Tourism and economic growth: Evidence of **Granger causality** for **Portugal**

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Abstract | As the tourism sector accounted for 15.8% of Portugal's economic output in 2022, it is crucial to examine this sector from various angles in Portugal. Using Granger causality, we confirmed a bidirectional relationship between tourism revenue and Gross domestic product per capita, as well as between the number of nights spent by tourists residing in Portugal in Portuguese collective accommodation establishments and Gross domestic product per capita from 1996 to 2022. Several unidirectional relationships were also found, namely between the average number of stays of tourists residing in Portugal and foreigners in the Portuguese Gross domestic product per capita, and the number of overnight stays of the tourists living in Portuguese territory and abroad in collective accommodation units (tourists who stay in establishments broadly classified as hotels) in Portugal, the average number of stays of these tourists, and Portuguese tourism revenues. Using data obtained from INE (Statistics Portugal) and Granger Causality, a notable fact that we observed is that, despite Portugal's GDP having increased in recent years, the average number of stays in Portugal, both for residents and non-residents, has not increased. More people spend nights in Portuguese shared accommodation units, but the average stay is not growing, which could benefit the country. Policy makers and various tourism agents must face this reality and find ways to encourage tourists to stay

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longer. As far as we know, this is the first time these variables have been used empirically with this methodology, which allows statistical relationships to be analysed from all possible angles.

Keywords | tourism, Portugal, economic growth, Granger causality

1. Introduction

International tourism has experienced exponential growth in recent decades, driven by several factors, including rising average income, globalisation, and declining air transport prices (Dileep & Kurien, 2021). According to the World Travel and Tourism Council (WTTC) (WWTC, 2021), travel and tourism spending accounted for more than 10.4% of the world's Gross Domestic Product (GDP) and 10.6% of jobs in 2019, not including multiplier effects that indirectly led to multiple contributions to the economy and labor market. According to the World Tourism Organisation (UNWTO) (2023), international tourism has already recovered to 84% of its pre-pandemic value between January and July 2023 compared to the same period in 2019. This indicates strong resilience and a sustained recovery in tourism demand. An estimated 700 million tourists took international trips during this period, and 2023 could end with a 95% recovery in tourism compared to pre-pandemic times.

Tourism has become a vital issue for many countries as it benefits the host country regarding income, employment, and infrastructure development (Vanegas & Croes, 2008). As the tourist consumes the service at the point of production, the benefits are transferred to other sectors of the economy, which also benefits the state due to chain effects in tax collection (Vanegas & Croes, 2008). The same opinion is shared by Gnangnon (2020), Hajam et al. (2023), Parida et al. (2017), and Ramos and Murta (2020), who point out that revenues from international tourism are considered very important for public finances through tax collection, job creation, and social security contributions (amounts paid by workers and companies for social security mechanisms).

Badino and Yuhuan (2023) note that inbound tourism increases total factor productivity. Consequently, the country's wealth and tourism are only effective if integrated into a broad strategic development plan for long-term economic growth. In addition to tourism activities, it is essential to design strategies required to maintain the quality of life of local communities

and to sustain and enhance the tourism experience, taking into account cohesion policies - policies that promote the development of the entire country, from the interior to the coastline, from the north to the south and the islands (Machado, 2018), cultural development and building conservation, and the importance of community participation in strategic planning (Dioko & So, 2017; Gullion et al., 2015; Quang et al., 2023; Yeap et al., 2023).

The tourism industry requires innovative approaches to managing the tourism experience worldwide, as it is seen as a "must-have" that generates revenue and jobs, fosters innovation and entrepreneurship, and creates opportunities for businesses (Araújo, 2017; Costa et al., 2017). In terms of innovative approaches, Costa (2020) affirms that tourism is a social and economic sector with a particular dynamic that exerts intense pressures on the environment as well as on society and the economy, and therefore, needs to be addressed with forward-looking approaches, such as joint planning between the business community and tourism management itself. Taking several factors into consideration, government agencies need to work towards boosting economic growth through tourism (Hajam et al., 2023), forgetting, however, that in the current context, in which the globalisation process and thus tourist flows have intensified, tourism must be viewed from a more microeconomic perspective and supported by a strategy that promotes the economic and social development of the region (Brandão et al., 2019) and thus also the development of the country.

