
Tourism and Economic Growth: An Empirical Analysis of Greece

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Abstract:

Purpose: The purpose of the study is to examine the impact of tourism on economic growth in Greece. This examination aims to test the validity of the tourism-led growth hypothesis.

Design/Methodology/Approach: The study utilizes time series regression analysis. Gross Domestic Product (GDP) is used as the dependent variable, while the real exchange rate (EX), Foreign Direct Investment (FDI), and Tourism Receipts (TR) are used as independent variables. The time series data cover the period from 1995 to 2018 for Greece.

Findings: The findings indicate a positive relationship between tourism and economic growth. Specifically, a 1% increase in the real exchange rate corresponds to a 0.78% rise in GDP. Regarding FDI, a 1% increase leads to a 0.003% decrease in GDP. Concerning Tourism Receipts, a 1% increase leads to a 0.036% increase in GDP. These results confirm that tourism significantly contributes to Greece's economic growth, thereby validating the tourism-led growth hypothesis.

Practical Implications: The study suggests that policymakers should emphasize policies that encourage investment in the tourism sector, as this would benefit Greece's economic growth.

Originality/Value: The study contributes to existing literature by examining the impact of tourism on economic growth specifically for Greece during the period from 1995 to 2018. It provides insights that can guide policymakers in supporting the tourism sector as a driver of economic growth.

Keywords: Tourism-led, growth hypothesis, tourism economics, time series regression, economic growth, Greek tourism.

JEL codes: C22, F43, F63, O11, Z32, Z38.

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1. Introduction

Tourism, as a sector of an economy, can be crucial and determinant for the magnitude of economic growth in a country, especially for those heavily dependent on it. Greece serves as a prime example, with its economy relying to a large extent on tourism. This assertion is supported by data from the Greek Tourism Confederation (SETE), indicating that the tourism sector contributed directly and indirectly to Greek domestic product by 30.9% in 2018.

Direct impact refers to the expenditure of tourists, such as purchasing items from restaurants, while indirect impact involves firms purchasing inputs from other firms to meet the demands of tourists. This interplay significantly influences the trajectory of the Greek economy.

Various indicators underscore Greece's heavy reliance on tourism. According to the World Tourism Organization, Greece recorded 30 million tourist arrivals in 2018, ranking it 8th among European countries. Additionally, tourism receipts, defined as the income derived from inbound tourists and spent within the country, further highlight tourism's significance.

In 2018, Greece ranked 8th globally in tourism receipts, amounting to an estimated \$19 billion USD (United Nations World Tourism Organization 2019). In light of these statistics, tourism emerges as a pivotal sector shaping the Greek economy.

Given the relevance of tourism to Greece, exploring its potential positive impact on the Greek economy presents an intriguing topic. Moreover, focusing on Greece adds significance to the inquiry, given the country's enduring economic challenges over the past decade, marked by the onset of the Greek economic crisis. Despite implementing three economic recovery programs and the conclusion of the debt crisis two years ago, Greece has yet to fully rebound, experiencing persistently low economic growth.

Thus, the Greek case warrants attention both for its interest and importance. This prompts the formulation of a research question:

RQ1: Does tourism significantly contribute to economic growth in Greece, and if so, how can this impact be quantified?

This question gains importance as it aligns with the imperative for Greece to bolster its economic recovery. If this study can demonstrate tourism's substantial role in driving Greek economic growth, it underscores the need for prioritizing and promoting the tourism sector to expedite GDP growth.

This research question draws upon the tourism-led growth hypothesis (ELGH), which will be further explored in the theoretical framework. Additionally, the validity of this hypothesis will be scrutinized in the study.

To properly answer this research question and quantify the impact of tourism, the method of multiple linear regression will be employed. This method entails constructing a model with Gross Domestic Product (GDP) as the dependent variable and several other variables as independent variables. The specific model utilized will be sourced from a credible academic reference. Through this approach, the results obtained will shed light on the extent to which tourism influences economic growth.

Quantifying the impact of tourism is a complex endeavor, but previous academic research has attempted to tackle this challenge. The data necessary for this study will be gathered from reputable sources such as the World Bank, the Greek Tourism Confederation, and the World Tourism Organization.

2. Literature Review

There are several studies that examined this topic and are analyzed in this analysis. These studies predominantly concluded that tourism can positively affect economic growth.

