

## Article

# Do Medieval Castles Drive Heritage-Based Development in Low-Density Areas?

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**Abstract:** Historical monuments enrich lives by connecting people to their community and heritage. They are key to understanding population movements and local development. This study analyzes how the presence of castles classified as National Monuments or of Public Interest can attract tourists, extend their stay, and motivate local authorities to invest in cultural activities, in particular in low-density areas. Heritage and tourism connect through economic, cultural, social, and territorial goals. They boost local economies, preserve cultural traditions, empower communities, and protect landscapes. Thoughtful planning ensures that regional character is maintained and a balance is struck between growth, preservation, equity, and safeguarding for the future. To evaluate the economic and touristic impact of classified castles in Portuguese municipalities, we started by analyzing the ‘Existence of Castle’ variable against three key factors: tourism flows (number of guests and average stay) and municipal expenditure on cultural activities. Additionally, we considered other important explanatory variables from alternative studies, including the following: the number of parishes, maximum and minimum altitude, cultural heritage and sports activity expenses, resident population, density, monthly earnings, commercial firms, Tourism Carrying Capacity, tourism revenues, and overnight stays. Our empirical results reveal that medieval castles generate diverse effects on cultural activities managed by municipalities. Quantile regressions demonstrate that municipalities with fewer resources but with a castle invest more in cultural activities, regardless of how expenditure is measured. Additionally, the presence of a castle attracts more tourists and extends their stay, indicating significant potential for economic and tourist development which is not yet fully realized.

**Keywords:** heritage; tourism; cultural economics; medieval castles; cultural landscape

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## 1. Introduction

Medieval castles were constructed during the early phases of the Reconquest, between the 11th and 13th centuries. In some cases, they were built upon older structures, integrating existing foundations or materials. This was especially true in the southern regions, where many fortifications incorporated elements of pre-existing Muslim architecture, reflecting both the strategic necessities and cultural influences of the time. During the 14th and 15th centuries, many of these castles were rehabilitated, reinforcing their significance. Even in this period, they remained crucial for population concentration, economic development, and defense, shaping both the social and strategic fabric of the regions they occupied [1].

Medieval castles, built in Romanesque and Gothic styles, served as essential landscape organizers while fulfilling vital administrative and military roles in territorial control [1]. As Barroca [2] argues, these castles are among the most significant elements of Portuguese culture and heritage, embodying the nation's rich historical legacy and architectural evolution. Martins [3] describes the extensive network of castles, towns, and fortified cities that existed in Portugal between the mid-13th and mid-14th centuries, totaling around 250. These fortifications varied significantly in size and importance; some were large and strategically crucial, while others were smaller and less significant. Given these differences, the principles that influenced their development, use, and organization were expressed in different ways and to different extents, adapting to the specific needs and roles in each location.

By focusing on medieval castles, this study seeks to understand their historical significance, architectural uniqueness, and cultural impact on rural and low-density regions. To maintain the study's clarity and precision, only medieval castles classified as National Monuments and Public Interest were considered, with forts, fortresses, and medieval towers specifically excluded from the analysis.

This study aims to examine whether the presence of these castles has spurred economic growth in their respective areas. It will be analyzed how a historical element spread throughout a country can motivate more significant flows of tourism and socio-economic development. Specifically, we want to assess whether the existence of castles classified as National Monuments or of Public Interest attracts more tourists to a location, whether these tourists spend more time in municipalities with castles, and whether local authorities feel motivated to invest more in cultural activities.

The methodological steps taken, from the description of the classification of medieval castles in Portugal and their distribution throughout the country to the empirical analysis that will assess the impact of the existence of castles on the economic and tourist development of Portuguese municipalities, are detailed. This empirical analysis involves not only the study of linear regressions but, given the heterogeneous reality of the country, also an analysis of quantile regressions.

Accordingly, this article is structured into six main sections. Following this introduction, the second section provides a review of the literature related to cultural heritage, historical landscapes, and the role of medieval castles in rural development. The third section presents the materials and methods used for data collection, classification, and spatial and statistical analysis. The fourth section discusses the main findings, including the spatial distribution of the classified castles, their relationship with demographic and tourism indicators, and the results of the econometric models. The fifth section offers concluding remarks, highlighting key insights; finally, the sixth section presents the limitations and potential directions for future research.

## 2. Literature Review

Sites of cultural importance enrich individuals' lives by fostering a meaningful and inspiring connection to their community, as well as to their history and shared experiences. This accumulated cultural heritage must be safeguarded for its enduring, authentic, and intergenerational values to sustain its demand [4]. In this way, the 'genius loci', or unique sense of place, should influence the preservation of monuments and sites in both their tangible and intangible aspects, as well as their diversity, to guarantee their values to society [5].

In 2005, the Faro Convention [6] established cultural heritage as a crucial element of societal progress and human development. The Convention highlighted and recognized the potential of cultural heritage and the vital role of cultural values in driving sustainable economic growth. The focus was on prioritizing the protection of cultural heritage to

achieve sustainable development while also promoting cultural diversity, encouraging intercultural dialogue, and fostering knowledge and sustainable practices related to cultural heritage [7]. Additionally, tourism is a sector that can contribute to preserving heritage and promoting cultural diversity [8].

At this stage, historical landscape studies hold vast potential that can be explored in heritage conservation, protection, tourism, and cultural economic growth. They also contribute to the understanding of local or regional policies and strategies [9]. They introduce new perspectives on territorial studies, highlighting the significance of cultural landscape preservation as a key factor in local development and identity [10].

However, as Albert [11] suggests, the protection of historical landscapes requires a more in-depth discussion about preservation methods, extending to practical actions related to planning, development, and the management of territorial uses in order to achieve local development. Van Lanen, Van Beek, and Kosian [12] share this view, emphasizing historical perspectives along with the contextualization and accessibility of cultural heritage. New methodologies and forward-thinking discussions are essential in order to support development and foster awareness, rooted in the historical layers that have shaped landscapes and imbued places with cultural significance.

Historical monuments and sites play a crucial role in understanding the territorial movements of populations and the key economic, political, and social factors that have shaped local development over time. As Yu et al. [13] suggest, studying the evolution of historical landscape features is vital for comprehending past settlements and enhancing the current protection of the key elements that define the character of places. These features are important for modern landscape planning and management, as recognizing the historical landscape structure helps to preserve heritage values and provide updated insights into local traditions and enduring practices [14].

Past events influence both the present and future developments. Historical monuments and sites provide the chance to connect economic and culturally focused approaches to regional transformation, offering diverse perspectives on how the links between the past, present, and future influence regional growth [15].

Many monuments and sites are located in small villages in low-density and peripheral areas. In the literature, peripheral regions are often viewed as disadvantaged in multiple areas, facing challenges in capitalizing on their existing cultural heritage [16]. Building networks is frequently regarded as essential for unlocking the potential of these assets, a strategy that is also encouraged by various regional policies [17]. In fact, rural areas or small towns with tourism potential play a key role in driving economic and social development in various regions [18]. Evaluating and connecting opportunities can increase local incomes, generate employment, protect cultural and natural heritage, and enhance the quality of life for local communities. As a result, rural tourism, slow tourism, wine tourism, and other niche forms of travel are growing in popularity, meeting the increasing demand from modern society for experiences rooted in natural and cultural heritage [19].

Understanding the spatial patterns of heritage assets in low-density territories is particularly relevant for identifying development potential and territorial cohesion priorities. Spatial analysis methods—particularly global spatial autocorrelation techniques—have been increasingly applied in cultural geography and tourism studies to detect non-random distributions of heritage features across space. Moran's I statistic is a widely used indicator for identifying whether a given phenomenon tends to cluster, disperse, or distribute randomly across discrete spatial units [20].

In recent years, Moran's I has been employed in various studies addressing the spatial behavior of cultural and tourism-related resources. For example, a study on the spatial structure of world cultural and natural heritage sites in China revealed significant

clustering patterns using this method [21]. Similarly, Li et al. [22] applied Moran's I to examine the aggregation of cultural heritage resources in Shanzhou, identifying spatial inequalities in heritage distribution. These studies highlight the analytical potential of spatial autocorrelation methods for understanding heritage concentration and informing regional development strategies.

