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Tourist Expenditure, Second Homes and Natural Amenities Tourism

Ph.D. Thesis

Ph.D. In Economics Management and Quantitative Methods

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Introduction

This thesis enhances comprehension of tourist expenditure and second-home tourism, offering new perspectives. It examines the economic effects of tourism in Italy, underscoring its contributions to GDP while confronting over-tourism and environmental impacts. The research focuses on second-home tourism, highlighting its social and economic impacts, including housing affordability and gentrification. Furthermore, the study analyses patterns of tourist expenditure, particularly among second-home visitors, and their cointegration with natural amenities tourism from 2002 to 2019. The methodology incorporates systematic literature reviews and econometric modelling to pinpoint gaps in existing research. This research explores definitions of second homes, bibliometric assessments, and long-term expenditure trends, seeking to comprehend the interplay between second-home and natural amenities expenditure in both inbound and outbound tourism. The thesis concludes with insights into future research and policy implications.

Tourism holds a crucial position in the worldwide economy, substantially contributing to economic expansion and progress (Zainullin et al., 2021). It generates foreign currency earnings, creates job opportunities, and stimulates various related sectors (Bunghez, 2016; Pjanić, 2019). Tourism catalyses economic development in many countries as one of the fastest-growing sectors worldwide (Mak, 2004; Ranasinghe et al., 2021). It stimulates local productivity and improves the balance of payments (Nissan et al., 2010). Despite challenges, the sector's outlook remains robust, with GDP growth expected to accelerate (Sofronov, 2017). However, tourism development also raises concerns about potential negative impacts on natural, cultural, and social resources (Mak, 2004). This underscores the increasing importance of sustainable tourism practices, which are crucial for maximising economic benefits while minimising adverse effects (Ranasinghe et al., 2021).

Therefore, tourism continues to shape the economic landscape as one of the fastest-growing sectors. This activity is essential to European economies, contributing significantly to GDP growth, employment, and overall economic development (Petrović et al., 2020; Pasieka et al., 2022; Haller, 2021). The COVID-19 pandemic has significantly affected the tourism sector, causing substantial losses and necessitating adaptations (Papadopoulou, 2020). Despite challenges, tourism remains a beacon of hope, crucial in reducing development gaps among European countries and improving living standards, particularly in Southern European nations (Proença & Soukiazis, 2008). In Italy's economy, tourism contributes over 5% to GDP and 6% to employment (Petrella et al., 2019).

The sector has shown growth potential, with projections indicating a 2.5% annual increase over the next decade (Mrozek, 2023). Both international and domestic tourism positively impact regional economic growth in Italy (Cortés-Jiménez, 2008). However, while tourism can drive economic development, overtourism may lead to negative externalities, affecting local quality of life (Biagi et al., 2019; Meleddu, 2014). Studies have confirmed a long-run relationship between inbound tourism and economic growth in Italy (Cortés-Jiménez & Pulina, 2009). The tourism-led growth hypothesis holds for about one-fifth of Italian

provinces, though with diminishing marginal returns as tourism reaches certain thresholds (Centinaio et al., 2022). Italy's tourism sector shows potential for sustainable development and economic contribution (Colacchio & Vergori, 2023).

Tourist expenditure is a crucial measure of tourism demand, influenced by various factors. Socio-demographic characteristics, trip-related variables such as accommodation, and psychological factors affect spending patterns (Wang & Davidson, 2010). Length of stay and daily activities impact expenditure, with longer stays reducing daily spending (García-Sánchez, 2013). Some studies reveal that the effects of determinants vary across expenditure levels (Santos & Vieira, 2012; Regev et al., 2023). Regional and seasonal differences also affect expenditure patterns (Kumar, 2022). Tourist satisfaction, particularly with the diversity of facilities, can significantly predict spending (Jurdana & Frleta, 2017). The relationship between satisfaction and expenditure and the interdependence of spending categories remains understudied and complex (Disegna & Osti, 2016).

Recent research suggests that second-home domestic tourists in Spain spend less on activities, dining, and other items than traditional tourists (Boto-García & Baños Pino, 2024). In Italy, second-home tourism has been underexplored. This thesis fills the gap in the literature about second-home tourism expenditure and its relationship with natural amenities tourism. Second-home tourism includes renter and owner tourists' expenditure because the demand side is under study. Natural amenities tourists' expenditure includes rural, mountain, coastal, and ecotourism typologies of tourists. Therefore, the general research question of this thesis is, *"Is there a relationship between second-home and natural amenities tourists' expenditure of inbound and outbound tourism in Italy from 2002 to 2019?* The thesis performs two literature reviews to explore tourists' expenditure and second-home studies. After identifying the gaps in the literature, the thesis explores the relationship between second homes and natural amenities for inbound and outbound tourism in Italy.

