Empirical study on international tourism and economic growth of Thailand: an ARDL - ECM bounds testing approach

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ABSTRACT

received: Feb-15, 2022	**Purpose —** *To examine the impact of tourism on economic growth in Thailand.*
accepted: Apr-05, 2022	**Research method —** *This study was conducted using the Autoregressive Distributed Lag (ARDL) bounds testing approach, performed between 1995 and 2018.*
published: Jun-01, 2022	**Result —** *The analysis finds out that there is a long-run cointegration in the data. The ECM approach is applied, and the results conclude that the long-run cointegration exists. However, the model depicts that there is not any significant positive relation between FDI and economic growth. The study results showed that the positive impact of tourism in the short term is extremely low, relative to that of the long term. The study results indicate that tourism's optimistic short-term effect is slightly smaller than in the long-term. This can be because certain government restrictions and other exogenous factors hinder the arrival of visitors in Thailand in the short term. Therefore, the government needs to resolve these constraints concerning trade, transportation, taxes, allocation of capital, and environmental risks to attract further tourism visitors and thus improve Thailand's economic growth.*

Keywords: *ARDL, economic growth, inflation, sustainable tourism, thai tourism*

BACKGROUND

For a country's economy, the tourism industry is very critical. Tourism creation and economic growth were related in studies in several countries, such as Thailand (Harasarn & Chancharat, 2014), Turkey (Akal, 2010), Africa (Fayissa et al., 2007), Korea (Mamipour & Nazari, 2014), Sri Lanka (B. Wickremasinghe & Ihalanayake, 2006), Malaysia and Singapore (Lean et al., 2014), Pakistan (Jalil et al., 2013) and Nepal (Gautam, 2011). This sector's significance can be shown by increasing profits, creating jobs, attracting the private sector, and improving infrastructure (Gee & Fayos-Sola, 1997). However, tourism benefits have a secure connection with the other industries in one region. As such, tourism can be classified into three groups, firstly, key core industries such as guides and hotel businesses. Secondary primary industries are souvenir shops and restaurants. Lastly, advertisements, public relations, money-sharing, and other network programs, such as mass transport, construction, and telecommunications, are funded businesses. Thus, the tourism industry boosts income, jobs, and investment in an area, contributing to the country's wealth and growing economy. Today tourism is proliferating worldwide and is the world's largest sector compared with other sectors (Tisdell, 2002). In various countries, especially in developing countries at the national level, tourism was established as a major catalyst for a sustainable and prosperous economy (Wahab & Piqram, 1997). Besides, tourism exportations account for around six to7 per cent of total exports for products and services and have been estimated by the World Travel Organization, which renders tourism the largest industrial sector globally, generating around 10 per cent of world GDP (Roe et al., 2004). This industry's potential contribution would bring to socioeconomic growth was noted by various developing countries (Sharpley, 2000).

Millions of visitors that travel worldwide impact the earnings of almost any single sector of the economy in countries. Tourism as interconnected enterprises, which has several economic influences is supposed to have; besides, the variety of tourism activities contributes to the development of the economy in several developing nations (Akal, 2010; Antonakakis et al., 2014; Harasarn & Chancharat, 2014; F. M. Kreishan, 2015).

Economists emphasize the economic effects of tourism on the world. Tourism is growing quickly, leading to higher national and public income by combining outcomes and raising the balance of payments and government funding for tourism. Tourism as a significant contribution to sustainable development is, therefore, common. Policymakers stress the beneficial impact on tourism. The rapid growth of tourism leads to higher families and public revenues by increasing balances of payments and by increasing the number of government policies supported by tourism (Gee & Fayos-Sola, 1997; Oh, 2005).

Thailand is a modern success story for international tourism growth. Thailand reported 177 international tourists over 25 years since the first figures on tourism were recorded in 1960. The tourism beauty of Thailand is wide-ranging. This country covers an area approximately France's size with tourist sites that

include majestic palaces, abandoned towns and historical sites, new busy cities, fishing towns, and coastal islands with palm trees, lush rice-grown countryside, and elephant forests. Glittering resort shores and centers of the cottage to the tribal villages (Gibbons & Fish, 1988). Tourism is an important economic driver that offers direct and indirect employment opportunities. Thailand's total exports reflect the partnership between trade and business exports (Nonthapot, 2013) distinctly.

The curiosity for international visitors has long been caught in Thailand, but Thailand has recently started to appear as the vital industry in Southeast Asia, following a constant stream of visitors abroad in the last century (Cohen, 1996).