In parallel, tourism management must emphasize responsibility, combining the efforts of local stakeholders such as governments, tour operators, businesses, destination managers, marketing organizations, land-use planners, heritage and tourism professionals, civil society, and visitors [23]. This collaboration aims to foster cultural heritage awareness and create opportunities for personal and community well-being and resilience [24]. Achieving a balance between tourism development and its economic benefits and heritage conservation is crucial for sustainable development. This requires a comprehensive approach to sustainable heritage management that not only balances urban development and conservation but also enhances resilience and fosters sociocultural ecosystems [25]. By integrating these elements, we can ensure that both tourism and heritage contribute to long-term sustainability and community well-being. This balance will promote decent work and economic growth while reducing inequalities and fostering the creation of sustainable communities and places [26].

Heritage sites, whether in rural or remote areas, form an intricate mosaic of assets that significantly benefit local communities. The inherent social, cultural, and natural characteristics of these sites attract creative industries and various businesses and activities that can benefit local communities [27]. By utilizing these unique features, communities can drive economic growth and enhance prosperity, creating a dynamic environment that promotes innovation, sustainability, and a stronger connection to local identity.

Castles emerged in the northwestern region of the Iberian Peninsula in the 9th century, serving both defensive and offensive purposes. These fortified structures gained significance during the conflicts with the Muslims who had settled south of the Mondego River. During the Reconquest period (9th century to 13th century in Portuguese territory), fortified architecture expanded, evolving from Romanesque and Gothic styles, often surrounded by defensive walls. In the southern Portuguese territory, the Reconquest phenomenon led to the conquest of Muslim castles, which had distinctive differences in their defensive systems [28]. These structures are not unique to Portugal, they accompanied the expansion of the medieval peninsular kingdoms of Portugal, León, Castile, Navarre, and Aragon. However, they possess local characteristics that distinguish them within the Iberian Peninsula. Both defensive systems possess valuable characteristics that allow them to be classified under special protection. As Venter [29] argues, military events have had a significant impact on history, making military heritage essential for comprehending societal values and traditions. Every country has its own unique military heritage.

In medieval Portugal, two types of frontier castles can be identified: those along the border with Spain, a conflict-ridden neighbor during the Middle Ages, and those established during the Reconquest of Muslim territories. The latter are particularly concentrated in the southern Mondego region, extending to the Algarve, shaping the territory with lines running from west to east. Another category of castles emerged during the medieval economic expansion up until the 14th century, driven by the nobility's efforts to promote economic activities and population growth within their territories [28]. These castles have been preserved and many of them are nowadays places of cultural activity. Cultural events based on castles include 'Festival de Música no castelo de Trancosco' (a music festival), 'Festival de Castelo Novo' (a diverse cultural event happening in Fundão), the cultural agenda of the Castle of Saint Jorge (Lisbon) throughout the year, 'Festa do Castelo' in Sesimbra, or 'Mercado no Castelo', another multicultural event located at the castle of Vila do Conde.

### 3. Materials and Methods

To gain a comprehensive understanding of the medieval castles as highly valuable heritage, a documental analysis using the Information System for Architectural Heritage—SIPA [30] (*Sistema de Informação para o Património Arquitectónico*)—was conducted. This system provides extensive information and documentation on a wide range of heritage sites, encompassing architectural, urban, and landscape heritage. It focuses specifically on heritage that is either Portuguese or has origins or influences rooted in Portuguese culture. On SIPA, the level of protection of the monuments is displayed. These data points are among the most important for describing the main heritage characteristics.

In Portugal, Law no. 107/2001 of September 8th [31], commonly referred to as the *Lei de Bases do Património Cultural* (Basic Law on Cultural Heritage), outlines the framework for the protection and classification of cultural heritage. This law categorizes cultural heritage through a classification process, which is a key component of heritage management in Portugal. It defines three levels of importance: a Monument of National Interest, Monument of Public Interest, and Monument of Municipal Interest. Additionally, it specifies the surrounding area of protection, known as the Zona Especial de Proteção (ZEP), to ensure the preservation of cultural heritage within its vicinity.

According to Law no. 107/2001 of September 8th [31], a Monument of National Interest is the highest classification level for cultural heritage assets in Portugal. This designation is given to assets of exceptional historical, cultural, artistic, or architectural significance that are considered to have paramount importance to the nation's heritage. These monuments are subject to the strictest protection measures to ensure their preservation for future generations. Public Interest classification is a classification for cultural heritage assets that have significant historical, cultural, or architectural value but are not considered as critical as those classified as Monuments of National Interest. Both classifications aim to protect and preserve Portugal's cultural heritage, ensuring that valuable historical assets are maintained for future generations. The classification process is complex and is defined by Decree-Law no. 309/2009 [32], updated on 23 October 2009. The classification process involves the most prominent cultural and heritage management organizations to determine the appropriate classification level.

Once classified, cultural heritage assets are officially registered and documented in the national inventory, which is part of SIPA [30]. This documentation includes comprehensive details about the asset's historical, cultural, and architectural significance, ensuring that its value is recognized and preserved for future generations. This process of registration and documentation is crucial as it not only provides legal protection for the assets but also makes information about these heritage sites accessible to researchers, historians, and the general public. SIPA [30] serves as a centralized repository where detailed records are maintained, including descriptions, historical context, and any relevant architectural features. By systematically documenting these assets, SIPA [30] plays a crucial role in the effective management and conservation of Portugal's rich cultural heritage and provides comprehensive documentation that not only facilitates the research process but also makes this information accessible through open access.

All the castles examined in this study were public monuments, managed by public entities such as municipal administrations. In SIPA, they were classified as cultural and recreational monuments, with only two designated as hotels and one as a cemetery.

To analyze the spatial distribution and contextual characteristics of medieval castles, we developed a series of thematic maps using QGIS 3.34.11-Prizren. The georeferenced locations of the castles were obtained from the (SIPA) [30], ensuring accurate spatial representation. To ensure data quality, several verification procedures were implemented. Missing or incomplete records in the SIPA database were cross-checked with official heritage documentation and excluded if essential attributes—such as classification status or

geographic coordinates—were unavailable or unverifiable. Duplicate entries and non-classified assets were also filtered out.

Geospatial validation was conducted using QGIS 3.34.11. Coordinates originally provided in WGS 84 by SIPA were projected and cross-referenced with the CAOP shapefiles, which use the national reference system ETRS89/Portugal TM06. This coordinate transformation ensured consistency and spatial accuracy across all cartographic products generated. As a result, the final dataset included only valid, classified, and accurately georeferenced medieval castles. Additionally, the administrative boundaries were integrated using the Carta Administrativa Oficial de Portugal (CAOP) [33], allowing for the precise delineation of municipal limits.

As a robustness check to assess spatial concentration patterns, we applied a spatial autocorrelation analysis to the distribution of classified castles located in low-density municipalities. The classification of low-density territories followed the official list of municipalities identified in the *Programa Nacional para a Coesão Territorial* (National Program for Territorial Cohesion—PNCT). This allowed us to isolate municipalities that contained classified heritage assets (National Monuments or Public Interest) situated in demographically disadvantaged areas.

We used the global Moran I statistic to evaluate whether the presence of these heritage sites exhibited a non-random spatial distribution. The analysis was conducted using GeoDa software (version 1.22.0.14), applying a first-order Queen contiguity spatial weights matrix. The test was based on a binary variable indicating whether a municipality had a classified castle located in a low-density territory. A total of 999 permutations were performed to assess statistical significance.