The first chapter of this thesis examines the literature on tourist expenditure using two methodological approaches. Firstly, it employs a Systematic Literature Review to select the pertinent literature on the subject under investigation. Secondly, it develops meta-database and a Poisson econometric model. This approach facilitates the analysis of certain aspects of the literature reviewed. The results of the Poisson model show that key exogenous factors influencing methodology complexity include Scopus, WOS, and SNIP. Scopus has a negative effect of moderate significance, while WOS and SNIP exert positive effects with low and moderate significance, respectively.

Seasonality is the only endogenous to the paper significant factor, negatively impacting complexity at a moderate level, probably because studies focusing on seasonality tend to adopt more straightforward estimation methods. Higher SNIP scores correlate with a greater likelihood of employing complex methodologies. Therefore, high-impact journals favour more complex methods. However, the influence of journal metrics on methodological complexity is not entirely conclusive. A clear trend emerges: Scopus-indexed journals typically use more straightforward econometric techniques, while high-impact WOS journals favour more complex methods. These findings guide researchers on the potential methodological impact of their publication choices.

The second thesis chapter aims to shed light on specific underexplored topics in other literature reviews. First, it seeks to comprehend the literature's definitions of second-home and second-home tourists. Second, a bibliometric analysis outlines the state-of-the-art research on second homes in general and second-home tourism in particular. The chapter also displays the key themes in the scholarly output concerning tourism related to second homes. The main findings highlight the need to broaden the definition of second-home (SH) tourism to include property owners and renters, particularly when analysing demand-side factors such as expenditure patterns. Bibliometric analysis is crucial in distinguishing second-home tourism from second-home tourists by identifying key research trends, themes, and collaboration networks. This allows for a more apparent distinction between macro-level impacts and micro-level behaviours. The bibliometric analysis reveals notable variations across countries, clustering patterns, and publication trends, reinforcing the importance of examining second-home tourism as a distinct field. Future research directions include analysing the evolution of second-home legislation and its impact on tourism and addressing the lack of supply-side data due to informality. Establishing a national registry of second-home owners is suggested to support research, promote fair competition, and enable better economic policy measures to integrate second-home tourism within national tourism strategies.

The primary aim of Chapter Three of the thesis is to address the gap in the literature on second homes' tourist expenditure by examining the long-term trends of the tourist expenditure series. The chapter analyses the monthly total expenditure series to demonstrate that it exhibits patterns different from the monthly second-home tourists' expenditure series. Therefore, it is important to investigate the latter separately. Then, the research compares the equivalent frequency of expenditure of second-home tourists for inbound tourism in Italy, including during and after COVID-19. It also evaluates those series and natural amenities tourist expenditure series before COVID-19. Finally, the chapter explored the study of long-run relationship between second-home tourists' and natural amenities tourists' expenditure to explore if the variables are cointegrated. The analysis of the expenditure series for second-home tourists (SHTE) in Italy highlights key differences compared to total tourist expenditure (TTE). While both series exhibit similar dynamics in seasonality and irregular components, SHTE shows a more substantial post-COVID-19 recovery in 2022. The study also compares these trends with tourist expenditure on natural amenities (NATE), revealing significant differences that justify analysing this category separately.

Also, Chapter Three identifies a short-term positive relationship between SHTE and NATE, with a modest elasticity of 0.15. However, long-term analysis using the Vector Error Correction Model (VECM) and Johansen Cointegration Test confirms a strong cointegration relationship, with an elasticity of 0.89, meaning that a 1% increase in NATE leads to a 0.89% rise in SHTE. Italy's Manufacturing Prices Competitiveness Index (MPCI) also emerges as a key endogenous factor influencing long-term trends. The findings highlight the need for better spatial planning in areas dependent on second-home tourism and natural amenities, as excessive and unclear regulations could threaten environmental and social stability. The study

underscores the importance of conservation policies, aligning with existing research on the environmental impact of second homes. Future research could extend the analysis to other countries with comparable data or examine domestic tourist expenditure and cointegration in natural amenities tourism.

