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Influence Analysis of Different Factors from the Tourism Sector on Rural Gross Value Added: Cross-Section Analysis at the EU Level

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Abstract: This article investigates the impact of rural tourism on the economy and on sustainable development in rural areas of EU member states. Rural tourism is a distinct form of tourism carried out in rural areas, which attracts tourists interested in authentic experiences, nature, and local culture. The article explores the multiple ways in which rural tourism influences the economy of rural areas. This paper seeks to identify factors that can enhance economic development in rural areas through the tourism sector. Therefore, various indicators of rural tourism and businesses operating in the accommodation sector will be analysed in order to determine their influence on gross value added. The analysis used the linear multiple regression method to determine the influence of these factors on gross value added. The analysis of the data identified that the founding countries of the European Union have a developed rural tourism activity, with the most nights spent as a tourist occurring in rural areas in France and the most rural accommodation establishments occurring in Italy. At the same time, Germany recorded the highest number of employees in the accommodation sector in 2021.

Keywords: rural tourism; gross value added; cross-section analysis; rural development; EU

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1. Introduction

The economic situation in rural areas in EU countries is complex and can vary considerably depending on region, country, and other specific factors. However, there are some general trends and common challenges facing many rural communities in the European Union [1]. A very important issue is that of demographic decline. Many young people are leaving the countryside to seek employment and education opportunities in larger cities or abroad, leading to an ageing rural population and a decrease in population numbers [2]. A second challenge facing rural areas is job loss. Traditional industries such as agriculture and forestry can be affected by automation and modernisation, leading to job losses and the depopulation of rural areas [3].

In less developed countries, a major impediment to growing or maintaining populated rural areas is access to basic services. Some rural areas may find it difficult to provide access to essential services such as health, education, transport, and broadband internet, which can affect quality of life and economic development [4]. At the same time, the environmental side must be considered so that climate change can also be seen as an impediment to rural communities. Rural communities are often more exposed to the effects of climate change, such as droughts, floods, or extreme weather events, which can affect agricultural production and traditional activities [5].

The enlargement of the EU in the early 2000s led to a structural transformation of each country's economy: the share of the agricultural sector declined, while the share of the services industry in GDP increased [6]. In the last ten years, the number of people employed in the tourism industry has grown at an average annual rate of 0.83%. The fastest growth in employment is in Germany, Estonia, Ireland, Luxembourg, Hungary, Malta, and

Iceland. EU tourism directly generates more than 5% of GDP. Around 1.8 million tourism businesses employ around 9.7 million people (5.2% of total employment). The importance of tourism in the EU economy is likely to continue to grow, with travel demand being expected to increase by more than 3% annually in the coming years [7].

All these challenges lead to imbalances between urban and rural environments, and to balance these two environments, policy makers are proposing various policies to revitalise rural areas. As the saying "Don't put all your eggs in one basket" goes, policy makers want to diversify rural activities in addition to agriculture. One such example is the promotion of new industries in rural areas, including rural tourism.

Therefore, this article aims to identify factors that can enhance economic development in rural areas through the tourism sector. Thus, various indicators on rural tourism and enterprises operating in the accommodation sector will be analysed with a view to their influence on gross value added. More specifically, factors such as the number of nights spent as a tourist in the rural area and the number of accommodation units in the rural area were identified as direct factors on the gross value added in the rural area, and then a model on the number of employees in accommodation units and their labour productivity was carried out on the same dependent variables, with the database used being Eurostat. These variables were considered relevant in view of their direct influence on the endogenous variable, as well as on the availability and homogeneity of the data.

2. Literature Review

To diversify activities in the rural environment, research has been carried out on opportunities for rural development with a focus on sustainable development. In general, sustainable development in rural areas in EU countries requires an integrated and collaborative approach, considering local needs and specificities, as well as environmental and social priorities [8].

Most of the time, economic diversification is not defined as a model of sustainable development. Promoting new and sustainable industries in rural areas, such as rural tourism, renewable energy production, local food processing, and other non-agricultural activities, can create new jobs and income opportunities [9].

The impact of the tourism industry on the local community varies depending on its active involvement in the tourism business [10,11]. Rural tourism, which takes place outside of large cities and traditional tourist destinations, attracts visitors that are eager to experience rural life and culture, enjoy natural landscapes, participate in traditional activities, and relax in a more tranquil and authentic setting [12].

Overall, rural tourism plays a crucial role in the rural and national economy by generating economic benefits, fostering socio-cultural interactions, and preserving the environment in rural areas [11].

Tourism plays a vital role in driving economic growth in European countries [13]. This is evident through increased employment opportunities, foreign exchange earnings, and infrastructure development. Tourism stimulates economic growth in European countries through various channels.

Additionally, tourism also contributes to the growth of related industries, such as hospitality, transportation, and retail. These industries benefit from the increased demand for their services due to tourism and experience growth as a result. Furthermore, tourism also encourages the development of infrastructure in European countries [14].

As the tourism industry continues to play a crucial role in driving economic growth in European countries, it is imperative to focus on sustainable tourism practices to ensure future economic stability and prosperity. Sustainable tourism emphasises responsible travel that minimises negative impacts on the environment and local cultures while also benefiting the economic development of the host communities [15].

Although economic activity tends to be concentrated in urban areas, rural areas generate 17% of gross value added (GVA) and provide 22% of employment opportunities [16]. Rural tourism can have a significant impact on the economy of rural areas in several ways.

According to studies, a primary impact of rural tourism is job creation. The development of rural tourism can generate new employment opportunities in rural communities, including in sectors such as hospitality, restaurants, tour guiding, recreation, and local product production. This can counter economic decline and depopulation in rural areas, providing jobs for local people and reducing the migration of young people to cities [17].

Rural tourism can help diversify the rural economy, offering alternatives to traditional industries such as agriculture and forestry. It can create new sources of income for farmers, local producers, and other small- and medium-sized rural enterprises through the sale of local products, tourist services, and authentic experiences [18].

By attracting tourist flows and their spending in rural communities, tourism can stimulate economic growth and contribute to increasing the income of residents. This can lead to improved living standards and stimulate consumption in local economies [19].

To meet the demand for tourism, rural communities can be motivated to invest in improving infrastructure and public services such as roads, transport, accommodation facilities, restaurants, and other tourist facilities. These investments can bring lasting benefits to the whole community, improving access and quality of life for residents [20].

Rural tourism can promote the preservation and protection of the cultural and natural heritage of rural areas by enhancing local traditions, traditional crafts, nature reserves, and scenic landscapes. This can help to maintain cultural identity and the environment and prevent their degradation or loss [21].

In the paper by Giannakis [16], who studied a similar phenomenon for only Cyprus, the author found that "if the output of the tourism sector increases by €1 million, the output of the other sectors will increase by €0.4318 million". At the same time, the authors found that a 200,000 increase in the number of tourists in a rural area or a EUR 38 million development in the sector would lead to a EUR 16 million increase in output elsewhere in the rural economy.

Iceland has embraced sustainable tourism as a key driver of economic growth. The country has capitalized on its unique natural landscapes, such as geothermal hot springs, waterfalls, and glaciers, to attract visitors interested in eco-adventures and outdoor activities. The tourism industry in Iceland has contributed significantly to the country's economic growth, creating job opportunities and generating revenue. However, there have been concerns about the negative impacts of mass tourism on Iceland's fragile environment [22].