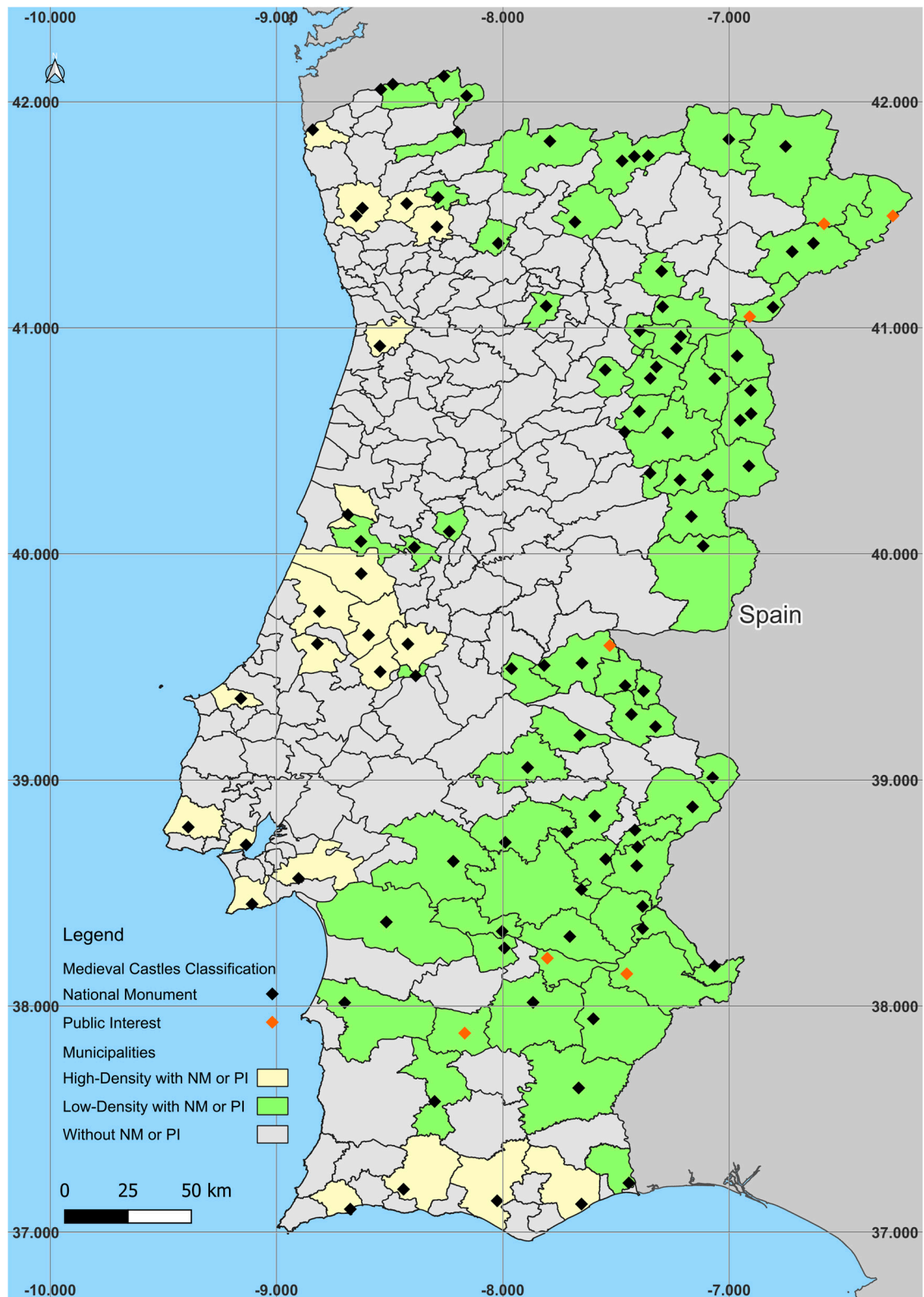
The results revealed a Moran's I value of 0.4827 and a pseudo  $p$ -value of 0.001, indicating a statistically significant and positive spatial autocorrelation. This confirmed that the classified castles in low-density municipalities tended to cluster geographically, rather than being randomly scattered across the national territory. A visual representation of these results is presented in the Supplementary Figure (Figure S1 and S2).

#### 4. Results

To better contextualize the presence of medieval castles in different territorial settings, we created a map distinguishing municipalities classified as low-density under the *Programa Nacional para a Coesão Territorial* (National Program for Territorial Cohesion—PNCT). This framework was preferred over general population density thresholds as it aligned with national cohesion policies and provided a more functional classification of territorial challenges. The map highlights three types of municipalities: (1) low-density with classified castles; (2) high-density with classified castles; (3) municipalities without any classified medieval castles.

This cartographic approach allows for a clearer identification of spatial trends in heritage distribution. As illustrated in Figure 1, there is a notable concentration of castles in low-density areas, particularly along the frontier with Spain—bordering the medieval kingdoms of León and Castile—and across the Alentejo and central regions. These spatial patterns reflect strategic medieval settlement and defense priorities, particularly during the Reconquest and territorial consolidation periods.

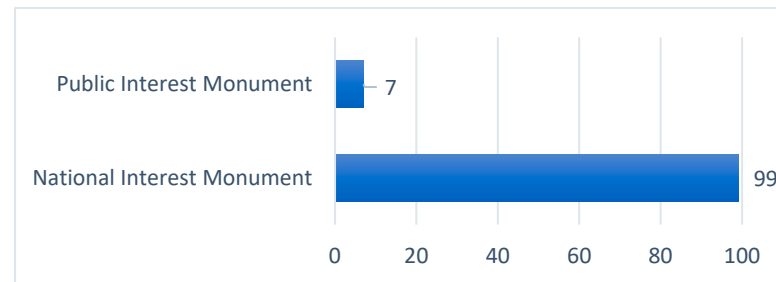
The SIPA inventory used in this study identified a total of 106 medieval castles classified across Portugal's 308 municipalities. Among these, 99 are classified as National Monuments (NMs) and 7 as Public Interest (PI), underscoring their cultural and historical significance (Figure 1).



**Figure 1.** Distribution of classified medieval castles in Portugal according to municipal density classification. Source: Authors' compilation based on SIPA [30], CAOP [33], and PNCT.

Data from the SIPA inventory was utilized in this study to analyze the number of castles classified as National Monuments and of Public Interest, their distribution across the national territory, the surrounding settlements of these medieval castles, and their classification dates.

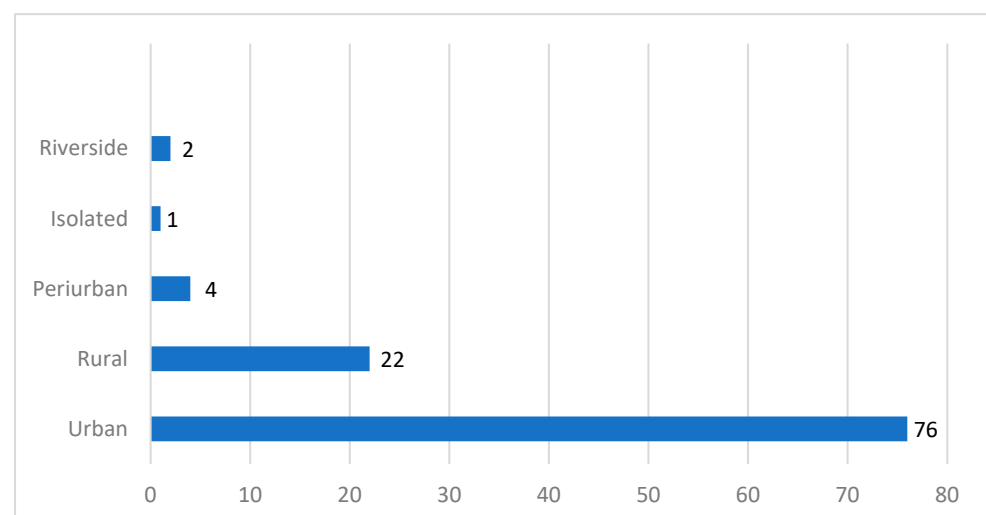
In the scenario of the studied monuments, a total of 106 medieval castles were identified in the SIPA database across the 308 municipalities, all resilient castles that survived the passage of time. The sample for this study included the following site: 99 castles classified as Monuments of National Interest, emphasizing their exceptional historical and cultural significance at a national level, and 7 castles recognized as being of Public Interest, indicating their importance to the public and their contribution to the nation's collective heritage (Figure 2).



**Figure 2.** Number of medieval castles classified as National Interest and Public Interest. Source: Own elaboration, based on SIPA [30].

Given the high percentage of castles classified under the most important category, it is evident that the Portuguese medieval military landscape is profoundly marked by castles and their related heritage. These elements characterize the cultural landscape and imbue places with unique features and singular authenticity that permit their recognition and protection at the highest level. These particular characteristics define the country's medieval military heritage, endowing the castles with exceptional histories and territorial features that are highly valuable. This distinctiveness highlights the historical significance of these structures and underscores their importance in the broader context of the Iberian Peninsula's cultural landscape.