Southeast Asia was too far away from the major urban centers to draw visitors involved in the sunshine, leisure, and sports into the business environment. After entering Europe, Australia, and the Far East, Thailand became the easy transit route. Besides, the probability of Thailand's variety of ethnic, ancient, and natural life could also be stimulated by regular travelers. As Thailand moved from a farm economy to a more industrialized, service-orientated culture, tourism was a major part of economic growth (Rezk & Rosario, 2019).
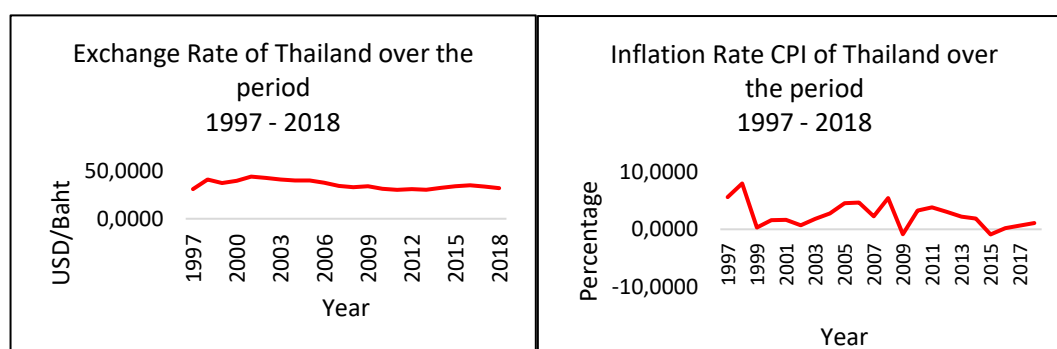

Figure 1. Exchange rate and inflation rate CPI of Thailand over the period 1997 – 2018
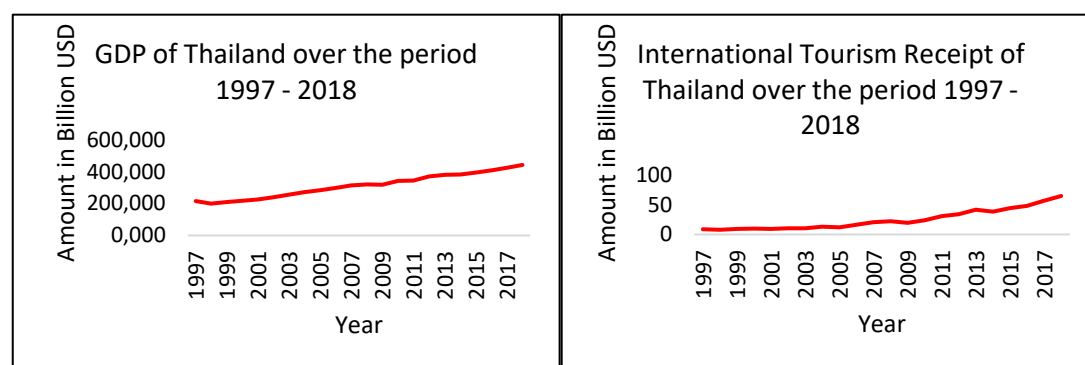source: World Bank (2018)

Figure 2. GDP and international tourism receipt of Thailand over the period 1997 – 2018
source: World Bank (2018)

Nevertheless, no consensus is yet achieved, whether tourism fosters economic growth or whether business activity results in tourism production, on either theoretical or empirical grounds. That may be because adjustments to the economic and tourist circumstances may, among other items, over time, modify the essence and scope of the partnership between these two shows. Nevertheless, the analysis was largely ignored in literature in a time-changing context (Antonakakis et al., 2014). Over 34 million tourists reach Thailand each year, mainly as tourism booms occur, which turn favorable for the economy. Nevertheless, the contributions made by Thailand's service industry to the GDP are yet to help many sectors of the economy due to the concentration of only a few tourist hotspots (IMF, 2018). Therefore, this paper aims to explore the link between tourism growth and economic growth by using time series data while applying certain econometric tests to determine the short-run and long-run cointegration among the variables and concentrate on the dynamics of tourism establishing a long-term relationship.

LITERATURE REVIEW

Various studies focused on tourism contribution to the GDP growth rate and evaluations of the informal relationship between tourism and economic growth. Regular outlets for tourism and economic growth analysis are hired in response to its relationship and cointegration, for example (Nonthapot, 2013; Odhiambo, 2011; Srinivasan et al., 2012; Zortuk, 2009) reviewed previous studies on the growth and economic development of international tourism. Nonthapot (2013) states that economists argue that tourism's growth fuels industry growth and increases overall economic growth. Therefore, the growth of the tourism sector serves as the main economic development strategy for most developing countries to boost the economy. Many past studies also concentrated on the links between tourism and economic growth in different countries.

Furthermore, Odhiambo (2011) tested the ARDL model to follow the formula for stability to reinforce the long-lasting correlation between tourism income and economic growth in Tanzania. Tanzania has built a long term relationship between tourism revenue, exchange rates, and economic growth. A long-term relationship of tourism incomes exchange rates and economic growth in Tanzania was explored through an Auto-Regressive Distributed Model to adopt a stability pattern to reaffirm Tanzania's long-term economic growth and the stable long-run relationship of tourism income.