Tourism has played a crucial role in Spain's economic growth. It is one of the largest industries in the country, contributing significantly to GDP and creating employment opportunities [23]. Despite the economic benefits, there have been concerns about the negative effects of mass tourism on local communities in Spain. These effects include higher living costs, overcrowding, and pressure on infrastructure and resources [24]. To address these concerns, Spain has implemented various measures to promote sustainable tourism. These measures include promoting responsible tourism practices, such as waste management and energy efficiency, supporting community-led tourism initiatives, and diversifying tourism offerings to reduce the reliance on traditional sun-and-beach tourism [25].

In conclusion, rural tourism can play an important role in stimulating economic and social development in rural areas, providing opportunities for employment, economic diversification, income growth, and preservation of cultural and natural heritage. However, it is essential that rural tourism development is managed in a sustainable and responsible way, considering the needs and values of local communities and protecting the environment.

This paper aims to fill the gap in the literature on cross-sectional analysis at the EU level on the influence of rural tourism factors on rural economic development. In the literature, there are articles dealing with one of the two topics, but not simultaneously; on the one hand, there are articles studying the influence of rural tourism on the rural economy but focused on a single geographical area, and on the other hand, there are cross-sectional analyses at the level of countries that study tourism but not distinguishing between rural and urban.

Variables Related to the Tourism Sector

The economic development of rural areas through the tourism sector has been a subject of extensive research, emphasizing the importance of identifying relevant variables that contribute to this development. In this context, our study uses gross value added (GVA) as a measure of economic development in rural areas [26]. GVA represents the total value of goods and services produced in an economy, minus the costs of goods and services used to produce them. This measure is crucial as it provides a clear indication of the economic contribution of various sectors, including rural tourism, to the overall economy. In rural areas, GVA can effectively reflect the economic impact of tourism, providing a tangible measure of economic growth [27].

Several studies have highlighted the importance of specific variables in assessing the impact of tourism on economic development. Our study includes variables such as the number of rural accommodation establishments, the number of employees in the accommodation sector, and labour productivity in the accommodation sector.

Previous research indicates that the number of accommodation establishments is a key indicator of tourism infrastructure development. An increase in the number of accommodation units signifies the development of tourism infrastructure, which is essential for attracting tourists and promoting economic growth in rural areas. Studies by López-Sanz [9] and Almeida and Machado [28] support the inclusion of this variable, demonstrating its relevance in tourism-driven economic development.

Employment in the accommodation sector is a direct measure of tourism's impact on job creation. An increase in employment within this sector reflects tourism's ability to generate new job opportunities, thereby contributing to local economic development. This variable is supported by research from Nugraha and Flora [15] and Mancilla and Ferrada [17], which highlight the critical role of employment in tourism-related economic growth.

Labor productivity is a measure of economic efficiency and competitiveness within the accommodation sector. Higher labour productivity indicates a more efficient use of resources and a greater capacity to generate economic value. Studies by Bjärstig and Sandström [29] and Falatoonitoosi et al. [14] emphasise the importance of labour productivity in improving economic performance and sustainability in tourism.

The literature extensively discusses the positive impacts of tourism on rural economies. Tourism attracts visitors, generates income for local businesses, creates jobs, and stimulates infrastructure development. For example, the number of nights spent by tourists in rural areas is a critical factor influencing local economic growth. Increased tourist stays lead to higher local spending, directly contributing to GVA. This relationship is supported by studies such as those by Giannakis [16] and Romanenko [7], which demonstrate the significant impact of tourist spending on local economies.

In general, the literature underscores the multifaceted role of tourism in driving economic development in rural areas. The chosen variables—number of accommodation establishments, number of employees, and labour productivity—are validated by extensive research, highlighting their relevance and importance in assessing the economic impact of rural tourism. These variables provide a comprehensive framework to understand how tourism can improve economic performance and sustainability in rural regions, aligning with the larger objectives of rural development policies and strategies within the European Union.

3. Materials and Methods

This research aimed to determine the influence of factors in the rural tourism sector on the gross value added in rural areas to determine the impact of tourism on the economic performance of the areas.

In light of the research presented previously in the literature review, the analysis of data that can measure tourism frequency in rural areas and data that can quantify economic development was used.

To carry out this research, in the first part of the work, data on the number of nights spent as a tourist in rural areas were analysed quantitatively and qualitatively, followed by data on the number of accommodation establishments in rural areas and data on the businesses in this sector, with reference to the number of employees and labour productivity. These data were extracted from the Eurostat database.

As for the European countries that were taken into account, given the availability of data, out of the 27 EU member states, data were identified for 24; data were unavailable for Cyprus, Malta, and Luxembourg, but data were also available for Serbia, a non-EU candidate country, so the total number of European countries included in the analysis was 25.

To analyse the impact of various factors on the economic development of the rural area, two multiple linear regression models were run using E-views Student version 12 software.

The first model had the gross value added in the rural area as an endogenous variable and the number of nights spent as tourist in the rural area and the number of accommodation units in the rural area as exogenous variables. This model was based on panel data, taking into account the 25 member states analysed and the time period of 2017–2019 and 2021, noting that for the year 2020, the Eurostat database did not record data for the variable accommodation establishments, given the situation generated by the COVID-19 pandemic; therefore, for the 4 years and the 25 member states, a panel database with 100 observations was formed.

The second model studied the same endogenous variable, and the number of employees in accommodation enterprises and their labour productivity were considered as exogenous variables. For this model, given the unavailability of data on exogenous variables, with data identified for 2021 and some only for 2022, it was decided that this model would analyse a cross-sectional database for the 25 states for 2021.

Table 1 presents the variables that have been taken into account for the construction of the econometric models presented above.

In the first instance, using the software, the models were developed, and the primary assumptions (assumptions) were checked, followed by model error testing and heteroscedasticity testing.

The methodology used in this study, although robust, has certain limitations that need to be recognised to correctly interpret the results. First, the use of a limited number of variables may lead to an oversimplification of the economic complexities of rural areas. The variables selected (number of nights spent in rural areas, number of rural accommodation establishments, number of employees in the accommodation sector, and labour productivity) are relevant but do not fully capture the economic and social dynamics of rural areas.

To address these limitations, we implemented several measures. First, we selected the variables based on data availability and their relevance in the literature, ensuring that our model is as robust as possible within the available data.

An example of a situation where our methodology may not accurately reflect reality is the case of countries with recent tourism development or emerging tourism policies that are not fully captured by our data. For example, in countries such as Greece, where tourism potential is high, but tourism infrastructure development is ongoing, the actual number of accommodation establishments and nights spent might not fully reflect potential economic growth. In such cases, our methodology might underestimate the actual GVA generated by rural tourism.

In interpreting the results, we recognise these limitations and suggest caution in extrapolating the findings to contexts other than those studied.

Table 1. The variables used in the model.

