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KEYWORDS

EU Cohesion Policy | tourism development | municipal-level analysis | Spatial Durbin Model | tourism attractiveness | spatial spillovers | Italy | regional development

JEL CODE

C33, L83, O18, R11, R58

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This study examines the effects of the European Union's Cohesion Policy (CP) on tourism development at the municipal level in Italy, addressing a gap in the literature that predominantly focuses on broader geographic units such as regions and provinces. The CP aims to reduce inequalities and stimulate economic growth by allocating substantial financial resources to less developed areas across the EU, with a significant portion directed toward tourism—a vital sector for income generation, employment, and trade in services. Italy, a leading global tourism destination with 60 UNESCO World Heritage sites as of 2024, provides an ideal case study to evaluate the localized impacts of these investments. In the two programming periods 2007-2013 and 2014-2020, the EU allocated 11.9 billion euros to culture and tourism in Italy.
This research uses data from OpenCoesione, covering over 2,000 municipalities, to offer the first large-scale analysis of CP's impact on tourism at this granular level. The study spans four programming cycles (2000-2006, 2007-2013, 2014-2020, and 2021-2027) and evaluates all tourism-related projects completed between 2014 and 2022. Key objectives include assessing the impact of CP investments on indicators such as tourist arrivals, overnight stays, and expenditures, and understanding the differential impacts across 2 municipalities. Findings reveal how localized CP investments in tourism contribute to broader economic development, emphasizing the importance of regionally tailored interventions.
The study offers valuable insights for policymakers, highlighting the need for sector-specific analy-

ses and strategic planning to maximize the effectiveness of EU funding in fostering sustainable tourism development and reducing territorial disparities.

# Cohesion Policy Impact on Tourism in Italy: a municipality-level assessment

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## Abstract

This study examines the effects of the European Union's Cohesion Policy (CP) on tourism development at the municipal level in Italy, addressing a gap in the literature that predominantly focuses on broader geographic units such as regions and provinces. The CP aims to reduce inequalities and stimulate economic growth by allocating substantial financial resources to less developed areas across the EU, with a significant portion directed toward tourism—a vital sector for income generation, employment, and trade in services. Italy, a leading global tourism destination with 60 UNESCO World Heritage sites as of 2024, provides an ideal case study to evaluate the localized impacts of these investments. In the two programming periods 2007-2013 and 2014-2020, the EU allocated 11.9 billion euros to culture and tourism in Italy. This research uses data from OpenCoesione, covering over 2,000 municipalities, to offer the first large-scale analysis of CP's impact on tourism at this granular level. The study spans four programming cycles (2000-2006, 2007-2013, 2014-2020, and 2021-2027) and evaluates all tourism-related projects completed between 2014 and 2022. Key objectives include assessing the impact of CP investments on indicators such as tourist arrivals, overnight stays, and expenditures, and understanding the differential impacts across

municipalities. Findings reveal how localized CP investments in tourism contribute to broader economic development, emphasizing the importance of regionally tailored interventions. The study offers valuable insights for policymakers, highlighting the need for sector-specific analyses and strategic planning to maximize the effectiveness of EU funding in fostering sustainable tourism development and reducing territorial disparities.
**Keywords:** EU Cohesion Policy; tourism development; municipal-level analysis; Spatial Durbin Model; tourism attractiveness; spatial spillovers; Italy; regional development.
**JEL codes:** C33; L83; O18; R11; R58.

# 1. Introduction

The European Union's Cohesion Policy (CP) is a comprehensive regulatory mechanism aimed at supporting economic and social development and reducing inequalities within the Union's territories, development by allocating financial resources to less developed regions and sectors, fostering economic growth, competitiveness, and employment opportunities. The European Union invests significant financial resources in the tourism sector through the CP. In Italy for the 2017-2013 and 2014-2020 programming cycles, 11.9 billion euros public funds were dedicated only to the thematic objective “Culture and Tourism”. To date, the literature has cantered on analysing the territorial effects of all funded projects, primarily at regional and provincial levels. Nevertheless, it is imperative for policymakers to possess evidence of the economic ramifications of these investments not solely at a disaggregated geographical level, but also concerning different sectors. This consideration is crucial due to the potential for varying degrees of local development, contingent upon the economic activities to which public funds are allocated.

The aim of this study is to assess the impact of EU Cohesion Funds for tourism on improving territorial tourist attractiveness, understood as an important component of broader territorial economic development. Tourism is closely connected to territorial attractiveness, and it plays an important role as a driving force of economic development, through the generation of income, employment, and foreign-exchange earnings. Several studies have empirically demonstrated the positive relationship between tourism expenditure and economic growth in the long term and short term (Yazdi, S. et al., 2017; Alam, 2016). We focus on tourism, not only for its substantial economic contributions to developing countries and regions, through bolstering the labour market and enhancing international trade in services, but also for its pivotal role in Cohesion Policies.

We selected Italy for our case study due to its status as the world's fifth most visited tourism destination, with 64.5 million international visitors, according to UNWTO (2019), following France, Spain, the USA, and China. Moreover, it holds the distinction of being one of the earliest established tourism destinations globally, particularly renowned for its art, cultural tourism, and

beach attractions since the 1930s. Today, Italy's appeal remains strong, offering a unique blend of art, culture, and lifestyle that continues to attract travellers worldwide. Having an enormous cultural heritage and numerous tourist attractions, as evidenced by the highest number of UNESCO sites in the world (60 in 2024), Italy is a particularly interesting case study to evaluate the effectiveness of European Cohesion Policy on tourism development.