To obtain details on tourist activities and the evolutions of international tourism arrivals in six of the larger eastern Asian countries, Chang et al. (2009) use box–jenke Autoregressive Distributed Average Model to evaluate the tourism patterns.

Studying the effect on Greece's long-term tourism development, the significant tourist foreign revenues are responsible for the 'reliable' causal link to growth

while 'natural causal financial' revenues from tourism are created by economic growth (Dritsakis, 2004).

Between 1960 and 2014, the TLGH based on the short-term effect of tourism in India was discussed by Ohlan (2017) and discussed the connections between tourism, industrial growth and sustainable economic growth. Commercial production was selected for the excluded element bias as an extra retrograde and has shown a strong contributor to economic development in prior studies. The findings showed that both short-and longer-term economic growth in India is cointegrated with financial, tourism, and industrial development and with the return of foreign tourism. Balaguer, Jacint; Cantavella-Jordá (2002) acknowledged that Spain's travel and economic growth figures have culminated in economic growth.

Traditionally, tourism preserves the foreign currency that pushes economic growth by purchasing capital goods for imported products and services (McKinnon, 1964). Wickremasinghe, Guneratne B. carried out the study, which explores the causal links between tourism and economic growth through cointegration, error simulation and variance deviations. Using Granger's VECM-based causality analysis, Zortuk (2009) explored the link between tourism and GDP and how these two aspects are distinct from tourism to economic growth. Meanwhile, Gunduz, Lokman, Hatemi-J (2005) analyzes Turkish tourism's ability to lead to economic growth. The authors took the tourists ' theories to the methodological proof of the Bootstrap causal analysis in Turkey. However, Belloumi (2010) explores the position of tourism in Tunisia – using a trivial model. The observer states that the cause of Tourism is positive and unidirectional in Tunisia.

The Sichuan province's investigations into tourism and economic growth found that tourism's growing role in fostering development is not evident, while the economic growth characteristics are important in fostering tourism production. The tourism role would nonetheless be improved over time in fostering economic growth. It can be argued that the secondary sector drives economic growth. The level of tourism developments in the province of Sichuan is lower, and supported economic growth is not evident. Studies of economic development in developing countries indicate that tourism is that on a medium-to-long-term basis and that, through improving IT and economic modernization, tourism business becomes a key element of both third-party and nation-wide industries.

The tourism industry's significance for economic development is very important compared to other provinces that have established the tourism industry in western China (He & Zheng, 2011). In terms of international tourist factors, Fayissa, Bichaka; Nsiah, Christian; Tadasse (2007) primarily studies Sub Saharan Africa's economic growth and development. The results indicate that international tourist spending has a major impact on Africa's economic growth. They reported that a 10% growth in tourism expenditure leads to a 0.4% rise in per capita GDP. The World Tourism Organization (WTO) reports that based on

economic, ecotourism, cultural tourism, sports tourism, and the tourism of exploration, Sub Saharan Africa has great potential; this capacity, however, remains largely established. However, the findings show that the factors of traditional development, such as physical and human resources and household expenditures, will increase productivity and stimulate growth on the basis of defense, accommodation, food and other household products. A strategic conclusion to be drawn from this analysis is that African countries can reduce their economic growth costs not only by leveraging traditional sources of growth such as improvements in the physical and human capital market, trade, foreign direct investment and the structural enhancement of the role and management of the tourist sector. However, Archer (1995) no longer argues that foreign exchange and income, which is now part of international business and finance and remains the primary source of jobs and the central pillar of the economy tourism, has no connection with the foreign exchange. According to Mohammed, Bouzahzah, Younesse (2013), their study showed a short-term presence of a unidirectional variable in the form of Granger's visitor incomes to GNP growth in Moroccan and Tunisian case, but also that of the GNP in GNP growth in the Moroccan and Tunisian context.

The key result of this analysis is that RGDP and RTEXP differ unidirectionally. This means that while New Zealand Granger spends on international tourism do produce the Gross domestic product, New Zealand's international tourism expenditure does not benefit from Granger's actual Gross domestic product. The result confirms the development model driven by tourism. Since RTEXP causes RGDP, the latter can be represented as the former feature. The cumulative association of the three variables then shows that in New Zealand, the long-term Gross domestic product elasticity in terms of international tourism spending is 0.4 to the factors' average estimates (Jaforullah, 2015). Meanwhile, Ozturk, Ilhan, Acaravci (2009) found out in their study that the Turkish economy cannot infer the hypothesis of tourism-led growth since international tourism and real GDP do not co-interdependently occur. Granger cannot survive in the long term as a source of research and error correction method.