Variable	Encoding	Variable Type	Variable Description	Unit of Measure
Rural gross value added	R_GVA	Dependent	This indicator measures at the current price level the gross value added in rural areas. This is considered the endogenous variable of the model.	Current prices, million euros
Number of nights spent in rural areas	R_N-S	Independent	This indicator measures the number of nights spent as a tourist in the rural area. This is considered the exogenous variable of the model.	Number
Number of rural accommodation establishments	R_Est	Independent	This indicator measures the number of rural accommodation units in tourist accommodation. This is considered the exogenous variable of the model.	Number
Number of employees in accommodation enterprises	Acc_EMP_NR	Independent	This indicator measures the number of people employed by enterprises in the accommodation sector. This is considered the exogenous variable of the model.	Number
Labour productivity	LABPRY_TEUR	Independent	This indicator measures the labour productivity of employees in enterprises in the accommodation sector. This is considered the exogenous variable of the model.	Thousand euros

Source: authors' own processing using Eurostat.

4. Results

To determine the influence of various factors on the rural tourism sector, a quantitative and statistical analysis of the main variables is proposed. Thus, in addition to the quantitative analysis of the indicators, a mapping of the results was also carried out to give the stakeholders a clear and complex picture of the results and to help them in their decision-making process.

Figure 1 shows the number of nights spent in the countryside as tourists by EU Member States for 2021.

When analysing the data on the number of nights spent as a tourist in the countryside for the year 2021, the most nights were spent in France, i.e., more than 137 million nights, the second highest number of nights spent was in Germany with around 96 million nights, and in third place was Italy, with around 90 million nights. At the opposite end of the scale, the fewest nights spent in the countryside as a tourist were in Latvia, with 628 thousand, followed by Slovakia in second last place with 1.2 million nights. On average, in each country analysed, the number of nights spent as a tourist in rural areas was around 27 million nights. There is a very large gap between the first ranked country and the last and the range is large, at over 135 million nights.

Figure 2 shows the number of rural accommodation establishments. In this context, different hierarchies can be observed from the previous analysis. Italy has the highest number of accommodation establishments, that is, 75 thousand establishments, while Hungary is in second place with more than 55 thousand rural accommodation establishments. Third in this ranking is Spain with just over 30 thousand accommodation units. At the bottom of the ranking is Slovakia with 482 rural accommodation units, followed by Latvia in second last place with 696 accommodation units. This situation of the last-placed countries is

justified given the rather small size of the countries. On average, for the year 2021, each member state analysed will have a number of accommodation units of 11,339, and at the same time, it should be noted that there are quite large discrepancies between countries, with the range between the extreme values being 74 thousand units.

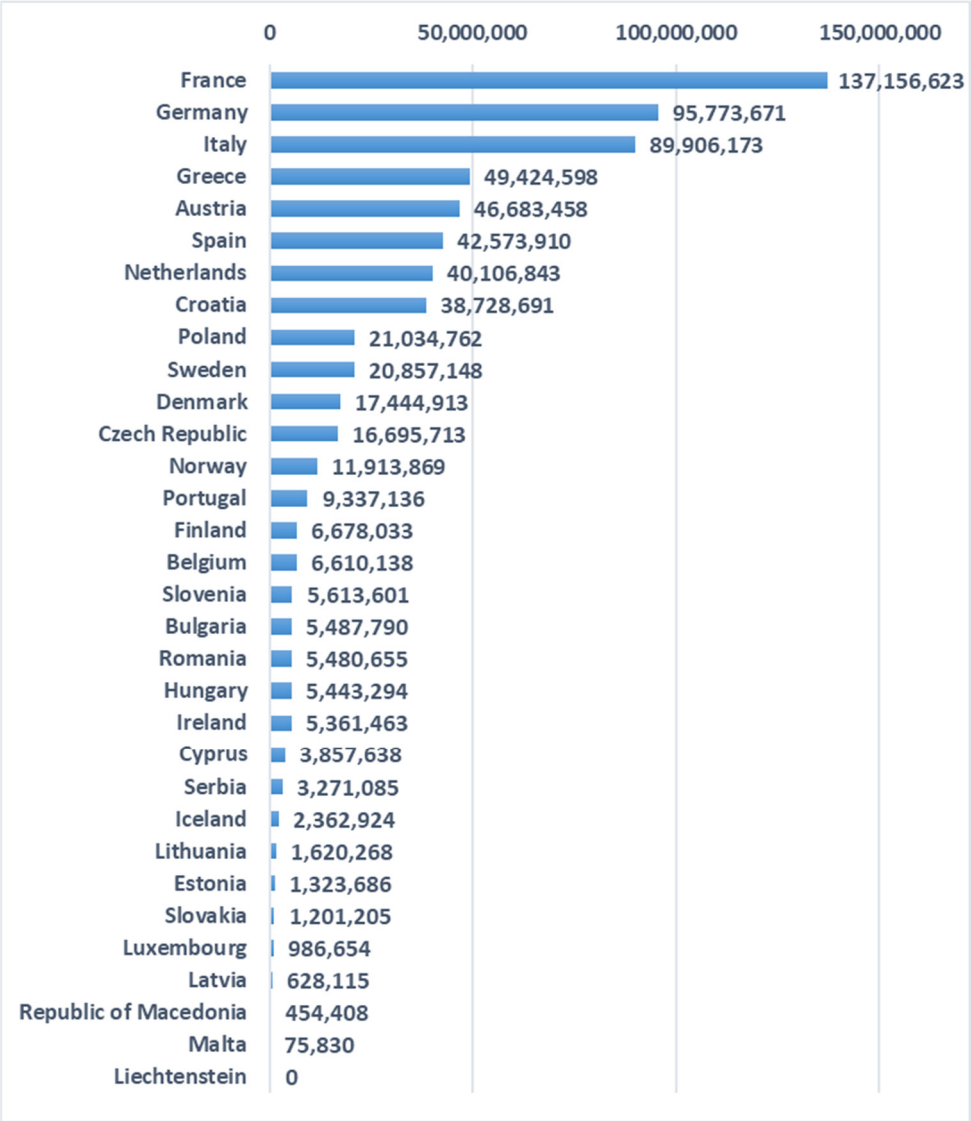


Figure 1. The number of nights spent in the countryside as a tourist. The year 2021. Source: Eurostat data processing.

The following will analyse data related to the accommodation sector, regardless of the rural and urban environments of residence. Thus, in Figure 3, we identify the number of employees in enterprises operating in the accommodation service by state.

In this case, if we rank the countries analysed according to the number of employees in companies working in the accommodation sector, Germany ranks first with just over 2 million people working in this sector, followed by Italy with 1.44 million employees in the accommodation sector and Spain with 1.42 million people. These countries have a long tradition in hospitality and tourism, with destinations always being sought after by tourists. In terms of member states with the smallest workforce in the accommodation sector, we identify Estonia (22 thousand people), Latvia (30 thousand people), and Slovenia (around 40 thousand people).

