

An empirical study to analyse the impact of tourism activity on economic development in Algeria .

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Abstract:

Algeria, similar to other developing nations, has recently accelerated efforts to diversify its income streams by placing greater emphasis on the tourism sector. This has involved increasing attention to the country's abundant tourism resources and assets, as Algeria boasts a wide array of natural and historical treasures due to its continental geography.

This study aims to evaluate the influence of tourism and the exchange rate on Algeria's gross domestic product (GDP) over the period from 2000 to 2019, employing both simple and multiple regression models. The findings reveal that tourism has a positive but relatively modest impact on the GDP. Conversely, the analysis shows an inverse relationship between the exchange rate and GDP.

Keywords: Tourism, Economic development; Exchange rate; GDP; Simple regression; Multiple regression

JEL Classification Codes : O11; Z32.

1. INTRODUCTION

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Tourism is currently considered an integrated industry that contributes to accelerating the economic development of many countries, which have given it special attention, as it is a strategic alternative that replaces dependence on depleting sources of natural wealth. It is also considered in many countries to be one of the most important sources of national revenue, in addition to being one of the most important means of attracting local and foreign investments, as the most important economic characteristics of activities related to this sector are the positive contributions it can make to development, including providing hard currency to alleviate the foreign exchange gap, financing imports of capital goods, increases in the number of jobs (employment), as well as increases in gross national product and personal income, and providing tax revenues for the government.

Therefore, Numerous developing nations have thus started to give this sector significant attention. One such nation is Algeria, which has recently been attempting to diversify its revenue streams rather than relying primarily on a single resource (fuel) by boosting interest in its resources and tourism advantages due to its large geographic area, potential for various historical and natural areas, location overlooking the Mediterranean Sea, and varied climate

Algeria's adoption of an effective strategy to advance this sector will inevitably bring many benefits, and it will have a new and important source of financing the public treasury.

Based on the above, the problematic of this study is as follows:

What is the impact of tourism on economic development in Algeria?

The main hypothesis of this problem is:

Tourism positively affects Algeria's economic development.

❖ Objectives of the study:

Through our study of this topic, we aim to:

- Discussing some studies that addressed this topic.
- Identify the most important concepts related to tourism and economic development.

Study the impact of tourism on the Algerian economy through an empirical study during the period from 2000 to 2019.

❖ Previous studies:

- study of (Stephen, 2015) explored the economic impact of tourism across seven small island developing states. The author evaluated the macroeconomic and sectoral impacts of growing tourism in these areas using input-output analysis, linkage analysis, and the EGC model.. The findings highlighted the transportation sector as a critical component, while tourism income multipliers revealed that tourism significantly contributes to generating substantial economic activity.
- (M.I, Valiollah, & Alizadeha, 2017) assessed the economic contribution of

tourism activities in comparison to other economic sectors by using the input-output model to calculate income and employment multipliers. They came to the conclusion that there is economic potential for tourism that can play a significant role in promoting employment and economic growth.

- Using the Benin Tourism Public Investment Program (PIP), the study (Anago, 2018) assessed how tourism affected economic growth in Benin. The estimated fixed effects model indicates that the investment rate and the direct contribution of tourism have a positive impact on economic growth at rates of 15.6% and 22.9%, respectively. If Benin is successful in implementing the PIP in tourism, it should see double-digit growth in 2018 of 11.45%.
- (Khan & all, 2020) evaluated the role of tourism in shaping the basic pillars of economic development in developing countries, by focusing on the case of Pakistan, and a number of econometric methods and strategies were applied to examine the causal links between economic growth and tourism, energy, agricultural development and poverty. According to the findings, a 1% growth in tourism raises GDP by 0.051%, foreign direct investment by 2.647%, energy development by 0.134%, agricultural development by 0.26%, and poverty reduction by 0.51 percent over the long run. He stressed that tourism can promote development through designing and implementing integrated policies in developing economies.
- The researcher based the study (Gnangnon, 2020) on the analysis of 156 countries (both developed and developing) over the period 1995-2015. The empirical findings demonstrated that international tourism revenues have a positive and significant impact on non-resource tax revenues. The study examines the relationship between international tourism revenues and government revenues. Furthermore, this effect grows as the research countries' levels of development rise, indicating that industrialized economies gain far more from an increase in foreign tourism receipts than do less developed ones in terms of non-resource tax income.
- On the other hand, (Ullah, Kashif, & Usman, 2023) in their study aimed to investigate the relationships among economic development, tourism, the use of natural resources, technical advancement, and carbon dioxide emissions in the BRICS group of nations. Among the countries in the panel data set, the results indicated that a 1% increase in tourism would lead to a 0.39% drop in carbon dioxide emissions. For that reason, it is crucial to promote sustainable tourism and technical innovation in those nations. In addition, a comprehensive set of policies should be created to support sustainable tourism certification, encourage low-carbon transportation, increase the use of local products, decrease waste management, and promote tourism education and awareness campaigns.

