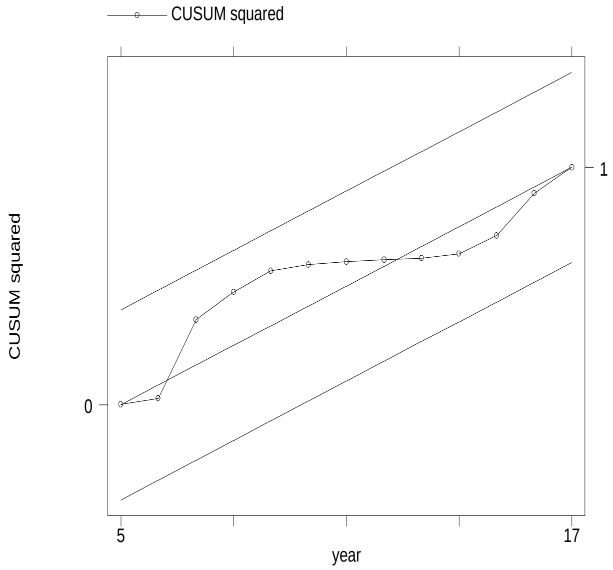
Model 1.2



Model 2.1



Model 2.2



Model 2.3

Figure 2. CUSUMSQ graphs for the five ARDL models.

5.4. Short-term and Long-term Granger Causality Analysis

Because the FDI data dropped dramatically in the period from 1999 to 2002, as described in Section 3, the study simultaneously examines the short-run and long-run relationships between the three variables, and the short-term error correction time to the long-run equilibrium in the long period (1995–2019) and the shortened period (2003–2019). It can be seen that FDI has no short-term or long-term causal relationship affecting GDP in both periods.

The non-causal association running from FDI to GDP in TTH province is parallel with countries such as Canada, France, Greece, Hong Kong, Portugal, Spain, Thailand, Turkey, United Kingdom, Netherlands, and Singapore in the study by Othman et al. (2012) and Taiwan in the study by Yu-Chi and Lin (2018) and is contrary to the findings in studies conducted by Khoshnevis et al. (2017) and Iamsiraroj and Ulubaşoğlu (2015) and two studies in Vietnam (Anwar & Nguyen, 2010; Luu et al., 2017). The reason is that FDI flowing into TTH province fluctuates widely, accounts for a low proportion of GDP, and was not on a par with the trend of GDP and FTA, so no directional Granger causality runs from FDI to GDP. Othman et al. (2012) concluded that the low FDI-to-GDP ratio is also the cause of the non-existence of a causal relationship running from FDI to GDP.

Being different from the non-causal relationship running from FDI to GDP as mentioned above, the ARDL model (2, 0, 1) in the shortened period established short-run and long-run causal relationships running from GDP to FDI. These relationships confirm that growth-led FDI is consistent with the findings by Luu et al. (2017) and

Anwar and Nguyen (2010) in Vietnam, Yu-Chi and Lin (2018), and Kaur and Sarin (2016). Due to the characteristics of the logarithmic and linear models, the obtained regression coefficients are the elasticity of the dependent variable according to the explanatory variables, with the unit being percent. If GDP increases by 1%, the corresponding rise in FDI is 0.611%. The ECT(-1) coefficient of the ARDL model will be equal to the negative value of the ratio of the short-run coefficient and the long-run coefficient. So, the ECT(-1) coefficients of models 1.2 and 2.2 are -0.901 and -0.842, respectively. In general, the ECT(-1) coefficient in the shortened period (2003–2019) is lower than that in the 1995–2019 period due to the elimination of a significant downturn in FDI. The recovery speed of FDI to long-run equilibrium is relatively fast, which were 1.1 years and 1.2 years in the 1995–2019 and 2003–2019 periods, respectively. Disequilibrium in a financial downturn recovered to long-run equilibrium more rapidly than adjusting back to steady equilibrium in a stable period.

Unlike FDI, GDP and FTA established a causal relationship, especially in the stable period (2003–2019); the causal relationship between FTA and GDP is quasi-bidirectional, not wholly the same as the conclusions of Yu-Chi and Lin (2018) and Rasool et al. (2021). Specifically, FTA has both short-term and long-term one-way causalities running to GDP between 1995 and 2019; inversely, GDP has a unidirectional, positive relationship affecting FTA for the period after 2003. As a result, the causal relationship between FTA and GDP in TTH is stronger than this relationship at the national level, according to Liu and Chokethaworn (2020).