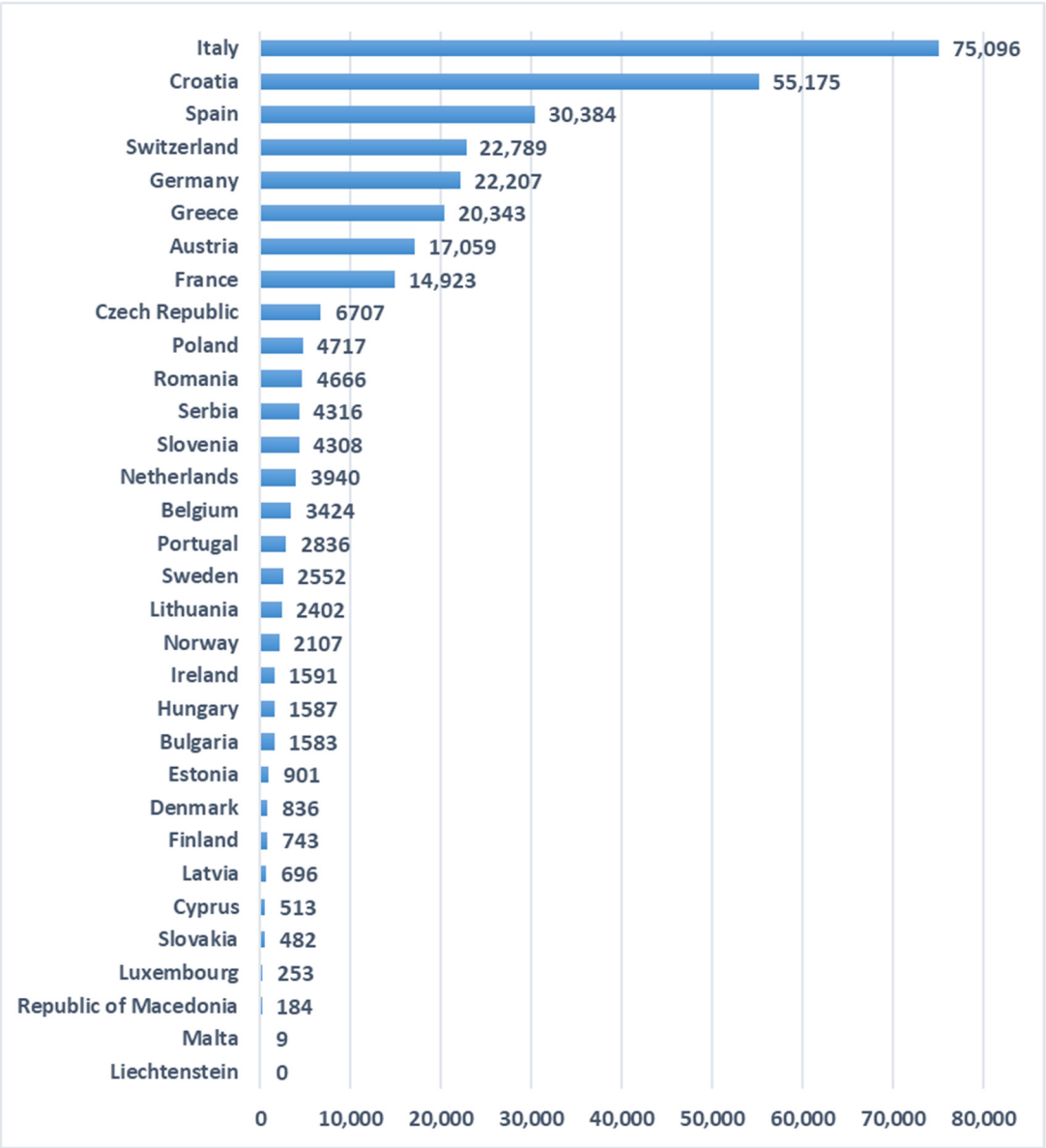


Figure 2. Number of rural accommodation units by member state for the year 2021. Source: Eurostat data processing.

In Figure 4, we identify the territorial distribution of the labour productivity of the employees of the accommodation sector enterprises. This productivity is measured in thousands of euros per employee in 2021.

Given that most employees were recorded in the western part of the European Union and that this indicator shows an inverse relationship with labour productivity; the highest labour productivity is recorded in Austria with a value of EUR 34.8 thousand, then in Sweden with EUR 34.1 thousand, and then in France with a labour productivity of EUR 30.7 thousand. Although tourism in Greece is well known, labour productivity in the accommodation sector is the lowest at EUR 7.7 thousand per employee, on par with Slovakia. On average, labour productivity in each member state is EUR 18,000, but here again the variation between countries is high, given the range between extremes of EUR 29,000.

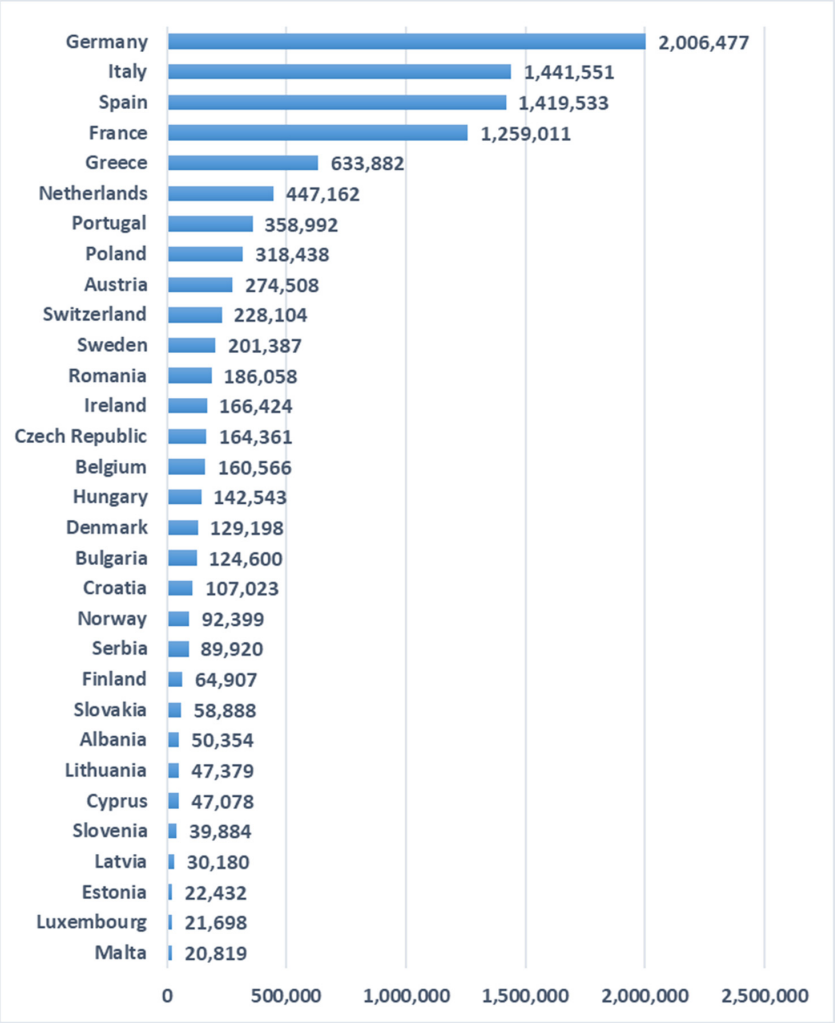


Figure 3. Number of employees in accommodation enterprises by member state for the year 2021. Source: Eurostat data processing.

