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Does Tourism Drive Economic Growth? Evidence from a Coastal Economy Over Three Decades

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Abstract

This study examines the relationship between tourism and economic growth in Khanh Hoa Province, Vietnam, using time-series data covering the period from 1994 to 2023. It employs the Autoregressive Distributed Lag (ARDL) model, Vector Autoregression (VAR), and Granger causality tests to analyze both short-run and long-run dynamics. Gross regional domestic product (GRDP) is specified as the dependent variable representing economic growth, while tourism revenue is treated as the independent variable representing tourism activity. A COVID-19 dummy variable is included to control for pandemic-related shocks. The results show no evidence of a long-run cointegration relationship between tourism and economic growth. The Granger causality test indicates a unidirectional relationship from economic growth to tourism development, with no evidence supporting the

reverse direction. Furthermore, variance decomposition results suggest that the contribution of tourism to economic growth remains limited, accounting for approximately 8.5% after ten years. In summary, the findings do not support the tourism-led growth hypothesis (TLGH) in the context of provincial economies. Instead, they highlight the limited and dependent role of tourism in driving long-term economic performance. This paper contributes to the existing literature by providing evidence from a coastal economy within a developing country. Policy implications underscore the need for more balanced and diversified development strategies to enhance the sustainability and resilience of economic performance.

Keywords: tourism-led growth hypothesis (TLGH), ARDL, VAR, economic growth, Khanh Hoa

1. INTRODUCTION

In recent years, tourism has established itself as one of the fastest-growing sectors of the global economy. According to the World Travel and Tourism Council [1], the tourism sector generated over 9.9 trillion US dollars, contributing 9.1 percent to global GDP and supporting nearly 330 million jobs in 2023, with domestic and international tourist spending increasing by more than 18 percent and 33.1 percent, respectively, compared to the previous year. These figures provide clear evidence of the tourism sector's resilience following the COVID-19 pandemic [2]. By creating employment, generating foreign exchange earnings, attracting investment, and stimulating related service industries, tourism is increasingly regarded as a key driver of economic growth, particularly in developing economies and coastal regions [3, 4].

Against this backdrop, the tourism-led growth hypothesis (TLGH) has emerged as one of the most widely studied and empirically tested approaches in tourism economics. This hypothesis suggests that the development of the tourism sector can serve as a core driver of long-term economic growth through channels such as job creation, increased foreign exchange earnings, infrastructure development, and the stimulating investment [5, 6].

In addition, the reverse perspective that economic growth promotes tourism development has also attracted considerable scholarly attention. This view maintains that economic growth provides a crucial foundation for tourism development. As the economy expands, improvements in infrastructure, enhancements in service quality, and greater access to international markets can create favorable conditions for tourism growth [7–10].

Moreover, some studies suggest that no causal relationship exists between tourism and economic growth [11, 12]. This lack of consensus may stem from variations in economic structure, the degree of dependence on tourism, estimation techniques, and the study period. These findings suggest that the relationship between tourism and economic growth is not universal but highly context-dependent, varying across specific local and national contexts [13, 14].

For coastal economies undergoing transformation, this issue becomes even more pressing. Many localities have identified tourism as a key economic sector in their restructuring strategies, considering it a major driver of economic growth and structural transformation. However, excessive reliance on tourism also entails considerable risks, particularly when the economy is exposed to external shocks. The COVID-19 pandemic provides a clear example: during 2020–2021, global tourism experienced an unprecedented decline, resulting in severe economic consequences for many countries and localities [1]. Li et al. [15] further show that the economic effects of tourism are heterogeneous across localities and are more pronounced in areas with stronger transportation infrastructure and more favorable development conditions. This evidence illustrates the importance of local structural conditions when evaluating tourism-related economic outcomes.

Khanh Hoa is a coastal province in Central Vietnam with a favorable geographical location and strong potential for tourism development. For many years, it has been considered one of Vietnam's major tourism centers. During the period from 1994 to 2023, Khanh Hoa Province recorded significant growth in both tourism revenue and GRDP. In 2023, the province welcomed over 7 million visitors, and its GRDP increased by 10.45 percent, ranking sixth nationwide [16, 17].

However, an important question remains: is tourism truly the driving force behind Khanh Hoa's long-term economic growth, or does overall economic growth facilitate tourism development? Answering this question is crucial, particularly in light of the limitations of previous studies.

In Vietnam, most studies on the relationship between tourism and economic growth have been conducted at the national level or have relied on data from multiple provinces simultaneously. Long-term time series studies focusing on a specific locality remain relatively limited [18, 19]. Furthermore, the impact of the COVID-19 pandemic, a major shock to the economy, has not been adequately examined in provincial-level studies in Vietnam when testing the tourism-led growth hypothesis [13].

To address these limitations, this study makes three main contributions. Firstly, it employs a long-term time-series dataset from 1994 to 2023 to examine the bidirectional relationship between tourism and economic growth in a specific locality, Khanh Hoa province, Vietnam. The province plays an important role in tourism development and is currently undergoing economic restructuring. Long-term provincial-level studies remain relatively limited.

Secondly, the study incorporates a COVID-19 dummy variable into the ARDL and VAR models to assess the impact of the pandemic on the relationship between tourism and economic growth in both the short and long run. This approach allows for a clearer assessment of the effects of a major economic shock on the local economy.

Thirdly, the study applies the ARDL model developed by Pesaran et al. [20], combined with Granger causality tests and variance decomposition analysis, to provide robust quantitative evidence on the relationship among the variables. The findings may serve as a useful reference for tourism policy development in developing coastal provinces.

The remaining sections of the study are structured as follows: Section 2 reviews relevant empirical studies. Section 3 presents the research methodology and estimation model. Section 4 describes the data and reports the empirical results. Section 5 discusses the findings and concludes the study.

2. LITERATURE REVIEW

The relationship between tourism and economic growth is one of the most widely discussed topics in applied economics. Existing evidence indicates that the impact of tourism on economic growth is not fixed, but varies with the level of economic development, industry structure, tourism policies, and external shocks such as pandemics. This review aims to synthesize the current empirical evidence and identify research gaps that warrant further investigation.

2.1. THE TOURISM-LED GROWTH HYPOTHESIS (TLGH)

There is considerable empirical evidence supporting the tourism-driven economic growth hypothesis across a range of research methodologies. Rasool et al. [21] employed a panel cointegration analysis for the BRICS economies, demonstrating that tourism positively influences long-term economic growth while also highlighting potential spillover effects to emerging markets. At the broader international level, Nunkoo et al. [22] conducted a meta-regression of over 150 studies, revealing that the relationship between tourism and economic growth is generally positive, although the magnitude and direction of the effect vary depending on countries' levels of economic development, estimation methods, and study periods. More recently, Alsabhan et al. [23] examined ASEAN economies, showing a clear positive impact of international tourism revenue on GDP, whereas Seraj et al. [24] obtained comparable results across several African countries using long-term cointegration techniques. In addition, Roy & Medhekar [25] provided a comprehensive review of global studies on the tourism-led growth hypothesis. They highlighted consistent evidence that tourism supports economic growth and also identified common research trends, methods, and gaps across different regions.