Another study was conducted by Mamipour, Siab; Nazari (2014), in which the findings of the study indicate that foreign expenditure on tourism has a crucial and positive impact on the gross domestic product while taking into consideration the use of econometric tests for finding out both the short-run and long-run cointegration. However, a rise of 1% in tourism spending indicates that the per capita GDP growth is 0.1% higher. Iran provides significant potential for seaside, cultural, leisure, recreational and agriculture discovery, and environment and ecotourism in conjunction with the World Tourism Organization. This capacity is, however, still largely unexplored. The findings suggest that conventional growth factors, such as investment in physical and human capital, will increase domestic production and accelerate economic growth.

According to Dritsakis (2012), the rise in receipts is essential for tourism's economic importance. The increase in real international tourism taxes per

household also means a rise in inward tourism earnings. As visitors increase revenues, they will pay more and look for better areas of tourism. On the other side, in contrast to the US dollar, the euro means that less individuals and countries depend solely on the US dollar, particularly tourism, for their global transactions. The exchange rate of long-term currency may have a major impact. The move will result in lower tourism and thus lower wages in the Mediterranean countries. Therefore, substantial profits decrease compared with other countries in the region, such as Tunisia and Turkey, France, Spain, Italy, Greece, and Cyprus. So, face it, the Mediterranean countries of the Euro Area will have to make more considerable investments in enhancing operating efficiency. The panel's cointegration ties between tourism development and GDP are very well shown in the seven Mediterranean countries under scrutiny. As for the FMLOS calculations, the β1 parameter (more substantial than one) is significantly high. It indicates that tourism revenues have a more significant impact on GDP in all seven Mediterranean countries.

The research revealed an increase in the real exchange rate and had a major effect on the rate of economic growth. There is also another study that focuses on tourism as a prerequisite for development. Four countries' data were sampled by Proença, Sara; Soukiazis (2008). In four southern countries, research focused on assessing tourism's importance as a prerequisite for development (international revenue), and those are Greece, Italy, Portugal, and Spain. To achieve the value of tourism in the four regions, as mentioned above, the per capita integration method was used to describe how differences between countries have evolved. For these countries' development, tourism should be crucial, including the main growth factors such as the accumulation of capital and population growth that impact their progress towards convergence. Using the concept of conditional convergence, the tourism literary works were provided to support the hypothesis of growth guided by tourism.

In Kreishan (2010) study, For the 1970-2009 era, he uses annual data to analyze and review the connection and interrelationship among tourism led-economic growth case. The methodological review has shown that all the variables used have unit root in this study for finding out the cointegration among the variables. This was the foundation for a stable equilibrium between both factors by using the Johansen cointegration analysis. The main causes of tourism and economic growth are studied in this study. Data show, however, that tourism and economic development have been the asynchronous source of economic growth and likelihood for tourism purchase for many years to come. The investigation usually supports Jordan's hypothesis of tourism-led development.

In improving Pakistan's economy, Khalil, Samina, Kakar (2007) discussed tourism. They define the unidirectional or bidirectional causative link between tourism and economic growth, with an annual estimation from 1960 to 2005. The study was based on short-term dynamic ties and longer-term balancing variables, concluding with the cointegration of Pakistan's tourism and economic growth, using co-insertion and Granger Causality Test concepts and techniques. The causative link between tourism revenue and development in developing

economies is very relevant for today's economies because of their significant economic effects (Gautam, 2011).

The association of tourism with economic growth is carried out in empirical and quantitative analyzes in many countries simultaneously and in a certain period, for example (Dritsakis, 2012; Narayan et al., 2010; Proença & Soukiazis, 2008; Sequeira & Campos, 2005). Dritsakis (2012) researched the growth of tourism and the gross domestic product in seven Mediterranean countries. His study revealed significant evidence in the seven Mediterranean States under the analysis of the cointegration panel ties between tourism and GDP. Similarly, (Proença & Soukiazis, 2008) has taken Southern European countries in the panel box and empirically finds that tourism makes a significant contribution towards raising living standards in these countries and serves as a convergence driver. Notwithstanding, Narayan et al. (2010) have found out that in Fiji, Tonga, Solomon Islands, and Papua New Guinea, tourism's importance to economic growth is expected to increase. A holistic evaluation of the cause and effect of international tourism and economic growth was undertaken in a further study sense. The results demonstrate that these variables are distinct from economic theory, since, besides, an endogenous theory of growth means that economic growth is related to firstly, R&D-intensive and hence high-productivity sectors; secondly, broad-scale (Sequeira & Campos, 2005). However, the causal input between the Gross Domestic Product and overall visitor entries to Taiwan was found (Kim et al., 2006).

Loganathan (2010) studied Malaysia's economic-oriented tourism theory with a hypothetical model with a specific gross domestic product, total tourism delivery, and an annual consumer goods price index with annual data from 1980 to 2007. The findings indicate a two-way link between the CPI and tourist figures and between the consumer price index and the GDP.