Utilizing data sourced from Open Cohesion, our analysis is conducted at the municipality level to assess the impact of CP on tourism development and attractiveness (in terms of number of arrivals, overnight stays, average stay, average tourist expenditure, etc.). The contribution of this paper is threefold. First, none of the works we reviewed focus on the municipal level at such a large scale as the national level. Impacts within a country or across Europe are often analyzed at the regional level (NUTS 2) or for individual member states at the provincial level (NUTS 3). Our study, instead, focuses on all Italian municipalities. The analysis includes over 2,000 municipalities where these investment projects are located, representing a significant portion of Italian municipalities. Second, to the best of our knowledge, this is the first study analysing the impact of CP's impact on tourism at a municipality level. Very few studies have analysed the impact of tourism projects funded by CP. It is important for policymakers to have evidence of the economic impact of these investments not only at a disaggregated geographical level, but also with reference to different sectors, considering that heterogeneous levels of local development can be achieved depending on the economic activity to which Cohesion funds are allocated. This research therefore focuses on the tourism sector, examining territorial attractiveness for tourists. Third, a key element contributing to the originality of this work is that the analysis spans all four programming cycles of EU Cohesion Funds (2000-2006, 2007-2013, 2014-2020, 2021-2027) and considers all projects completed over a period of nine years, from 2014 to 2019, an area that remains unaddressed in the existing literature. Unlike typical studies, which often focus on a single budgetary period, our analysis is centered on all projects that were completed during this 6-year period.

The rest of the paper is organized as follows. Section 2 reviews the literature background on CP and the evaluation of its impact on regional growth, with a specific focus on tourism. Section 3 presents the data used and some descriptive statistics. Section 4 shows the methodology employed. Section 5 discusses the results. Section 6 concludes, presents policy recommendations, and highlights limitations and further developments.

# 2. Outline of literature background

Although the literature on the impacts of CP has notably expanded, empirical evidence still provides varying results ranging from positive (Giua, 2017; Fratesi & Perucca, 2019; Arbolino & Boffardi, 2017; Gagliardi & Percoco, 2016) to non-significant effects (Dall'Erba & Le Gallo, 2008; Aiello & Pupo, 2010) of cohesion policies on regional development. Becker et al. (2012) analyse to what extent the objective of fostering growth in the target regions was achieved with the funds provided and whether more transfers generated stronger growth effects. Using data at the NUTS3 level from two EU budgetary periods (1994–1999 and 2000–2006), the authors demonstrate that in 36% of the recipient regions the transfer intensity exceeds the aggregate efficiency maximizing level and in 18% of the regions a reduction of transfers would not even reduce their growth.

Accetturo et al. (2014) employ a Fuzzy Regression Discontinuity Design to examine the impact of EU structural funds on trust and cooperation levels in NUTS2 EU regions from 2000 to 2006. They compare regions just below the 75% cutoff (eligible regions) with those just above the cutoff (non-eligible regions) and find negative and significant coefficients for all the indicators of local endowments of trust and cooperation they considered (European Social Survey). The Regression Discontinuity Design is exploited also by Giua (2017), which uses a novel spatial discontinuity represented by the administrative boundaries between municipalities belonging to Objective 1 and non-Objective-1 regions in central Italy within the period 1988–1999. Results show that EU Regional Policy increases employment of Objective 1 areas by 15% over 10 years and that the impact is positive and significant for the targeted strategic sectors. The main downside of this approach is that using a dummy variable instead of the actual treatment intensity increases the risk of mistakenly categorizing eligible observations as treated when no treatment was administered. While there is a substantial body of literature exploring the effects of CP on regional growth, research specifically investigating the influence of EU Cohesion Policy (CP) on the tourism sector is scant and predominantly focus on identifying potential correlations between investments made with cohesion funds and key tourism metrics (Del Vecchio and Passiante, 2017; Giaccio et al., 2018; Bellini et al., 2017; Benner, 2017 and 2020; Smarandake, 2018 and 2020; Valente & Medeiros, 2022; Weidenfeld, 2018). To the best of our knowledge, only a few of these studies investigate causal relationships between invested funds and tourism variables (Colaizzo et al., 2018; Brandano & Crociata; 2023).

Smarandake (2018 and 2020) find a positive correlation between EU Structural Funds and respectively tourism development in Romania, evidenced by increased arrivals and accommodation facilities from 2007 to 2017. Giaccio et al. (2018) focuses on the impact of EU rural policies on agritourism development in Italy. They find that the rural development policy has mainly supported small and medium-sized farms with tourism activities and located in disadvantaged areas. Valente & Medeiros (2022) use the Territorial Impact Assessment (TIA) methodology to analyse the impact of POSEUR, an operational programme to implement EU Cohesion Policy funds in Portugal between 2014 and 2020, on sustainable tourism in Algarve. They find that the amount of funding available was insufficient to promote a systemic change in the region towards a sustainable model of tourism, but there are some positive impacts, namely

the improvement of water efficiency in golf courses, the renewed coastal areas adapted to the risks of the ecosystem, and the promotion of cleaner methods of public transport.

Brandano & Crociata (2023) stands out as the sole empirical study that evaluates the impact of the Cohesion Policy on tourism and culture in Italy. Utilizing a Synthetic Control Method, the authors use the number nights of stay in low season as a measure of tourism, and the tickets for theatrical and musical entertainment as a measure of culture and consider as a treated group the convergence regions (Campania, Apulia, Calabria and Sicily). The analysis is performed at the NUTS2 level and the programming period 2007-2013 is considered. Results show that CP expenditures have a positive association with the cultural sector but have been ineffective in most regions as for the tourism sector.

Colaizzo et al. (2018) provides a counterfactual assessment on the possible causal effects of Cohesion Policy on tourist attractiveness in the Apulia region. The analysis is performed at the municipality level and the considered period is 2007-2015. They find an overall positive causal relationship between per-capita investments and tourist arrivals.