In Portugal, according to Turismo de Portugal (2025), tourism revenues (€ 7,216.83 million) for the cumulative period from January to April 2025 surpassed the amount recorded in the same period of 2024 (€6,867.71 million), corresponding to a 5.1% increase. In terms of overnight stays in Portuguese territory during the same period, the United Kingdom market accounted for 16.8%, the German market for 11.9%, the United States market for 8.5%, the Spanish market for 8.4%, and the French market for 7.2%. In just these five markets, non-resident overnight stays in Portugal account for 52.8%, highlighting the high dependency on foreign tourism from a small number of countries. Due to its great importance to the Portuguese economy, tourism must be a subject of attention by the authorities, who should conduct studies that provide empirical evidence to inform their decisions.

This study spans the period from 1996 to 2022. The databases were obtained from INE (Statistics Portugal), and Granger causality was used. To the best of our knowledge, this is the first time that several variables have been used simultaneously for Portugal, including the

number of overnight stays by foreign tourists, the number of overnight stays by Portuguese tourists, and the average length of stay.

A significant contribution of this work to the scientific debate is the verification of Granger causality in bidirectional terms between tourism revenue and Gross Domestic Product per capita (GDP per capita), as well as between the number of nights spent by tourists residing in Portugal in Portuguese collective accommodation establishments and GDP per capita. We also found some unidirectional relationships, namely between the average number of stays of tourists residing in Portugal and foreigners in the Portuguese GDP per capita, and the number of overnight stays of tourists residing in Portuguese territory and abroad in collective accommodation units in Portugal, the average number of stays of these tourists, and the volume of revenue from Portuguese tourism. Regarding the main conclusions, all the tourism variables considered confirm the importance of tourism for Portugal's economic growth.

Another significant contribution this study makes to the scientific debate is that, using Granger's methodology, it is possible to study the simultaneous interaction of these variables and perceive the possible relationships between them. Through existing relationships, better decisions can be made. To the best of our knowledge, this is the first time this methodology has been applied to these variables.

2. Tourism and economic growth

For Krueger (1980), the relationship between tourism and economic growth is contained in the theories of international trade (by emphasising the importance of exports for economic growth), which emphasise the importance of international tourism for economic development in terms of the law of comparative advantages such as relative productive efficiency (Ricardian model) and relative abundance in factor endowments (Heckscher-Ohlin model). Krueger (1980) also notes that product specialisation extends the frontiers of production and consumption possibilities beyond domestic production, further improving economic welfare. As tourism is a labour-intensive industry, expanding tourism benefits both developed and developing countries, which compete at different levels of tourism (Scott et al., 2019).

In recent decades, the scientific community has given increasing attention to the impact of tourism on the economic activity of both developed and developing countries. Scott et al. (2019) note that, with the rapid degree of globalisation over the last 50 years, tourism is one

of the facets of this high level of globalisation. For Hakim et al. (2021), a country's tourism growth can be verified by the increase in the number of tourists, their length of stay, and the average expenditure of visitors.

Tourism is a vital economic activity that plays a crucial role in the growth and development of many economies worldwide. It benefits the economy in several ways, including creating jobs, increasing public revenue, promoting investment, and stimulating local trade (UNWTO, 2020; WTTC, 2023).

Tourism generates various jobs across various sectors, including transportation, hospitality, food service, entertainment, and retail commerce. These jobs can be direct, such as those involving services in hotels and restaurants, or indirect, such as those that arise in companies that provide tourism-related products and services. According to the World Tourism Organisation, the tourism sector was responsible for around 10% of global jobs in 2019 (UNWTO, 2020). Furthermore, tourism also contributes to formalising the labor market and can generate jobs in regions that would otherwise have few economic alternatives.