Many reports have concluded with the economic growth hypothesis powered by tourism, and some of them are (Brida & Pulina, 2010; Gabriel Brida et al., 2010), but Oh (2005) did not agree with the tourism-led growth theory. Similarly, Schubert, Stefan Franz; Brida, Juan Gabriel; Risso (2011) point out that all small islands are among the top ten countries rated by tourism's contribution to the GDP.

Howard (2009) has studied Thailand's online surveys and expectations and unique risks or challenging encounters. Descriptive statistics have been listed according to the composition of the respondent study, the proportion of total reporting issues and significant impacts and their importance, descriptions of what Thailand has least experienced, accounts of the adverse effects of tourist operation and their degree of life and pleasure and plans to revisit Thailand. Similarly, Rittichainuwat, Bongkosh Ngamsom; Chakraborty (2009) investigated tourist concerns regarding the potential risk of travelling overseas and whether these perceived risks influenced tourists' decision-making during crisis utilizing consistency and quantitative analysis techniques.

Tourists contribute to the scale and scope of sustainable economies (Croes, 2006). Firstly, it will allow companies to reduce average costs by raising their output or value per production unit. It allows companies to cut their average total costs as the number of different products generated grows. For the growing demand for international tourism, hotel companies appear to increase their dimensions and offer various facilities (Weng & Wang, 2004).

The existing causal inference and its complex outcomes demonstrate that a concept that can be acknowledged as axiomatic cannot be generally applied. More specifically, the analysis of such partnership was ignored mainly in a complex context because these experiments were related to a static setting. Lean, Hooi Hooi; Tang (2010), Arslanturk, Yalcin; Balcilar, Mehmet; Ozdemir (2011) and Lean, Hooi Hooi; Chong, Sio Hing; Hooy (2014) have recently addressed tourism economic growth stability.

Thai policymakers are very involved in tourism revenue, with industry support spending contributing around 3% of the government's total budget (Chancharat, 2011). The expansion of tourism in Thailand is creating jobs for unqualified citizens, which could directly impact poverty reduction. Nevertheless, most tourism increases are induced by conditions outside of unskilled labour, which can potentially exacerbate income distribution. Therefore, low-skilled jobs can be lost in other sectors and returned to the ground, which allows the poor a large share of their income to decline as tourists rise (Wattanakuljarus & Coxhead, 2008).

RESEARCH METHOD

Descriptive statistics

This study examines Thailand's economic growth throughout the years 1995-2018 through receipt of international tourism, with an emphasis on the testing method associated with the Autoregressive Distributed Lag (ARDL). Pesaran, M. Hashem; Shin (1998) and Pesaran, M. Hashem; Shin, Yongcheol; Smith (2001) originally introduced the ARDL simulation approach.

The numbers used in this study are statistical averages over the 1995-2018 period. This study concerns the 2010 GDP of constant USD prices, international tourism revenues, CPI inflation and the USD / Baht official exchange rate. The data is obtained from the repositories of the World Bank. The time chosen relies on data availability.

This method is based on using a Regression for Unrestricted Error Correction, with several benefits over traditional methods. First of all, a tiny sample size review Pesaran, M. Hashem; Shin, Yongcheol; Smith (2001) could be used, and the boundary testing would, therefore, be suitable for this research. Second, it separately measures the short-term and long-term calculations, raising problems with incomplete and autocorrelated variables. Thirdly, the non-standard distribution of classical Wald or F-statistics constraints under the null hypothesis does not include any of the corresponding variables, whether I (0), I

(1) or partially mixed. Fourthly, this method provides robust long-term regression predictions and accurate data in synthetic circumstances (Harris & Sollis, 2003). Fifth, the model can be concurrently measured at both short and long-run parameters. Sixth, where order lags have been correctly selected in the ARDL model, a basic Ordinary Least Square (OLS) approach can be used to approximate the cointegration relationship (Srinivasan et al., 2012). Besides, the ARDL solution is ideal for the small number of samples, but different approaches to cointegration adapt to sample size, and specific feature criteria for ARDL must be checked. For further reference, one can refer to (Pesaran et al., 2001; Pesaran & Shin, 1998; Srinivasan et al., 2012).

In general, the ARDL method is ideal for the limited number of samples, but different approaches to cointegration adapt to the sample size, and ARDL needs to be tested for additional functionality.

Our whole dataset comprises 24 years of annual observations from 1995 to 2018. Table 1 provides descriptive statistics that indicate that the current average gross domestic product in 2010 is US$ 303.4103 billion, with a normal variation of US$ 77.13722. Similarly, the average amount in USD billions for the international tourism receipts for Thailand over 1995 – 2018 is 24.0016. The standard deviation of 17.11, which is somehow depicting a high variation in the amount coming from the international tourism receipts to Thailand. Moreover, two other independent variables, namely, the official exchange rate and the inflation rate of Thailand, have an average value of 35.1035 and 2.71745, respectively.