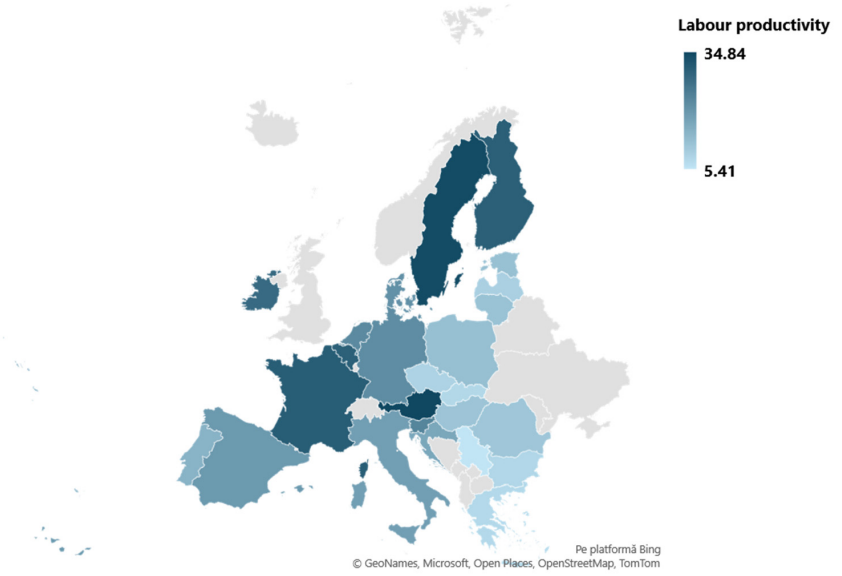


Figure 4. Labour productivity of employees in accommodation enterprises by member state for the year 2021. Source: Eurostat data processing.

To measure the performance of the rural sector and how different drivers contribute to the development of the accommodation sector, Figure 5 shows the territorial distribution of rural gross value added in 2021.

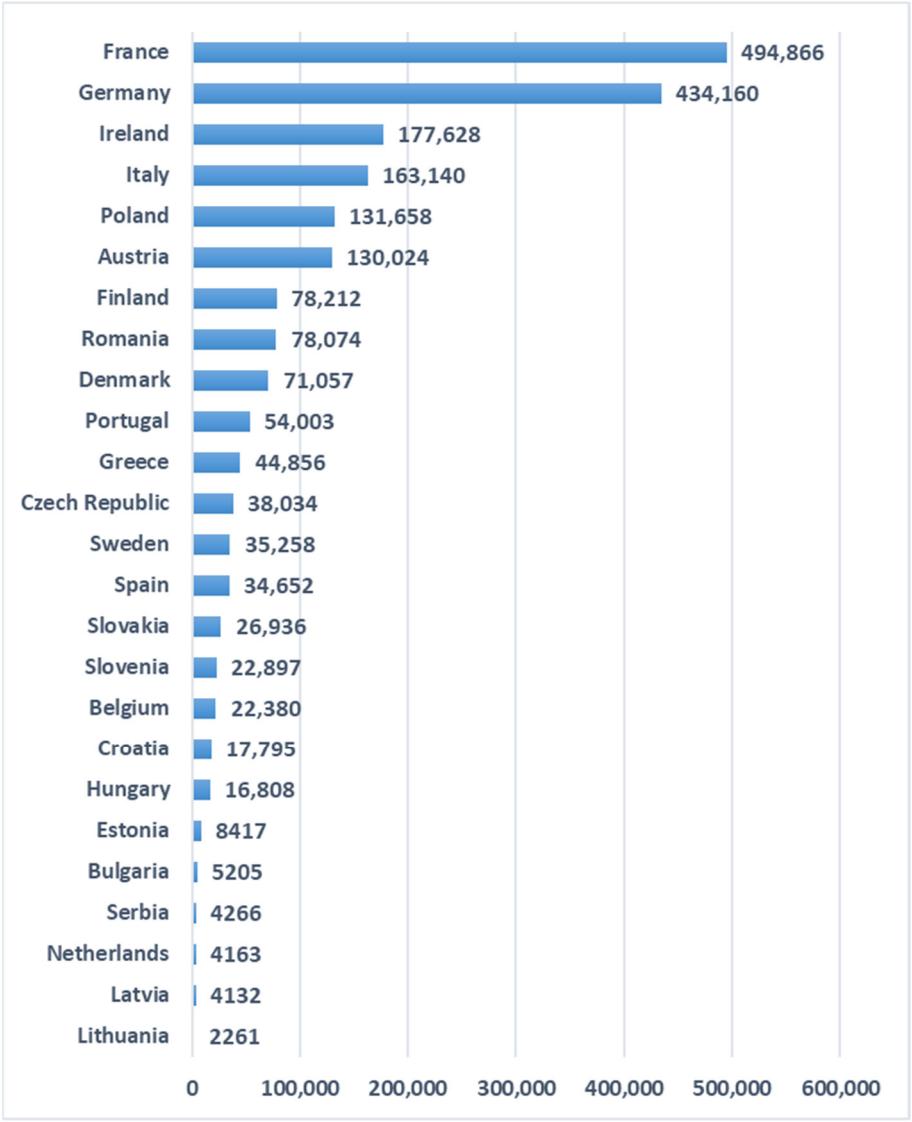


Figure 5. Gross value added in rural areas by member state. The year 2021. Source: Eurostat data processing.

Analysing the gross value added (GVA) in rural areas at the member state level, the highest value is recorded in France, with almost EUR 495 billion, followed by Germany in second place with EUR 434 billion and, surprisingly (given the size of the country), Ireland with EUR 177 billion. The countries with the lowest GVA in rural areas are Latvia and Lithuania with EUR 2.2 billion and EUR 4.1 billion. The average value for each country is EUR 84 billion, and the range between the minimum and maximum values is very wide at EUR 492 billion.

Although in the previous analyses the average value of the indicators and the amplitude between the minimum and maximum values were determined, we consider it necessary to perform a statistical descriptive analysis on the indicators and subsequent variables to determine the median and variance as well as the normality of the data distributions for the 25 countries analysed (Table 2).

Table 2. Descriptive statistical data for the indicators analysed (variables).

Specifications	R_GVA	R_N-S	R_Est	Acc_EMP_NR	LABPRY_TEUR
Mean	84,035	26,977,719	11,339	395,812	18
Standard error	25,094	6,978,401	3651	107,514	2
Median	35,258	9,337,136	3940	164,361	17
Standard deviation	125,471	34,892,005	18,254	537,571	9
Kurtosis	6.082	3.431	6.464	2.814	−1.090
Skewness	2.502	1.901	2.528	1.931	0.452
Range	492,605	136,528,508	74,614	1,984,045	29
Minimum	2261	628,115	482	22,432	5
Maximum	494,866	137,156,623	75,096	2,006,477	35
Sum	2,100,883	674,442,972	283,474	9,895,304	452
Count	25	25	25	25	25

Source: Eurostat data processing.

When analysing the dependent variable, i.e., rural GVA, although the average per member state would have been EUR 84 billion, the median, which divides the values, is at the level of EUR 35 billion; thus, there are several countries with lower GVA values, a natural situation given the size of the countries. The variation is also explained by the standard deviation, which is higher than the mean value; thus, the variation is higher than 100%. There are some states with very high values of GVA and a value of six from the study of the kurtosis vaulting indicator, which is more than recommended for a normal distribution. We could already determine from the comparison of the mean with the median that there is a positive skewness, with the skewness coefficient being 2.5, identifying a left skewness.