- (Cárdenas-García, Brida, & Segarra, 2024) used a sample of 123 nations to examine the connection between tourism and economic development from 1995 to 2019. Granger causality was tested using the adaptation developed by Dumitrescu and Horlin. Given the significant discrepancies between the findings of the causal analysis with the entire panel and the analysis of homogeneous country groups with regard to their dynamics of tourism specialization and economic development, the study critically examined causal analysis with heterogeneous panels. On the one hand, in nations with low levels of tourist specialization and development, there is a one-way causal relationship between tourism and development. However, in nations with high levels of development and tourist specialization, there is a one-way causal relationship between development and tourism.
- (Alejandro & all, 2024) research sought to ascertain if, between 1995 and 2019, there was a causal link between tourism and economic growth in 20 island nations by applying the Granger causality test and the econometric adjustment developed by Dumitrescu and Hurlin. . It was demonstrated that there is a causal relationship between tourism and economic development and that development aids in the growth of tourism. It is advised to create policies to improve the living conditions of the populace, as well as to lower poverty levels, as well as to improve health, education, and security, all of which will eventually lead to improvement in economic development. This is because tourists are increasingly demanding that destination countries have a sufficient level of development in order to have a satisfactory tourism experience.

2. The study's theoretical component:

2.1 Tourism concept:

Tourism is one of the largest and most dynamic areas of the global economy, and it has an impact on other economic sectors.

According to the World Tourism Organization (OMT), it includes all activities people engage in while traveling and remaining in locations other than their usual ones for a maximum of one year, for leisure, and for other reasons unrelated to engaging in a paid activity while there (Loubet, 2011).

According to Burkart (1974), tourism is the collection of connections and occurrences that arise from people's travels and stays away from their primary permanent residence and place of employment; However, according to McIntosh (1977), it is the science, art, and policy of drawing in, escorting, and housing tourists while subtly meeting their needs and wants. (Christine, 2005, p. 11).

Tourism is a multifaceted industry that affects many different people's lives and a wide range of economic activities. It can be thought of as an integrated set of people, businesses, institutions, and locations that join together in some way to deliver a travel experience.

2.2 The notion of economic development:

Economic development, which is defined as the structural transformation of the economy, is crucial for any nation to reduce poverty by implementing more advanced automated technologies that raise labor productivity, employment, income, and the population's standard of living. However, in order to facilitate economic transformation, it must be accompanied by improvements in infrastructure as well as social, political, and institutional factors. (Prabha, 2020, p. 1).

Economic development is the growth of capabilities that help society advance by maximizing the potential of people, businesses, and communities. It is a long-term improvement in prosperity and quality of life that is accomplished through innovation, lowering transaction costs, and utilizing capabilities in the production of goods and services. (Prabha, 2020, p. 1).

2.3 Economic development and tourism's relationship:

In the economy of tourist nations, tourism revenue is crucial since it improves the balance of payments and is seen as a key source of employment opportunities for citizens, sustaining their social lives and level of living. After being an abstract subject taught only in universities and other institutions, tourism is now closely associated with economic development and is regarded as one of the fundamental components of national economic activity. In light of this, global institutions like the World Bank and UNESCO have been interested in it and now see tourism as a vital and significant component of bridging cultural divides.