Tu and Zhang (2020) attempted to find the impact of tourism on economic growth in Chinese ethnic minority areas. In their sample, they used panel data derived from 75 Chinese autonomous counties. The data they gathered were from 2007 to 2016. The statistical method they used in their research was the threshold model. According to their results, the impact of tourism on economic growth is significant but nonlinear for Chinese ethnic minority areas.

Cannonier and Burke (2019) studied tourism's impact on economic growth in 15 Caribbean countries from 1980 to 2015, using RGDP per capita as the dependent variable. They included variables like tourist receipts and arrivals per capita. Their model, estimated using IV regression and GMM, showed varied results: in Haiti, a 10% rise in tourism receipts led to a 4% RGDP increase, while in Bermuda, it led to a 0.4% increase. Inflation and government consumption negatively impacted growth, while investment was crucial. OLS coefficients, though slightly lower, confirmed tourism's significant contribution to economic growth.

Dogan and Zhang (2023) investigated the relationship between tourism and economic growth in the countries that belong to the Schengen area. Their data were from the period of 1995 to 2019. To examine this topic, they utilized a non-parametric panel data model. Their findings showed that the relationship between tourism and economic growth is non-linear and varied over time. Moreover, they found this relationship to be positive during the period from 1995 to 2003.

However, the relationship was found to be negative for the periods from 2007 to 2008 and from 2012 to 2013.

Fauzel *et al.* (2017) studied the impact of foreign direct investments (FDI) in tourism on economic growth in Mauritius from 1984 to 2014 using a vector error correction model. Their model included real GDP (Y) as the dependent variable and human capital (HC), economic freedom (EF), tourism FDI (FDIT), non-tourism FDI (FDINT), and tourism receipts (TOUR) as independent variables. The results indicated that tourism FDI significantly contributes to economic growth both in the short and long run. Additionally, they found bi-causality and feedback effects within the FDI tourism-economic growth model, supporting the tourism-led growth hypothesis.

Selimi *et al.* (2017) measured tourism's impact on economic growth in the Western Balkans (Albania, Croatia, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia) using panel data from 1998 to 2014 and panel regression analysis. They examined fixed effects and individual heterogeneity across countries. Their model used real income per capita as the dependent variable, with lagged income, tourist arrivals, tourism receipts, government expenditures, FDI stock, and exports as independent variables.

The results showed a positive, significant relationship between tourism and economic growth. For example, a 1% increase in tourist arrivals could boost economic growth by 0.08%, highlighting tourism's importance.

Schubert *et al.* (2011) analyzed something different compared to previous approaches. Instead of examining the impact of tourism on economic growth, they focused on the impact of an increase in the growth rate of tourism demand on economic growth. Their analysis demonstrated that when the growth rate of tourism demand rises, economic growth can gradually increase. This analysis was applied to the case of Antigua and Barbuda from 1970 to 2008 using cointegration analysis methodology.

Another study by Habibi, Rahmati, and Karimi (2018) examined how tourism impacts economic growth. Their sample included the provinces of Iran using data from 2005 to 2014. Their methodology included the Growth Decomposition Method (GDM). The results indicated that tourism can have a positive influence on economic growth. This was evident in all the provinces of Iran included in the sample.

Eleftheriou and Sambracos (2019) investigated the relationship between tourism development and economic growth at a regional level in Greece. They used data from 49 counties in Greece from 2010 to 2014. To examine this relationship, they employed the method of spatial panel econometrics. According to their research, the

relationship is positive, as they found positive spillover effects for both the short run and the long run in the counties of Greece.

Ribeiro and Wang (2019) investigated tourism's impact on economic growth in Sao Tome and Principe from 1997 to 2018. Their model used GDP as the dependent variable and tourism receipts (TR), foreign direct investment (FDI), and real exchange rate (EX) as independent variables. They employed Unit Root, Johansen Cointegration, and Granger Causality tests. The results showed a unidirectional relationship between TR and GDP, and between FDI and the other variables. This indicates that changes in FDI can affect GDP, tourism, and the exchange rate, highlighting FDI's significant role in the economy.