Tourism generates significant tax revenues through taxes on tourism services, including hotel fees, airfare, restaurant fees, and admission to tourist attractions. According to UNWTO (2020), global tourism tax revenues were estimated at US$1.8 trillion in 2019, representing about 10% of total global tax revenues. These revenues are often reinvested in improvements to public infrastructure and essential services such as health, education, and security. Private investment is also common in popular tourist destinations, with large hotel chains, resorts, and attractions investing in new facilities and services. This increase in private investment not only creates jobs but also enhances local infrastructure, ultimately benefiting the economy as a whole. An example of this was the significant investment in tourism infrastructure in the Maldives, which helped transform the country into one of the most sought-after luxury destinations globally (WTTC, 2023).

The impact of tourism on local commerce is evident. Tourists spend money on various products and services, including food, drink, souvenirs, and crafts. These expenses create a multiplier effect on the local economy, which directly benefits small businesses and service providers. Furthermore, tourism can contribute to the development of new markets for local products, including handicrafts, agricultural goods, and traditional foods (WTTC, 2023).

However, it is not only international organisations that highlight the benefits of tourism for the economy, but also its externalities. Empirically, the first authors to establish a relationship

between tourism and economic growth were Lanza and Pigliaru (2000), who found that countries specialising heavily in tourism experienced rapid increases in their per capita income, particularly in small countries. Additionally, less recent literature, although still important, was highlighted by Balaguer and Cantavell-Jordá (2002), who concluded that, in the long term, tourism in Spain promoted the country's economic growth, in addition to producing multiplier effects on the economy.

Serra et al. (2014) considered that tourism contributes to economic growth and offers a diverse range of products. Tourism in Portugal can assume the character of a luxury service, indicating high economic potential. Considering Portuguese regions according to the NUTS II classification from 1990 to 2007, Neves et al. (2015) suggest that tourism contributes to economic growth and development, enhances quality of life, and accelerates regional convergence. According to these authors, all Portuguese regions make significant contributions to the country's GDP, albeit at varying intensities. Positive and significant effects on GDP are also observed in the tourism sector's turnover, tourism supply volume, tourism investment, hotel occupancy rates, employment in the industry, and tourism demand. Additionally, for Portugal, Bento (2016) examined the inflow of domestic and foreign tourists from 1995 to 2015, employing cointegration and causality analysis, and discovered a long-term relationship between tourism and economic growth, particularly between the number of domestic tourists and this growth. In contrast, the causal relationship between the number of tourists and real GDP has ceased to exist. The author believes that tourism is an essential source of economic growth in Portugal. However, he has yet to find evidence that the number of foreign tourists has an impact on the Portuguese economy.

Falk and Lin (2018) empirically examined the relationships between the number of overnight stays and the average length of stay in hotels in Switzerland over a period of seven decades, finding long-term relationships between these variables and the country's economic growth. These authors also conclude that these relationships hold regardless of whether the tourists are domestic or foreign.

In an extended meta-regression based on 545 estimates from 113 studies that empirically test the tourism-based economic growth hypothesis, Nunkoo et al. (2020) found that the results indicate that many studies confirm the hypothesis that tourism contributes to economic growth. These authors noted that the estimates depend on factors related to country data, sample specifications and characteristics, and the econometric technique used. Nunkoo et al.

(2020) also found that tourism positively impacts economic growth. However, it does not significantly affect the obtained statistics, regardless of whether real GDP, GDP per capita, or real GDP per capita is used as a proxy. These authors also noted that studies distinguishing between short- and long-term effects conclude that the most significant impact on economic growth occurs in the long run through multiplier effects. Besides the fact that tourism boosts economic growth, there are also causal studies that find bidirectional relationships between economic growth and tourism. Also in the same year, Brida et al. (2020) analysed the role of tourism in economic growth for 80 countries over 22 years, concluding that tourism contributes to the economic growth of these countries through both direct and indirect channels. These conclusions apply to developed and developing countries, and countries should consider tourism a key economic sector.