In conclusion, it is evident that more empirical research is needed to fully understand the impact of EU Cohesion Policy on tourism, and implications for regional development.

# 3. Data and descriptive statistics

After comparing various databases available on Opencoesione, the national web platform coordinated by the Department for Cohesion Policies and for the South of the Presidency of the Council of Ministers, we chose to use the new database of the Policy Focus "Tourism Attractiveness"[1], which represents a cross-sectoral approach of a policy that focuses on protecting and enhancing resources, promoting destinations, engaging stakeholders, and building infrastructure to attract visitors. The choice was driven by several factors: first, it contains a greater number of projects compared to the database for the thematic objective 6 "Culture and Tourism"; second, it cuts across all incentive measures in the sector (businesses, innovation, infrastructures, etc.), while the Objective 6 database doesn't include the numerous and relevant projects of the other Thematic Objectives (e.g. enterprises' competitiveness, mobility, environment, etc.), which might have an impact on tourism development; third, it has been recently released (February, 2023) and therefore it represents a novelty in the literature.

Table 1 ranks regions by the number of projects and total expenditure completed between 2014 and 2019, highlighting Campania, Puglia, and Sicily as the top-performing regions. Together, these three southern regions account for 55% of total expenditure, highlighting the Cohesion Policy's focus on aiding less developed regions by allocating a greater share of funds. In contrast,

[1] https://opencoesione.gov.it/it/pillole/pillola-n-38-politiche-di-coesione-e-turismo-focus-sullattuazione-del-ciclo-2007-2013-e-primi-elementi-della-programmazione-2014-2020/

table 2 ranks the top 20 municipalities by project count and total expenditure over the same period. Perugia leads in project count, while the southern capital cities of Naples and Bari top the list in total tourism-related expenditure. Livinallongo del Col di Lana, a small village of about 1,000 residents in northern Italy, stands out among the municipalities with the highest expenditure, having constructed a new ski lift in its skiing area. Similarly, Castel di Sangro, a town of around 6,000 residents in Abruzzo, has also made significant investments, including two new ski lifts.

**Table 1** - Ranking of the Italian regions per number of tourism projects (left) and total expenditure (right) between 2014 and 2019.

| Region | nr. projects | % | Region | Total expenditure (€) | % |
|---|---|---|---|---|---|
| PUGLIA | 1,340 | 18.59 | CAMPANIA | 537,000,000 | 23.12 |
| BASILICATA | 833 | 11.55 | PUGLIA | 512,000,000 | 22.05 |
| CALABRIA | 698 | 9.68 | SICILIA | 237,000,000 | 10.20 |
| CAMPANIA | 621 | 8.61 | VENETO | 199,000,000 | 8.57 |
| LOMBARDIA | 601 | 8.34 | BASILICATA | 126,000,000 | 5.43 |
| SICILIA | 580 | 8.04 | EMILIA-ROMAGNA | 113,000,000 | 4.87 |
| UMBRIA | 406 | 5.63 | CALABRIA | 107,000,000 | 4.61 |
| ABRUZZO | 374 | 5.19 | PIEMONTE | 104,000,000 | 4.48 |
| SARDEGNA | 321 | 4.45 | TOSCANA | 72,400,000 | 3.12 |
| VENETO | 292 | 4.05 | ABRUZZO | 71,100,000 | 3.06 |
| PIEMONTE | 260 | 3.61 | SARDEGNA | 63,000,000 | 2.71 |
| EMILIA-ROMAGNA | 238 | 3.3 | UMBRIA | 44,900,000 | 1.93 |
| TOSCANA | 191 | 2.65 | LAZIO | 37,900,000 | 1.63 |
| MOLISE | 182 | 2.52 | LOMBARDIA | 31,000,000 | 1.33 |
| LIGURIA | 86 | 1.19 | MOLISE | 22,400,000 | 0.96 |
| TRENTINO-ALTO ADIGE | 80 | 1.11 | LIGURIA | 16,100,000 | 0.69 |
| FRIULI-VENEZIA GIULIA | 52 | 0.72 | TRENTINO-A.A. | 14,000,000 | 0.60 |
| LAZIO | 38 | 0.53 | FRIULI-V.G. | 7,016,050 | 0.30 |
| MARCHE | 15 | 0.21 | MARCHE | 6,442,546 | 0.28 |
| VALLE D'AOSTA | 2 | 0.03 | VALLE D'AOSTA | 1,254,826 | 0.05 |
| Total | 7,210 | 100 | Total | 2,322,513,422 | 100 |

**Table 2 -** Ranking of the top 20 Italian municipalities per number of tourism projects (left) and total expenditure (right) between 2014 and 2019.

| Municipality | nr. Project | Municipality | Total expenditure (€) |
|---|---|---|---|
| PERUGIA | 214 | NAPOLI | 114,000,000 |
| BARI | 137 | BARI | 109,000,000 |
| MATERA | 135 | POMPEI | 50,600,000 |
| PALERMO | 99 | ROMA | 38,100,000 |
| CATANZARO | 89 | LECCE | 37,600,000 |

| | | | |
|---|---|---|---|
| POTENZA | 87 | LIVINALLONGO DEL COL DI LANA | 29,900,000 |
| POMPEI | 75 | MATERA | 25,900,000 |
| TORINO | 63 | MONOPOLI | 25,200,000 |
| MILANO | 62 | CASTEL DI SANGRO | 23,100,000 |
| CAGLIARI | 58 | PALERMO | 22,800,000 |
| LECCE | 56 | VERBANIA | 21,400,000 |
| NAPOLI | 50 | MELENDUGNO | 18,700,000 |
| MONOPOLI | 49 | PERUGIA | 18,500,000 |
| TARANTO | 45 | AGEROLA | 18,200,000 |
| COSENZA | 42 | VENEZIA | 18,000,000 |
| L'AQUILA | 42 | UGENTO | 17,800,000 |
| LAMEZIA TERME | 37 | CAGLIARI | 17,600,000 |
| CAMPOBASSO | 36 | SAN GIOVANNI ROTONDO | 16,300,000 |
| REGGIO DI CALABRIA | 36 | CATANZARO | 15,800,000 |
| GALLIPOLI | 34 | TARANTO | 15,400,000 |