At the regional and local levels, the evidence is equally compelling. Saputra et al. [26] applied time series analysis and found that tourism positively influences economic growth in Aceh province, Indonesia, while Wang et al. [27] demonstrated that tourism development makes a significant contribution to economic output in Yunnan province, China. In Southeast Asia, Maulana et al. [28] analyzed panel data from five ASEAN economies and found that international tourist arrivals and tourism receipts are positively associated with economic growth. Their findings emphasize the importance of tourism-sector development for broader economic performance in the ASEAN-5 context. Specifically in Vietnam, Nguyen [29] showed that investment in tourism infrastructure has a positive non-linear impact on attracting international tourists, providing indirect evidence that supply-side improvements can activate the tourism-led growth channel in a developing coastal economy. Collectively, these studies underscore that tourism can act as a vital catalyst for economic growth.

2.2. THE ECONOMIC-DRIVEN TOURISM GROWTH HYPOTHESIS (EDTGH)

Another line of research suggests that economic growth is a prerequisite for tourism development rather than the reverse. Tankus et al. [10], using panel data from Mediterranean coastal countries, showed that GDP per capita and trade openness are the main drivers of tourism revenue growth, supporting the Economic-Driven Tourism Growth Hypothesis (EDTGH). Similarly, Bilen et al. [8], also focusing on the Mediterranean region, reported consistent findings. Furthermore, Cárdenas-García and Alcalá-Ordoñez [30] examine the relationship among tourism, sustainability, and economic development through comparative case analysis. Their findings indicate that tourism can function as an instrument of economic development, although its effects depend on broader sustainability and development conditions. As economies grow, both public and private sectors can invest in institutional frameworks, infrastructure, and human resources, thereby enhancing the attractiveness, safety, and competitiveness of destinations [14].

In the Vietnamese context, Nguyen [31] highlights that broader economic development has strengthened the aviation sector, playing a key role in the recovery of tourism demand after the COVID-19 pandemic. Similarly, Tegegne et al. [32] examined the role of large-scale infrastructure development in East Africa and showed that major infrastructure projects can create opportunities for tourism growth and diversification. This evidence reinforces the broader importance of infrastructure for realizing tourism potential. In short, empirical evidence on the Economic-Driven Tourism Growth Hypothesis (EDTGH) indicates that economic growth acts as a fundamental driver of tourism development through investments in infrastructure, human capital, and institutional frameworks.

2.2.1 Bidirectional and nonexistent causal relationship between tourism and economic growth

Several studies provide evidence of a bidirectional causal relationship between tourism and economic growth. Fan & Ha [4], using data on Southeast Asian countries together with panel causality tests and structural equation modeling, showed that the direction of the tourism–growth relationship differs across economies with different levels of development. Their results provide evidence that economic growth can promote tourism development across ASEAN countries, while tourism can exert a stronger growth effect in larger and more developed economies. Similarly, Wijesekara et al. [33], in a global study combining Granger causality tests with wavelet cohesion analysis, demonstrated that tourism and economic growth mutually influence each other, especially in middle-income countries. Su et al. [34] reported similar results based

on provincial-level panel data for China. In Vietnam, Pham & Vu [35] observed evidence of reciprocal causality in both directions, with variations depending on income groups and time periods.

Despite substantial evidence of a bidirectional relationship, some studies caution against generalizing these findings. Lolos et al. [36], reviewing Greece over a long period, found that tourism significantly contributed to economic growth in earlier decades, but this effect weakened as the economy matured and structural weaknesses accumulated. Cárdenas-García et al. [37], using a homogeneous panel approach across country groups, showed that the relationship between tourism and economic growth is highly heterogeneous, with some countries exhibiting reciprocal interactions while others show no significant relationship. These findings underscore the need for context specific analyses, suggesting that the impact of tourism on economic growth at the provincial level, particularly in coastal provinces that depend on tourism, may differ considerably from results observed at national or regional levels.

2.2.2 The COVID-19 factor in the relationship between tourism and economic growth

The COVID-19 pandemic constitutes a major exogenous shock that may induce structural changes in the relationship between tourism and economic growth. Such a disturbance can introduce structural breaks in time series data, thereby affecting parameter stability, the persistence of long-run relationships, and the reliability of cointegration estimates. Kumar et al. [13] incorporated structural breaks into cointegration tests for Vietnam and showed that ignoring these shifts can result in biased or misleading inferences. Empirical evidence further indicates that the pandemic triggered an unprecedented contraction in Vietnam's tourism sector, with international arrivals falling by more than 95 percent between 2020 and 2021, while domestic tourism was unable to compensate for the loss [38]. In addition, Li et al. [15] find that the recovery phase following the pandemic altered the underlying dynamics of this relationship, raising concerns about the stability and sustainability of economic growth driven by tourism.

Therefore, when examining the relationship between tourism and economic growth, incorporating a COVID-19 dummy variable into time series models is a necessary adjustment to control for structural shifts and reduce the risk of spurious regression.

2.2.3 Empirical evidence from Vietnam and coastal regions with similar characteristics

Studies on Vietnam and similar coastal economies are directly relevant to this study. Hoang & Bakucza [39] analyzed the relationship between governance quality and tourism development in Vietnam over three decades and found that institutional improvements associated with economic growth played a significant role in promoting tourism development. This finding suggests that the effect of economic growth on tourism may be stronger than the effect of tourism on economic growth.

Furthermore, Hoang [40], employing a spatial panel regression model, found that tourism revenue in Vietnam is shaped by spatial effects and by local determinants such as tourist numbers, hotel capacity, mobility, and reductions in travel-related time costs. This finding suggests that national-level analysis alone may obscure important regional differences, thereby underscoring the need for local-level investigation.

Internationally, Trinajstić et al. [41], drawing on panel data for Croatian regions, documented a positive relationship between tourism activity and regional economic growth, while also identifying differences across counties. This evidence is particularly relevant for coastal provinces experiencing rapid economic restructuring, such as Khanh Hoa.

In addition, sustainable tourism development in middle-income economies tends to generate more stable long-term growth relationships than mass tourism models focused primarily on quantity [30]. This insight has important implications for Khanh Hoa, a province that has experienced both rapid expansion and sharp declines in international tourist arrivals and now needs to shift its tourism development strategy toward a more sustainable and higher-value model.

A synthesis of previous studies identifies four key issues that require further clarification in this study.

First, there is no universal causal relationship between tourism and economic growth. The dominant direction of impact varies according to the level of development, geographical characteristics, and the period examined.

Second, analysis at the provincial level is necessary, as evidence at the national level may mask substantial regional disparities, particularly in a diversified economy such as Vietnam.

Third, failure to account for structural changes, especially the shock associated with COVID-19, may bias long-run estimates and lead to misleading conclusions.

Fourth, whether tourism genuinely functions as a driver of economic growth or simply expands alongside overall economic growth remains an open question. The answer depends on the local economic structure, institutional quality, and the extent of linkages between tourism and other sectors.

These considerations motivate the choice of methodology. Accordingly, this study employs the ARDL bounds testing approach together with Granger causality analysis within a VAR framework, using a dataset covering 30 years for Khanh Hoa province. A COVID-19 dummy variable is incorporated into the model to capture structural shifts.