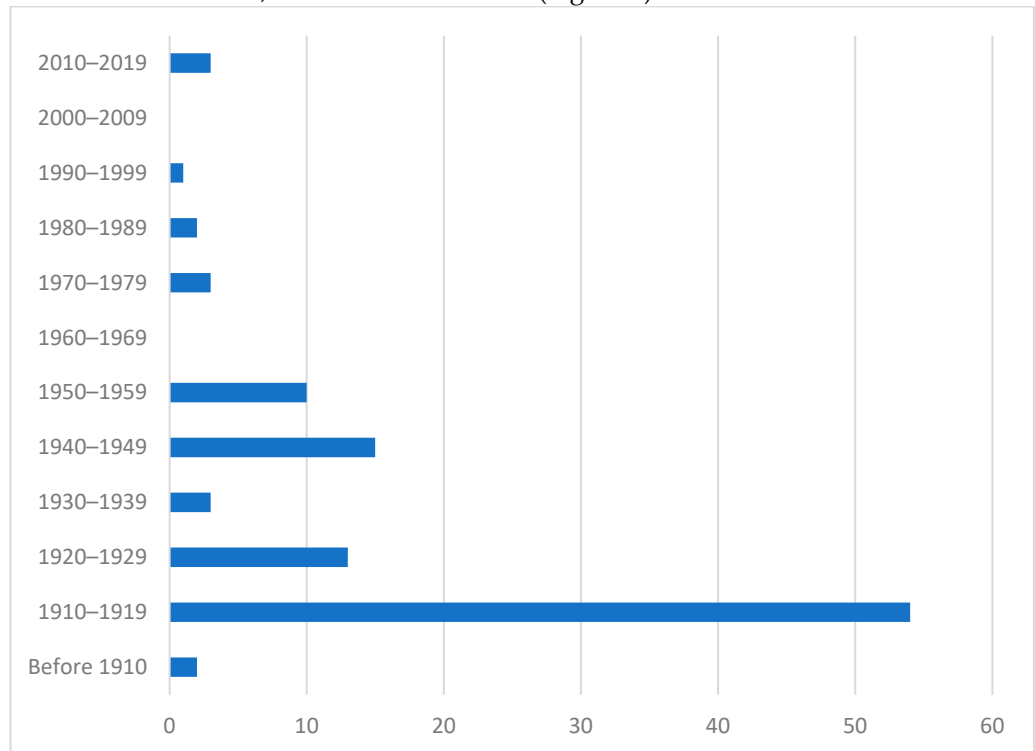
The majority of sites, totaling 76 (Figure 3), are located in urban areas. This indicates a significant connection between these castles and the cities and villages established during the medieval period, which have now evolved into more densely populated areas. This association emphasizes the role of castles as central hubs in medieval settlements, where they often served as administrative centers, military fortifications, and symbols of power. There are 22 monuments in rural areas, demonstrating that many sites are located in less densely populated, countryside locations.



**Figure 3.** Characteristics of settlements surrounding classified medieval castles. Source: Own elaboration, based on SIPA [30].

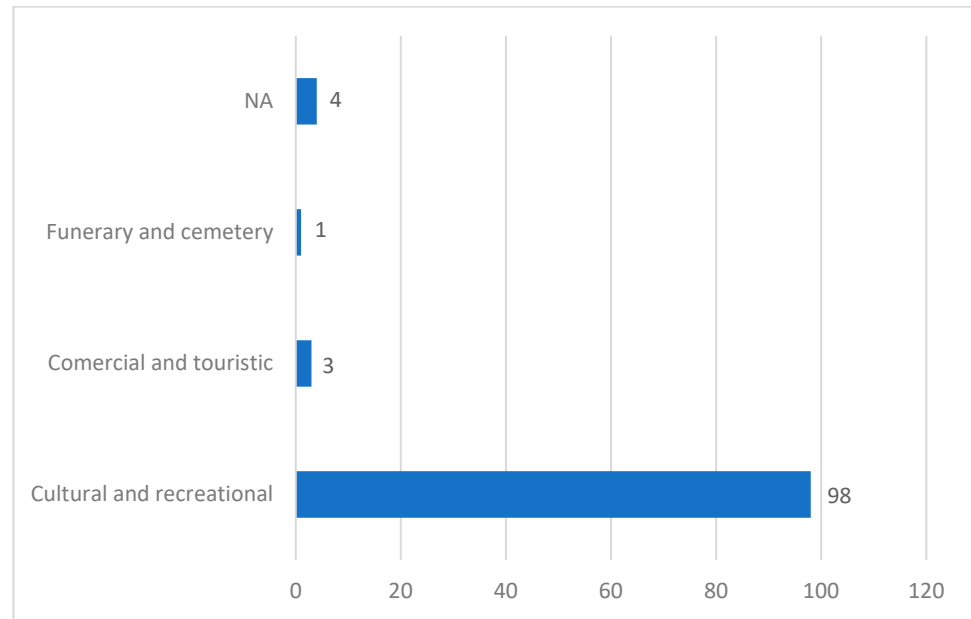
The Decree-Law establishing the monument classification process was endorsed on 30 December 1901, and the first classification, Elvas Castle, took place on 27 September 1906. These dates highlight the historical importance of castles as monuments and indicate that, during the initial phase of Portuguese monument classifications, castles were among the first to be protected.

Upon analyzing the approach to classification dates, it is evident that most castles were classified primarily between 1910 and 1919, with 54 classifications, and again between 1940 and 1949, with 15 classifications (Figure 4).



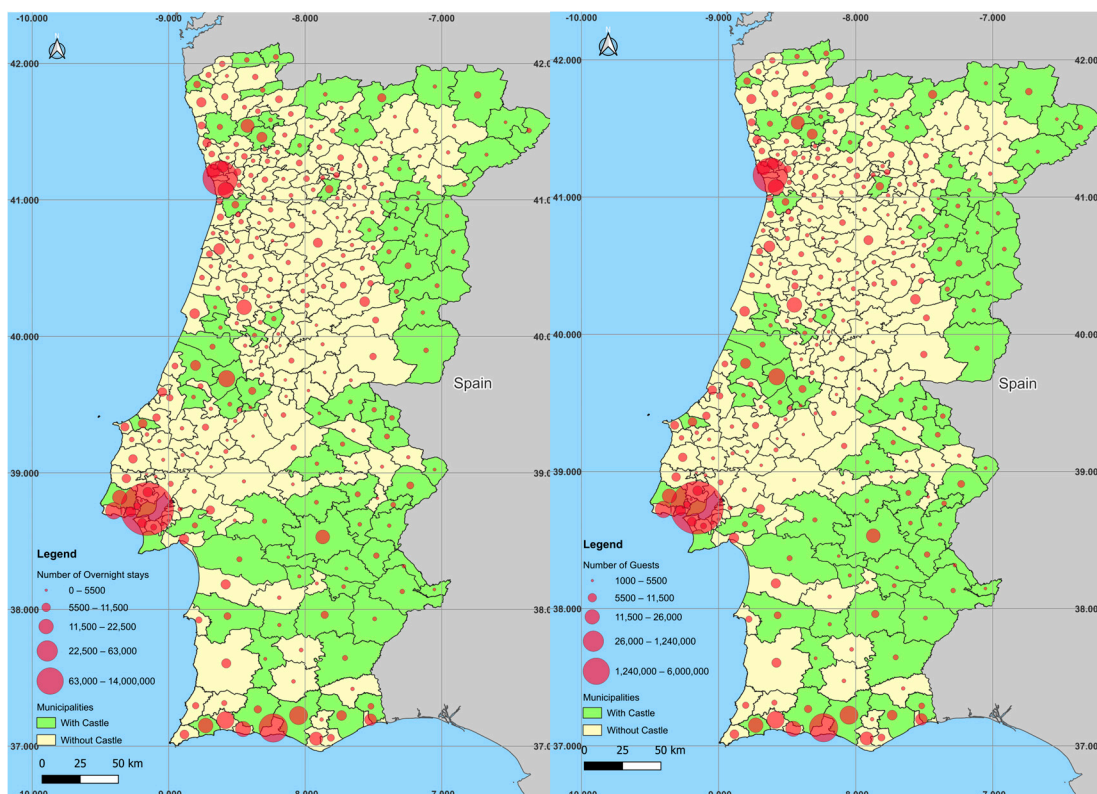
**Figure 4.** Date of classifications as Monuments of National and Public Interest. Source: Own elaboration, based on SIPA [30].