As an illustration of the significance of tourism in the employment sector, According to the World Travel and Tourism Council (WTTC), during the previous century, the travel and tourism sector has directly or indirectly created over a million job opportunities worldwide.

Through the purchases of goods and services made by visitors, tourism is also seen as a significant source of foreign exchange earnings. It is also acknowledged that hard currencies, particularly in emerging nations like Algeria, lower inflation and living expenses by allowing the nation to import products and services and bolstering the local currency. (Al Ansari, 2019).

2.4 The effect that tourism has on Algeria's economy:

According to a study by (Hadia & Rouaski, 2020), despite the country's remarkable tourism growth, tourism in Algeria did not represent an increase in the country's contribution to the national economy, as evidenced by the balance of payments - after travel - as spending exceeded foreign tourism on incoming tourism revenues during the 1999 to 2017 period. Its contribution to employment was estimated to be 2.23% of all jobs in 2015, and its contribution to the gross domestic product did not exceed 1.8% over the previous 20 years. As a result, tourism makes a minimal contribution to Algeria's national economy. In this research paper, we will examine the impact of tourism on GDP in Algeria from 2000 through 2020.

3. Results and discussion:

3.1 Study methodology:

Prior to starting the study, we will outline each variable, the data source for each variable, and the model that will be used.

- **Study variables:**

Dependent variable:

Gross Domestic Product (current value in US dollars), which we symbolize as GDP.

Independent variables:

- International tourism (number of arrivals), which we symbolize as Ntrv.
- The exchange rate (local currency against the US dollar), which is symbolized by Tch.

- **Study data:**

Based on global development indicators for the years 2000–2019, we retrieved statistical information on the research variables from the World Bank database. We came to an end in 2019 because of the Covid-19 epidemic, which resulted in the closing of both air and land borders and a halt to travel to all countries worldwide. We were unable to find data relevant to our investigation for the post-pandemic period.

- **Study model:**

We used two models to examine how tourism affects GDP: simple and multiple linear regression, as well as "eviews" software.

3.2 Descriptive analysis of study data:

Table 1. Table of descriptive statistics for the study variables.

	Number of arriving tourists	exchange rate	National income
Mean	1851200	81.49063	1.41E+11
Maximum	2733000	116.5900	2.14E+11
Minimum	866000	64.58280	5.47E+10
standard deviation	605828.6	15.02259	5.42E+10
Skewness	-0.190035	1.375149	-0.381470
Kurtosis	1.827883	3.440182	1.858688
Pr (normal distribution)	0.531193	0.039460	0.455992
Views	20	20	20

Source: Prepared by researchers, using Eviews 12 program.

The first table indicates the descriptive statistics for the study variables during the period 2000 to 2019, while the first figure shows the development of these variables during the same period. The average national income was about 141 billion dollars, with a dispersion of about 5.42 billion dollars during the same period, meaning there is relative homogeneity in the performance of the national economy during this period. As for the exchange rate of the dinar against the dollar, there is a deterioration and relative decline of the local currency, as the average exchange rate was estimated at 81.49 dinars for one dollar, but we note the large dispersion of this variable, which is estimated at about 15.02 dinars, without talking about the exchange rate in the parallel economy, which reached the range of 220 to 230 dinars per dollar. The number of foreign tourists arriving was relatively stable during this period, with an average number estimated at 1.85 million tourists, most of them from the community residing abroad, with a standard deviation estimated at 0.605 million tourists. Accordingly, the distribution hypothesis was fulfilled for the variable of national income and the number of foreign tourists.

Figure 1. Development of study variables during the period 2000-2019.



Source: Eviews 12 program outputs.

3.3 Study of the stability of series of study variables:

We used the developed Dickey-Fuller test to test the stability of all study variables before starting the econometric modeling of the regression relationship. The test results are summarized in Table (2), and they show that these series are stable at the level because the test probability value was greater than the 0.05 level of significance in the three models of this test (with a constant, without a constant and a trend, and with a constant and a trend together).

Table 2. Results of the developed Dickey-Fuller stability test.