In terms of the number of nights spent as tourists in rural areas, although the average per member state was almost 27 million nights, the median is much lower at only 9.33 million, and the standard deviation exceeds the median, so the variation between countries is significant given the size of the countries, the development of tourism in rural areas, the preferences of the population, and other factors that may contribute to these differences. However, the kurtosis is close to a normal distribution (kurtosis = 3) with a value of 3.4, but this distribution is not symmetric with a positive skewness, the coefficient being 1.9.

Regarding the number of accommodation units in rural areas, once again there is a high variation between countries; while the average per member state was at the level of 11 thousand accommodation units, the median is almost 4 thousand accommodation units, and the standard variation exceeds the average. There is a high bolting coefficient and a positive skewness, with values very close to the gross value added in rural areas.

Analysing the number of employees in enterprises belonging to the accommodation sector shows that the median is half of the average; if there were on average 395 thousand employees per member state, the value dividing the 25 states is 164 thousand employees. Regarding the value of labour productivity, the average is EUR 18,000 and the median is close to EUR 17,000. From the point of view of the coefficient of skewness, it is negative, so the distribution is flattened, which indicates that there are not very high values in some countries compared with others, which is also natural given that productivity is measured per unit of employee; the distribution is almost similar, with a slightly positive coefficient of skewness of 0.45.

Following the analysis of the descriptive data on variables, the distribution of the data was analysed. The analysis continues with the test of the stationarity of the data, although we can assume that the data are stationary given that no time period analysis has been carried out. This assumption is validated by the results of the Dickey–Fuller test, which can be found in "Appendix A" for each variable. The probability of the test is below the 5% threshold, and the absolute value of the test is higher than all three critical values of the test (t-statistics), so we can judge that the data are stationary (Figure A1).

4.1. Drivers: Number of Nights Spent as a Tourist and Rural Accommodation Establishments

Given the similar context of the indicators, that is, both study the rural accommodation sector, a linear multiple regression model analysis was conducted on the influence of the number of nights spent as a tourist in rural areas and rural accommodation establishments on rural gross value added (Figure 6).

Dependent Variable: R_GVA
Method: Least Squares
Date: 08/19/24 Time: 09:31
Sample: 1 100
Included observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_EST	-2.733725	0.408213	-6.696803	0.0000
R_N_S	0.003002	0.000178	16.87832	0.0000
C	12609.70	7729.827	1.631305	0.1061

R-squared	0.761122	Mean dependent var	81775.37
Adjusted R-squared	0.756197	S.D. dependent var	122783.1
S.E. of regression	60625.88	Akaike info criterion	24.89237
Sum squared resid	3.57E+11	Schwarz criterion	24.97053
Log likelihood	-1241.619	Hannan-Quinn criter.	24.92400
F-statistic	154.5329	Durbin-Watson stat	1.835669
Prob(F-statistic)	0.000000		

Estimation Command: LS R_GVA C R_N_S R_EST

Estimation Equation: R_GVA = C(1) + C(2) × R_N_S + C(3) × R_EST

Substituted Coefficients: R_GVA = -2.73372469828 × R_EST + 0.00300248589241 × R_N_S + 12609.7032064

Figure 6. Results of the econometric model on the number of nights and accommodation units in rural areas. Source: authors' calculations based on Eurostat data using Eviews Student Version 12 software.

Analysing the results of the model, a coefficient of determination of 0.76 can be observed, which leads to the situation where 76% of the variation of the endogenous variable is explained by the variation of the exogenous variables. We also observe an F-statistic of 154.5, well above the critical value given that the probability of the F-test is well below 0.05; thus, we can consider the model valid. At the same time, by analysing the value of the probabilities of the t-statistic test related to the coefficients, they are statistically significant, with their absolute value being above the critical value, and the probability of these values are below the maximum acceptable threshold of 0.05. We note that the confidence level of the constant is lower, with the probability level being above the 5% threshold, but given that it refers to the constant, we can continue the analysis, excluding the possibility of making predictions. Also, by analysing the value of the Durbin–Watson test, which is around two, which is recommended, it is found that there is no autocorrelation between the model errors.

Finally, given these conditions for the validity of the model and the coefficients, the equation shown in Figure 6 can be considered valid. Therefore, an increase in the number of nights spent as a tourist in the countryside by one unit leads to an increase in the gross value added in the countryside by 0.003 units and a decrease in the gross value added in the countryside by 2.73 units when the number of accommodation units increases by one unit.

Naturally, the number of nights spent as a student influences rural gross value added in the same direction; surprisingly, the relationship between the number of rural accommodation units and rural gross value added is inversely proportional. This situation can

be explained by the fact that rural tourism and agritourism has certain peculiarities, so tourists come for certain experiences and consider that this is why they also choose to live in the countryside separately with all the conditions and utilities of the urban environment. Therefore, as the indicator measures accommodation units with certain conditions and requirements on accommodation standards, there is a possibility that tourists do not use these services and only look for sleeping beds, which is a separate indicator from establishments.

To complete the testing of the model, the residuals were also plotted (Figure 7), given that they should be homoscedastic, nonlinear, and normally distributed.

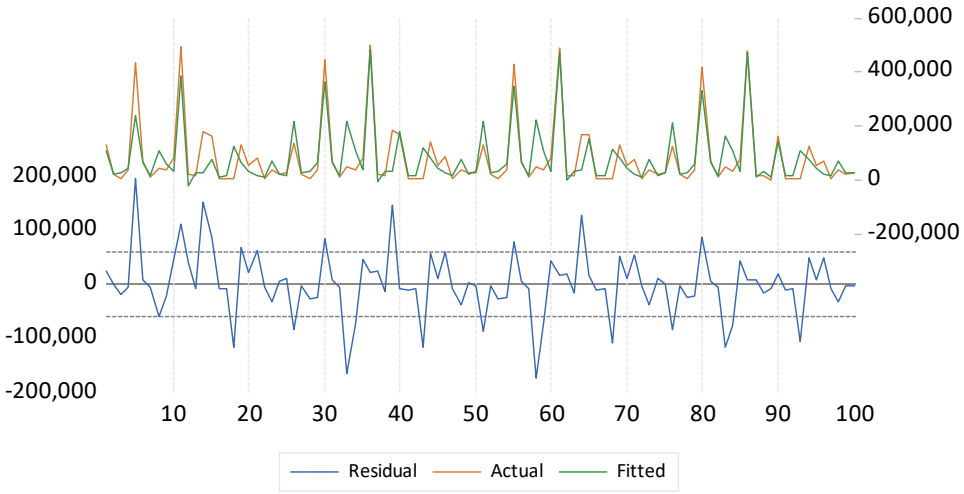


Figure 7. Model errors: number of nights and accommodation units. Source: authors' calculations based on Eurostat data using Eviews Student Version 12 software.

Out of the 100 observations of the model, in terms of residuals, 16 of them (4 annually) do not fall within the limits presented by the model. Thus, there are quite large differences between the observed and calculated values.