The current usage of medieval castles (Figure 5) shows the clear predominance of cultural and recreational purposes. Most sites (98) are dedicated to cultural and recreational purposes. This suggests a strong emphasis on preserving and promoting cultural heritage and providing spaces for recreational activities. There are only three monuments categorized as commercial and touristic. This indicates that comparatively few monuments are specifically dedicated to commercial activities or attracting tourists. Instead, many monuments are geared toward recreational activities, which are primarily intended for residents. However, these recreational activities can also be quite appealing to tourists, offering them a chance to engage with the local culture and enjoy the unique experiences that these sites provide.



**Figure 5.** Actual uses of medieval castles. Source: Own elaboration, based on SIPA [30].

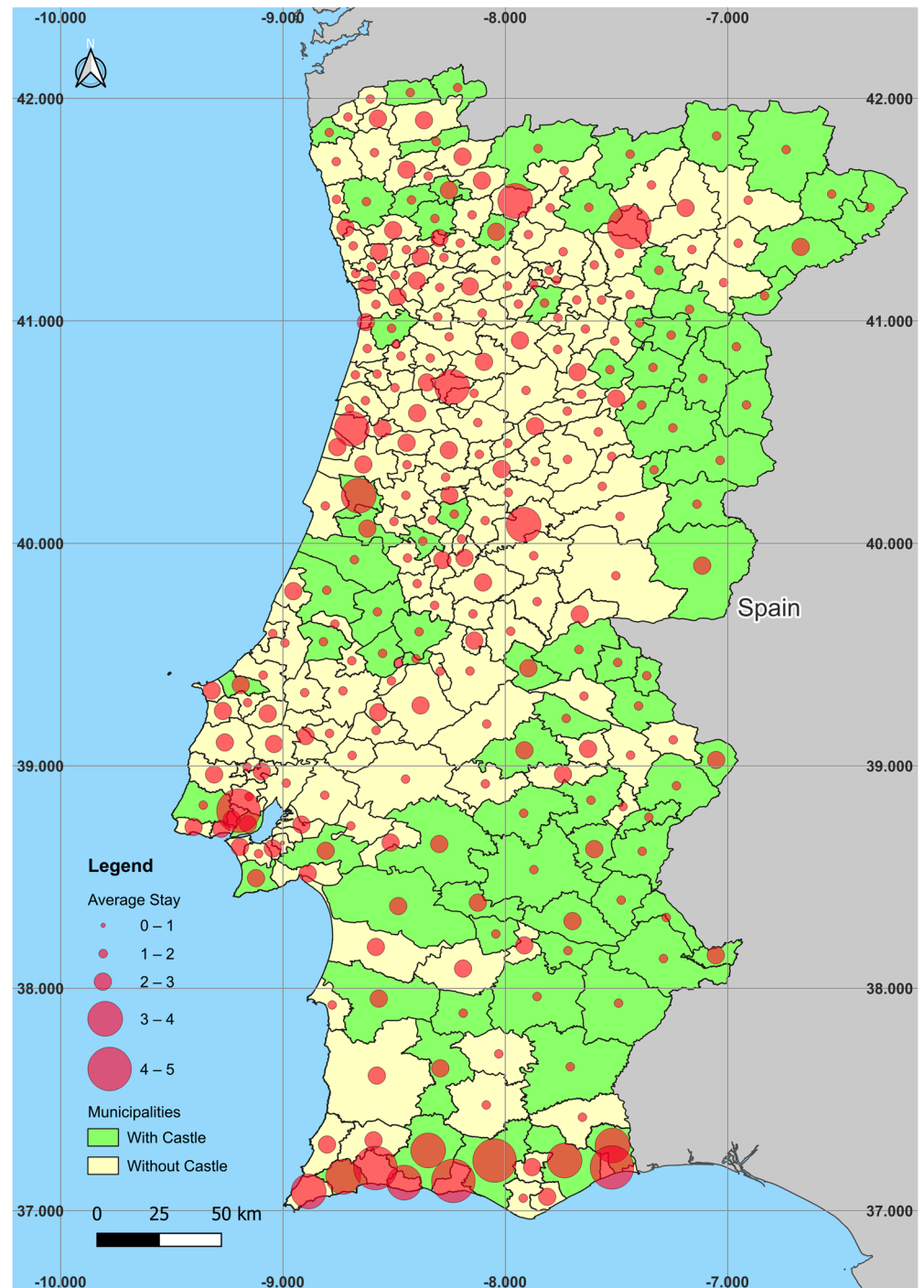
By examining the maps of overnight stays and number of guests (Figure 6a,b), it becomes evident that castles are not sufficiently attractive to drive significant tourism. This map highlights the phenomenon where low-density and rural areas in the interior of Portugal correlate with low levels of tourism. Despite their historical and architectural value, with the highest levels of classification, National and Public Interest, these castles do not seem to attract enough visitors to counterbalance the inherent challenges of their remote locations. This underscores the importance of additional efforts to enhance the tourism demand of these inland areas. Therefore, to increase tourism, it may be necessary to develop complementary activities and services that enhance the overall appeal of these low-density regions.



(a) (b)

**Figure 6.** Number of overnight stays (a) and number of guests (b) in 2022 in relation to medieval castle locations. Source: Authors' compilation based on CAOP [33], SIPA [30], and INE [34].

A map showing the average lengths of stay in municipalities with castles reveals similar conclusions (Figure 7).



**Figure 7.** Average stay in 2022 in relation to medieval castle locations. Source: Authors' compilation based on CAOP [33], SIPA [30], and INE [34].

This map reveals that the average stay in most municipalities ranged between 1.7 and 2.2 nights, with the national average standing at 2.05 nights. Only a few municipalities

recorded values above 3 nights, with the major tourist destinations, such as the Algarve and Lisbon, unsurprisingly, registering higher average stays. This highlights the attractiveness of these areas for longer tourist stays.

When examining the relationship between the presence of castles and the average stay, no direct correlation is observed. More than 65% of municipalities with a castle have an average stay below the national average. Among the remaining municipalities with castles, around 27% report an average stay between 2 and 3 nights, while only 8% exceed 3 nights. Notably, within this 8%, the majority are in the Algarve region (five out of six municipalities in this category).

For this reason, there appears to be no direct relationship between the presence of castles and the average length of stay of tourists. This suggests that these locations may function more as short-term visit attractions rather than extended-stay destinations.

This highlights an opportunity for inland regions and low-density areas to invest in a type of tourism that leverages local cultural and heritage elements. Let us clarify that we are not claiming that denser places are per se more touristically attractive. By focusing on these aspects, these regions can develop distinctive and attractive tourism offerings that interest visitors and support local communities.

However, despite all the efforts of national and international institutions to highlight the contribution of the existence of historical monuments as essential to the economic development of communities, there are underlying critical readings. As exposed in Figure 7, in Portugal, tourism remains concentrated in Lisbon and Porto, the two largest cities, as well as in the Algarve region, which has a long-standing tradition of beach and sun tourism.

Therefore, an empirical analysis is required that contributes to the potential of a robust methodology for this discussion. The next sub-section aims to achieve this intention.

To assess the economic and touristic dynamism capacity of the presence of classified castles in Portuguese municipalities, we began by regressing the dummy variable 'Existence of Castle' on three variables that we considered fundamental to describing the potentially impacted realities: tourism flows, assessed by the number of guests and average stay [34], as well as municipal expenditure on cultural activities [34]. There is an expectation that the presence of castles (especially if they are classified as heritage objects of Public Interest) will promote a dynamic cultural agenda in the area. The castle space is an opportunity to host cultural events as well as to stimulate tourism, which provides local authorities with additional space for these cultural events. In addition, the presence of a castle tends to be part of a tradition of cultural events that comes from previous mandates of mayors and other local cultural promoters. In addition to the variable under discussion (Existence of Castle), we included as explanatory variables other variables that have proven to be important for explaining the respective dependent variables in alternative studies [10,12,17,19]: the number of parishes, maximum altitude, minimum altitude, expenditure on cultural heritage, expenditure on sports activities, resident population, density, monthly earnings, commercial firms, Tourism Carrying Capacity, tourism revenues, and overnight stays.