The Tourism Attractiveness database includes over 52,000[2] projects. This analysis focuses on a subset of 7,210 projects completed between 2014 and 2019, regardless of their programming period, to account for the significant overlap between different budget cycles. Table 3 provides a summary of the projects by year and programming period, with the final row showing the percentage completed from 2014 to 2019 for each cycle. Notably, nearly half of these projects are from the previous budgetary period (2007-2013). Excluding them would introduce bias, as it would overlook the impact of projects completed during these years that, despite not being part of the 2014-2020 cycle, contributed to outcomes within this period.

**Table 3** –Projects per completion year and programming period

| Year | Programming periods | | | Total |
|---|---|---|---|---|
| | 2000-2006 | 2007-2013 | 2014-2020 | |
| 2014 | 2 | 503 | 0 | 505 |
| 2015 | 6 | 1,413 | 34 | 1,453 |
| 2016 | 13 | 440 | 208 | 661 |
| 2017 | 29 | 510 | 792 | 1,331 |
| 2018 | 31 | 238 | 1,425 | 1,694 |
| 2019 | 21 | 138 | 1,407 | 1,566 |
| Total | 102 | 3,242 | 3,866 | 7,210 |
| % | 1,41 | 44,97 | 53,62 | 100 |

While data is available until 2023, the COVID period has been excluded from this analysis to avoid potential biases in the estimates. The pandemic significantly disrupted global travel patterns. By

[2] For further information about the total database: https://opencoesione.gov.it/it/dati/focus/attrattivita_turistica/

concentrating on the pre-COVID period, this study aims to provide a more accurate assessment of how various tourism investments influence tourism dynamics, thereby enhancing the validity of the findings. Moreover, although the database contains a wide range of variables that allow for project categorization, these variables are insufficient and highly heterogeneous, making it challenging to clearly identify the types of projects included in the analysis. This is an essential consideration, since different categories of projects have varying impacts on a municipality's attractiveness. Therefore, a new project categorization has been implemented to better align with the study's objectives. The categorization process[3] resulted in the following six distinct categories: (1) Projects carried out by accommodation facilities, whose beneficiaries are mainly private. This category includes renovations, new constructions, expansions, and various enhancements of both hotel and non-hotel accommodations, such as bed and breakfasts, farmhouses, holiday homes, hostels, etc. (2) Projects aimed at enhancing cultural and natural heritage. This category encompasses urban redevelopment initiatives, as well as the restoration of churches, monuments, castles, and archaeological sites. It also includes projects to protect and enhance natural areas, such as parks, lakes, rural landscapes, biodiversity, and forests. (3) The "Festivals and Events" category encompasses a wide range of activities, including festivals, exhibitions, workshops, as well as participation in national and international tourism fairs and marketing initiatives. (4) The "Transport and Mobility" category includes projects aimed at building new transportation infrastructure or improving existing facilities, such as roads, bike paths, ski lifts, airports, ports, and railways. (5) The category "Tourism businesses" includes complementary tourism services, such as food and beverage services (cafes, restaurants), travel agencies and tour operators and businesses whose customers are mainly tourists-but they are not accommodation facilities-such as beach clubs. (6) Finally, the category "Non-tourism businesses" includes businesses not specifically within the tourism sector but still incorporated in this database for their contribution to territorial vibrancy and competitiveness. Examples include retail businesses, such as souvenir shops and local craft stores. The residual variable "Others" (1.58% of the total expenditure) includes projects that could not be categorized due to insufficient information in the dataset. Table 4 shows the result of the categorization process, with the number of projects, the total expenditure and the percentage of expenditure per category. The maps in Fig.1, instead, show the spatial distribution of the municipalities involved for each project category.

[3] The ATECO code (Italian Classification of Economic Activities) allows to identify the specific activities of private beneficiaries; however, this variable alone is insufficient for categorizing all projects, as it is only available for 8% of the projects in the dataset. Among the private businesses, a distinction is needed among accommodations facilities. tourism businesses (except accommodation facilities), and non-tourism businesses that are included in the "Tourist Attractiveness" dataset. In cases where the ATECO code is missing, other available categories ("summary theme", "category description", "type of expenditure") are used to reallocate the projects in the preferred categories. Finally, when none of the available categories is sufficiently clear, a textual analysis is conducted, checking the presence of specific keywords both in the title and summary of the projects.

**Table 4 –** Number of projects, total expenditure and percentage of expenditure per investment category (2014-2019).

| Investment Category | N. projects | Total expenditure (€) | % |
|---|---|---|---|
| Accommodation facilities | 1,255 | 311,700,000 | 13.42 |
| Cultural and Natural Heritage | 3,639 | 1,246,000,000 | 53.63 |
| Transport and Mobility | 279 | 154,300,000 | 6.64 |
| Festivals and events | 446 | 117,900,000 | 5.08 |
| Tourism businesses | 1,099 | 299,900,000 | 12.91 |
| Non-tourism businesses | 268 | 156,700,000 | 6.75 |
| Others | 224 | 36,614,907 | 1.58 |

**Fig. 1 –**Distribution of municipalities where at least one project was funded for each category (2014-2019) A) Accommodation facilities B) Cultural and Natural Heritage; C) Transport and Mobility; D) Festival and Events E) Tourism businesses; F) Non-tourism businesses.