3. EMPIRICAL METHODOLOGY

To examine the causal relationship between tourism and economic growth in Khanh Hoa province, this study combines ARDL and VAR models using time-series data from 1994 to 2023. This approach allows for the examination of the bidirectional relationship between tourism and economic growth, capturing both the impact of tourism on economic growth and the reverse relationship. In addition, the model incorporates a dummy variable to reflect the disruptive impact of the COVID-19 pandemic during the study period.

3.1. MODEL SPECIFICATION

Based on the endogenous growth theory [42, 43] and the cointegration approach developed by Pesaran et al. [20], the study specifies a general functional form as follows:

$$GRDP = f(TR, D_{COVID}),$$

$$TR = f(GRDP, D_{COVID}),$$

where: GRDP is the gross regional domestic product of Khanh Hoa province (expressed in natural logarithm, denoted as LNGRDP); TR is tourism revenue (expressed in natural logarithm, denoted as LNTR); D_{COVID} is a binary dummy variable that takes the value of 1 for the years 2020–2021 and 0 otherwise, used to control for the unexpected impact of the COVID-19 pandemic on tourism revenue and GRDP. The inclusion of this dummy variable in the model is based on the recommendation of Kumar et al. [13], as ignoring the structural break caused by COVID-19 may lead to seriously biased conclusions in time series models.

This study uses the ARDL method because it is suitable when variables have different orders of integration, $I(0)$ and $I(1)$, and it still provides reliable results even when the sample size is small, which is common in provincial economic studies [44, 45]. Therefore, the ARDL model applied in this study is specified as follows:

$$\Delta LNGRDP_t = \alpha_0 + \psi \cdot ECT_{t-1} + \sum_i \beta_i \cdot \Delta LNGRDP_{t-i} + \sum_j \gamma_j \cdot \Delta LNTR_{t-j} + \delta \cdot D_{COVID,t} + \varepsilon_t,$$

where: $\Delta LNGRDP_t$: First-order difference of the logarithm of GRDP, reflecting changes in economic growth at time t . α_0 : Constant term of the model, representing the average change in growth when other factors are held constant. ECT_{t-1} (Error Correction Term): Captures the deviation from the long-run equilibrium in the previous period. ψ : Coefficient measuring the speed of adjustment toward equilibrium, typically expected to be negative. A statistically significant ψ indicates the existence of a long-run relationship among the variables. $\sum_i \beta_i \cdot \Delta LNGRDP_{t-i}$: Represents the effect of past values of economic growth on its current value. $\sum_j \gamma_j \cdot \Delta LNTR_{t-j}$: Captures the short-run impact of tourism revenue on economic growth. $D_{COVID,t}$ (dummy variable): Takes the value of 1 for the period 2020–2021 and 0 otherwise, used to capture the impact of the COVID-19 pandemic. δ (coefficient of D_{COVID}): Measures the magnitude of the impact of the COVID-19 pandemic on economic growth. ε_t : Random error term, representing other factors not included in the model.

Since the Bounds Test results indicate the absence of a long-run relationship, implying that no cointegration exists, the study does not employ the ECM framework but instead adopts a VAR model in first differences. This approach is consistent with Engle and Granger [48]. The VAR model is specified as follows:

$$D(LNGRDP_t) = c_1 + \sum_i \alpha_{1i} \cdot D(LNGRDP_{t-i}) + \sum_i \beta_{1i} \cdot D(LNTR_{t-i}) + \delta_1 \cdot D_{COVID,t} + u_{1t},$$

$$D(LNTR_t) = c_2 + \sum_i \alpha_{2i} \cdot D(LNGRDP_{t-i}) + \sum_i \beta_{2i} \cdot D(LNTR_{t-i}) + \delta_2 \cdot D_{COVID,t} + u_{2t},$$

where: $D(LNGRDP_t)$, $D(LNTR_t)$: First-order differences of GRDP and tourism revenue, reflecting their short-run fluctuations. c_1 , c_2 : Constant terms in each equation. $\sum_i \alpha_{1i}$, $\sum_i \alpha_{2i}$: Effects of past GRDP on current values. $\sum_i \beta_{1i}$, $\sum_i \beta_{2i}$: Effects of past tourism revenue on current values. $D_{COVID,t}$: Exogenous variable used to control for the COVID-19 shock. δ_1 , δ_2 : Measure the impact of COVID-19 on each variable. u_{1t} , u_{2t} : Error terms of each equation.

The optimal lag is determined based on the AIC criterion. However, since the sample size is reduced to only 29 observations after differencing, the maximum lag is limited to 2 to avoid over-parameterization [46, 47].

3.2. ESTIMATION PROCEDURE

The research process is conducted in five main steps as follows:

Step 1: Testing for Stationarity

The study employs two tests, namely the ADF and KPSS tests, to examine the stationarity of each variable, both in levels and first differences. The combined use of these tests allows for cross-validation, thereby enhancing the reliability of the results, especially in the case of a small sample size. Specifically, the ADF test assumes that the series contains a unit root and is therefore non-stationary, whereas the KPSS test assumes that the series is stationary [20, 48]

Step 2: Cointegration Test (Bounds Test)

After determining the order of integration of the variables, the Bounds Test is conducted within the ARDL framework. If the F-statistic exceeds the upper critical bound $I(1)$ at the chosen significance level, it can be concluded that a long-run relationship exists among the variables, and the ECM model is then applied. Otherwise, if no cointegration is found, the study proceeds with a VAR model using variables in first differences [5, 20].

Step 3: VAR Estimation and Granger Causality Test

The VAR model is specified with two endogenous variables, $D(LNGRDP)$ and $D(LNTR)$, and one dummy variable, D_{COVID} . The optimal lag length is selected based on the AIC criterion. Subsequently, the Granger causality test is conducted to examine the causal relationship between GRDP and TR. This step is essential for addressing the main research question [4, 28].

Step 4: Model Diagnostics and Stability Test

The stability of the VAR model is examined using the inverse roots of the characteristic polynomial (AR Roots Graph), with the requirement that all roots lie within the unit circle. In addition, the LM test is employed to detect residual autocorrelation at various lags, ensuring that the estimated model is both adequate and reliable [49, 50].

Step 5: Dynamic Analysis using IRF and FEVD

Finally, the study employs impulse response functions (IRF) and forecast error variance decomposition (FEVD) to analyze the interactions between variables in the short and medium term. The Cholesky decomposition is applied with the ordering $D(LNTR) \rightarrow D(LNGRDP)$. IRF shows how one variable responds over time to a shock originating in another variable. FEVD measures the contribution of each variable to the forecast error variance of the other over a 10-period horizon. The results from these methods are used to support the findings of the Granger causality test [21, 34].

4. DATA DESCRIPTION AND PRELIMINARY ANALYSIS

4.1. DATA DESCRIPTION

This study uses annual time-series data for Khanh Hoa province from 1994 to 2023, with a total of 30 observations. The two main variables included in the analysis are real GRDP, which is adjusted for inflation and expressed in constant 2010 prices, and tourism revenue, which is also measured in constant 2010 prices. Before being included in the model, both variables are transformed into natural logarithms to reduce variability and to facilitate the interpretation of the regression coefficients in terms of elasticities.