The main municipal expenditures in Portugal, in terms of percentage, are as follows: expenditure on general public administration services (around 34%), followed by health (19%), social protection (14%), education (11%), and economic affairs (11%). In 2022, social protection led with 39.7% of total expenditure.

Let us detail these expenditures:

- General public administration services include expenditure on municipal management, administrative staff, and public debt (interest), among others.
- Health expenditure is on hospitals, health centers, health programs, etc.

- Social protection relates to expenditure on support for families, elderly people, people with disabilities, unemployment, etc.
- Education expenditure goes to schools, nurseries, education programs, etc.
- Economic affairs regard expenditure on infrastructure, economic development, tourism promotion, etc.

There are other municipal expenditures:

- Defense, Security, and Public Order: Expenditure on police, security, etc.
- Housing and Community Development: Expenditure on housing programs, social infrastructure, etc.
- Leisure, Culture, and Religion: Expenditure on cultural and sports activities, etc.
- Let us note that percentages may vary from municipality to municipality and from year to year, depending on the needs and priorities of each location. As noted, cultural expenditure tends to not be particularly high considering the generality of Portuguese municipalities.

Therefore, we tested the following empirical equation:

$$Y_i = \alpha + \beta_1 * Castle_i + \gamma'X_i + \varepsilon_i \quad (1)$$

where  $Y_i$  is the dependent variable for municipality  $i$ , which can be tourism flow, assessed by the number of guests and the average stay [1], as well as municipal expenditure on cultural activities [1].  $X_i$  is a vector of control variables.  $\varepsilon_i$  relates to the idiosyncratic error term.  $\alpha$  is the intercept, while  $\beta_1$  refers to the coefficient for the presence of a castle.  $\gamma$  is the vector of the coefficients of the control variables. We first estimated Equation (1) by OLS analysis, and then considered quantiles 25, 50, and 75.

We present a table with the descriptive statistics of these variables and their respective detailed sources.

#### OLS Estimation

Tables 1–3 show the results obtained by ordinary least squares (OLS) analysis, considering a robust estimation of the errors.

**Table 1.** Guests, log (OLS).

Dependent Variable: Guests, log (OLS)	Coefficient	Standard Error (Robust)	<i>p</i> -Value
Castle	9.4834	13.3732	0.479
Number of parishes, log	−18.85 **	7.942	0.023
Maximum altitude, log	−0.458 ***	0.152	0.004
Minimum altitude, log	1.206 **	0.475	0.011
Expenses on cultural heritage, log	−0.002	0.002	0.325
Expenses on sports activities, log	−0.868	3.302	0.793
Resident population, log	0.129	0.125	0.304
Density, log	−3.949	2.981	0.376
Monthly earnings, log	3.409	13.011	0.481
Commercial firms, log	46.1 ***	14.5	0.002
Constant	12.748 ***	4.632	0.006
N	277		
Prob > F(13,263)	0.000		
R-squared	0.52		

Significance level: 1%, \*\*\*; 5%, \*\*; Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, due to their high VIF (>10.0) we removed these variables from the final models of guests (VIF Tourism Carrying Capacity: 101.43; VIF tourism revenues: 103.63; VIF overnight stays: 335.89), of average stay (VIF Tourism Carrying Capacity: 121.46; VIF tourism revenues: 153.67; VIF overnight stays: 325.99), and of expenses on cultural activities (VIF Tourism Carrying Capacity: 128.47; VIF tourism revenues: 183.69; VIF overnight stays: 221.72). Source: Own elaboration.



**Table 2.** Average stay (OLS).

Dependent Variable: Average Stay, log (OLS)	Coefficient	Standard Error (Robust)	p-Value
Castle	0.99	7.41	0.989
Number of parishes, log	0.84	2.04	0.692
Maximum altitude, log	-0.12	0.11	0.271
Minimum altitude, log	-0.44	2.84	0.124
Expenses on cultural heritage, log	0.13	0.21	0.516
Expenses on sports activities, log	0.02	0.06	0.730
Resident population, log	-0.68	1.26	0.509
Density, log	0.21	0.39	0.585
Monthly earnings, log	0.27	0.21	0.900
Commercial firms, log	-0.02	0.02	0.268
Constant			
N	277		
Prob > F(13,263)	0.000		
R-squared	0.528		

Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, due to their high VIF (>10.0) we removed these variables from the final models of guests (VIF Tourism Carrying Capacity: 101.43; VIF tourism revenues: 103.63; VIF overnight stays: 335.89), of average stay (VIF Tourism Carrying Capacity: 121.46; VIF tourism revenues: 153.67; VIF overnight stays: 325.99), and of expenses on cultural activities (VIF Tourism Carrying Capacity: 128.47; VIF tourism revenues: 183.69; VIF overnight stays: 221.72). Source: Own elaboration.

**Table 3.** Expenses on cultural activities, log (OLS).

Dependent Variable: Average Stay, log (OLS)	Coefficient	Standard Error (Robust)	p-Value
Castle	26.804 ***	10.313	0.010
Number of parishes, log	-0.232	0.372	0.533
Maximum altitude, log	-0.020 *	0.011	0.085
Minimum altitude, log	0.124 ***	0.040	0.003
Expenses on cultural heritage, log	0.134 ***	0.0329	0.000
Expenses on sports activities, log	9.745 ***	1.295	0.000
Resident population, log	-0.384 ***	0.139	0.006
Density, log	0.002	0.005	0.673
Monthly earnings, log	-0.042	0.041	0.296
Commercial firms, log	-0.144	0.201	0.475
Constant	35.271	45.848	0.442
N	277		
Prob > F(13,263)	0.000		
R-squared	0.4547		

Significance level: 1%, \*\*\*; 10%, \*. Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, due to their high VIF (>10.0) we removed these variables from the final models of guests (VIF Tourism Carrying Capacity: 101.43; VIF tourism revenues: 103.63; VIF overnight stays: 335.89), of average stay (VIF Tourism Carrying Capacity: 121.46; VIF tourism revenues: 153.67; VIF overnight stays: 325.99), and of expenses on cultural activities (VIF Tourism Carrying Capacity: 128.47; VIF tourism revenues: 183.69; VIF overnight stays: 221.72). Source: Own elaboration.

Through an integrated reading of Tables 1–3, we observe that the presence of a classified castle, although always a factor of tourist interest, contributing to a greater number of guests registered in the municipality (Table 1, +9.483, *p*-value: 0.479) as well as to an extension of the average stay (Table 1, +0.99, *p*-value: 0.989), does not achieve this in a

statistically significant way in Portuguese municipalities. This proves our perception that any set of initiatives to promote visits to castles in Portugal and more complex tourism and cultural promotion requires greater effectiveness.

Nevertheless, the existence of a classified castle proved to be important for the dynamics of municipal expenditure on cultural activities. Specifically, Table 1 shows that municipalities with at least one classified castle are expected to have this variable be higher by around EUR 27 million than municipalities without any classified castle. Table 1 shows that there tends to be a movement of complementarity between expenditure on heritage and expenditure on sports in relation to expenditure on cultural activities.

However, recognizing that the Portuguese territory is based on profound heterogeneity [35], we also considered the relevance of using the ‘quantile regressions’ method. According to the literature [36], this method allows us to differentiate estimates considering observations by quantiles. Thus, it enabled us to estimate a different model for the observations with lower values of a given dependent variable which was different from the one estimated for the observations with higher values of the same dependent variable. It is a method that allows for more robust estimates that differentiate, in our case, the municipalities by the greater or lesser level of development of the tourism sector (respectively, quartiles 25 and 75).

Tables 4–6 show the estimates obtained by ‘quantile regressions’.