According to Rasool et al. (2021), tourism has been the third-largest export industry in the world, surpassing fuels and chemicals and overtaking the food and automobile industries. These authors found evidence of bidirectional causality between inbound tourism revenues and economic growth in the case of the BRICS countries (Brazil, Russia, India, China, and South Africa) using Granger causality. They advised these countries to adopt policies that increase tourism volumes. These same authors state that inbound tourism stimulates investment in new infrastructure, promotes specialisation, facilitates human capital formation, increases competition among domestic firms as they strive to become more efficient, creates jobs, and contributes to long-term economic growth. The economies of scale resulting from increased inbound tourism help reduce average production costs. In an empirical examination of the development of tourism and economic growth in the world's top ten tourist destinations over a 25-year period, Benkraien et al. (2021) found that different short- and long-term effects occurred, depending on the relative weight of tourism in each country's economy. In countries where tourism plays a more significant role, the impact on economic growth is substantial and critical in the short and long term compared to countries with lower importance.

In 2024, international tourism solidified its status as the third-largest global export industry, surpassing even pre-pandemic benchmarks in terms of value (UNWTO, 2025). The total export revenues, including tourist spending and passenger transport, reached a record USD 2.0 trillion, approximately 3% higher than 2019 levels (UNWTO, 2025).

Considering the number of international tourist arrivals and economic growth for 23 countries over a more extended period, Enilov and Wang (2022) concluded that the tourism sector is an

essential source of future economic development from a global perspective. These authors also note that governments can promote national and regional economic prosperity in international tourism.

Peng et al. (2023), who also acknowledge that the tourism industry is a significant driver of economic growth for destinations, suggest that countries should diversify their source markets to stabilise the number of foreign tourists and tourism revenues. Lower-income countries benefit more from the greater diversification and stabilisation of tourist numbers than higher-income countries. As the tourism industry is one of the most dynamic and vulnerable to social, political, and economic factors, diversification can help generate sustainable tourism revenues, create jobs, better distribute income between social classes, and reduce poverty.

In a recent study covering 182 countries and spanning data from 1998 to 2022, Sun et al. (2025) found that tourism plays a significant role in the economic growth of this large group of countries. These authors also conclude that tourism synergies are amplified when countries have high institutional quality, which in turn favors economic growth. Additionally, tourism promotes employment, generates tax revenue, and stimulates consumption, reducing inequality and poverty.

Even for a mature tourism destination such as Turkey, Yilmaz and Anasori (2024) concluded that the perceived positive economic impacts of tourism significantly influence investment decisions in the sector, including those made by local residents in tourist areas. On the other hand, in a study conducted for an emerging tourism destination (Kazakhstan), Salauatova et al. (2025), by dividing the country according to economic activity criteria, concluded that there is a strong positive correlation between both domestic and international tourism and the economic activity of the more prosperous regions. Furthermore, according to the same authors, in regions with moderate or low economic activity, tourism contributes to economic diversification, job creation, improved living standards, an expanded tax base, and the development of social infrastructure.

3. Methods

3.1. Data, variables, and statistics

The sample used in this study covers Portugal from 1996 to 2022. Table 1 shows the variables used in the empirical analysis, the units of measurement, and the data sources. Since we

intend to study the effect of tourism on Portuguese economic growth, the value of the sector's revenue, the number of overnight stays of tourists residing in Portugal, and the number of overnight stays of tourists residing outside Portugal in collective accommodation establishments located in Portugal, as well as their average length of stay, are indicators that meet the objectives of this paper. Table 2 shows the main descriptive statistics, correlation coefficients, skewness, and kurtosis statistics.