Data on GRDP and tourism revenue are collected from the Khanh Hoa Provincial Statistics Office and annual reports of the Provincial Department of Culture, Sports and Tourism. In addition, the study includes a dummy variable, D_{COVID} , which takes the value of 1 for the years 2020 and 2021 and 0 otherwise, to capture the impact of the COVID-19 pandemic. During this period, tourism activities, particularly international tourism, were almost completely suspended, while domestic tourism was also significantly restricted. This situation led to a sharp decline in tourism revenue and slowed down GRDP growth in the province [38]. Table 1 presents a summary of the variables used in the model.

Table 1. Variable Description

Symbol	Variable	Unit	Source
LNGRDP	Natural logarithm of real GRDP	Billion VND (constant 2010 prices)	Khanh Hoa Provincial Statistics Office
LNTR	Natural logarithm of tourism revenue	Billion VND (constant 2010 prices)	Khanh Hoa Department of Culture, Sports and Tourism; Khanh Hoa Provincial Statistics Office
D_{COVID}	COVID-19 dummy variable	1 = 2020-2021; 0 = otherwise	Author's own

Note: LNGRDP and LNTR are natural logarithms of the respective variables. D_{COVID} is a dummy variable used to control for the impact of the COVID-19 pandemic. Source: Author's calculations using EViews 10.

4.2. UNIT ROOT TEST RESULTS

Before estimating the model, it is necessary to examine whether the variables are stationary in order to avoid spurious regression. This study employs both the ADF and KPSS tests to determine the order of integration of the variables. It should be noted that these two tests are based on opposite hypothesis formulations. For the ADF test, the null hypothesis (H_0) states that the series is non-stationary, while the alternative hypothesis (H_1) implies stationarity; thus, if the p-value is less than the chosen significance level, H_0 is rejected and the series is considered stationary. In contrast, for the KPSS test, the null hypothesis (H_0) assumes that the series is stationary, whereas the alternative hypothesis (H_1) suggests non-stationarity; accordingly, if the test statistic is lower than the critical value, H_0 cannot be rejected, indicating that the series is stationary. Therefore, using both tests in combination provides more robust and reliable conclusions.

Table 2. Unit root test results (ADF and KPSS)

Variable	ADF (level)	KPSS (level)	Conclusion	ADF (first difference)	KPSS (first difference)	Integration order
LNGRDP	0.343 (0.998)	0.253 > 0.216	Non-stationary	-4.266 (0.003) *	0.373 < 0.463	I(1)
LNTR	-3.819 (0.030) *	0.104 < 0.119	Stationary	-5.478 (0.000)	0.045 < 0.347	I(0)

Note: ADF reports the t-statistic, with p-value in parentheses. KPSS reports the LM statistic, which is compared with critical values. The symbol * denotes statistical significance at the 5% level. Exogenous components: a constant and trend are included in level tests, while only a constant is included in first-difference tests. Source: Author's calculations using EViews 10.

Based on the results in Table 2, the LNGRDP variable is found to be non-stationary at the level, as both tests provide consistent conclusions. Specifically, the ADF test reports a p-value of 0.998, which is greater than the 5% significance level; therefore, the null hypothesis (H_0) cannot be rejected, indicating that the series is non-stationary. Similarly, the KPSS test produces a statistic of 0.253, which exceeds the critical value of 0.216, leading to the rejection of the null hypothesis (H_0) of stationarity. However, after taking the first difference, both tests indicate that the series becomes stationary (the ADF p-value is 0.003, which is less than 0.05, and the KPSS statistic of 0.373 is below the critical value of 0.463). Hence, LNGRDP is identified as an integrated series of order one, meaning that it becomes stationary only after first differencing, denoted as I(1).

In contrast, the LNTR variable is stationary at the level. The ADF test yields a p-value of 0.030, which is less than 0.05, leading to the rejection of the null hypothesis (H_0). Meanwhile, the KPSS statistic is 0.104, which is lower than the critical value of 0.119, implying that the null hypothesis (H_0) of stationarity cannot be rejected. These results consistently suggest that LNTR is stationary at the level, meaning that it does not require differencing to achieve stationarity and is therefore an integrated series of order zero, denoted as I(0).

Overall, the results indicate that the model includes variables with mixed orders of integration, specifically I(0) and I(1). This provides a suitable basis for applying the ARDL Bounds Test to examine the cointegration relationship in the model [20].

5. EMPIRICAL RESULTS

5.1. ARDL MODEL AND BOUNDS TEST FOR COINTEGRATION

5.1.1 ARDL model estimation results

According to the Akaike Information Criterion (AIC), the ARDL (1,1) model was selected, with one lag for the LNGRDP variable and one lag for the LNTR variable. The conditional error-correction form of the ARDL (1,1) model is specified, where D(LNGRDP) serves as the dependent variable, D_{COVID} is included as an exogenous variable, and a linear trend (@TREND) is incorporated. The estimation results are presented in Table 3.

Table 3. ARDL Estimation Results

Variable	Coefficient	t-Statistic	p-value
LNGRDP (-1)	0.8897	11.5846	0.0000
LNTR	0.0502	1.080	0.2913
LNTR (-1)	-0.0426	-1.440	0.1633
D_{COVID}	-0.0863	-0.967	0.3437
Constant (C)	1.7475	1.462	0.1573
@TREND	0.0057	0.747	0.4627

$R^2 = 0.9976$; Adjusted $R^2 = 0.9971$; F-statistic = 1918.039 ($p = 0.000$); Durbin-Watson = 1.682. Note: LNGRDP (-1) and LNTR (-1) denote long-term coefficients; D(LNTR) reflects short-term dynamics; D_{COVID} is an exogenous variable. Source: Author's calculations using EViews 10.

The estimation results of Table 3 indicate that the coefficient of lagged LNGRDP (-1) is 0.889 ($p < 0.001$), demonstrating a strong and statistically significant effect of past GRDP on current GRDP, reflecting the high persistence of the series. In

contrast, the coefficient of lagged LNTR (-1) is -0.042 ($p = 0.163$), which is not statistically significant, suggesting that the long-run relationship between tourism revenue and GRDP during the study period is not evident. The short-run coefficient of $D(LNTR)$ is positive (0.050) but also statistically insignificant ($p = 0.291$), indicating that tourism revenue did not exert an immediate effect on GRDP growth. The coefficient of D_{COVID} is negative (-0.086) as expected; however, it is not statistically significant ($p = 0.344$), implying that the impact of the pandemic was not fully captured by the ARDL model.

Overall, the model exhibits a very high R^2 (0.9976) and adjusted R^2 (0.9971), primarily due to the strong persistence of the GRDP series, as reflected by the lagged coefficient of LNGRDP. This coefficient largely explains the variation of current GRDP based on past values, which may reduce the apparent significance of other variables. The F-statistic (1918.039, $p < 0.001$) confirms that the model is statistically significant overall.