Variable	First Difference			Level		
	Const & Trend	Const	None	Const & Trend	Const	0.764
National income	0.0087	0.015	0.001	0.982	0.408	0.993
Exchange rate	0.0001	0.057	0.014	0.998	0.999	0.896
Number of arriving tourists	0.4262	0.204	0.023	0.641	0.511	0.764

Source: Prepared by researchers, using Eviews 12 program

After studying stability, we estimated two linear regression models; In the first model (simple linear regression) we tried to estimate only the impact of tourism (number of tourists) on national income without taking into account the exchange rate variable, while in the second model (multiple linear regression) both variables were entered into one model to measure their impact on national income.

Equation of the first model	$Lgdp_t = \beta_0 + \beta_1 Lntrv_t + \varepsilon_t, t: 2000 \dots 2019$
Equation of the second model	$Lgdp_t = \beta_0 + \beta_1 Lntrv_t + \beta_2 Ltch_t + \varepsilon_t, t: 2000 \dots 2019$

The results are summarized in Table 3, and the detailed results are in the appendices.

3.4 Econometric Modeling Results:

Table 3. Modeling results of the effect of the number of arriving tourists and the exchange rate on the size of national income.

	ependent variable (national income)							
	Independent variable	Coefficient	Standard error	T-Test	Pr > t	R ²	D W*	Prob(F)
First model	Number of tourists	1.2317	0.0802	15.347	0.0000	0.9290	1.258	0.000
	Constant	7.8775	1.1538	6.8273	0.0000			
The second model	Number of tourists	1.2944	0.0794	16.287	0.0000	0.9435	1.584	0.000
	exchange rate	-0.3659	0.1746	-2.0951	0.0514			
	Constant	8.5813	1.1104	7.7275	0.0000			

Source: Eviews 12 output. *DW: Durbin & Watson test

3.5 Statistical analysis of the two models:

We found the coefficient of determination (R²) to be very acceptable based on the first model's results, which showed the relationship between the national income variable and the number of tourists variable. This indicates that, when all other factors are held constant, the level of explanation of this independent variable for the change in the national income variable is largely acceptable, with a percentage exceeding 92.9%. However, in the second model, which incorporates an extra independent variable—the dinar exchange rate against the dollar—the percentage rose to 94.35%.

Regarding the statistical significance of the estimated parameters, the results indicate that they are all statistically significant at the 0.05 significance level, regarding the autocorrelation of the estimated models (statistically measured by the Durbin & Watson test); The results of this test indicate the presence of positive and relatively weak autocorrelation in the estimated models. The independent variable parameter “number of tourists” has a positive and statistically significant sign in both models, which indicates that there is a direct relationship (or positive effect) between the variable. For example, in the first model, every 1% change in the number of arriving tourists creates a 1.23% change in the dependent variable (with other factors remaining constant). While in the second model, every 1% change in the value of the variable “number of tourists” causes a 1.29% change in the dependent variable (with other factors remaining constant), which is approximately the same percentage in the first model. The parameter of the independent variable “exchange rate” was negative and statistically significant at the level of 0.05, so there is an inverse relationship between national income and the exchange rate of the dinar against the dollar.

3.6 Model quality tests:

Table 4. shows the results of modeling quality tests.