Moreover, another investigation by De Siano and Canale (2022) also explored the impact of tourism on economic growth. Their sample included Italian provinces for the period from 2005 to 2018. For the methodology utilized, they used spatial analysis. Their results showed that tourism plays a positive role in economic growth.

However, the relationship was found to be nonlinear, indicating that there can be some negative effects, such as overcrowding. This can worsen the living conditions of the local people and hurt the local economy in certain cases. Thus, a balance should be found to ensure that tourism achieves optimum results with minimal problems.

Liu *et al.* (2018) examined the impact of tourism on economic growth through the approach of dynamic stochastic general equilibrium. Their analysis concerned the case of Mauritius for the years 1999 to 2014. Their model attempts to examine the impact of tourism on economic growth by simulating an economy experiencing a productivity shock in the tourism sector. It included several macroeconomic variables such as income and exchange rate. The results of the simulation model showed that a 1% increase in tourism productivity would lead to a 0.09% increase in Gross Domestic Product.

Adamopoulos and Thalassinou (2020) conducted another study that investigated the relationship between tourism development and economic growth. They focused on a sample consisting of Canada, France, Germany, Italy, the United Kingdom, and the USA over the period from 1995 to 2017.

To analyze this relationship, they employed a structural equation model and applied the Monte Carlo simulation method. Their findings revealed that there is a positive relationship between tourism development and economic growth.

Ekeocha *et al.* (2021) examined the relationship between international tourism and economic growth. Their sample included countries from the continent of Africa, specifically 41 African countries. The data derived from 2009 until 2018. It was utilized the technique of GMM and panel Granger causality.

They found that tourism in Africa is insignificant as a way for economic growth. They suggest that policy makers should implement policies that will manage to make the country enjoy the benefits of tourism.

A different study by Dogru and Bulut (2018) used a sample that included Croatia, Greece, France, Italy, Slovenia, Spain, and Turkey. Their data covered the period from 1996 to 2014. In their methodology, they used a panel causality test. The results showed that there is a bidirectional causality between the growth of tourism receipts and economic growth, indicating an interdependence between these two factors.

Li, Jin, and Shi (2018) used a different approach to find the relationship between tourism and economic growth compared to other studies. They conducted a critical review. To do this, they utilized 346 papers taken from 11 journals related to the tourism sector. The majority of the studies confirmed the positive impact of tourism on economic growth, but not all of them.

They also found that through different channels such as earnings and government revenue, tourism can help reduce poverty. Additionally, the findings showed that the productivity and efficiency of tourism can be influenced by factors such as labor and capital.

Moreover, Kyara, Rahman, and Khanam (2021) attempted to find the relationship between tourism and economic growth for the country of Tanzania. They utilized time series data from 1989 to 2018. To examine this relationship, they used Granger causality tests, the Wald test, and the Impulse Response Function. The results indicated that there is a unidirectional causality where only tourism development causes economic growth and not vice versa. They suggest, as a policy implication, encouraging the tourism sector as a source of economic growth.

Scarlett (2021) examined the impact of tourism on economic growth using a sample of 46 countries from 1995 to 2018. The method utilized was GMM. The findings showed that tourism has a positive influence on economic growth. It should be noted that the researcher used both a linear model and a nonlinear model.

In the linear model, the positive influence of tourism is 50% higher when measured using tourism receipts compared to tourist arrivals. In the nonlinear model, extremely high levels of tourism specialization can reduce the positive effect of tourism on economic growth. Despite this, tourism receipts contribute positively to economic growth at all levels.

3. Research Methodology

This research investigates whether tourism has any impact on economic growth in Greece and whether the tourism-led growth hypothesis is valid. Therefore, the null

hypothesis posits that tourism has no impact on economic growth in Greece and that the tourism-led growth hypothesis is invalid. To assess the viability of rejecting the null hypothesis for both questions, a stationarity test and regression analysis will be employed.

The analysis will commence with a stationarity test. This test is essential as it determines whether the time series used are stationary or not (Cameron, 2005). Non-stationary time series can lead to spurious regressions, rendering the results of regression analysis invalid. Conversely, stationary time series can be reliably utilized in regression equations. The Augmented Dickey Fuller test (ADF) will be employed to ascertain the presence of stationarity in the time series.

Therefore, if the time series are found to be stationary, this will facilitate proceeding with the regression analysis. The regression analysis aims to quantify the data and estimate the model or equation.