**Table 4.** Guests, log (quantile regressions).

Dependent Variable: Guests, log (OLS)	Coefficient (Standard Error) [Quartile 25]	Coefficient (Standard Error) [Quartile 50]	Coefficient (Standard Error) [Quartile 75]
Castle	2573.38 (4584.42)	1352.78 (4001.31)	345.68 (3626.5)
Number of parishes, log	−80.127 (181.49)	−75.17 (160.54)	−182.3 (143.4)
Maximum altitude, log	3.885 (6.311)	1.050 (5.566)	1.793 (4.992)
Minimum altitude, log	−0.478 (21.246)	4.295 (18.540)	5.146 (16.806)
Expenses on cultural heritage, log	−0.465 (2.052)	−0.002 (0.001)	−0.003 ** (0.001)
Expenses on sports activities, log	18.97 (512.4)	59.32 (377.9)	71.014 (405.36)
Resident population, log	0.054 (0.063)	0.139 ** (0.055)	0.168 *** (0.049)
Density, log	−1.361 (3.367)	−3.949 (2.981)	−3.273 (2.664)
Monthly earnings, log	3.432 (14.74)	3.409 (13.011)	2.639 (11.665)
Commercial firms, log	1470.09 (118.96)	1655.24 *** (105.11)	775.8 (94.106)
Average stay, log	−2701.43 (3761.3)	−5751.86 ** (3326.54)	−5915.2 ** (2927.5)
Constant	−2362.4 (19,148.3)	4428.54 (16,934.4)	7107.2 (15,147.6)
N	277	277	277
Pseudo-R-squared	0.703	0.796	0.877

Significance level: 1%, \*\*\*, 5%, \*\*; Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, due to their high VIF (>10.0) we removed these variables from the final model. Source: Own elaboration.

**Table 5.** Average stay, log (quantile regressions).

Dependent Variable: Average Stay, log (OLS)	Coefficient (Standard Error) [Quartile 25]	Coefficient (Standard Error) [Quartile 50]	Coefficient (Standard Error) [Quartile 75]
Castle	−0.009 (0.063)	−0.015 (0.058)	−0.067 (0.102)
Number of parishes, log	0.003 (0.002)	0.003 (0.002)	$-5.3 \times 10^{-4}$ (0.004)
Maximum altitude, log	−0.121 (0.852)	−0.134 (0.815)	−0.234 * (0.144)
Minimum altitude, log	−0.246 (0.294)	−0.454 * (0.274)	−0.374 (0.474)
Expenses on cultural heritage, log	0.168 (0.278)	0.118 (0.258)	−0.281 (0.448)
Expenses on sports activities, log	−0.002 (0.007)	0.004 (0.006)	−0.001 (0.111)
Resident population, log	−0.697 (0.877)	−0.867 (0.817)	−0.287 (0.146)
Density, log	0.309 (0.465)	0.385 (0.435)	0.375 (0.755)
Monthly earnings, log	0.154 (0.24)	0.103 (0.194)	0.294 (0.324)
Commercial firms, log	0.004 ** (0.002)	−0.001 (0.001)	0.004 (0.007)
Average stay, log			
Constant	1.563 *** (0.243)	1.802 *** (0.222)	2.087 *** (0.392)
N	277	277	277
Pseudo-R-squared	0.124	0.136	0.239

Significance level: 1%, \*\*\*, 5%, \*\*, 10%. \* Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, due to their high VIF (>10.0) we removed these variables from the final model. Source: Own elaboration.

**Table 6.** Expenses on cultural activities, log (quantile regressions)

Dependent Variable: Expenses on Cultural Activities, log (OLS)	Coefficient (Standard Error) [Quartile 25]	Coefficient (Standard Error) [Quartile 50]	Coefficient (Standard Error) [Quartile 75]
Castle	0.221 *** (0.044)	0.1990 *** (0.079)	0.116 *** (0.013)
Number of parishes, log	−0.223 (0.165)	−0.358 (0.317)	0.067 (0.527)
Maximum altitude, log	0.007 (0.005)	0.002 (0.011)	−0.014 (0.018)
Minimum altitude, log	0.047 ** (0.018)	0.051 (0.036)	0.120 ** (0.060)
Expenses on cultural heritage, log	0.766 *** (0.176)	0.135 *** (0.346)	0.076 (0.056)
Expenses on sports activities, log	4.42 ***	6.733 ***	11.111 ***

	(0.386)	(0.748)	(1.232)
Resident population, log	-0.194 *** (0.056)	-0.034 *** (0.109)	-0.018 (0.017)
Density, log	-0.003 (0.003)	0.003 (0.006)	0.056 (0.097)
Monthly earnings, log	0.010 (0.013)	-0.016 (0.027)	-0.045 (0.042)
Commercial firms, log	0.005 (0.152)	-0.209 (0.208)	-0.105 (0.486)
Average stay, log	0.029 (0.004)	0.003 (0.006)	-0.007 (0.015)
Constant	-17.14 (17.32)	32.95 (33.534)	26.78 (55.61)
N	277	277	277
Pseudo-R-squared	0.286	0.295	0.345

Significance level: 1%, \*\*\*; 5%, \*\*; Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, due to their high VIF (>10.0) we removed these variables from the final model. Source: Own elaboration.

Through a cross-reading of the estimations in Tables 4–6, we conclude that the existence of a castle in Portuguese municipalities, despite generating tourist flows to the areas, is far from being a widespread factor in tourism dynamics. Regardless of the quartile analyzed and whether we were checking the estimations for guests or for average stay, we concluded that the presence of a castle did not significantly alter the tourism dynamics of the municipalities. Table 2 also shows that the presence of a castle tends to increase the number of guests in the least-visited municipalities (q25), but without statistical significance. Concerning the average stay, the effect is even less significant, regardless of the quartile.

However, once again, Table 2 (expenses on cultural activities) shows that the presence of a castle stimulates a municipality's spending on culture. The difference between quartiles is evident here, with the lowest quartile (q25) reacting with a more significant increase in expenditure to the presence of a castle than the other quartiles. Regardless of the quartile, the presence of a listed castle is a real motivator for the municipality in question to have more cultural expenditure.

For robustness purposes, we also recurred two alternative dependent variables: the (log of) municipal expenditure on cultural activities per resident and the (log of) municipal expenditure on cultural activities over total municipal expenses (Tables 7 and 8).

**Table 7.** Municipal expenditure on cultural activities per resident, log (quantile regressions).

Dependent Variable: Municipal Expenditures on Cultural Activities per Resident, log (OLS)	Coefficient (Standard Error) [Quartile 25]	Coefficient (Standard Error) [Quartile 50]	Coefficient (Standard Error) [Quartile 75]
Castle	0.789 *** (0.306)	0.828 ** (0.335)	0.079 (0.199)
N	277	277	277
Pseudo-R-squared	0.469	0.387	0.344

Significance level: 1%, \*\*\*; 5%, \*\*; Note: we also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, we removed these variables from the final model due to their high VIF (>10.0). We also included as explicative variables those appearing in Table 6 (omitted to save space). Source: Own elaboration.

**Table 8.** Municipal expenditure on cultural activities as share of total expenditure, log (quantile regressions).

Dependent Variable: Municipal Expenditure on Cultural Activities as Share of Total Expenditure, log (OLS)	Coefficient (Standard Error) [Quartile 25]	Coefficient (Standard Error) [Quartile 50]	Coefficient (Standard Error) [Quartile 75]
Castle	0.174 * (0.102)	0.134 (0.089)	0.113 ** (0.066)
N	277	277	277
Pseudo-R-squared	0.488	0.392	0.452

Significance level: 5%, \*\*, 10%. \* Note: We also included the Tourism Carrying Capacity, tourism revenues, and overnight stays as explicative variables. However, we removed these variables from the final model due to their high VIF (>10.0). We also included as explicative variables those appearing in Table 3.2 (omitted to save space). Source: Own elaboration.

Once again, we observe that the presence of a castle motivates higher levels of municipal expenditure on cultural activities per resident and over total municipal expenditures (Table 3). These effects are particularly significant for the lowest quartiles, indicating that municipalities with a classified castle especially increase their expenses on cultural activities when they have limited resources.

## 5. Conclusions

The existence of National Monuments is an important issue in the dynamics of tourism in any location. It is also important to understand the expenses associated with their conservation and restoration and the socio-economic potential involved in the existence of such National Monuments.

In this work, we focused our attention on the presence of castles classified as National Monuments or of Public Interest in the municipalities of Portugal. In particular, we wanted to assess whether municipalities with less population density received unique stimuli in terms of tourist flows or cultural dynamism due to their medieval castles.