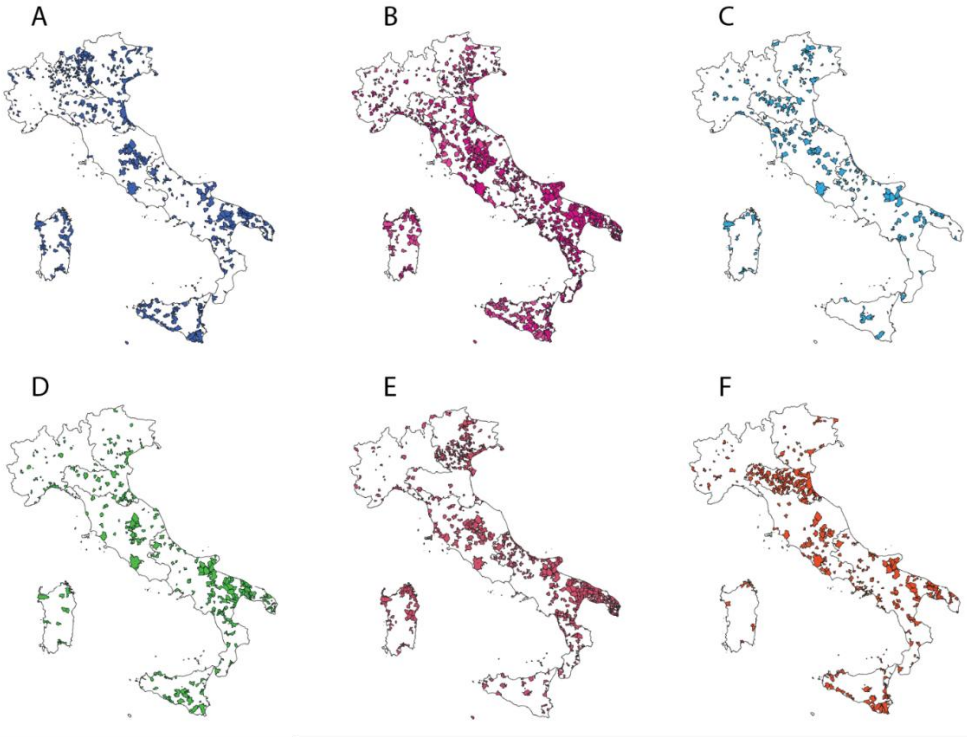



**Table 5** – Variables description and source.

| Variable | Description | Source |
|---|---|---|
| Total Stays | Total number of overnight stays in year t in municipality i | ISTAT |
| Accommodation facilities | Realized cost for projects concerning accommodation facilities in year t in municipality i | OpenCoesione |
| Natural and Cultural heritage | Realized cost for projects concerning Natural and Cultural heritage in year t in municipality i | OpenCoesione |
| Transport | Realized cost for projects concerning Transportation in year t in municipality i | OpenCoesione |
| Events | Realized cost for projects concerning Marketing and Events in year t in municipality i | OpenCoesione |
| Non-tourism businesses | Realized cost for projects concerning Non-Tourism businesses in year t in municipality i | OpenCoesione |
| Tourism businesses | Realized cost for projects concerning Tourism businesses except accommodation facilities in year t in municipality i | OpenCoesione |
| Per-capita income | Total income per municipality i divided by the number of taxpayers in year t in municipality i | MEF |
| Population | Resident population in year t in municipality i | ISTAT |
| Graduates | Number of new graduates in year t in municipality i | ISTAT |

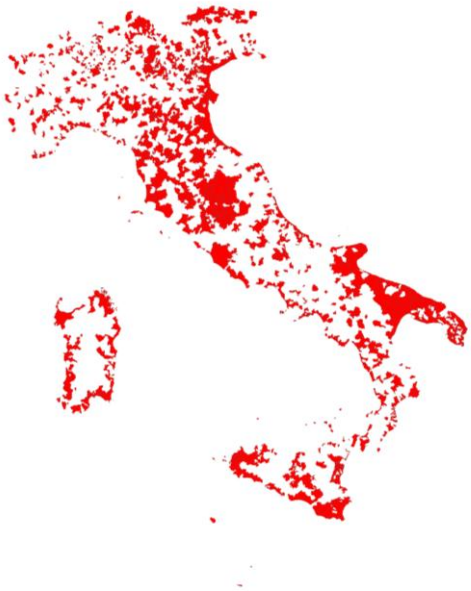
**Table 6** – Descriptive statistics.

| Variable | Obs. | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| Total Stays | 14,046 | 151,854.60 | 785,383.50 | 226 | 31,000,000 |
| Accommodation facilities | 14,046 | 18,637.47 | 224,187.60 | 0 | 8,813,170 |
| Natural and Cultural heritage | 14,046 | 57,266.97 | 589,296.30 | 0 | 30,900,000 |
| Transport | 14,046 | 9,065.79 | 266,134.10 | 0 | 22,900,000 |
| Events | 14,046 | 9,015.46 | 134,975.50 | 0 | 5,392,742 |
| Non-tourism businesses | 14,046 | 10,134.93 | 304,470.10 | 0 | 21,200,000 |
| Tourism businesses | 14,046 | 17,947.15 | 351,511.00 | 0 | 35,300,000 |
| Per-capita income | 14,046 | 18,048.45 | 3,396.32 | 9,263 | 47,808 |
| Population | 14,046 | 17,161.69 | 76,316.04 | 58 | 2,820,219 |
| Graduates | 14,046 | 90.57 | 466.18 | 0 | 20,052 |

Table 5 and 6 show respectively the variables used in the analysis with source and description, and some descriptive statistics. The range of values varies significantly across variables. To ensure comparability of coefficients and mitigate issues from differing scales, all variables have been z-score normalized, resulting in a mean of 0 and a standard deviation of 1.