Following the equation estimation, it will be determined how much an increase in one independent variable can influence the dependent variable while holding the other independent variables constant.

Regarding the time series in the sample, it will span from the years 1995 to 2018 and pertain to the case of Greece. The data are sourced from the World Bank.

The methodology is based on the research of Ribeiro and Wang (2019). This choice was made due to the similarity in the topics examined. Both studies analyze the validity of the tourism-led growth hypothesis and investigate whether tourism has any impact on economic growth.

As for the model, to mitigate the issue of non-stationary time series, all variables were transformed from their original form to natural logarithmic form. The Gross Domestic Product (GDP) serves as the dependent variable, while the independent variables include the real exchange rate (EX), foreign direct investment (FDI), and tourism receipts (TR).

4. Results

4.1 Time-Series Plot, Descriptive Statistics and Augmented Dickey Fuller Test (ADF)

In Figures 1, 2, 3 and 4, the time-series plot can be seen, and in Table 1, the descriptive statistics of all the variables included in the model are presented. The results of the Augmented Dickey-Fuller (ADF) test can indicate whether the time series are stationary or not. Based on Tables 2, 3, 4, and 5, the results indicate that almost all variables exhibit non-stationarity.

Specifically, for Gross Domestic Product (GDP), real exchange rate (EX), and tourism receipts (TR), there is no stationarity, as their p-values in the ADF test exceed 0.05. Only Foreign Direct Investment (FDI) shows statistical significance in the ADF test, indicating no unit root and stationary time series.

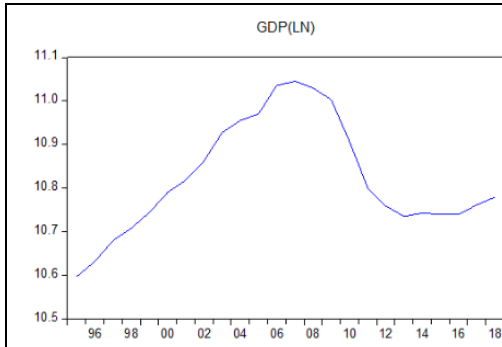


Figure 1. GDP Plot

Source: Own study.

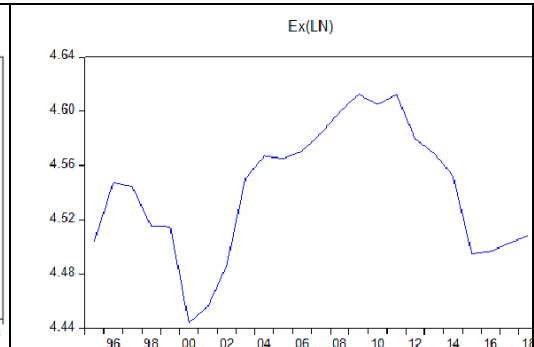


Figure 2. Real Exchange Rate Plot

Source: Own study.

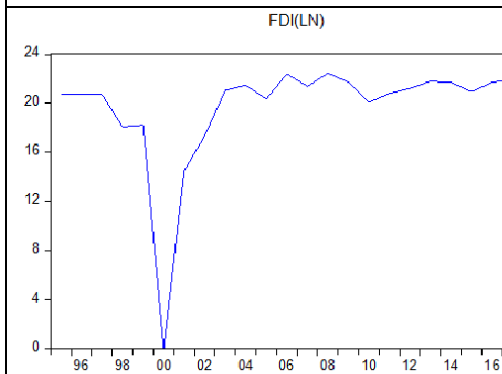


Figure 3. FDI Plot

Source: Own study.

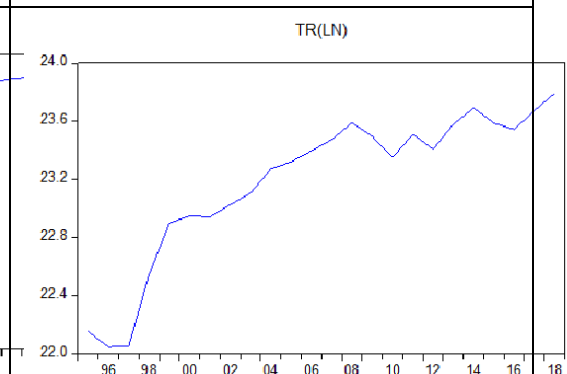


Figure 4. Tourism Receipts Plot

Source: Own study.