Table 1 - Variable definition and data source

Variable	Definition	Unit	Source
$GDPpc_t$	Gross domestic product per capita, in year t (base, 2016)	EUR	INE
TR_t	Tourism receipts in year t	EUR	INE
NOA_t	Number of nights spent by foreign tourists in Portuguese collective accommodation units in year t	Units	INE
NPO_t	Number of nights spent by residents in Portugal in collective accommodation units in Portugal in year t	Units	INE
FASt	A foreigner's average stay in collective accommodation units in year t	Units	INE
PASt	The average number of nights spent by residents in Portugal in collective accommodation units in Portugal in year t	Units	INE

Source: Authors' elaboration

Table 2 - Main descriptive statistics and correlations

	LnGDPpc	LnTR	LnNOA	LnNPO	LnFAS	Average	Standard deviation	Max	Min	Skewness	Kurtosis
LnGDPpc	1	0.721	0.074	0.489	-0.619	9.656	0.223	10.052	9.145	-0.5920	-0.1900
LnTR		1	0.256	0.529	-0.489	9.778	0.065	9.9143	9.610	-0.5176	-0.3664
LnNOA			1	0.727	-0.209	16.14	0.342	16.813	15.25	-0.4443	0.2908
LnNPO				1	-0.715	17.11	0.334	17.779	16.31	-0.3077	0.1689
LnFAS					1	0.735	0.038	0.7884	0.693	0.1122	-0.8380

Source: Authors' elaboration

As shown in table 2, the variables do not follow a normal distribution because the data are skewed to the left, also known as data with negative skewness. Since the kurtosis statistics are all below three, our variables are considered platykurtic, meaning that the excess kurtosis value is negative, resulting in the distribution having thinner tails than usual.

To obtain accurate results in the empirical analysis, we also consider the problem of multicollinearity. Applying the Pearson correlation test (Table 2) to our variables, we checked that there is no high multicollinearity between the variables. We used a cut-off value of 0.80, as some econometricians consider this value a reference, although there is no absolute consensus on this value (Masanipour & Tompson, 2020).

3.2. Granger causality

Causal tests came into broader use after the British economist Clive Granger's article in Econometrica (1969) was published. In this article, Granger assumes that past relevant impacts have a future effect. For example, if event A occurred in the past, event B appears in the present, and C will happen in the future, this may ultimately mean that A causes B or C, but C does not cause B or A.

The Granger method (1969) is widely used in the economics literature to test for temporal relationships and changes in economic variables, i.e., to determine the temporal significance of one variable over another.

Granger (1969) proposed a method for testing causality using autoregressive vector linear models, known as Vector Autoregressive Analysis (VAR). According to Granger, if one time series, x(n), causes another, y(n), then knowledge of the first's past improves the predictability of the second. This is given in equation (1).

$$x(n) \xrightarrow[Cause]{Granger} y(n) \tag{1}$$

A fact considered necessary in this causality is that it has the property of symmetry, that is $x(n) \xrightarrow[Cause]{Granger} y(n)$, does not imply that $y(n) \xrightarrow[Cause]{Granger} x(n)$, because there may be a unidirectional relationship but not a bidirectional relationship.

In empirical terms, Granger's Causality is obtained through two regressions (Granger, 1969), namely those represented in equations (2) and (3).

$$X_t = \sum_{j=1}^{m} \alpha_j \; x_{t-j} + \sum_{j=1}^{m} \beta_j \; Y_{t-j} + \varepsilon_t \tag{2}$$

$$Y_t = \sum_{j=1}^{m} \gamma_j \; y_{t-j} + \sum_{j=1}^{m} \emptyset_j \; x_{t-j} + \mu_t \tag{3}$$

On what ε_t and μ_t represent the so-called white noises that are not correlated, m being the upper temporal number of data considered. On the other hand, Gujarati (2002) states that the validity of the series studied through Granger's causality is verified through Test F, where the null hypothesis is that the coefficients are jointly $\sum_{j=1}^{m} \beta_j$ and/or $\sum_{j=1}^{m} \emptyset_j$ equal to zero as exposed in equation (4).

In the former, SSSR is the sum of squares of the residuals of the restricted regression; SSSR is the sum of squares of the residuals of the unrestricted regression; x is the number of lagged errors of variable X; n is the sample size and k is the number of regressors estimated in the unrestricted regression including the constant.