The first deviation we identify is in the fifth observation, i.e., in Germany, where rural GVA is among the highest; thus, the model could not perfectly fit the values within these countries as there are several factors influencing this high value of GVA in this country.

The second deviation is identified at position eight corresponding to Greece, but the situation is the opposite, where there is a rather low GVA in rural areas compared with the value obtained by the model; so, it can be considered that there is an untapped potential in this country.

Ireland is similar to the situation in Germany, the 14th different total residual value; therefore, we can establish from the beginning, from Figure 5, that Ireland is in the unexpected third position overall in relation to its size on rural GVA, so there are other contributors to this high value.

And the last deviation is for the Netherlands, which also stands out unfavourably with a very low value of rural GVA; thus, there is a potential in this area, or at the same time, we can consider that the countryside is not so large to create an added value according to the number of nights of accommodation and accommodation units.

Finally (Figure 8), we propose testing the homoscedasticity of the module errors to validate all of the hypotheses and implicitly validate the model.

The presented White test of heteroscedasticity indicates the presence of heteroscedasticity in the regression model, meaning that the variance of the residuals is not constant. All *p*-values associated with the tests (F-statistic, Obs*R-squared, and Scaled explained SS) are extremely small (0.0000), suggesting a clear rejection of the null hypothesis of homoscedasticity. This implies that the variance of the errors depends on the explanatory values of the model, which may influence the validity of the parameter estimates. Although the White test indicates the presence of heteroscedasticity, the model is still sufficiently robust for

the purposes of the analysis, given that the coefficient values are stable and significant. Also, in many practical cases, heteroscedasticity does not dramatically change the overall conclusions of an analysis if it is maintained at moderate levels.

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	10.40588	Prob. F(5,94)	0.0000
Obs*R-squared	35.62941	Prob. Chi-Square(5)	0.0000
Scaled explained SS	62.82240	Prob. Chi-Square(5)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/19/24 Time: 09:34
Sample: 1 100
Included observations: 100

Figure 8. Heteroscedasticity testing of errors (model 1). Source: authors' calculations based on Eurostat data using Eviews Student Version 12 software.

4.2. Drivers: Number of Employees in the Accommodation Sector and Their Labour Productivity

A second analysis was carried out with data referring to enterprises in the accommodation sector; thus, the influences between the number of employees in the accommodation sector and their labour productivity on gross value added in rural areas were studied (Figure 9).

Dependent Variable: R_GVA
Method: Least Squares
Date: 02/08/24 Time: 20:59
Sample: 1 25
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-40438.07	35419.28	-1.141697	0.2659
ACC_EMP_NR	0.140791	0.030119	4.674539	0.0001
LABPRY_TEUR	3398.142	1764.537	1.925798	0.0672

R-squared	0.578591	Mean dependent var	76742.01
Adjusted R-squared	0.540281	S.D. dependent var	114750.1
S.E. of regression	77803.52	Akaike info criterion	25.47393
Sum squared resid	1.33E+11	Schwarz criterion	25.62019
Log likelihood	-315.4241	Hannan-Quinn criter.	25.51450
F-statistic	15.10291	Durbin-Watson stat	2.139435
Prob(F-statistic)	0.000074		

Estimation Command: LS R_GVA C ACC_EMP_NR LABPRY_TEUR

Estimation Equation: R_GVA = C(1) + C(2) × ACC_EMP_NR + C(3) × LABPRY_TEUR

Substituted Coefficients: R_GVA = -40438.0736052 + 0.140790824775 × ACC_EMP_NR + 3398.14195714 × LABPRY_TEUR

Figure 9. The econometric model results on the number of employees in the accommodation sector and their labour productivity. Source: authors' calculations based on Eurostat data using Eviews Student Version 12 software.

The model in Figure 9 shows a coefficient of determination of 0.578, so that 57.8% of the variation in rural GVA is explained by the variation in the number of employees and labour productivity in the accommodation sector. The value of the F-statistic parity is 15.1, being

higher than the critical value, which is indicated by the value of the probability of the F-statistic test being less than 0.05 (0.0074%). We also identify a value of the probability of the t-statistic test of the coefficients below the threshold of 0.05 for the first independent variable and slightly above this threshold for the second independent variable, the threshold being 0.067; thus, the coefficients are valid at a proportion of 93.28% compared with the threshold of 95%.

In this case, it can be considered that the presented equation is valid in a proportion of at least 93%, and the influences of the number of employees in the enterprises in the accommodation sector and their labour productivity influence the gross value added in rural areas in the same direction. Therefore, an increase in the number of employees in the accommodation sector by one unit leads to an increase in rural GVA by 0.14 units and an increase in labour productivity by one unit leads to an increase in GVA by 3398 units.

Figure 10 shows the observed values, calculated values, and model residuals in order to identify their fit to the model.

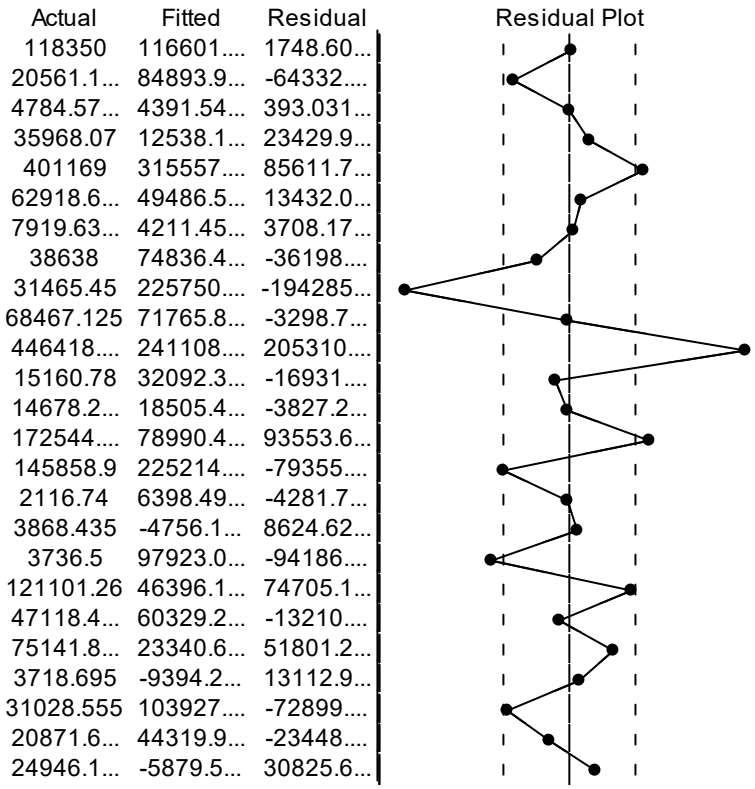


Figure 10. Model errors: number of employees and labour productivity. Source: authors' calculations based on Eurostat data using Eviews Student Version 12 software.

Regarding the distribution of errors in the model, it is observed that five values are not within the predefined limits. This also influences the result of the homoscedasticity test in Figure 11.

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	11.71864	Prob. F(5,19)	0.0000
Obs*R-squared	18.87833	Prob. Chi-Square(5)	0.0020
Scaled explained SS	29.13922	Prob. Chi-Square(5)	0.0000

Figure 11. Heteroscedasticity testing of errors (model 2). Source: authors' calculations based on Eurostat data using Eviews Student Version 12 software.