Table 1. Statistics of the variables over the years 1995 – 2018

	Y(GDP)*	TOUR**	RER***	INFR****
Mean	303.4103	24.00167	35.10358	2.717456
Median	305.9594	18.21750	34.26675	2.213214
Maximum	441.6782	65.24200	44.43190	7.994729
Minimum	199.3123	7.954000	24.91518	-0.900425
Std. Dev.	77.13722	17.11191	5.206559	2.333110
Skewness	0.203052	0.969102	-0.043716	0.410474
Kurtosis	1.733458	2.764819	2.350545	2.401616
Jarque-Bera	1.769049	3.811945	0.429436	1.032017
Probability	0.412911	0.148678	0.806769	0.596898
Sum	7281.847	576.0400	842.4859	65.21894
Sum Sq. Dev.	136853.5	6734.799	623.4898	125.1982
Observations	24	24	24	24

*Gross Domestic Product constant 2010 in USD billions; **International Tourism Receipt in USD billions; ***Official Exchange Rate in USD/Thai Baht; ****Inflation rate at the consumer price index

The exchange rate value over the years 1995 – 2018 has consistently shown the sign of increasing, but the inflation rate for the consumer price index has a slight variation. All variables are positively skewed except the official exchange rate variable; GDP was touching 0.2030, the international tourism receipt has a value of skewness of 0969, the inflation rate has a value of skewness 0.4104, and the exchange rate, it is -0.043716. Therefore, it can be said that other than the exchange rate variable, all other variables are right-skewed; positive skewness means the variables tail is rightly skewed, and the data shows asymmetry in its typical distribution graph. Kurtosis statistics of the variables show that GDP is too platy-kurtic (short-tailed or lower peak). Similarly, the international tourism receipt is quite nearly to the mesokurtic stage (i.e., the tails are symmetric). Both inflation and exchange rates, though, are flat-turned and have small spikes and a lower height. The J-B test reveals that the residuals probability values of GDP, international tourism receipt, inflation rate, and exchange rate are 0.4129, 0.1486, 0.8067, and 0.5968. The null hypothesis is, therefore, not discarded and is not disregarded. Therefore, we can assume that all variables are normally distributed. This test is typically used for finding the normality of the residuals in the given data. It mostly works perfectly if the observations sample were a lot. For more study on the Jarque-Bera test, please refer to Thorsten, Thadewald; Herbert (2007) study on this test.

Cointegration – ARDL bounds testing procedure

In this study, a recent Autoregressive Distributed Lag (ARDL) test method analyses the long-term relationship between the real exchange rate, inflation, economic growth, and international tourism. The ARDL testing approach was initially introduced by Pesaran, M. Hashem; Shin (1998); and Pesaran, M. Hashem; Shin, Yongcheol; Smith (2001). The ARDL model used in this analysis can be given the following expression:

$$\Delta lnY_t = \beta_0 + \sum_{i=1}^{n} \Phi_1 \Delta \ln TOUR_{t-i} + \sum_{i=0}^{n} \Phi_2 \Delta \ln Y_{t-i} + \sum_{i=0}^{n} \Phi_3 \Delta \ln EXCHR_{t-i} + \sum_{i=0}^{n} \Phi_4 \Delta \ln INFR_{t-i} + \beta_1 lnY_{t-1} + \beta_2 lnTOUR_{t-2} + \beta_3 lnEXCHR_{t-3} + \beta_4 lnINFR_{t-4} + \varepsilon_t$$

.... (1)

Where Y, TOUR, EXCHR, and INFLR are gross domestic product, international tourism receipt, real exchange rate, and inflation rates, respectively; Δ indicates a first difference operator; it symbolizes natural logarithmic transformation; β_0 is an intercept and ε_t is a white noise error.

Approximating equation (1) with specific lesser squares is the first step in the ARDL bonded-testing method to verify the existence of a long relationship between the different variables by conducting an F-test of the coefficients of lagged levels, i.e., H0: β1= β2 = β3 = β4 = 0 against the alternative H1: β1 ≠ β2 ≠ β3 ≠ β4 ≠ 0. Pesaran, M. Hashem; Shin (1998) and (Pesaran et al., 2001) generates two sets of critical F-statistic point constraints. When the F-statistics

is smaller than the lowest essential limit values, null hypotheses for cointegration cannot be excluded. On the contrary, the null hypothesis that the models' variables have a long-lasting cointegration relationship is denied if it approaches the crucial high limit. Nevertheless, deductions are unclear if the estimated value falls within the rules.