The analysis uses stays as a measure of tourism attractiveness, serving as the dependent variable. The dataset includes all municipalities for which the dependent variable is available for the entire study period. Fig. 2 shows the municipalities included in the present analysis.

**Figure 2**: Italian municipalities included in the analysis.



The realized cost[4] for each investment category has been selected as independent variables, rather than funds commitments, to avoid potential measurement errors, since commitments may not always be fully executed or may be drawn down with delays, often due to issues like limited absorption capacity. The total realized cost is fully allocated to the completion year of each project, except for projects related to events. While the impact of structural and infrastructural projects, such as renovations, can only be assessed upon completion, the effects of festivals or structured events that last several years should be observed throughout the entire duration, from the project's start date to its end date.

Following a well-established literature, population, per capita income, and educational level are used as control variables in this analysis. Larger populations are typically associated with better infrastructure and services, potentially attracting more tourists (Pompili et al., 2019; Khadaroo & Seetanah, 2008). Per-capita income is used to account for living standards following Paci & Marrocu (2014); Patuelli et al. (2014); Romão & Nijkamp (2018); Zamparini et al. (2017), among others. Finally, the number of graduates is used as an indicator of human capital, as higher education levels can indicate a skilled workforce capable of enhancing tourism services and products (Dettori et al., 2012). Additional factors affecting tourism demand include crime rates and environmental conditions, though data limitations restrict their inclusion in this analysis. To address these issues, municipality and time-fixed effects are employed to control for unobserved characteristics that vary across municipalities or over time.

# 4. Methodology

Following Pienkowski and Berkowitz (2016), who advocate for using spatial econometrics to analyse Cohesion Policy impacts, a fixed effects panel spatial model is employed.

The presence of spatial correlation is tested for the main dependent variable (overnight stays), by performing the Moran test (Table 7). The Moran's I is statistically significant and positive for every year under analysis, suggesting that there is strong evidence of spatial autocorrelation. In other words, municipalities with higher tourist stays tend to be near other municipalities with higher tourist stays. Additionally, the declining Moran's I values from 2014 to 2019 suggest a gradual reduction in this clustering effect, likely reflecting a shift in tourist preferences. Over time, tourists may increasingly be exploring less central or alternative destinations, resulting in a more dispersed distribution of tourism activity across municipalities.

[4] Value of works and project activities actually carried out as of the reporting date, even if not yet paid. This is an indicator that anticipates cash needs and also provides information on the project's progress in economic terms, using parameters that are comparable across different types of projects. For public works, the realized cost value is derived from the site's analytical accounting and from additional expenses incurred by the implementing entity for other project-related activities, such as technical expenses, expropriations (source: Metadata of the dataset available on https://opencoesione.gov.it/it/opendata/dataset/focus_turismo_3 ).

**Table 7** – Moran's I statistics using a distance spatial matrix with a cut-off at 70 km.

| Year | Moran's I |
|---|---|
| 2014 | 0.0083 *** |
| 2015 | 0.0072 *** |
| 2016 | 0.0075 *** |
| 2017 | 0.0072 *** |
| 2018 | 0.0065 *** |
| 2019 | 0.0059 *** |

Signif. Codes: 0.001 '***'

To account for spatial correlation, a Spatial Durbin Model (SDM) with two-way fixed effects is employed. The SDM introduces spatial lags of the independent variables in addition to the dependent variable, which allows us to capture both direct effects (within a municipality) and indirect spatial spillover effects (from neighboring municipalities). The model specification is as follows:

$$y_{it} = \rho \sum_{j=1}^{N} w_{ij} y_{it} + \beta X_{it} + \lambda \sum_{j=1}^{N} w_{ij} X_{it} + \gamma C_{it} + \alpha_i + \theta_t + \epsilon_{it}$$

Where:

- $y_{it}$ is a measure of tourism attractiveness, i.e. arrivals and overnight stays (both resident, non-resident and total) in municipality *i* at time *t*.
- ρ is the spatial autoregressive coefficient. It captures the spatial dependence of tourism attractiveness in municipality *i* on tourism attractiveness in neighbouring municipalities
- The term $\sum_{j=1}^{N} w_{ij} y_{it}$ represents the spatial lag of the dependent variable;
- $w_{ij}$ is defined as an inverse distance spatial weight matrix with a cut-off of 70 km, representing the spatial relationship between municipalities *i* and *j* based on geographic proximity.

$X_{it}$ is a vector of independent variables, representing the total expenditure by municipality $i$ in year $t$ for various project categories, with β measuring their direct impact on tourism attractiveness.

The term $\sum_{j=1}^{N} w_{ij} X_{it}$ represents the spatial lag of the independent variable. This captures how the expenditure per neighboring municipalities j impacts the tourism attractiveness of municipality $i$. The coefficient $\lambda$ measures this spatial spillover effect.

$C_{it}$is a vector of control variables including population, per capita income, and number of graduates and γ represents the effect of these control variables.

$\alpha_i$ represents the Municipality-Level Fixed Effects, which control for time-invariant characteristics of each municipality, such as historical, geographical, or institutional factors that might affect tourism attractiveness.

$\theta_t$ represents the Time Fixed Effects, which account for time-specific factors that affect all municipalities, such as national economic trends.

$\epsilon_{it}$ is the idiosyncratic error term.

The Spatial Durbin Model (SDM) is preferred because it introduces spatial lags of the independent variables, in addition to the dependent variable, which allows us to capture both direct effects (within a municipality) and indirect spatial spillover effects, from the neighboring municipalities.

# 5. Findings and Discussion

Table 8 and 9 present the results of the panel fixed effects Spatial Durbin Model analysing the impact of different categories of tourism investments respectively on the number of stays and arrivals, with separate estimations for resident, non-resident and total. Distance spatial weight matrix with a cut-off at 70 km is employed.