Model 1.1 reveals that a 1% increase in FTA raises GDP by 0.219% in a short-term relationship. However, with a 1% rise in FTA, GDP was boosted by 1.478% in the long-term relationship from 1995 to 2019, consequently supporting the tourism-led growth hypothesis. In contrast, the coefficient of the dependent variable, FTA, in model 2.1 is not statistically significant in the short period, from 2003 to 2019, which empirically shows the non-existence of causality running from FTA to GDP in the short and long runs. The R-squared value in model 2.1 is only around 32%, indicating that, aside from FDI and tourism, other sectors significantly impact GDP in the short period. The ECT(-1) coefficients in models 1.1 and 2.1 are 0.148 and 0.142 at the 1% significance level, respectively. The restoration time from the short-term shocks of FTA and FDI to the long-run equilibrium of GDP is 6.8 years and seven years, in 1995–2019 and 2003–2019, respectively.

Short-run causation is only found from GDP to FTA in model 1.3 since FTA, GDP, and FDI are not cointegrated, as shown in Table 3. Short-run and long-run unidirectional causalities running from GDP to FTA in the shortened period 2003-2019 are distinct from those in the whole period. Specifically, the short-run dynamics of model 1.3 prove that a one percent growth in GDP can increase 1.284 percent in FTA, whereas a one percent increase in one lagged GDP will reduce FTA by 1.038% in the period 1995-2019. Meanwhile, a one percent rise in GDP led to a 0.254 percent increase in FTA in the short run and 0.347 percent in the long term from 2003 to 2019. Finally, the coefficient of the ECT(-1) is -0.723 at a 0.1 level of significance, indicating that the speed of adjustment is relatively fast from the short-run to the long-run equilibrium of 1.4 years.

There is no short- and long-run unidirectional causality running from FDI to FTA based on models 1.3 and 2.3 in the two periods. It could be concluded that TTH province does not attract a lot of FDI, so foreign investment in accommodation and travel agencies is rather limited. This leads to the fact that spillover effects of FDI in TTH province on the quantity and quality of tourism services have yet to be determined, so the number of FTA drawn by FDI has not significantly appeared in TTH province. However, during the 16-year period starting from 2003, FTA and a one-year lagged FTA Granger-caused FDI in the short-run, which is similar to the findings of Kaur and Sarin (2016) in India and Siddiqui and Siddiqui (2019) in Pakistan (Model 2.2). This result is attributable to the rising tourism demand, which has prompted international investors to invest in TTH province's accommodation facilities in recent years. Also, a one-year lagged FTA explains that investors first prioritize examining investment destinations and make investment decisions later. The weak association between FDI and FTA in TTH province is similar to the case study of some countries such as Singapore and China in Salleh et al. (2011) and 20 developing countries in Samimi et al. (2013), and divergent from some studies at the national research sites (Haley & Haley, 1997; Suntikul et al., 2010).

6. CONCLUSION AND RECOMMENDATIONS

The GDP growth rate in TTH province has remained consistent and sustainable at 14.7% per year from 1995 to 2019. It is undeniable that tourism is a vital economic sector in TTH province, contributing significantly to GRDP. In addition, based on the statistics, although the number of tourists entering TTH province has fluctuated slightly, the annual growth rate remained consistent at 8.8% per year. Furthermore, FDI into TTH province varied abnormally despite the relative stability of GDP and FTA. And the proportion of FDI in the overall capital investment was low. As a result, FDI has yet to be recognized as a significant economic resource. FDI fluctuated markedly from 1999 to 2002; consequently, the study explores the nexus between three variables across a whole period (1995–2019) and a shortened period (2003–2019).

The empirical studies reflecting the direction of the causal relationship of these three variables (GDP, FDI, and FTA) vary depending on the socio-economic stability, government policy, economic crisis, research period, etc. The shortened period (2003–2019) established more cause-and-effect relationships than the whole period (1995–2019) by eliminating the impact of the financial crisis. The pair of variables (FDI and FTA) established a weaker relationship than the two pairs of variables (FDI and GDP) and (FTA and GDP) in TTH province. The two-way short- and long-term causal relationships between FTA and GDP are compatible with the significant role of tourism in provincial GDP and the national pattern. However, FDI has not been the driving force for economic growth in TTH province in the long period (1995–2019); contrariwise, short-run and long-run causality runs from economic development to FTA in- the shortened period (2003–2019).

Concomitantly, FDI is not strong enough to have the spillover effect of attracting international tourists. Still, the increase in international tourists promoted FDI attraction in the short run in the shortened period. Based on the findings, this research recommends that local governments should encourage tourism development and address the issues related to incentive policies to attract international investors. This is because tourism development policies and foreign investment attraction policies require mutual assistance and aid in the implementation process to achieve high and sustainable economic growth.

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