If, through the F-test, the null hypothesis for equation (2) is rejected but not for equation (3), there are indications that the series y causes x, not vice versa. If, in turn, the F test is used to reject the null hypothesis for both equations, it means that one can speak of a bidirectional relationship between the two series (x ↔ y). Finally, if the F test does not reject the null hypothesis for both equations, then there is no evidence of causality between the two time series.

We employed the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) to investigate the potential presence of stationarity. As shown in table 3, the logged time series exhibits the stationarity problem, whereas the first-difference time series no longer presents stationarity; therefore, we should reject the null hypothesis that they contain a unit root. Given the value of the statistics obtained using the variables' lagged logarithms, we employ these variables' lagged logarithms in calculating Granger causality.

Table 3 - Augmented Dicker-Fuller (ADF) test

Variables	Asymptotic p-value	Variables	Asymptotic p-value
Ln GDPpc	0.3582	Ln NPO	0.1531
dLn GDPpc	0.0225	dLn NPO	0.0003
Ln TR	0.3147	Ln FAS	0.3589
dLn TR	0.0004	dLn FAS	0.0007
Ln NOA	0.1402	Ln PAS	0.0841
dLn NOA	0.0001	dLn PAS	0.0154

Source: Authors' elaboration

The Granger Causality Test is performed according to two hypotheses.

Null hypothesis: The lagged variable does not Granger-cause the other variable.

Alternative hypothesis: The lagged variable Granger causes the other variable.

The decision criteria: reject the null hypothesis if the p-value of x^2 statistic is < 0.05.

Table 4 - Granger causality Wald tests

Granger causality test in pairs	x^2	p-value
dLnTR does not Granger cause dLnGDPpc	7.3258	0.031*
dLnNOA does not Granger cause dLnGDPpc	11.354	0.003*
dLnNPO does not Granger cause dLnGDPpc	17.440	0.000*
dLnFAS does not Granger cause dLnGDPpc	7.0472	0.018*
dLnPAS does not Granger cause dLnGDPpc	6.6544	0.022*
All five variables do not cause dLn GDPpc	68.347	0.000*
dLnGDPpc does not Granger-cause dLnTR	9.5014	0.023*
dLnNOA does not Granger cause dLnTR	6.7501	0.024*
dLnNPO does not Granger cause dLnTR	14.574	0.000*
dLnFAS does not Granger cause dLnTR	8.6471	0.034*
dLnPAS does not Granger cause dLnTR	10.378	0.005*
All five variables do not cause dLnTR	47.657	0.000*

dLnGDPpc does not Granger-cause dLnNOA	2.4071	0.118
dLnTR does not Granger cause dLnNOA	1.1247	0.512
dLnNPO does not Granger cause dLnNOA	2.3578	0.102
dLnFAS does not Granger-cause dLnNOA	9.6014	0.022*
dLnPAS does not Granger cause dLnNOA	2.4328	0.105
All five variables do not cause dLnNOA	31.974	0.001*
dLnGDPpc does not Granger cause dLnNPO	5.8325	0.037*
dLnTR does not Granger cause dLnNPO	1.3478	0.474
dLnNOA does not Granger cause dLnNPO	3.4785	0.147
dLnFAS does not Granger cause dLnNPO	1.0147	0.598
dLnPAS does not Granger cause dLnNPO	6.1471	0.025*
All five variables do not cause dLnNPO	57.947	0.000*
dLnGDPpc does not Granger cause dLnFAS	2.9471	0.217
dLnTR does not Granger cause dLnFAS	3.5394	0.167
dLnNOA does not Granger cause dLnFAS	2.0004	0.364
dLnNPO does not Granger cause dLnFAS	3.4561	0.146
dLnPAS does not Granger cause dLnFAS	3.6247	0.151
All five variables do not cause dLnFAS	98.574	0.000*
dLnGDPpc does not Granger cause dLnPAS	3.0044	0.145
dLnTR does not Granger cause dLnPAS	3.9471	0.130
dLnNOA does not Granger cause dLnPAS	1.3287	0.471
dLnNPO does not Granger cause dLnPAS	3.2541	0.157
dLnFAS does not Granger cause dLnPAS	1.5747	0.511
All five variables do not cause dLnPAS	68.471	0.000*