So far, the cointegration between second homes and natural amenities in outbound tourist expenditures in Italy has not been explored, and this is the primary objective of the fourth thesis chapter. Additionally, it examines the dynamics of total outbound tourism compared to second homes and natural amenities in Italian tourists' expenditures abroad. Furthermore, it compares Italy's GDP with second-home and total tourist expenditure overseas. It also investigates whether a short-term relationship exists between second homes and natural amenities in Italian tourists' expenditures abroad. The research creates two monthly time series from 1997 to 2023 for total and second homes for Italian tourists' expenditure abroad. In addition, it creates a monthly series of natural amenities for Italian tourists abroad from 2002 to 2019. Then, it studies the cointegration from 2002 to 2019 because the expenditure on natural amenities for tourists was not surveyed during the 2020 pandemic and before 2002.

Chapter 4 identifies distinct trends in second-home tourism, natural amenities, outbound tourism, and Italy's GDP. While second-home tourism exhibits 12-year cycles, GDP follows a 5-year cycle. Notably, no systematic relationship exists between GDP fluctuations and second-home tourist expenditure, indicating its resilience to macroeconomic changes. This suggests second-home tourism could act as a stabilising force in the tourism sector during economic downturns. Future research should explore the factors driving this stability. The short-term relationship between second-home tourism expenditure (SHTEI) and natural amenities expenditure (NATEI) highlights the importance of the environment in driving second-home investments. However, lagged effects indicate a cyclical adjustment mechanism, where past increases in spending lead to later reductions, likely due to budget constraints or shifting consumer preferences. Strong seasonality is observed, with peak spending in July and August and a sharp decline in winter, posing challenges for policymakers. Strategies such as off-peak tourism incentives and infrastructure improvements could help mitigate these fluctuations.

The structural shift 2012 presented in this last chapter suggests a long-term transformation in second-home tourism, potentially influenced by economic reforms and market changes. External shocks, such as policy changes and financial crises, also impact expenditure patterns. Investments in environmental conservation and tourism infrastructure could provide long-term benefits by stabilising tourism demand. The study also finds that while second-home tourism adjusts quickly to economic and policy shifts, natural amenities expenditure remains stable, reinforcing the need for sustained environmental investments. More specific, policy recommendations include balancing second-home construction restrictions in Spain and Greece to protect natural amenities while supporting tourism growth. Future research should examine supply-side data, such as Airbnb listings for Italian tourists, and analyse tourist preferences in domestic and outbound travel. Understanding these dynamics is crucial for developing policies that sustain second-home tourism while minimising environmental impacts.

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Acronym Glossary

ADF: Augmented Dickey-Fuller

AIC: Akaike Information Criteria

AO: Additive Outlier

ARDL: Autoregressive Distributed Lag

BSM: Basic Structural Model

CD: Calendar Dummies

C: Constant

CS: Cite Score

GDP: Gross Domestic Product

MC: Methodology Complexity

MCPI: Manufacturing Competitivity Price Index

NATE: Natural Amenities Tourists' Expenditure

NATEI: Natural Amenities Tourists' Expenditure of Italians Abroad

NM: Number of Methodologies

LISREL: Linear Structural Relation

LOS: Length of Stay

LS: Level Shift Outlier

OLS: Ordinary Least Squares

PCA: Principal Components Analysis

S: Scopus

SD: Seasonality Dummies

SHTE: Second-Home Tourists' Expenditure

SHTEI: Second-Home Tourists' Expenditure of Italians Abroad

SJR: Scientific Journal Rankings-Scimago

SNIP: Source Normalized Impact per Paper

TEMPS: Tourist Expenditure Microeconometric and Parametric Approaches

TTE: Total Tourists' Expenditure

TTEI: Total Tourists' Expenditure of Italians Abroad

VECM: Vector Error Correction Model

W: WOS

WOS: Web of Science

YR: Year

2yIF: Two-year Impact Factor

5yIF: Five-year Impact Factor

CHAPTER I

Determinants of Tourists' Expenditure:

Systematic Literature Review and Complexity of the Methodologies Applied

1. Introduction

The determinants of tourist expenditure have been extensively studied in the literature on tourism economics. The primary motivation for such studies is that tourist flows in many countries represent the primary source of economic growth and local development sources (Brida et al., 2013; Marrocu et al., 2015; Pulido et al., 2017; Aguiló et al., 2017; Massidda et al., 2022; Boto-García & Baños-Pino, 2024). The researchers found that expenditure can be influenced by socioeconomic status, nationality, age, job, income, length of stay, accommodation type, travel companions, destination loyalty, package holiday status and psychographic variables. Analysing tourism spending, breaking it into parts and clarifying what influences it allows managers, researchers, and policymakers to understand how specific factors impact various expenditure categories (Massidda et al., 2022). For this reason, understanding the determinants influencing tourism expenditure becomes crucial to fostering tourism's economic impact on destinations. Other authors explored the breakdown of various tourist expenditures, showing the reallocation of expenditures and how prices affect the expenditure distribution. Thus, policymakers and tourism institutions must understand not only how tourists allocate their spending but also how price fluctuations and external factors affect this allocation (Dobruszkes, 2013; Gómez-Déniz et al., 2020; Boto-García & Baños-Pino, 2024).

Several methodologies have been used to explore tourist expenditure, both parametric and non-parametric, and within the microeconometric and macroeconometric frameworks. This systematic literature review (SLR) analyses tourism expenditure microeconometric and parametric studies (TEMPS). This chapter focuses on microeconomic studies, as they provide a perspective from the demand side at an individual level, which influences the macroeconomic level of a tourist destination. Also, understanding tourists' expenditure from the tourist surveys perspective provides a detailed insight into the phenomenon, enabling the development of the macroeconomic series presented in Chapters Three and Four. However, these last two chapters review the macroeconomic literature, which underexplored second homes and environmental connection, to contextualise tourist expenditure from that perspective. Parametric studies are included instead of non-parametric ones, as the aim is to identify the determinants of expenditure used in the literature and assess their impact rather than merely analysing the shape or distribution of the tourists' expenditure functions present in non-parametric studies.

Since the last literature review by Brida and Scuderi (2013), the number of publications on parametric studies of the determinants of tourist expenditure has grown markedly. These authors found 86 papers with this object of study in 36 years, from 1977 to 2012. Between

2013 and 2022, this chapter shows forty-six papers that take a parametric approach to the determinants of tourist expenditure, which implies a growth of 34% in only nine years. These data suggest that the average number of publications per year almost doubled from 2.4 in Brida and Scuderi's (2013) survey to 5 in the period examined in this paper. This increase in the number of publications on the subject of study makes it clear that there is a growing interest in determining what factors influence tourist consumption in the different tourist destinations studied.

Most TEMPS have relied on ordinary least squares (OLS) regression for estimation (Brida & Scuderi, 2013). However, OLS regression only offers estimates at the average level of spending, limiting the exploration of factors affecting those spending more or less than the average (Almeida & Garrod, 2017). This proves ineffective when identifying high-spending tourists for targeted marketing campaigns (Kozak & Martin, 2012). Sharma et al.'s (2019) research uses a more complex methodology than OLS. Through unconditional quantile regression, these authors demonstrate how the impacts of explanatory factors fluctuate throughout the spending spectrum, carrying significant implications for tourism promotion strategies. According to David et al. (2018), describing how one tourist's activity affects a destination's spending is straightforward. The authors argue that, however, it becomes complex when considering the network of multiple tourists engaging in daily activities. They also highlight the complexity of how these interactions influence the destination's overall spending. Moreover, they add that traditional analyses fail to visually represent the paths within the network that require deeper exploration.

In addition, the crucial findings of Wang and Davidsons' (2010) literature review on microeconometric studies generate a remarkable influence on TEMPS research. The authors conclude that greater emphasis should be given to the microeconomic modelling of tourism demand and the investigation of the effect of psychological and destination-related factors on tourist expenditure. The results of this chapter show that the scientific community took note of Wang and Davidsons' (2010) suggestions. Furthermore, Mehran and Olyas's (2019) review of tourist expenditure differs from the previous ones because it only analyses the literature on outbound tourism expenditure (OTE) without focusing on the methodologies used. The study concludes that the conceptual structure of OTE is premised on a sustainability platform, which is influenced by socio-cultural, environmental, economic, and political issues.