In summary, the ARDL (1,1) estimation results indicate that, during the study period, both the short-run and long-run effects of tourism revenue on GRDP growth were not statistically significant. Furthermore, the effect of the COVID dummy variable was also not statistically significant in the ARDL model.

5.1.2 ARDL bounds test for long-run cointegration

Following the determination of the variables' integration orders, the bounds testing approach of Pesaran et al. [20] was employed to examine the existence of a long-run equilibrium relationship. The study utilized the ARDL (1,1) model estimated in the preceding section.

The Bounds Test is used to examine whether a long-term relationship exists between the variables. In this test, the null hypothesis (H_0) states that no long-run relationship exists, whereas the alternative hypothesis (H_1) posits the presence of a long-term relationship. Theoretically, if the F-statistic or the t-statistic exceeds the critical value, H_0 is rejected, indicating that the variables are cointegrated. Conversely, if the statistic is below the critical value, H_0 is not rejected, meaning there is no evidence of a long-term relationship.

Table 4. Results of the Bounds Test (ARDL model)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	1.030923	Asymptotic: n=1000		
		10%	5.59	6.26
k	1	5%	6.56	7.3
		2.50%	7.46	8.27
		1%	8.74	9.63
Actual Sample Size	29	Finite Sample: n=35		
		10%	5.95	6.68
		5%	7.21	8.055
		1%	10.365	11.295
		Finite Sample: n=30		
		10%	6.01	6.78
		5%	7.36	8.265
		1%	10.605	11.65
t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-1.435615	10%	-3.13	-3.4
		5%	-3.41	-3.69
		2.50%	-3.65	-3.96
		1%	-3.96	-4.26

Note: Critical values are based on a finite sample table with $n = 30$ [20]. F-statistic = 1.031; t-statistic = -1.436. Source: Author's calculations using EViews 10.

The results in Table 4 indicate that the F-statistic of 1.031 is far below the 5% critical value of 7.36 for I(0) and also does not exceed the I(1) critical value of 8.265. Similarly, the t-statistic of -1.436 does not exceed the critical values of -3.41 for I(0) and -3.69 for I(1). Therefore, both tests fail to reject the null hypothesis (H_0), suggesting that there is no evidence of a long-run relationship between LNGRDP and LNTR during 1994-2023.

This finding aligns with several studies in Southeast Asia, indicating that cointegration between tourism and economic growth does not always exist, particularly in local economies that are highly dependent on external factors [13, 37].

Due to the lack of cointegration, the VECM model is not suitable. Therefore, the study proceeds with a differenced VAR model to analyze short-run dynamic relationships and conduct Granger causality tests, following standard econometric procedures [45, 48].

5.2. VAR MODEL ESTIMATION RESULTS

The VAR model was estimated with D(LNGRDP) and D(LNTR) as endogenous variables, while D_{COVID} was included as an exogenous variable. Although LNGRDP is I(1) and LNTR is I(0), both variables were first-differenced to ensure symmetry and consistency in the dynamic analysis framework, following standard practice when no cointegration is found [48]. The optimal lag length was determined to be 2 according to the Akaike Information Criterion (AIC), balancing model simplicity and fit given the available sample ($T = 30$). After accounting for observations lost due to lagging, the actual estimation sample covers the years 1997 to 2023, with 27 observations.

Table 5. VAR Model Estimation

Explanatory Variable	D(LNGRDP) Coefficient [t-stat]	D(LNTR) Coefficient [t-stat]	Notes
D(LNGRDP (-1))	0.174 [0.82]	-0.472 [-0.46]	Not statistically significant
D(LNGRDP (-2))	-0.204 [-1.03]	-4.218 [-4.41] ***	Statistically significant in D(LNTR)
D(LNTR (-1))	-0.042 [-1.63]	-0.282 [-2.24] **	Statistically significant in D(LNTR)
D(LNTR (-2))	-0.016 [-0.655]	-0.143 [-1.189]	Not statistically significant
D_{COVID}	-0.188 [-5.72] ***	-1.712 [-10.79] ***	Statistically significant
Constant (C)	0.096 [5.59] ***	0.696 [8.40] ***	Statistically significant
R^2	0.67	0.90	-

Note: Values in brackets are t-statistics. *** and ** indicate significance at 1% and 5% levels, respectively. D_{COVID} is an exogenous variable. Source: Author's calculations using EViews 10.

Several notable findings emerge from the VAR model estimation results presented in Table 5, and these findings are discussed in detail below.

In the D(LNGRDP) equation, the lagged variables of tourism revenue, D(LNTR (-1)) and D(LNTR (-2)), are not statistically significant, with coefficients of -0.042 ($t = -1.63$) and -0.016 ($t = -0.655$), respectively. The t-values of both variables are smaller than the conventional critical value of approximately ± 1.96 at the 5% significance level; therefore, the null hypothesis (H_0) that the coefficients are zero cannot be rejected. This suggests that in the short term, tourism revenue does not provide additional predictive power for GRDP growth, indicating that GRDP is more strongly influenced by other economic factors such as consumption, public investment, or industrial production.

In the D(LNTR) equation, D(LNGRDP (-2)) has a substantial negative coefficient of -4.218, which is highly statistically significant ($t = -4.41$; $p < 0.01$). This indicates that economic growth two years earlier is associated with a decline in current tourism revenue growth, reflecting a possible resource-reallocation mechanism when the economy expands strongly. As other sectors develop, investment and resources may temporarily shift away from tourism activities. Consequently, tourism revenue growth slows down. This effect aligns with observations on structural economic adjustment reported by Tegegne et al. [32]. Meanwhile, D(LNGRDP (-1)) has a coefficient of -0.472 but is not statistically significant ($t = -0.46$), suggesting that economic growth one year earlier does not significantly affect current tourism revenue.

Regarding the lagged variables of tourism revenue in the D(LNTR) equation, D(LNTR (-1)) has a coefficient of -0.282 ($t = -2.24$), which is statistically significant at the 5% level, indicating a moderate negative effect from tourism revenue one year prior on current growth. In contrast, D(LNTR (-2)) has a coefficient of -0.143 ($t = -1.189$), which is not statistically significant, implying that the impact of tourism revenue two years earlier on current growth is weak and negligible. This indicates that the spillover effect of past tourism revenue is short-lived and has almost no direct impact on current tourism revenue growth.

The exogenous variable D_{COVID} has a clear and strong impact on both equations. In the D(LNGRDP) equation, the coefficient is -0.188 ($t = -5.72$; $p < 0.001$), while in the D(LNTR) equation it is -1.712 ($t = -10.79$; $p < 0.001$). This confirms that the COVID-19 pandemic caused a substantial shock to the economy, with a much stronger effect on the tourism sector, consistent with reports of a near-total collapse of international tourist arrivals and paralysis of the hotel industry [38].

The R^2 in the D(LNTR) equation is 0.90, indicating that the model explains 90% of the variation in tourism revenue growth, whereas the R^2 in the D(LNGRDP) equation is 0.67, which is considered acceptable for a short-term annual time series. Overall, these estimates highlight the strong impact of the COVID-19 shock and indicate that the short-term effect of tourism revenue on GRDP growth is limited.