Our empirical results show differentiated effects caused by the presence of a medieval castle in a given municipality. These effects are particularly visible in the dynamism of cultural activities under the responsibility of the municipality. Using several dependent variables for a more robust discussion, quantile regressions show that expenditure on cultural activities is particularly dynamic in municipalities with fewer resources but with a castle in their area. Regardless of whether we observe this effect considering the logarithmic value of expenditure on cultural activities, the value of this type of expenditure per capita, or the proportion of this type of expenditure in the total municipal expenditure, the conclusion is in the same direction: the presence of a classified castle leads municipalities with fewer resources (namely, less available budget) to invest more in cultural activities. We agree with Gnanapala and Sandaruwani [37] that cultural and heritage sites can generate significant benefits; however, the long-term sustainability of the industry relies on effectively addressing key challenges. Issues such as excessive tourism concentration or, conversely, a lack of tourism, can present obstacles. We acknowledge the importance of these concerns and share the view that comprehensive strategies are essential to ensure the preservation and responsible development of heritage tourism.

Even so, our results also show that the presence of a castle should promote the arrival of more tourists in a location, as well as the extension of their average stay. Thus, it is shown that there is significant potential for the economic and touristic development of municipalities depending on the existence of a classified castle, a potential that is still far from being achieved. Agreeing with Munien, Phungula, and Bob [18], we contend that by developing more diverse and appealing tourism products, improving infrastructure, and enhancing marketing efforts, these areas can attract more tourists and provide them with

a better experience. This can lead to increased tourism revenue, economic growth, and sustainable development for their communities.

The findings of this study highlight that heritage can serve as a catalyst for enhancing local economic activity and stimulating municipal spending. However, the results also indicate that the presence of castles, while valuable, is insufficient on its own to significantly increase tourism numbers. The presence of a classified castle demonstrates a marginal influence on key tourism indicators, including the number of guests and their average length of stay. This underscores the necessity for more comprehensive and integrated strategies that align with the principles of tourism development, ensuring long-term benefits for both cultural heritage preservation and the local economy. Sabadash et al. [38] similarly emphasized that the absence of effective strategies underscores the urgent need to develop innovative resource mobilization approaches, particularly at the municipal level, as a vital step toward addressing these challenges effectively. From another perspective, Alyahya [39] highlights the importance of a comprehensive management strategy for historical tourism attractions. Their study emphasizes that successful heritage sites must maintain authenticity by preserving their cultural and historical integrity while also ensuring sustainability, so tourism activities contribute to their long-term preservation rather than causing harm. This study emphasizes the necessity of adopting more effective strategies to promote castles, revealing the significant potential of heritage-based tourism to advance social sustainability by actively engaging local communities and fostering the creation of shared value. Furthermore, in low-density areas, tourism strategies must be meticulously tailored to address the unique needs and capacities of individual municipalities, thereby supporting balanced regional development. Notice that Decree-Law No. 5/2023 of January 25, establishes the classification of low-density areas in Portugal, defining them as regions with fewer inhabitants per square kilometer. This design aims to promote balanced territorial development through targeted funding, incentives, and socio-economic policies. Under Portugal 2030, 165 municipalities and 74 parishes benefit from positive discrimination measures designed to reduce disparities, enhance sustainability, and support local economic growth and infrastructure development. From this perspective, tourism strategies in low-density areas must be thoughtfully tailored to meet the unique needs and capacities of each municipality, ensuring both balanced and sustainable development. In the last few decades, Portugal has improved its quality of life through European funds, enhancing social cohesion, healthcare, education, heritage preservation, infrastructure, and sustainable development. The Cohesion Policy, which was maintained under the 2020 agreement, has historically included funding for heritage preservation, recognizing its role in cultural identity, tourism, and economic development. Additionally, the Recovery and Resilience Facility supports sustainable growth, which often incorporates heritage conservation as part of regional development strategies (Decree-Law No. 5/2023 of January 25). This presents a significant opportunity to reflect on heritage and enhance its resilience and conservation, particularly for the monuments classified as being of the greatest National and Public Interest.

As Arumugam, Nakkeeran, and Subramaniam [40] suggest, governments and stakeholders play crucial roles in strengthening heritage tourism by improving infrastructure, promoting attractions, and organizing cultural events. Educating visitors fosters appreciation, while strategic marketing attracts tourists and preserves traditions. Digital marketing enhances visibility and engagement cost-effectively, though print media remains valuable. Sustainability is vital for long-term success. Moreover, heritage tourism reinforces brand value, draws visitors in, and boosts recognition, making investment in infrastructure, promotion, and cultural initiatives essential for a thriving tourism sector. From another perspective, the presence of classified castles demonstrates their significant role in stimulating municipal investment in cultural activities, whether assessed per capita or as

a proportion of total municipal expenditures. This effect is particularly pronounced in municipalities where classified castles emerge as pivotal drivers. Moreover, this dynamic highlights the potential of heritage-driven strategies to foster territorial cohesion by empowering under-resourced municipalities to enhance their cultural infrastructure and offerings.

An essential strategy to implement is investment in accessibility, particularly in infrastructure. Lahura and Sabrera [41] highlighted that infrastructure development plays a crucial role in stimulating tourism and economic growth, especially in archeological sites with high potential. Their study demonstrates that enhancing transportation networks, visitor facilities, and accessibility effectively boosts tourism demand, increases local revenue, and generates employment opportunities, reinforcing the long-term economic sustainability of these regions. Organizations responsible for preserving and managing heritage and increasing its value must enhance skills, tools, and attitudes, and often redefine their roles within the planning process. It is crucial to understand heritage as a vital resource within the urban ecosystem and as an essential resource for promoting the harmonious development of historic towns and their surrounding areas [42]. Rasoolimanesh, Jaafar, Ahmad, and Barghi [43] emphasize the crucial role of local authorities in enhancing residents' awareness, engagement, and participation in heritage conservation and tourism development. The authors argue that effective communication, education, and accessible opportunities foster involvement and ensure sustainable growth. Additionally, encouraging decision-making participation and promoting positive perceptions strengthen community support for heritage preservation while also generating economic and cultural benefits. Alyahya [39] reinforces the importance of community involvement, as engaging local residents fosters a sense of ownership and encourages responsible tourism practices. This study suggests that only by combining these elements in a collaborative approach can historical tourism sites remain relevant and thrive over time.

## 6. Limitations and Future Research

Despite its contributions, this study has some inherent limitations. The reliance on quantitative methods, while valuable for identifying large-scale patterns, may overlook more localized and context-specific trends. Future research could benefit from mixed-method approaches that combine econometric modeling with fieldwork to capture the opinions of local communities and tourists. Moreover, this study focuses solely on classified castles, potentially excluding other historical sites with significant cultural and economic roles. Expanding the scope to include non-classified heritage assets could offer a more holistic understanding of the broader cultural landscape. Addressing these limitations will be crucial for designing more effective heritage-based tourism policies that balance conservation needs with economic development objectives.

Future research should further explore the potential role of medieval castles as anchors for sustainable regional growth, namely in low-density regions. This can be achieved by assessing governance models that capitalize on existing cultural heritage to foster economic resilience and demographic revitalization. Many low-density regions face significant challenges, including population decline, economic stagnation, and limited public investment. Investigating how local, regional, and national policies can create synergies between heritage conservation, tourism, and local economic activities is crucial. Comparative studies analyzing governance structures in different low-density regions—both within Portugal and internationally—could provide insights into effective frameworks that balance heritage preservation with socio-economic needs. Adding more detailed breakdowns of budgetary items is also a highly promising avenue for future research. We also recognize the opportunity for relevant insight detailing the complex relations between the public expenses of municipalities and the effectiveness of their

outcomes on enhancing important dimensions like tourism flows. A detailed analysis regarding the specific types of investments made, the mediation mechanisms involved, and the causal pathways connecting cultural investment to tourism activation must also be considered a promising line of further research for disentangling the relation between public agents and the effectiveness of tourism promotion. Data on cultural events or activities, as well as Supplementary Data such as case studies by region, changes in the number of events held, or the creation of new tourism programs that would demonstrate how the cultural budget was operationalized, must also be considered for extending this work.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/doi/s1>, one figure (S1 and S2) is available as Supplementary Material, about the Spatial autocorrelation analysis using Moran's I.

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## Abbreviations

The following abbreviations are used in this manuscript:

SIPA	Sistema de Informação para o Património Arquitetónico
CAOP	Carta Administrativa Oficial de Portugal
OLS	Ordinary least squares
PNCT	Programa Nacional para a Coesão Territorial
NM	National Monument
PI	Public Interest

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