Nidhra et al. (2013) state that a systematic literature review evaluates and interprets all available research relevant to a specific research question, topic, area, or phenomenon of interest. The first stage of this process is planning the systematic literature review of tourist expenditure and, more specifically, the determinants of tourist expenditure. The research question and literature search strategies are first defined in this stage. The studies to be considered are selected through inclusion and exclusion criteria in the second stage. In the third stage, the quality of the selected papers is determined by constructing a specific quality indicator. Finally, a meta-database is created from the selected texts by surveying the fundamental characteristics of the papers that respond to the research questions (Tikito & Nissrine, 2019). The meta-database allows descriptive and principal component analysis to be performed on the literature of parametric studies on the determinants of tourist expenditure. Finally, the chapter shows the estimation of the Poisson model (Wooldridge, 2012) to obtain some impacts of independent variables used in the articles, exogenous variables related to journal metrics, and others to the complexity of the methodology as the dependent variable.

This thesis not only updates the last review on TEMPS but also incorporates a metaanalysis and econometric analysis of the literature. This represents an innovation in the research field of tourist expenditure. The SLR presented in this research highlights the methodology aspects of the papers that apply quantitative parametric approaches. Similarly, Khoo et al. (2019) conducted an SLR on mixed methods tourism research, emphasising methodological aspects while considering the application of quantitative and qualitative methodologies. The results of this chapter show that some variables exogenous to the paper positively influence the complexity of the methodology chosen in TEMPS. However, some endogenous to paper variables negatively affect the choice of the complexity of the methodology.

In turn, the principal endogenous components, household welfare and destination satisfaction, have no statistically significant relationship with the dependent variable complexity of the methodology used in the TEMPS. Compared to the studies published up to 2012, there is a greater interest in knowing the tourist's opinions, which can be seen in the broader use of satisfaction variables. This review provides a general overview of the state of the art in TEMPS, which allows empirical research to be conducted in context. Also, it identifies topics not yet explored in the literature. Finally, designing a TEMPS model permits a better pre-selection of the target and control of explanatory variables like environmental, social, and economic destination concerns of the tourits as determinants of their expenditure. Section 2 explains the SLR methodology applied to the TEMPS database to answer the research questions. Consequently, Section 3 summarises the meta-analysis's most remarkable statistics. This third section also discusses the results of the Poison Model. Finally, Section 4, gives some concluding remarks regarding the research questions' responses, future lines of research, and policy implications.

2. Systematic literature review (SLR) of tourism expenditure microeconometric and parametric studies (TEMPS)

2.1. Research questions and strategies for searching

This section defines the research questions according to the Population, Intervention, Population Comparison, Outcome, and Context (PIPOC) criteria established by Petticrew and Roberts (2006). According to this criterion, the population of this research is parametric studies of tourist expenditure (at the destination in inbound tourism or by the household in outbound tourism). The intervention uses the articles' methodologies in the parametric studies of the determinants of tourist expenditure from 2013 to 2022. Therefore, in the case of this thesis, intervention implies obtaining an in-depth analysis of the methodologies that will bring to light results on its application. The population comparison concerns the articles that are part of the literature reviews of Brida and Scuderi (2013) on parametric studies of the determinants of tourists' expenditure from 1977 to 2012 and Wang and Davison (2010) on microeconometric survey of papers. The outcome constitutes the factors that affect the complexity of the methodology of parametric studies on tourist expenditure. Then, the outcome is a regression model. Finally, the context is framed at the microeconomic level by considering papers that develop parametric econometric regression models. Hence, the context is parametric microeconomics, so articles on macroeconomics and nonparametrics are left out because they do not respond to the research questions of this chapter. Consequently, according to the PIPOC criteria, the questions are as follows. 1) What variables

describe and are the principal components of the parametric studies on the determinants of tourist expenditure? 2) What factors affect the complexity of the methodology performed in parametric studies on the determinants of tourist expenditure?

Concerning the strategies for searching the literature (Nidhra et al., 2013), this research is a database of tourist expenditure microeconomic studies from 2013 to 2022. This database obtains articles from Scopus and Web of Science (WOS) by searching for all papers that cite the review of Brida and Scuderi (2013) (which is in Scopus, but not in WOS) and the review of Wang & Davidson (2010) (which is in WOS but not in Scopus). Table 1 displays the total number of papers found, 166. Of that total, 131 papers citing Brida and Scuderi (2013) and only in SCOPUS, 56 papers only in Web of Science (WOS) citing Wang and Davison (2010), and 20 articles appear in both databases.