**Table 8**: Results of the panel fixed effects Spatial Durbin Model for tourist stays.

| Dep. variable = stays | Resident | | Non-resident | | Total | |
|---|---|---|---|---|---|---|
| Accommodation facilities | 0.0021 | ** | 0.0036 | *** | 0.0033 | *** |
| | (0.0009) | | (0.0006) | | (0.0005) | |
| λ Accommodation facilities | -0.0017 | | -0.0003 | | -0.0008 | |
| | (0.0045) | | (0.0030) | | (0.0028) | |
| Cultural and Natural Heritage | 0.0008 | | 0.0058 | *** | 0.0043 | *** |
| | (0.0010) | | (0.0007) | | (0.0007) | |
| λ Cultural and Natural Heritage | 0.0068 | | -0.0003 | | 0.0019 | |
| | (0.0057) | | (0.0039) | | (0.0037) | |
| Transport Infrastructure | 0.0004 | | 0.0008 | | 0.0007 | |
| | (0.0009) | | (0.0006) | | (0.0005) | |
| λ Transport Infrastructure | 0.0076 | | 0.0058 | | 0.0065 | |
| | (0.0099) | | (0.0068) | | (0.0063) | |
| Events | 0.0052 | *** | 0.0084 | *** | 0.0077 | *** |
| | (0.0011) | | (0.0008) | | (0.0007) | |
| λ Events | 0.0170 | * | 0.0035 | | 0.0079 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.0100) | | (0.0069) | | (0.0064) | |
| Non-Tourism Businesses | 0.0156 | *** | 0.0144 | *** | 0.0157 | *** |
| | (0.0011) | | (0.0007) | | (0.0007) | |
| λ Non-Tourism Businesses | -0.0160 | *** | -0.0305 | *** | -0.0287 | *** |
| | (0.0059) | | (0.0039) | | (0.0038) | |
| Tourism Businesses | 0.0006 | | 0.0012 | ** | 0.0011 | ** |
| | (0.0009) | | (0.0006) | | (0.0005) | |
| λ Tourism Businesses | -0.0028 | | -0.0101 | *** | -0.0082 | *** |
| | (0.0050) | | (0.0034) | | (0.0032) | |
| Income | 0.0154 | *** | 0.0103 | *** | 0.0119 | *** |
| | (0.0052) | | (0.0036) | | (0.0033) | |
| Population | 2.8210 | *** | 1.2710 | *** | 1.9255 | *** |
| | (0.0828) | | (0.0565) | | (0.0526) | |
| Graduates | 0.8139 | *** | 0.7119 | *** | 0.7923 | *** |
| | (0.0182) | | (0.0124) | | (0.0116) | |
| λ | 0.0950 | ** | 0.2353 | *** | 0.2143 | *** |
| N | 14,046 | | 14,046 | | 14,046 | |

Signif. codes: 0.001 '***' 0.01 '**' 0.05 '*'. Standard errors in parentheses.

**Table 9** – Results of the panel fixed effects Spatial Durbin Model for tourist arrivals.

| Dep. variable = arrivals | Resident | | Non-resident | | Total | |
|---|---|---|---|---|---|---|
| Accommodation facilities | 0.0029 | *** | 0.0030 | *** | 0.0031 | *** |
| | (0.0007) | | (0.0006) | | (0.0005) | |
| λ Accommodation facilities | -0.0044 | | -0.0001 | | -0.0017 | |
| | (0.0034) | | (0.0029) | | (0.0027) | |
| Cultural and Natural Heritage | 0.0094 | *** | 0.0103 | *** | 0.0104 | *** |
| | (0.0008) | | (0.0007) | | (0.0006) | |
| λ Cultural and Natural Heritage | 0.0031 | | -0.0002 | | 0.0012 | |
| | (0.0045) | | (0.0038) | | (0.0036) | |
| Transport Infrastructure | 0.0018 | *** | 0.0007 | | 0.0011 | ** |
| | (0.0007) | | (0.0006) | | (0.0005) | |
| λ Transport Infrastructure | 0.0045 | | 0.0077 | | 0.0067 | |
| | (0.0076) | | (0.0065) | | (0.0061) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Events | 0.0128 | *** | 0.0120 | *** | 0.0128 | *** |
| | (0.0009) | | (0.0007) | | (0.0007) | |
| λ Events | 0.0018 | | -0.0028 | | -0.0001 | |
| | (0.0077) | | (0.0066) | | (0.0062) | |
| Non-Tourism Businesses | 0.0142 | *** | 0.0092 | *** | 0.0114 | *** |
| | (0.0008) | | (0.0007) | | (0.0007) | |
| λ Non-Tourism Businesses | -0.0128 | *** | -0.0173 | *** | -0.0161 | *** |
| | (0.0045) | | (0.0038) | | (0.0036) | |
| Tourism Businesses | 0.0024 | *** | 0.0023 | *** | 0.0025 | *** |
| | (0.0007) | | (0.0006) | | (0.0005) | |
| λ Tourism Businesses | 0.0010 | | -0.0056 | | -0.0033 | |
| | (0.0038) | | (0.0033) | | (0.0031) | |
| Income | 0.0254 | *** | 0.0164 | *** | 0.0209 | *** |
| | (0.0041) | | (0.0035) | | (0.0033) | |
| Population | 2.4983 | *** | 2.0102 | *** | 2.2602 | *** |
| | (0.0636) | | (0.0547) | | (0.0508) | |
| Graduates | 0.5086 | *** | 0.5513 | *** | 0.5590 | *** |
| | (0.0140) | | (0.0120) | | (0.0112) | |
| λ | 0.4184 | *** | 0.2255 | *** | 0.2957 | *** |
| N | 14,046 | | 14,046 | | 14,046 | |

Signif. codes: 0.001 '***' 0.01 '**' 0.05 '*'. Standard errors in parentheses.