5.3. MODEL STABILITY AND RESIDUAL DIAGNOSTICS

5.3.1 Testing the stability of the VAR model

Before conducting further analyses such as the Granger causality test, the impulse response function (IRF), or the forecast error variance decomposition (FEVD), it is important to ensure that the VAR model is stable. If the model is not stable, shocks to the system may increase over time, which could make the results of subsequent analyses unreliable.

The stability of a VAR model can be tested by examining its inverse roots. According to Verbeek [49], a VAR model

is considered stable when all inverse roots lie within the unit circle.

In this model with two endogenous variables, there are four inverse roots. Figure 1 shows that all roots are inside the unit circle. This indicates that the VAR model is stable. In other words, any shock applied to the system will gradually decline over time.

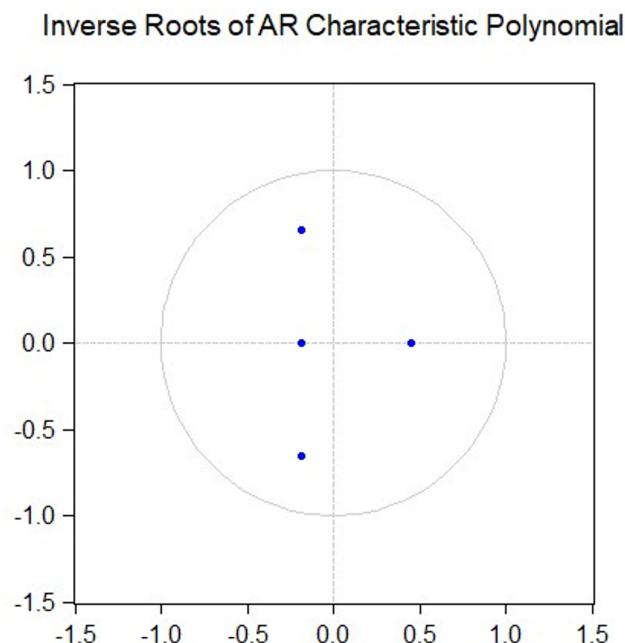


Figure 1. Inverse roots of the VAR model. Source: Author's calculations using EViews 10

Ensuring the stability of the model allows us to conduct further analyses with confidence that the results will be reliable.

5.3.2 Testing for autocorrelation of residuals in the VAR model

To assess whether autocorrelation exists in the residuals of the VAR model equations, the Lagrange Multiplier (LM) test was applied. The null hypothesis (H_0) states that there is no autocorrelation in the residuals at a given lag h , while the alternative hypothesis (H_1) states that autocorrelation is present. Failure to reject H_0 is the desired outcome, as it indicates that the model has adequately captured the dynamics of the data.

The main statistics reported include the LRE* statistic, which is a multivariate LM statistic with Edgeworth correction, and the Rao F-statistic, an equivalent F-statistic. The p-value represents the probability of rejecting H_0 ; when the p-value is greater than 0.05, there is insufficient evidence to conclude that autocorrelation exists.

Table 6. Residual correlation test results. Source: Author's calculations using EViews 10

VAR Residual Serial Correlation LM Tests						
Sample: 1994 2023						
Included observations: 27						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	4.358107	4	0.3597	1.125037	(4, 36.0)	0.36
2	5.053119	4	0.2819	1.317024	(4, 36.0)	0.2822
Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	4.358107	4	0.3597	1.125037	(4, 36.0)	0.36
2	7.376051	8	0.4967	0.938387	(8, 32.0)	0.4994

*Edgeworth expansion corrected likelihood ratio statistic.

The test results in Table 6 show that, for each individual lag (lag 1 and lag 2), the p-values range from 0.28 to 0.36. When testing jointly for lags 1 and 2, the p-value is approximately 0.50. All these values exceed the 5% significance level, indicating no evidence of residual autocorrelation. Therefore, selecting lag order $p=2$ for the VAR model is appropriate,

ensuring that the residuals adequately reflect the dynamic relationships in the data.

Combined with the stability test in Section 5.3.1, these results suggest that the VAR model provides a reliable foundation for subsequent subsequent causality and dynamic analyses.

5.4. RESULTS OF THE GRANGER CAUSALITY TEST

The Granger causality test within the VAR framework was conducted to determine the direction of the relationship between tourism revenue and economic growth in Khanh Hoa over the period 1994–2023. The test employs the Wald (chi-square) statistic with two lags ($p = 2$). In principle, the null hypothesis (H_0) states that the coefficients of the lagged explanatory variables are jointly equal to zero; if H_0 is rejected, a Granger causality relationship is inferred. The test results are presented in Table 7.

First, consider the effect of tourism on economic growth. The hypotheses are formulated as follows:

H_0 : D(LNTR) does not Granger-cause D(LNGRDP).

H_1 : D(LNTR) Granger-causes D(LNGRDP).

According to Table 7, when D(LNGRDP) is the dependent variable and D(LNTR) is the excluded variable, the Wald statistic is $\chi^2 = 3.5021$ with 2 degrees of freedom, corresponding to a p-value of 0.1736. At the 5% significance level, H_0 is rejected if the p-value is less than 0.05. Since 0.1736 exceeds 0.05, there is insufficient statistical evidence to reject the null hypothesis (H_0). This implies that the coefficients of D(LNTR (-1)) and D(LNTR (-2)) are not jointly statistically significant in the economic growth equation. In other words, once the lagged values of GRDP are included in the model, past tourism revenue does not provide additional explanatory or predictive power for economic growth. Therefore, the empirical evidence does not support the tourism-led growth hypothesis (TLGH) during the study period.

Table 7. Results of the Granger Causality Test in the VAR Model ($p = 2$)

Dependent Variable	Excluded Variable	Chi-square (Wald)	df	Prob.
D(LNGRDP)	D(LNTR)	3.5021	2	0.1736
D(LNTR)	D(LNGRDP)	22.5147	2	0.0000***

Note: H_0 : The excluded variable does not Granger-cause the dependent variable. *** Statistically significant at the 1% level. Source: Author's calculations using EViews 10.

Conversely, when examining the effect of economic growth on tourism, the hypotheses are stated as follows:

H_0 : D(LNGRDP) does not Granger-cause D(LNTR).

H_1 : D(LNGRDP) Granger-causes D(LNTR).

In this case, the Wald statistic is $\chi^2 = 22.5147$ with 2 degrees of freedom and a p-value of 0.0000. Since this value is below the 1% significance level, the null hypothesis (H_0) is strongly rejected. The result indicates that the coefficients of D(LNGRDP (-1)) and D(LNGRDP (-2)) are jointly statistically significant. Therefore, past economic growth contains substantial predictive information for current tourism revenue.

A direct comparison of the two chi-square statistics (22.5147 versus 3.5021) reveals a clear asymmetry in the relationship between tourism revenue and economic growth. The evidence confirms the existence of a unidirectional Granger causality running from economic growth to tourism revenue, whereas the reverse direction is not statistically supported.