Table 1: Papers that cite Brida and Scuderi (2013) and Wang and Davidson (2010)

Data Base	Nr.Papers	%
Scopus- Brida & Scuderi (2013)	131	78,92
WOS - Wang & Davidson (2010)	15	9,04
Scopus & WOS	20	12,05
Total	**166**	**100**

Table 1: Papers that cite Brida and Scuderi (2013) and Wang and Davidson (2010). Source: author elaboration with Scopus and WOS databases.

2.2. Selecting primary studies: inclusion-exclusion criteria

This section shows the criteria for including and excluding publications to select the articles most intricately linked to the research questions. Then, the procedure includes articles in full text, written in English or Spanish, and within tourist expenditure microeconometric and parametric studies. Those languages were chosen because they are known to the author of the thesis, in addition to Italian, but no articles were found in this language. Furthermore, it excludes studies that are not available in full text, are not in English or Spanish, are not related to the research questions, are outside the time range considered 2013-2022 (in the boundaries), and are related to tourist expenditure but are not TEMPS. Next, Table 2 shows that of the 166 publications, more than 69% are non-micro econometric-parametric papers. However, micro econometric-parametric studies represent a smaller percentage of almost 28%. Three publications are not available in full text; only one was found out of the publication range 2013-2022. Therefore, forty-six articles were selected through the inclusion-exclusion criteria, constituting the total number of observations in the meta-database and the econometric analysis.

Table 2: Tourist Expenditure Microeconometric and Parametric Studies (TEMPS)

Studies	Nr. Papers	%
Not TEMPS	116	69.80
TEMPS	46	27,70
Not available in full text	3	1,80
Out of the 2013-2022 range	1	0,60
Total	**166**	**100**

Table 2: Tourist Expenditure Microeconometric and Parametric Studies. Source: author´s elaboration from Scopus and WOS databases.

2.3. Assessing the Quality of the TEMPS

According to the methodology by Ain et al. (2019), the quality assessment (QA) is to make decisions concerning the quality of the selected investigations to guarantee the importance of their results and analyses. In doing so, the five (QA criteria) questions listed below were established to evaluate the selected papers:

Q1: Does the research topic addressed pertain specifically to tourism expenditure determinants in a microeconometric and parametric approach?

Q2: Is the context of the research clear?

Q3: Does the research adequately delineate the methodology?

Q4: Is the data collection procedure adequately explained?

Q5: Is the approach used for data analysis appropriately explained in the research?

Afterwards, to assess the quality of ranking, the procedure set three quality levels – “high,” “medium,” and “low” –. Hence, the paper is assigned a score of 1 for a quality criterion if it completely satisfies it. Likewise, a study is assigned a rating of 0.5 if it partially meets a quality criterion, and a score of 0 is given when a study does not fulfil a quality criterion. In this systematic literature review, the highest rating is 5 for the 5 QA criteria, while the lowest is 0. Based on the coding scheme, a study is of high quality: if > 3, e.g., 3.5, medium quality: if <3 and >1, e.g., 1.5, 2, and 2.5, low quality: if <1, e.g., 0.5 (Ain et al., 2019).

Thus, Table 3 shows that none of the selected papers were assigned low quality. Likewise, the proportion of high-quality papers is high at 93,33%, with almost 9% being medium quality. For example, the papers included in this 9% do not control sociodemographic variables in the econometric model or do not explain the data collection procedure perfectly well.

Table 3: Quality Assessment of the TEMPS

Quality Level	Nr. Papers	%
High	42	93,33
Medium	4	8,69
Total	**46**	**100**

Table 3: Tourist Expenditure Microeconometric and Parametric Studies Quality Assessment. Source: author´s elaboration from Scopus and WOS databases.

3. Meta-analysis and econometric analysis of the TEMPS

Meta-analysis is the statistical combination of results from two or more studies (Deeks et al., 2019). The procedure for conducting the meta-analysis consists of creating a database that gathers the primary publication information of the articles and the results obtained in the estimations carried out through the methodologies. Then, it performs a principal component analysis on that meta-database. Next, it uses an econometric Poisson model to analyse the determinants of the complexity of the studies' methodology.

3.1. Descriptive statistics of the TEMPS meta-database

The journal with the highest number of publications on TEMPS is Tourism Economics, with thirteen publications in forty-six selected studies, representing just over 28% of the total articles. Tourism Management Perspectives follows this, with five publications representing 10.86% of the total and Tourism Management, with three publications representing around 6.5%. The rest of the articles are distributed between 2 and 1 in eighteen different journals, as seen in Table 4 (Annex 1).