In this case, the value of the statistical parameter F of 11.7 is higher than the critical one (of 2.74), and the situation also identified from the probability value analysis is below 0.05, thus rejecting the null hypothesis, with the error values being heteroscedastic and not indicated for the model. Therefore, the variation of the errors is not constant, and the model cannot be considered valid in its entirety, which is one of the limitations of the research.

5. Discussions

By investing in the development and promotion of rural tourism, governments can stimulate economic growth, create employment opportunities, and improve the sustainability of rural areas [30]. Furthermore, the integration of agriculture and rural tourism can provide a win–win relationship as it not only enhances the economic benefits but also contributes to the ecological sustainability of rural areas [31].

The direct influence of the tourism sector on rural gross value added can be measured through various factors. These factors include the development of the transport infrastructure in agrotourism facilities, the training of agrotourism specialists, the implementation of government programmes to stimulate agrotourism, and the organisation of exhibitions and conferences dedicated to agrotourism [32].

Furthermore, the development of social and transport infrastructure in rural areas and creating conditions for active recreation for the general population can also contribute to increasing the level of ecological culture of tourists, further enhancing the impact of the tourism sector on rural gross value added [33].

5.1. Rural Tourism Activity in the EU Founding Countries

The analysis of data on rural tourism in the founding countries of the European Union reveals some important trends. France, Italy, and Germany have made important contributions to rural tourism, each with their own characteristics. France dominates the number of tourist overnight stays in rural areas, demonstrating the strong attractiveness of its rural landscape and local traditions. Italy, on the other hand, offers the highest number of rural accommodations, indicating that it has an extensive and diverse infrastructure to accommodate tourists. Germany is characterised by the highest number of employees in the accommodation sector, underlining the importance of this sector for its rural economy. These differences between the founding countries illustrate the diversity of strategies for attracting and accommodating rural tourists, reflecting the particularities of each country.

5.2. Relationship between Overnight Accommodation and Rural GVA

The results of the linear regression model indicate a direct relationship between the number of overnight tourist stays and rural gross value added (GVA). The increase in overnight tourist stays resulted in an increase in GVA of EUR 3000, highlighting the importance of promoting rural tourism for the economic development of rural areas. However, the analysis also revealed an inverse relationship between the number of accommodation units and GVA, where an increase in the number of units by one unit resulted in a decrease in GVA of EUR 2.73 million. This is explained by tourists' preference for authentic and traditional experiences, where the quality and character of accommodation units are more important than quantity.

5.3. Impact of Employees and Labour Productivity on Rural GVA

The second regression model shows the positive impact of the number of employees in the accommodation industry and labour productivity on rural GVA. Each increase in the number of employees increases GVA by EUR 140,000, indicating that increasing employment in the tourism industry can significantly boost the rural economy. In addition, each EUR 1000 increase in labour productivity is associated with an increase in GVA of EUR 3.4 billion, demonstrating that improving labour efficiency and performance can have a significant impact on rural economies. These results highlight the need to invest

in the training and development of tourism employees to maximise their contribution to rural GVA.

5.4. Political and Strategic Implications

The results of this analysis have important implications for the formulation of EU rural development policies and strategies. Promoting rural tourism and improving accommodation infrastructure should be key priorities for regional and national authorities. In addition, investment in training and the development of tourism employees can bring enormous benefits to rural economies. Furthermore, strategies that emphasise the quality and character of rural tourism experiences rather than the number of accommodation units can promote the sustainable growth of rural tourism. These measures help to strengthen local economies and promote sustainable development in rural areas in the EU.

6. Conclusions

This research aimed to identify the drivers that can contribute to the development of rural economic performance through tourism. Thus, data on the gross value added in the rural environment were analysed, as well as variables relating to the number of nights spent as tourists in the rural environment and the number of accommodation units and data from the accommodation sector relating to businesses, i.e., the number of employees and their labour productivity.

When analysing the data at the EU member state level, it was found that there was a high degree of variation between countries, which is natural given the size of the country, economic development, size of rural areas, related activities in rural areas, and other factors that can lead to high variation between member states. The only variable that showed little variation, given that it is calculated per employee unit so that the data can be comparable, was labour productivity.

The analysis of the data identified that the founding countries of the European Union have a high level of rural tourism activity, with the most nights spent as a rural tourist occurring in France and the most rural accommodation occurring in Italy. At the same time, Germany recorded the highest number of employees in the accommodation sector in 2021.

After running the linear regression model between GVA in the countryside and the number of nights spent as a tourist and the number of accommodation units in the countryside, it was established that all assumptions and criteria of the model were met; thus, it was determined that the number of nights spent has a direct influence on GVA. If the number of nights increases by one, the value added increases by EUR three thousand. If the number of nights remains constant, the number of accommodation units has an inverse influence on GVA, so an increase in the number of units by one unit results in a decrease of EUR 2.7 million. A possible explanation for this situation was also presented in the analysis; given that rural tourism has certain particularities and people want a traditional experience, accommodation units (establishments) are not sought after in this segment, but rather the number of sleeping beds, which is another indicator of European databases.

In the case of the second model, we can identify that both the number of employees in the accommodation sector and their labour productivity influence the gross value added in rural areas in the same direction. In the EU member states where the number of employees was one person higher, the GVA in rural areas was EUR 140 thousand higher, and if this variable is constant, in the countries where labour productivity was EUR one thousand higher, the GVA in rural areas was EUR 3.4 billion higher.

However, it should be noted that not all conditions were met and the errors are not homoscedastic; thus, the variation of the errors is not constant, which is the limit of the research in this study, together with the fact that the variables could not be structured under the umbrella of a single model. Regarding the future directions of research, it can be considered that a more complex model with an additional series of variables should be created that can better describe the situation of tourism in the rural area and its economic implications.

The data obtained from this research are extremely useful in understanding how rural tourism can contribute to the economic performance of rural areas in the member states of the European Union (EU). These data provide insight into the relationships between the different variables analysed and the GVA (gross value added) in rural areas. The usefulness of the data obtained can be felt in several ways: informing public policy, rural tourism planning and development, investment and financing, international comparisons, and best practices. The data obtained from this research provide a solid basis for the informed decision making and sustainable development of rural tourism within the European Union. The use of these data in decision-making and planning processes can help boost economic growth and prosperity in rural areas.

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Appendix A

Null Hypothesis: R_EST has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.940587	0.0026
Test critical values:	1% level	-3.499167	
	5% level	-2.891550	
	10% level	-2.582846	

Null Hypothesis: R_GVA has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.371239	0.0000
Test critical values:	1% level	-3.498439	
	5% level	-2.891234	
	10% level	-2.582678	

Figure A1. *Cont.*

Null Hypothesis: R_N_S has a unit root
Exogenous: Constant
Lag Length: 12 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.500969	0.0000
Test critical values:	1% level	-3.507394	
	5% level	-2.895109	
	10% level	-2.584738	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.152140	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Figure A1. Stationarity Testing—Dickey–Fuller Test. * Mackinnon (1996) one-side *p*-values [34].

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