In the second step, the conditional long-run ARDL model for Y_t can be calculated after cointegration is created as:

$$lnY_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \, lnY_{t-i} + \sum_{i=0}^{q} \beta_2 \, lnTOUR_{t-1} + \sum_{i=1}^{q} \beta_3 \, lnEXCHR_{t-2} + \sum_{i=2}^{q} \beta_4 \, lnINFR_{t-3} + \varepsilon_t \qquad ....(2)$$

All variables are described in advance, and this will include choosing the ARDL model orders using the Schwarz Bayesian Criterion (SBC). In the third step, we attain the complex short-run parameters by calculating the error correction model's function with the long-run estimates. This is laid out in the following way:

$$\Delta lnY_t = \beta_0 + \sum_{i=1}^{p} \Phi_1 \, \Delta lnY_{t-i} + \sum_{i=0}^{q} \Phi_2 \, \Delta lnTOUR_{t-1} + \sum_{i=1}^{q} \Phi_3 \, \Delta lnEXCHR_{t-2} + \sum_{i=2}^{q} \Phi_4 \, \Delta lnINFR_{t-3} + \delta ECT_{t-1} + \varepsilon_t \qquad ....(3)$$

Where, Φ_1, Φ_2, Φ_3 and Φ_4 are the short-run active coefficients of the model, and in such case, the coefficients conform and following balance in the model and δ is the change or speed modification parameter, and ECT is the term for correction arising from the estimated reference Equation of the specified equilibrium (1).

RESULT AND DISCUSSION

Unit root tests

We use a conventional ADF approach to identify data consistency and the PP test suggested by (Phillips & Perron, 1988), And Dickey-Fuller's (DF-Perron) generalized least-square test, which Elliott, Graham; J. Rothenberg, Thomas; H. Stock (1992) suggested. However, the ADF method is enough to give us an accurate result. Besides, the variables must be checked for stationarity before they are added to the causality test. In this way, the variables in I(2) are not in stationarity since Pesaran, Shin & Smith (2001) determined F-statistics are only accurate if the variables are I(0) or I(1). The Augmented Dickey-Fuller (ADF) test is thus conducted, and the findings are described in Table 2. The unit root check effects suggest that the inflation, tourist receipt, the exchange rate, and the Gross Domestic Product figures were in I(1), respectively. Later we used Autoregressive Distributed Lag Model (ARDL) to examine the impact of international tourism receipt on Thailand's economic growth. The effects of the

equation-based ARDL Co-integration Study are listed in Table 3. The respective lag period for the ARDL-UECM dependent was selected based on the Akaike Info Criterion (AIC). The table results show that the measured F-statistic at the five per cent significant level is more significant than the crucial maximum value of 3.67. Therefore, no cointegrating null hypothesis is denied, indicating that Thailand has a robust long-term cointegration between tourism and economic growth.

Table 2. Unit root tests results at first difference

Variable	ADF Test			Results
	t-test	Prob. Value 1	Critical value at 5%	
LnY(*)	-3.994	0.0247	-3.004	
lnTOUR(**)	-4.130	0.0205	-3.658	I(1)
lnEXCHR(**)	-3.763	0.0389	-3.632	
lnINFR(**)	-7.779	0.0000	-1.957	

(*) constant   (**)intercept and trend   1. denotes significant level based on the McKinnon critical value first

Once the cointegration relation has been verified among the variables, equation (2) has been calculated, and its effects are defined in Table 3 for the 1long-term coefficients of the chosen ARDL model, based on the Akaike Info Criterion (AIC).

Table 3. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5.190629	NA	2.82e-05	0.875298	1.074255	0.918477
1	73.42053	119.7884*	7.53e-08*	-5.087669	-4.092886*	-4.871776
2	84.85809	13.07150	1.42e-07	-4.653151	-2.862541	-4.264543
3	110.1061	19.23660	1.07e-07	-5.533917*	-2.947480	-4.972594*

* Indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 3 depicts the model lag order selection criteria. We have considered the Akaike Information Criterion, and based on the statistics, it shows that the due lag is 3.

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[1]The long-run estimates and their standard errors were obtained using Microfit 4.0. (Pesaran & Shin, 1998)

Table 4. ARDL bounds test

F-Statistics	90%			95%			99%	
	I(0)	I(1)		I(0)	I(1)		I(0)	I(1)
17.80196	2.37	3.2		2.79	3.67		3.15	4.08

The F-statistics in Table 4 indicates the long-term cointegration of the model, and the data has the association, i.e., the F-statistics value (17,80), which is 3,2 in 5% confidence interval, above the upper-bound values. Therefore, we are allowed to apply the Error Correction Form for testing the long-term cointegration. Furthermore, it is shown in table 5.

The findings of Table 5 indicate that the approximate tourism coefficient at 5% is optimistic and negligible. In comparison, the analysis also indicates that both exchange rates and inflation rates positively affect Thailand's economic growth at a 5 per cent confidence interval, but the connection is negligible with the percentages of 0.5274 and 0.3758.