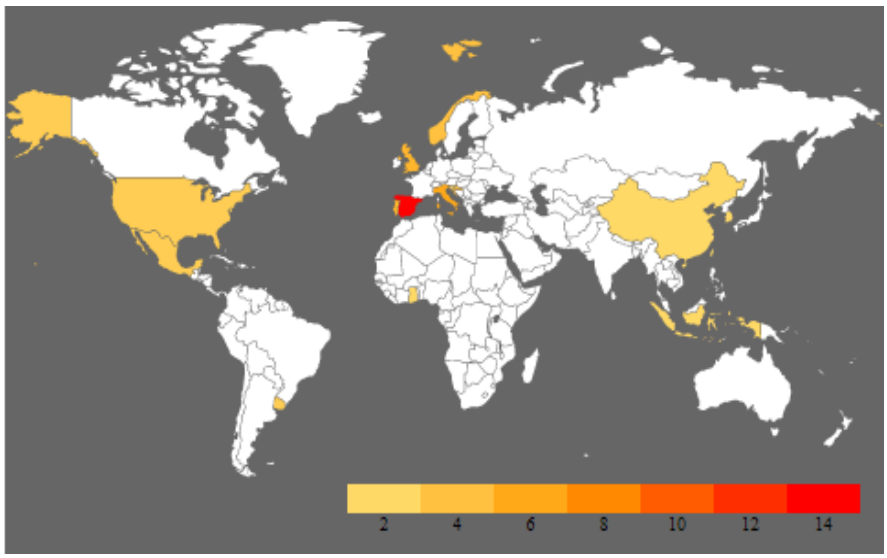
The ranking of countries where the tourist survey was conducted is presented in Table 5. Spain is the most analysed country destination, with thirteen publications in the total number of publications of forty-six selected papers, representing more than 28%. Italy is following in the ranking, with less than half of Spain's publications, with five publications (10,86%). This percentage is followed by Portugal and the United Kingdom with four publications and Norway with three publications, almost 9% and 6,5%, respectively. The rest of the publications are distributed between two and one publication in different countries, as seen in table 5 and graph 1. These data show that Europe leads in TEMPS publications with seven countries and 69,5% of the papers selected. Asia follows with five countries and accounts for 10,86% of the TEMPS. South America and Africa have only one country with TEMPS: Uruguay and Ghana, respectively. North America has two countries with TEMPS: Mexico and the United States.

Table 5: Ranking Survey's Country

Country	Nr. Papers	%
Spain	13	28,26
Italy	5	10,86
Portugal	4	8,69
United Kingdom	4	8,69
Norway	3	6,52
Croatia	3	6,52
Mexico	2	4,34
United States	3	6,52
Uruguay	2	4,34
China	1	2,17
Ghana	1	2,17
Indonesia	1	2,17
Slovenia	1	2,17
South Korea	1	2,17
Sultanate of Oman	1	2,17
Taiwan	1	2,17
Total	**46**	**100**

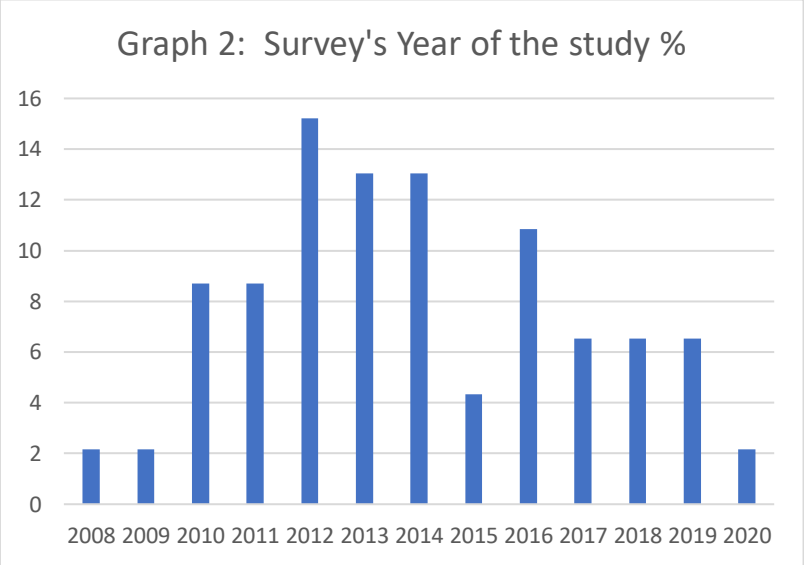
Table 5: Tourist Expenditure Microeconometric and Parametric Studies Ranking of Journals. Source: author´s elaboration from Scopus and WOS databases.