GDPpc – Gross Domestic Product per capita; TR – Tourism receipts; NOA – Number of nights spent by foreign tourists in Portuguese collective accommodation units; NPO – Number of nights spent by residents in Portugal in collective accommodation units; FAS – Number of nights spent by residents in Portugal in collective accommodation units; PAS – The average number of night spent by residents in Portugal in collective accommodation units in Portugal. Source: Authors' calculation. *Indicates the rejection of the null hypothesis with significance levels greater than 5% (Granger, 1969).

4. Results and discussion

Using the results of the Granger method (Table 4), we established two bidirectional relationships. The first is between the volume of tourist revenue and GDP per capita, and the second is between the number of nights spent by tourists residing in Portugal in Portuguese collective accommodation establishments and GDP per capita. Notably, Portugal's GDP per capita increased by 1.5% in 2023. According to Turismo de Portugal (2024), this growth was accompanied by a 1.9% increase in overnight stays in Portugal. Tourist activities contribute to GDP in two ways: through consumption by residents and the export of services provided to non-residents in Portuguese territory. On the other hand, GDP per capita contributes to an increase in tourist revenue, possibly because the sales prices of Portuguese collective accommodations align with the rise in GDP per capita. As already demonstrated by several authors and in different regions (Enilov & Wang, 2022, Brida et al., 2020, Nonkoo et al., 2020, Neves et al., 2015 Peng et al., 2023), among many others), we have established through Granger causality, that in Portugal, tourism revenues contribute to economic growth. On the other hand, economic growth also contributes to increased tourism receipts. In an extensive study of one of the world's most prominent tourist destinations, Spain, Moreno-Luna et al. (2021) empirically demonstrated the significant importance of tourist revenue to the Spanish economy.

The same table also shows nine unidirectional relationships. For example, there is a unidirectional relationship between the number of nights foreign tourists spend in collective accommodation units in Portugal and Portugal's GDP per capita. This result may be because the price these tourists pay for accommodation contributes to the formation of GDP.

The second and third unidirectional relationships are verified between the average number of stays of tourists residing in Portugal and the GDP per capita of foreigners in Portugal. As previously mentioned, expenditure on accommodation units contributes to the formation of GDP; therefore, the number of overnight stays and the average length of stay will also contribute to this macroeconomic variable.

The following four unidirectional relationships exist between the number of overnight stays of tourists residing in Portugal and abroad in collective accommodation units, the average number of stays of these tourists, and Portuguese tourism revenues. By staying in accommodation units, whether for one night or for more extended periods, tourists contribute to tourism revenue. Neves et al. (2015) conclude that the occupancy rate of accommodation

establishments contributes to Portuguese economic growth. Our study reached similar conclusions by examining the number of nights spent by Portuguese and foreign tourists, as well as the average number of stays. Portugal's GDP per capita increased by 147% in real terms between 1996 and 2022. Portuguese economic growth contributes to an increase in the number of tourists residing in Portugal in accommodation establishments, but not to the average length of stay. These factors suggest that tourists living in Portugal and residents outside Portugal use their income to stay in collective establishments within Portuguese territory, but not for extended stays.

Finally, the last two unidirectional relationships involve the average stays of residents in Portugal and abroad in accommodation units located in Portugal and the respective number of overnight stays. Although, for example, Turismo de Portugal (2024) states that the average number of overnight stays in Portugal (either by tourists residing in Portugal or those living abroad) has not increased over the years (or even decreased slightly), the total number of overnight stays has seen annual increases, which means that there is a higher number of tourists, which, despite not causing an increase in the average length of stay, contribute to the total increase in the number of nights spent in collective accommodation establishments located in Portugal. This phenomenon is not exclusive to Portugal, and Chang (2007) discusses new forms of tourism worldwide, highlighting how they alter tourist behaviour. As tourists increasingly seek short, intense experiences rather than extended stays in a single location, their preferences change.