In summary, the quantitative evidence reported in Table 5 indicates that, in the context of Khanh Hoa province during 1994–2023, economic growth played a leading role in stimulating tourism development. Conversely, tourism does not appear to have generated a sufficiently strong spillover effect to produce a statistically significant feedback effect on overall economic growth. These findings suggest that the relationship between the two variables during the study period was unidirectional, with economic growth acting as the driving force.

5.5. IMPULSE RESPONSE FUNCTION ANALYSIS

Figure 2 presents the Impulse Response Functions (IRFs) estimated from the VAR model, illustrating the dynamic responses of economic growth (D(LNGRDP)) and tourism revenue (D(LNTR)) over 10 periods following a one-standard-deviation shock. In each panel, the solid line represents the estimated impulse response, while the two dashed lines denote the ± 2 standard error confidence bands, corresponding approximately to a 95% confidence level. A response is considered statistically significant when the confidence bands do not encompass the zero line.

First, when GRDP growth is subjected to its own shock, the initial response is positive and relatively large in the first year. However, the effect diminishes rapidly in subsequent periods and converges toward equilibrium after approximately 3–4 years. This pattern reflects the short-run inertia of economic growth, where internal shocks generate immediate but transitory effects.

Second, when GRDP growth responds to a shock from tourism revenue, the estimated response is very small and fluctuates around zero throughout the observation horizon. The confidence bands consistently include the zero line,

indicating that the response is not statistically significant at any period. This finding suggests that shocks originating from the tourism sector do not generate meaningful spillover effects on economic growth in Khanh Hoa province during the study period.

Third, the response of tourism revenue to shocks from GRDP growth exhibits a clear short-run adjustment. The initial response is negative, reaching its lowest point around the second to third year. During the early periods, the confidence bands exclude the zero line, indicating that this negative effect is statistically significant. Thereafter, the magnitude of the response gradually declines and converges toward equilibrium after approximately 5–6 years. This pattern suggests that economic growth exerts a significant short-run influence on fluctuations in tourism revenue, although the effect does not persist in the long run.

Fourth, when tourism revenue is subjected to its own shock, the initial response is positive and relatively large, followed by a rapid adjustment and subsequent convergence. This behavior reflects the high sensitivity and short-term adjustment dynamics of the tourism sector in response to internal disturbances.

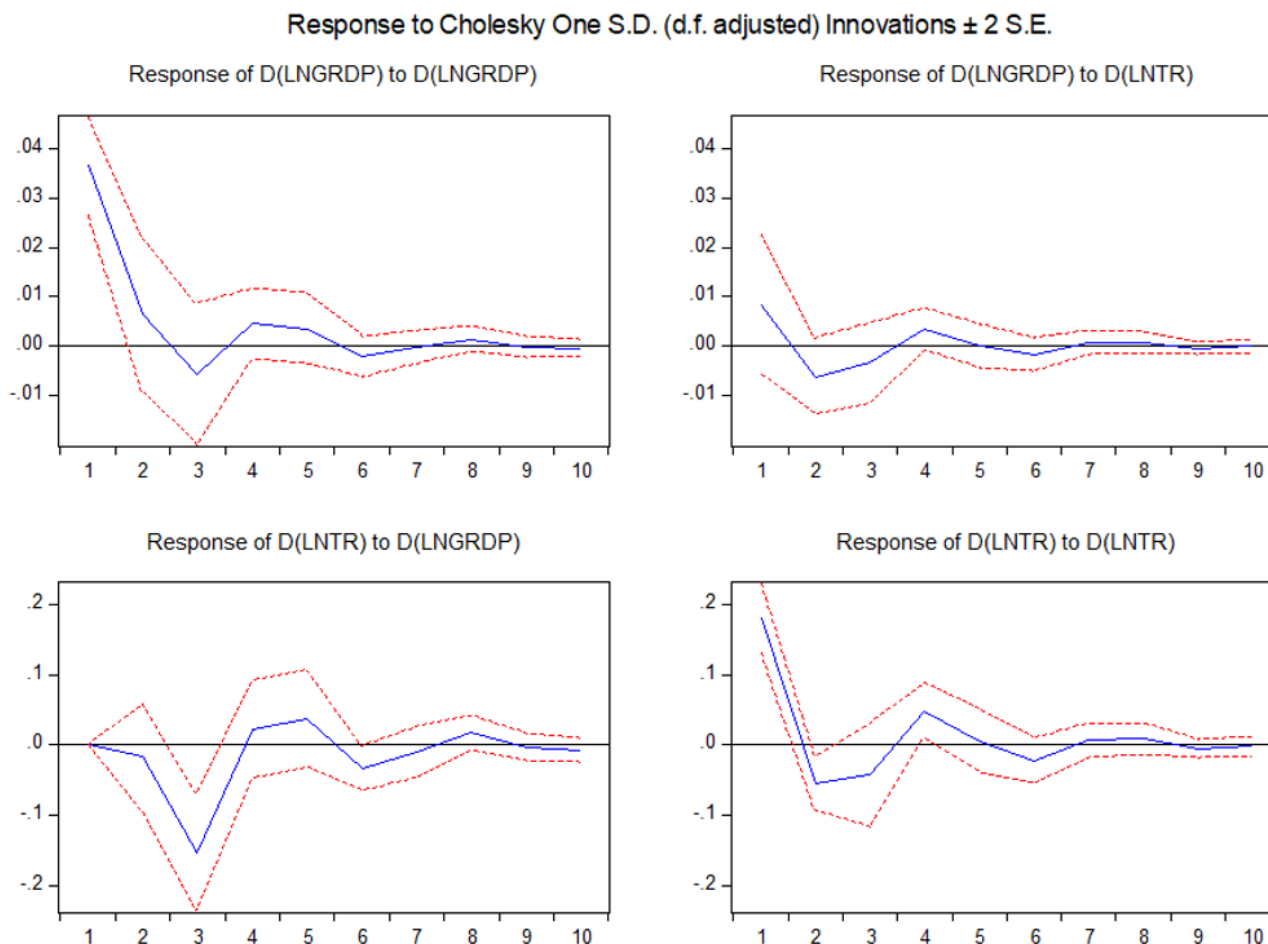


Figure 2. Impulse Response Functions between $D(LNGRDP)$ and $D(LNTR)$. Source: Author's calculations using EViews 10.

In sum, the impulse responses reported in Figure 2 reveal an asymmetric dynamic relationship between tourism revenue and economic growth. Shocks from tourism do not produce statistically significant effects on economic growth, whereas shocks from economic growth induce significant short-run fluctuations in tourism revenue. These findings are consistent with the earlier Granger causality results and reinforce the conclusion that, over the period 1994–2023, economic growth played a leading role in shaping tourism development in Khanh Hoa province rather than the reverse.

5.6. FORECAST ERROR VARIANCE DECOMPOSITION (FEVD) ANALYSIS

Forecast Error Variance Decomposition (FEVD) measures the extent to which the variability of each variable in the VAR model is attributable to its own shocks and to shocks originating from the other variable. In essence, this method helps identify which variable plays a more influential role in generating observed economic fluctuations. Rather than focusing on a single period, the results are examined in the short, medium, and long run to illustrate how the interaction between

economic growth and tourism revenue evolves, thereby providing a clearer understanding of the dynamic relationship between the two variables.