Investments in accommodation facilities have a positive and strongly significant impact across all specifications. However, their spatial lags (λ) show no significant spillover effects on neighbouring municipalities. Investments in cultural and natural heritage (including urban redevelopment) show a positive and significant impact across all specifications, except for resident stays. These investments yield the highest coefficients, highlighting the crucial role of cultural and natural heritage in attracting tourists. The spatial lag of these investments, however, shows no significant impact on neighbouring municipalities.

Investments in transport infrastructure, along with their spatial lag, have no significant effect on stays in any specification. However, they show a positive and significant direct impact on resident and total arrivals, suggesting that these projects may enhance accessibility and thus attract more tourists, though they do not affect the length of the stay. These results align with a previous study, Nguyen (2021), which found no significant impact of investment in transport and communications infrastructure on attracting international visitors to Vietnam in the short-term. Moreover, the enhancement of a single transportation infrastructure does not automatically ensure that a tourist destination becomes more accessible. In fact, tourists typically rely on various types of infrastructures for their travel (Bergantino et al., 2023). These results are also consistent with Scotti (2024), which indicate that a greater availability of tourism

accommodations, along with cultural and natural resources, significantly influences overnight stays. Conversely, transportation facilities enhance the attractiveness of municipalities for same-day visits, a factor not considered in this analysis.

Event-related investments, such as festivals, marketing, and tourist information projects, have a positive impact on both stays and arrivals across all specifications, indicating their strong effectiveness in attracting both domestic and foreign tourists. The spatial lag for event investments is marginally significant for Italian stays (at a 95\% confidence level), suggesting that these events may create some spillover effects in neighbouring municipalities.

Investments in non-tourism businesses positively affect stays and arrivals across all specifications, suggesting that these investments may enhance a municipality's appeal by improving the overall environment, services, and amenities, thus making the destination more vibrant and attractive. However, the negative coefficients on their spatial lag indicate a potential competitive effect, where the presence of such investments in neighbouring municipalities may draw tourists away from the focal municipality.

Finally, investments in tourism businesses other than accommodation facilities—such as restaurants, cafes, travel agencies, and beach clubs—have positive and significant effects across all specifications, except for resident stays, while their spatial lags indicate a significant negative effect on neighbouring areas for non-resident and total stays. Similar to non-tourism businesses, these non-accommodation tourism investments appear to generate a competitive effect with neighbouring municipalities.

The control variables – per-capita income, population, and number of graduates - are consistently positive and significant, suggesting that municipalities with higher socio-economic status and educational attainment levels tend to attract more tourists. The spatial dependence parameter, lambda, is always significant, indicating the presence of spatial autocorrelation and validating the use of a spatial model.

It is noteworthy that investments mainly yield localized benefits, as evidenced by the generally non-significant spillover effects. This implies that the positive impacts of tourism investments tend to be confined to the municipalities where the investments are made, rather than extending to surrounding areas. Only specific businesses categories exhibit a negative spillover effect, indicating a competitive dynamic.

# 6. Conclusions

This study examined the impact of EU Cohesion Policy-funded tourism investments on the attractiveness of Italian municipalities. Our findings indicate that Cohesion Policy funds generally have a positive influence on enhancing tourism attractiveness, though the effects vary across different types of investments. Several innovative elements strengthen this analysis. First, the

newly developed policy-focus dataset, “Tourism Attractiveness”, has been used instead of the conventional “Objective 6 - Culture and Tourism” dataset. This choice provided a more comprehensive view of tourism investments, which better reflects the cross-cutting nature of tourism. Second, an original re-categorization process clarified the types of investments in the database, allowing to differentiate their impacts on municipal attractiveness. Third, by focusing on the smallest administrative units, this approach provided a deeper and more nuanced understanding of the impact of Cohesion Policy-funded tourism investments.

This research fills a critical gap in the literature by examining the impact of Cohesion Policy-funded tourism projects at the municipal level across Italy. While previous studies often aggregate data at higher levels and fail to focus on specific sectors, this study contributes to the existing body of tourism economics literature by providing empirical evidence on how tourism investments can effectively enhance territorial attractiveness and foster local development. Additionally, it offers practical insights for guiding future investments aimed at promoting territorial development. Policymakers can capitalize on these results to refine their strategies, focusing on targeted tourism investments that enhance territorial attractiveness.

Limitations of this study include data-related and methodological constraints. First, the data on stays and arrivals are only available at the municipal level from 2014 onward and are limited to municipalities classified by ISTAT as tourism-oriented, potentially excluding areas with emerging or unclassified tourism activities. Second, the present analysis omits the COVID-19 period to avoid biases, as the pandemic drastically altered travel behaviour. While this decision enhances the reliability of the results, it restricts our understanding of how Cohesion Policy investments might have either alleviated or exacerbated the pandemic's effects on tourism. The limited availability of municipal data, combined with the external shock of the pandemic, hinders our ability to estimate the long-term effects of funds that are intended to have structural impacts. Finally, this analysis disregards the local contextual factors that could affect the policy's success or failure. Research suggests that the impacts of Cohesion Policy are influenced by a range of local and contextual variables, such as government capacity, social dynamics, community engagement, and environmental conditions.

A potential further development of this work could involve incorporating the COVID-19 period into the model and repeating the analysis after the conclusion of the current programming cycle in 2027. This would enable a more comprehensive understanding of the long-term effects of Cohesion Policy investments. Additionally, it would be beneficial to integrate local contextual factors into the analysis to provide a more nuanced view of how these variables influence the outcomes of CP investments.

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