Table 5. Long-run ARDL levels equation

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOUR	0.122244	0.261312	0.467809	0.6462
EXCHR	-0.499364	0.772964	-0.646038	0.5274
INFLR	-0.085764	0.094147	-0.910961	0.3758
C	25.87502	9.305730	2.780547	0.0134

EC = GDP - (0.1222*TOUR -0.4994*EXCHR -0.0858*INFLR + 25.8750)

Table 6. ARDL error correction regression

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCHR)	-0.334597	0.041857	-7.993767	0.0000
D(INFLR)	-0.002072	0.001415	-1.464511	0.1624
CointEq(-1)*	-0.096130	0.009113	-10.54809	0.0000

Table 6 indicates a low cointegration factor, and this is a good indication for the model. It is possible to say that there is a long-lasting cointegration of all the variables in the model. The value of the cointegration is -0.096130, with the probability value of 0.0000. This implies that the null hypothesis of long-term cointegration of the variables is simply rejected.

Table 7. Long-run error correction model specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.014128	0.018319	-0.771217	0.4518
D(GDP(-1))	1.329263	0.431840	3.078137	0.0072
D(TOUR(-1))	0.016094	0.063404	0.253826	0.8029
D(EXCHR(-1))	-0.003222	0.132634	-0.024291	0.9809
D(INFLR(-1))	-0.006058	0.002435	-2.488069	0.0242
ECT(-1)	-1.705329	0.399502	-4.268637	0.0006

Short-run Diagnostic and Stability Tests

Descriptions	Statistics	Prob. value
Serial Correlation LM Test	5.4995	0.0332
Heteroscedasticity Test	2.6117	0.0654
Normal Distribution (JB)	1.7050	0.4263
Ramsey RESET Test	0.4272	0.6753

Table 7 result reveals that the estimated error correction coefficient is negative and significant at the five per cent level, ensuring that the adjustment process from the short-run deviation is quite slow.
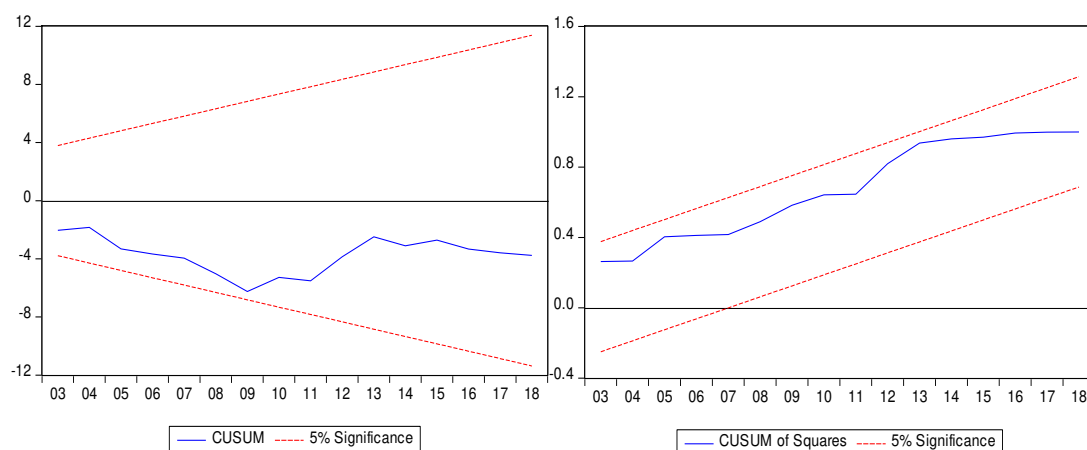

Figure 3. CUSUM and CUSUMSQ Plots at 5% L.O.S.

The estimated coefficient of tourism is positive and insignificant at the five per cent level. This implies a statistically short-run positive impact of tourism on the economic growth in Thailand, but the data shows that it is insignificant. Figures 3, respectively, display the CUSUM and CUSUMSQ plots for long-term stability tests and the ARDL Error Corrections model's short-run movements. If the plot's estimates in the CUSUM and CUSUMSQ statistic stay within critical limits of 5% of the signs point, all regression coefficients' null hypothesis is stable and cannot be discarded. The null hypothesis can, therefore, be retained. For more study, the readers can refer to Tanizaki (1995) study on CUSUM and CUSUMSQ. A review of Figures 3 reveals that estimates from CUSUM and CUSUMSQ are far below the

confidence level of 5%, which indicates a robust long-term and short-term coefficient in the ARDL error correction model.

CONCLUSION

The impact of international tourism on Thailand's economic growth were investigated in Autoregressive Distributed Lag (ARDL). Our analysis shows in general that tourism is having a positive effect on Thailand's economic growth in the short and long run. However, the study results indicate that tourism's optimistic short-term effect is slightly smaller than in the long-term. This can be because certain government restrictions and other exogenous factors hinder the arrival of visitors in Thailand in the short-term. Therefore, the government needs to resolve these constraints concerning trade, transportation, taxes, allocation of capital, and environmental risks to attract further tourism visitors and thus improve Thailand's economic growth.

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