Regarding the potential causal relationship from the perspective of Granger causality, we fail to reject the null hypothesis that there is no causal relationship for seventeen relationships. In this statistical evidence, it is worth highlighting what is happening in reality: the number of overnight stays by residents and foreigners in collective accommodation establishments located in Portuguese territory does not affect the average duration of these stays. Similarly, it can be concluded that GDP per capita does not significantly impact the average, as mentioned earlier. To the best of our knowledge, there has been no established relationship between GDP per capita and the length of stay of tourists in collective accommodation units. In the case of Portugal, there is no significant relationship.

Using the Granger methodology, we can see that although Portugal has increased its GDP per capita in recent decades, this does not contribute to increasing the average length of stay of

residents in Portugal in their collective accommodation units or for tourists residing outside the country.

5. Conclusion

As mentioned previously, tourism contributes to countries' economic growth, and tourism is a form of export that can be influenced by external and internal variables, such as tourists' tastes and preferences, income, prices, crises, conflicts of interest, health, and global instability. Countries like Portugal, heavily dependent on tourism, must pay special attention to and care for this sector. Given that Portugal has a chronic deficit in the Balance of goods, in more recent years, it has managed to balance the Balance of trade as a result of the surpluses it presents in the Balance of services, in this case, the entry and permanence of tourists in the country being the central balance of the trade balance, which further reinforces the role of tourism in the Brazilian economy.

Although Portugal has proven to be a top tourist destination in recent decades, attracting both Portuguese and foreign tourists, it is essential to promote an increase in tourism revenue through the efforts of tourist companies and political decision-makers. It will be necessary for Portuguese political decision-makers, through their embassies, consulates, and delegations abroad, to be equipped with the conditions required to promote Portugal as a tourist destination, particularly in markets with high purchasing power. As for tourist companies, through their marketing departments, they encourage initiatives that help increase the number of national and foreign tourists in their accommodation and benefit from their influx. A higher number of nights per tourist can increase hotel revenues and help promote a more significant number of tourist attractions, as well as the indirect impact of tourism on other businesses and various parts of the country.

On the other hand, it is also essential that all players in the sector pay more attention to the reasons why the increase in Portuguese GDP is not contributing to the rise in the number of tourists residing in Portugal in collective accommodation units located in Portuguese territory, which only contributes to the rise in the number of overnight stays in these establishments.

Therefore, in collaboration with political decision-makers, collective accommodation units located in Portuguese territory should develop more products and services that promote an increase in the number of tourists and foreign visitors staying in Portugal, as well as the occupancy rate of these accommodations. As mentioned by Jacobsen et al. (2018), the creation of programs aimed at specific groups of tourists according to their desires and tastes,

creating more attractive offers, can attract tourists to stay a few more days and, due to this fact, increase the average number of stays, as well as benefit from economies of scale resulting from this higher average.

Utilising artificial intelligence (AI) in tourism can also increase tourist revenue and the average length of stay in collective accommodation units. With AI, it is possible to enhance the quality of services provided to tourists and develop tailored solutions for each case. Another application of AI could be the development of marketing strategies that enable the tourist product to be customer-focused and respond dynamically to the challenges tourism faces.

By using this methodology, we open up new avenues for tourism research. Replication of this study to other countries or regions that compete in Mediterranean terms with Portugal in tourism will allow comparisons with the results obtained in this study, thereby aiding in the development of public policies in the tourism sector.

Another suggestion for future work could be to incorporate new variables, such as the Gross Domestic Product purchasing power parity of the leading countries sending tourists to Portugal or the investment made in the international promotion of Portugal as a tourist destination, to better understand the impact on all other variables under study here. Two possible variables that could be considered for future work include, for example, the occupancy rate of these collective accommodation units in terms of beds and rooms.

One last suggestion for future work would be to expand this study to consider the different accommodation classifications. Based on these classifications, we can observe upward or downward movements of Portuguese tourists, which cannot be accurately assessed considering the totality of accommodations (in terms of the number of nights and average length of stay).

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