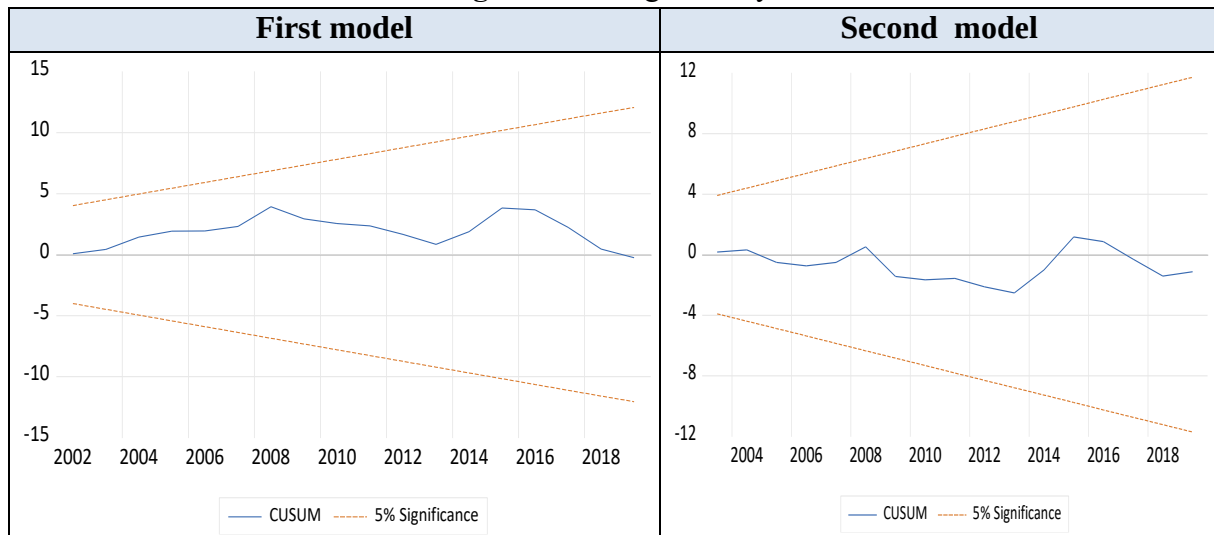
	First model	Second model
Normality test	0.3619	0.1447
ARCH-LM test	0.9006	0.6077
Serial Correlation LM test	0.0893	0.1786

Source: Prepared by researchers, using Eviews 12 program

Test results for the quality of the estimated models indicate that the assumption of a normal distribution of the residuals is accepted and fulfilled in all models, as the probability value of the test of the distribution of the residuals was greater than 0.05. Regarding the LM test, or what is also called the Breusch-Godfrey test, a generalization of the Durbin & Watson test, we note that the assumption of linear association of the residuals is rejected (since the probability value is greater than 0.05) in all estimated models. While for the test of homogeneity of error variance, this hypothesis is accepted in all estimated models, as indicated by the probability values of the ARCH test in Table (4), as they are all greater than the value of 0.05.

3.7 Results of model stability tests:

Figure 2. String stability test.



Source: Prepared by researchers, using Eviews 12 program

By examining the stability of the model, the CUSUM test, which is based on the dynamics of the predicted error, enables the detection of structural instability of the regression equations over time (during the research period). Actually, the main goal of this test is to examine the normal forecast error time process; this series of prediction errors computed at $t-1$ for t is known as recursive residuals. Since the graphical representation (in blue) consistently stays within the confidence interval, the tests of

the models' stability clearly show that all models are stable. Consequently, the CUSUM (cumulative sum) test will rely on the cumulative sum of the repeated residuals.

4. Conclusion:

Today, tourism is seen as an integrated industry due to the variety of its operations and is seen as an economic activity that influences many development issues, particularly economic ones, in many nations that are interested in it.

In this study, we used a simple regression model and multiple regression to measure the impact of tourism on Algeria's economy. The findings showed that there is a direct relationship (or positive effect) between the two variables, with a 1.23% change in the dependent variable for every 1% change in the number of tourists arriving (all other factors being equal). In the second model, a 1.29% change in the dependent variable (all other factors being equal) is caused by every 1% change in the value of the variable "number of tourists," which is roughly the same percentage in the first model.

There is an inverse relationship between national income and the exchange rate of the dinar against the dollar.