5.6.1 Variance decomposition of economic growth (D(LNGRDP))

From Table 8, it can be observed that in the short term (period 1), almost all fluctuations in GRDP growth, accounting for 95.02%, are explained by its own shocks, while tourism shocks contribute only 4.98%. This result indicates that short-term economic growth is largely driven by internal factors, with tourism playing a relatively limited role.

Table 8. Forecast Error Variance Decomposition of D(LNGRDP). (Unit: %). Source: Author's calculations using EViews 10

Period	Due to D(LNGRDP)	Due to D(LNTR)
1	95.02	4.98
2	92.67	7.33
5	91.60	8.40
10	91.42	8.58

In the medium term, the contribution of tourism increases but remains modest. Specifically, tourism accounts for 7.33% in period 2 and approximately 8.40% in period 5. In the long term (period 10), this share rises slightly to 8.58%. This suggests that even after a prolonged period, more than 91% of the fluctuations in economic growth continue to stem from its own internal shocks.

Taken together, these findings imply that although a spillover effect from tourism to economic growth exists, its magnitude remains limited. Tourism does not appear to be the primary driver of economic growth in Khanh Hoa province during the study period.

5.6.2 Variance decomposition of economic growth (D(LNTR))

The results in Table 9 show that tourism revenue fluctuations differ from those of economic growth. In the short term (periods 1 and 2), most tourism revenue fluctuations stem from its own shocks, accounting for 100% in period 1 and 99.18% in period 2. This indicates that, in the initial stage, tourism revenue is primarily driven by internal industry factors and is not significantly influenced by economic growth.

Table 9. Forecast Error Variance Decomposition of D(LNTR). (Unit: %). Source: Author's calculations using EViews 10.

Period	Due to D(LNGRDP)	Due to D(LNTR)
1	0.00	100.00
2	0.82	99.18
5	38.32	61.18
10	39.89	60.11

However, from the medium term onward, the role of economic growth becomes more evident. In period 5, approximately 38.82% of tourism revenue fluctuations are explained by shocks to GRDP growth. By period 10, this share increases slightly to 39.89%. This suggests that in the long term, nearly two-fifths of tourism revenue fluctuations are associated with changes in the broader economy rather than solely with internal industry dynamics.

In short, comparing the two directions of impact reveals a clear difference. In the long term, tourism shocks explain only about 8.6% of economic growth fluctuations, whereas economic growth shocks account for nearly 40% of tourism revenue fluctuations. This indicates that economic growth exerts a stronger influence on tourism than tourism does on economic growth. In other words, the tourism sector is substantially affected by changes in the overall economy, while its contribution to economic growth remains relatively limited during the period 1994–2023.

6. DISCUSSION AND CONCLUSION

6.1. DISCUSSION OF KEY FINDINGS

The empirical results of this study present a clear and consistent picture: in Khanh Hoa province during the period 1994–2023, economic growth played a dominant role in tourism development, rather than the reverse direction. This conclusion is not based on a single test but is supported by four mutually reinforcing pieces of evidence, including the bounds test, the Granger causality test, the impulse response function (IRF), and variance decomposition (FEVD).

The lack of evidence supporting the tourism-led growth hypothesis (TLGH) may be surprising, as Khanh Hoa has long been considered one of Vietnam's leading tourism destinations. However, this can be explained by the province's economic structure. Although tourism contributes significantly to employment and revenue, Khanh Hoa's GRDP is also driven by other sectors such as industrial production and public services. Therefore, the spillover effects of tourism may

not be strong enough to generate a significant impact on overall economic output, particularly in the short and medium term given the 30-year sample period. This finding is consistent with Karimi et al. [14], who show that in Singapore, tourism is well developed but does not Granger-cause overall economic growth.

Conversely, the results support the hypothesis that tourism development is driven by economic growth. As the economy expands, favorable conditions for tourism emerge: infrastructure is upgraded, household incomes rise, which in turn boosts tourism demand, air connectivity improves, and the institutional environment becomes more supportive. Variance decomposition results show that, in the long run, approximately 40% of the variation in tourism revenue can be explained by shocks to economic growth. This provides strong quantitative evidence of the fundamental role of economic growth in supporting the tourism sector.

Furthermore, the results related to the COVID-19 dummy variable reveal varying levels of vulnerability across sectors. During the 2020-2021 period, tourism revenue declined sharply, with a magnitude equivalent to approximately 171% on a log scale (see Table 5), while GRDP declined by about 19% on a log scale (see Table 5). It should be noted that these figures are derived from coefficients in a log-difference model and therefore reflect relative changes rather than absolute percentage declines. The substantial gap between the two indicators suggests that the tourism sector is more vulnerable than the overall economy to external shocks. This finding underscores the importance of economic diversification in mitigating risks associated with unexpected events.

6.2. CONCLUSIONS

This study investigates the relationship between tourism and economic growth in Khanh Hoa province over the period 1994–2023, employing the ARDL bounds testing approach and a Vector Autoregression (VAR) model, with COVID-19 as a dummy variable. Two principal conclusions are drawn.

First, empirical evidence rejects the existence of a long-term relationship between tourism and economic growth. The ARDL bounds test indicates no cointegration between tourism revenue and GRDP ($F = 1.031$; $t = -1.436$), as both statistics fall below the lower critical bound at all significance levels. The Granger causality test confirms a strong unidirectional relationship running from economic growth to tourism ($\chi^2 = 22.514$; $p < 0.001$), while no reverse causality is detected ($\chi^2 = 3.502$; $p = 0.174$). The FEVD results further reinforce this asymmetry: economic growth explains approximately 40% of the variation in tourism revenue over a 10-year horizon, whereas tourism accounts for only about 8.6% of the variation in GRDP over the same period. The IRF analysis shows that shocks to economic growth generate statistically significant short-term responses in tourism revenue, whereas shocks to tourism do not produce statistically significant effects on economic growth.

Second, COVID-19 caused a disproportionately large negative shock to tourism (-171.2% in annual log growth over 2020-2021) compared to GRDP (-18.8%), highlighting the structural vulnerability of a coastal economy heavily dependent on international tourism.

6.3. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study uses total provincial tourism revenue as a proxy for tourism activity. While this approach is consistent with data constraints and the methodological requirements of the ARDL bounds testing approach and VAR modeling over a 30-year period, it does not permit identification of specific transmission channels between economic growth and tourism.

Based on the current findings, two directions for future research are proposed: (i) extending the analysis to panel data for the Central Coast provinces of Vietnam to examine whether the tourism-led or economy-driven growth hypothesis is a regional characteristic or specific to Khanh Hoa; and (ii) incorporating intermediate variables such as public investment in infrastructure, tourism-related human capital, and air connectivity into a multivariate ARDL or structural VAR framework to better identify the transmission mechanisms linking economic growth and tourism development in coastal transition economies.

AUTHORS CONTRIBUTION

Both authors contributed equally to this research. Both authors read, critically reviewed, and approved the final version of this paper.

CONFLICTS OF INTERESTS

The authors reported no potential conflicts of interest related to this research.

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DATA

The data are available from the corresponding author upon reasonable request.

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