Table 1. Descriptive Statistics

	GDP_LN_	EX_LN_	FDI_LN_	TR_LN_
Mean	10.82374	4.541197	19.73990	23.18529
Median	10.78505	4.549207	21.01347	23.37480
Maximum	11.04525	4.612857	22.46958	23.79568
Minimum	10.59730	4.444374	0.000000	22.04742
Std. Dev.	0.130988	0.048052	4.592082	0.518726

Source: Own study.

Table 2. Unit Root GDP

Null Hypothesis: GDP_LN_ has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic- based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.448592	0.1409
Test critical values:		
1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Source: Own study.

Table 3. Unit Root Real Exchange Rate

Null Hypothesis: EX_LN_ has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic- based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.699934	0.4175
Test critical values:		
1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Source: Own study.

Table 4. Unit Root FDI

Null Hypothesis: FDI_LN_ has a unit root
 Exogenous: Constant
 Lag Length: 5 (Automatic- based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-13.22036	0.0000
Test critical values:		
1% level	-3.857386	
5% level	-3.040391	
10% level	-2.660551	

Source: Own study.

Table 5. Unit Root Tourism Receipts

Null Hypothesis: TR_LN_ has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic- based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.765635	0.3870
Test critical values:		
1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

*Mackinnon (1996) one-sided p-values.

Source: Own study.

It is important to note that the ADF test was applied in levels. Therefore, based on the results of the ADF test, there is non-stationarity among the time series. Consequently, if these time series were to be employed in a regression model, the regression would be spurious.

However, despite the presence of unit roots, the series exhibit cointegration in the fitted regression. Cointegration indicates the absence of unit roots in the time series, implying that the time series are stationary. To demonstrate this, it must be established that the regression residuals do not contain unit roots, a test which can be conducted through an Augmented Dickey-Fuller (ADF) test. This will be shown following the regression analysis.

4.2 Regression Analysis

Several different regression specifications were estimated. In each specification, the dependent variable is the log GDP regressed on various independent variables listed in Table 6, along with other alternative exploratory variables that were not found to be statistically significant.

The overall performance measure, with an R-squared value of 0.96, is highly satisfactory, and the p-value of the F-statistic is very small (see Prob(F-statistic)). Additionally, the p-values of the t-Statistics (Prob.) are all less than 0.0514, indicating statistical significance.

The variable with the highest contribution to the model is log(EX), and notably, the coefficient of log(EX) is positive. This indicates that as log(EX) increases, log(GDP) also increases. The interpretation of this coefficient suggests that a 1% increase in EX corresponds to a 0.78% increase in GDP.

Table 6. Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP_LN_(1)	0.872272	0.053810	16.21022	0.0000
EX_LN_	0.786797	0.164539	4.781833	0.0001
FDI_LN_	-0.003429	0.001643	-2.087677	0.0513
TR_LN_	0.036025	0.013091	2.751925	0.0131
C	-2.965252	0.753490	-3.935358	0.0010
R-squared	0.964583	Mean dependent var		10.82565
Adjusted R-squared	0.956713	S.D. dependent var		0.133589
S.E. of regression	0.027794	Akaike info criterion		-4.138333
Sum squared resid	0.013905	Schwarz criterion		-3.891487
Log likelihood	52.59083	Hannan-Quinn criter.		-4.076252
F-statistic	122.5578	Durbin-Watson stat		1.543862
Prob(F-statistic)	0.000000			

Source: Own study.

This relationship aligns with economic theory, as a currency appreciating over others signifies demand for that currency (Snowdon and Vane, 2005). For example, in the case of the UK, a stronger GDP attracts more investors who increase their use of pounds in transactions, thereby appreciating its value against other currencies. This principle applies similarly to Greece.

Regarding tourism receipts (TR), a 1% increase leads to a 0.036% increase in GDP. TR is a crucial variable in the model as it primarily measures tourism activity. This positive relationship is consistent with economic theory, as increased tourist spending contributes to economic growth (Sloman, 2015).