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5. Appendices

1. Estimation results of the first model

Dependent Variable: LGDP

Method: Least Squares

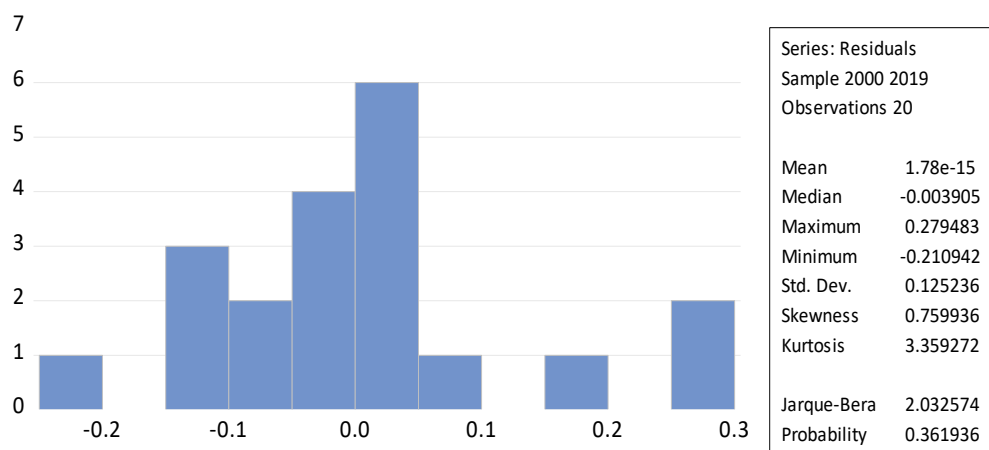
Date: 01/12/22 Time: 09:13

Sample (adjusted): 2000 2019

Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTRV	1.231754	0.080257	15.34770	0.0000
C	7.877513	1.153823	6.827317	0.0000
R-squared	0.929009	Mean dependent var		25.58053
Adjusted R-squared	0.925065	S.D. dependent var		0.470030
S.E. of regression	0.128667	Akaike info criterion		-1.168531
Sum squared resid	0.297996	Schwarz criterion		-1.068958
Log likelihood	13.68531	Hannan-Quinn criter.		-1.149094
F-statistic	235.5518	Durbin-Watson stat		1.258580
Prob(F-statistic)	0.000000			

2. Results of choosing the normal distribution of the residuals (first model)



3. Serial Correlation test results (first model)

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	2.820506	Prob. F(2,16)	0.0893
Obs*R-squared	5.213261	Prob. Chi-Square(2)	0.0738

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 01/12/22 Time: 09:19
Sample: 2000 2019
Included observations: 20
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTRV	0.028922	0.076465	0.378235	0.7102
C	-0.411264	1.098215	-0.374484	0.7130
RESID(-1)	0.493832	0.230863	2.139066	0.0482
RESID(-2)	-0.440388	0.263713	-1.669952	0.1144
R-squared	0.260663	Mean dependent var		1.78E-15
Adjusted R-squared	0.122037	S.D. dependent var		0.125236
S.E. of regression	0.117345	Akaike info criterion		-1.270533
Sum squared resid	0.220319	Schwarz criterion		-1.071386
Log likelihood	16.70533	Hannan-Quinn criter.		-1.231657
F-statistic	1.880338	Durbin-Watson stat		2.084963
Prob(F-statistic)	0.173605			

4. ARCH test results (first model)

Heteroskedasticity Test: ARCH			
F-statistic	0.016067	Prob. F(1,17)	0.9006
Obs*R-squared	0.017940	Prob. Chi-Square(1)	0.8934

Test Equation:
 Dependent Variable: RESID^2
 Method: Least Squares
 Date: 01/12/22 Time: 10:24
 Sample (adjusted): 2001 2019
 Included observations: 19 after adjustments

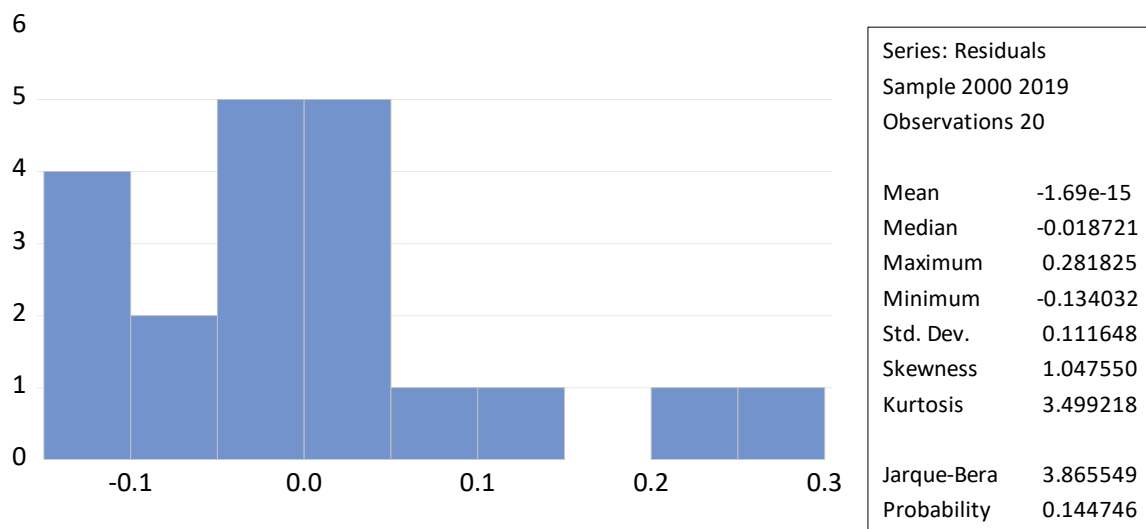
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.016145	0.006720	2.402661	0.0280
RESID^2(-1)	-0.030463	0.240328	-0.126756	0.9006
R-squared	0.000944	Mean dependent var		0.015680
Adjusted R-squared	-0.057824	S.D. dependent var		0.023856
S.E. of regression	0.024536	Akaike info criterion		-4.478016
Sum squared resid	0.010235	Schwarz criterion		-4.378601
Log likelihood	44.54115	Hannan-Quinn criter.		-4.461191
F-statistic	0.016067	Durbin-Watson stat		2.030372
Prob(F-statistic)	0.900621			

5. Estimation results of the second model

Dependent Variable: LGDP
 Method: Least Squares
 Date: 01/12/22 Time: 09:21
 Sample (adjusted): 2000 2019
 Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTRV	1.294463	0.079475	16.28763	0.0000
LTCH	-0.365938	0.174663	-2.095113	0.0514
C	8.581351	1.110495	7.727504	0.0000
R-squared	0.943577	Mean dependent var		25.58053
Adjusted R-squared	0.936939	S.D. dependent var		0.470030
S.E. of regression	0.118033	Akaike info criterion		-1.298218
Sum squared resid	0.236842	Schwarz criterion		-1.148858
Log likelihood	15.98218	Hannan-Quinn criter.		-1.269061
F-statistic	142.1485	Durbin-Watson stat		1.584043
Prob(F-statistic)	0.000000			

6. Results of choosing the normal distribution of the residuals (second model)



7. Serial Correlation Test Results (Second model)

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.936199	Prob. F(2,15)	0.1786
Obs*R-squared	4.103768	Prob. Chi-Square(2)	0.1285

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 01/12/22 Time: 09:23
Sample: 2000 2019
Included observations: 20
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTRV	0.007706	0.075571	0.101974	0.9201
LTCH	0.115801	0.179807	0.644029	0.5293
C	-0.616108	1.117231	-0.551460	0.5894
RESID(-1)	0.303124	0.237298	1.277394	0.2209

RESID(-2)	-0.475260	0.271203	-1.752416	0.1001
R-squared	0.205188	Mean dependent var		-1.69E-15
Adjusted R-squared	-0.006761	S.D. dependent var		0.111648
S.E. of regression	0.112025	Akaike info criterion		-1.327868
Sum squared resid	0.188245	Schwarz criterion		-1.078935
Log likelihood	18.27868	Hannan-Quinn criter.		-1.279274
F-statistic	0.968099	Durbin-Watson stat		2.116726
Prob(F-statistic)	0.453554			

8. ARCH test results (Second model)

Heteroskedasticity Test: ARCH			
F-statistic	0.273605	Prob. F(1,17)	0.6077
Obs*R-squared	0.300950	Prob. Chi-Square(1)	0.5833

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/12/22 Time: 09:24
Sample (adjusted): 2001 2019
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.010883	0.005464	1.991737	0.0627
RESID^2(-1)	0.125763	0.240431	0.523073	0.6077
R-squared	0.015839	Mean dependent var		0.012446
Adjusted R-squared	-0.042052	S.D. dependent var		0.019538
S.E. of regression	0.019944	Akaike info criterion		-4.892433
Sum squared resid	0.006762	Schwarz criterion		-4.793018
Log likelihood	48.47811	Hannan-Quinn criter.		-4.875608
F-statistic	0.273605	Durbin-Watson stat		1.952212
Prob(F-statistic)	0.607675			