In contrast, Foreign Direct Investment (FDI) exhibits a negative coefficient, indicating that a 1% increase in FDI results in a 0.003% decrease in GDP. While economic theory suggests a positive relationship between FDI and economic growth, the negative coefficient could be attributed to the abrupt changes in Greek data over the sample period from 1995 to 2018 (Miškinis and Juozėnaitė, 2015).

Notably, Greece experienced economic growth from 1995 to 2008, followed by the Greek economic crisis from 2009 to 2016, during which GDP declined while FDI increased. These fluctuations may have influenced the negative estimators.

It should be noted that in the subsequent test results, it is demonstrated that the series are cointegrated. This validates the regression results, including estimated coefficients, standard errors, R-squared values, etc., thereby preventing a spurious regression.

The final model is:

$$\ln(GDP_t) = \beta_0 + \beta_1 \cdot \ln(GDP_{t-1}) + \beta_2 \cdot \ln(EX_t) + \beta_3 \cdot \ln(FDI_t) + \beta_4 \cdot \ln(TR_t)$$

4.3 Cointegration Test - Augmented Dickey-Fuller for Unit Root Test of Regression Residuals

To bolster the validity of the regression results, it was demonstrated that the series are cointegrated by confirming that the regression residuals do not exhibit a unit root through the Augmented Dickey-Fuller test (Wooldridge, 2006). The p-value in Table 7 is 0.0024, which is less than 0.05, indicating that the residuals are stationary. Consequently, the regression results, including estimated coefficients, standard errors, R-squared values, etc., are deemed valid, thereby preventing a spurious regression.

Table 7. Unit Root Tests of Residuals

Null Hypothesis: RESIDUALS (RES) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.517174	0.0024
Test critical values:		
1% level	-3.831511	
5% level	-3.029970	
10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RES(-1)	-1.633700	0.361664	-4.517174	0.0005
D(RES(-1))	0.870588	0.300803	2.894209	0.0118
D(RES(-2))	0.568800	0.248793	2.286237	0.0383
D(RES(-3))	0.658228	0.202915	3.243867	0.0059
C	-0.000251	0.005008	-0.050112	0.9607
R-squared	0.659833	Mean dependent var		0.000296
Adjusted R-squared	0.562643	S.D. dependent var		0.032824
S.E. of regression	0.021707	Akaike info criterion		-4.601410
Sum squared resid	0.006597	Schwarz criterion		-4.352874
Log likelihood	48.71340	Hannan-Quinn criter.		-4.559348
F-statistic	6.789073	Durbin-Watson stat		2.166198
Prob(F-statistic)	0.002961			

Source: Own study.

5. Conclusion and Methodology Limitations

This paper investigates the impact of tourism on economic growth in Greece for the period from 1995 to 2018. Most of the research in the literature review supports the notion that tourism can have a positive impact on economic growth. The findings of our research, largely align with the studies of Fauzel *et al.* (2017), Selimi *et al.* (2017), Eleftheriou and Sambracos (2019), Adamopoulos and Thalassinos (2020), Scarlett (2021), De Siano and Canale (2022).

According to our regression analysis, if the real exchange rate increases by 1%, GDP will increase by 0.78%, and if tourism receipts increase by 1%, GDP will increase by 0.036%. This underscores tourism as a significant contributor with a moderately strong impact on economic growth in Greece.

Thus, if tourism indeed influences economic growth, the null hypothesis suggesting that tourism has no impact on economic growth can be rejected. Furthermore, if tourism has a positive effect on economic growth, then the tourism-led growth hypothesis is also validated.

This hypothesis posits that tourism can stimulate economic growth, and therefore, rejecting the notion that the tourism-led growth hypothesis is invalid is warranted. Consequently, tourism not only affects economic growth in Greece but does so positively, affirming the validity of the tourism-led growth hypothesis.

However, there are many limitations to conclusively reject the null hypothesis. Measuring tourism is inherently challenging, with methodologies varying significantly in terms of the applied tests and utilized variables. Additionally, in this research, the sample was sufficient for our research but can be characterized as relatively small, primarily due to data unavailability.

Furthermore, it could be noted that incorporating more variables would enhance accuracy. Future research could address these limitations by incorporating a broader range of variables and employing much more robust methodologies to enhance accuracy in measuring tourism's economic impact.

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World Bank GDP (current US\$). World Bank.

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