Graph 1- Ranking Survey's Country Heat Map



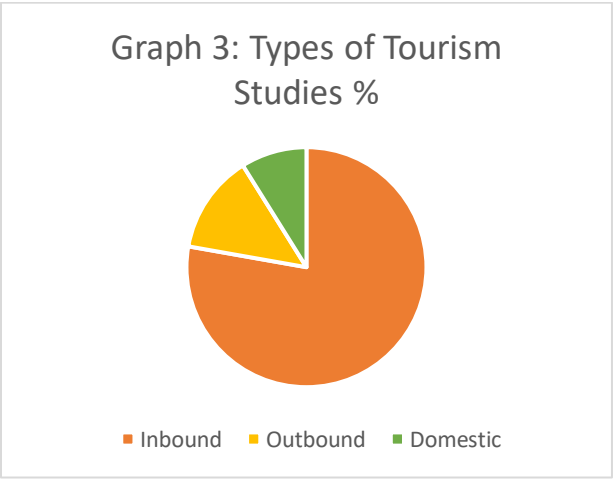
Graph 1: Tourist Expenditure Microeconometric and Parametric Studies Ranking of Survey's Country Heat Map. Source: author´s elaboration from Scopus and WOS databases.

The surveys conducted in these countries are distributed as shown in Table 6 and Graph 2 between 2008 and 2020. The most significant number of surveys is concentrated between 2012 and 2014, with 19 papers in those three years, representing 40% of the 46 papers using surveys conducted in the 12 years from 2008 to 2020.



Graph 2: Tourist Expenditure Microeconometric and Parametric Studies Ranking of Survey's Year Graph. Source: author´s elaboration from Scopus and WOS databases.

Considering the type of tourism analysed in the selected papers, Graph 3 displays that inbound tourism studies are the most frequently conducted, accounting for 76% of the total. This percentage is followed by papers analysing outbound tourism with 15%. In the last place, almost 9% are studies on domestic tourism.



Graph 3: Tourist Expenditure Microeconometric and Parametric Study Types of Tourism Graph. Source: author´s elaboration from Scopus and WOS databases.

Table 6: Ranking survey's Year of the study

Year	Nr.Papers	%
2012	7	15,21
2013	6	13,04
2014	6	13,04
2016	5	10,86
2010	4	8,69
2011	4	8,69
2017	3	6,52
2018	3	6,52
2019	3	6,52
2015	2	4,34
2008	1	2,17
2009	1	2,17
2020	1	2,17
Total	**46**	**100**

Table 6: Tourist Expenditure Microeconometric and Parametric Studies Ranking of Survey's Year. Source: author´s elaboration from Scopus and WOS databases.

Table 8 shows the estimated number of regressions, representing seventy in 10 years, from 2013 to 2022. This total of regressions implies an annual average of almost seven regressions. Brida and Scuderi (2013) found a total of 304 regressions in 35 years, from 1977 to 2012, which implies an average of about eight regressions per year. Of the forty-six papers under study, twenty-eight used only one type of regression, representing 60,86% of the total papers. Around 28% of the documents estimate two regressions, 9% estimate three regressions, and only one paper estimates four regressions (see Table 8).

Table 9 shows that the ordinary least squares (OLS) methodology is the most used of the seventy estimated regressions, accounting for 48,5% of the estimated regressions. This position is followed by quantile regression, which has a much lower percentage, 13%. Third and fourth place go to the Heckman method, with 11%, and Tobit regression, with almost 6% of the total seventy estimated regressions. Finally, it shows that more than 4% of the unconditional regression methods are distributed by 1.4% in 12 different methodologies.

The results of Table 9 are different from those of Brida and Scuderi (2013), where the most common approach for these authors was the OLS with 64% of the papers and 46,6% of the regressions. They found that the second alternative used in the literature was the quantile regression model (percentage not specified). The authors list but do not detail the share occupied by the rest of the methodologies surveyed: weighted least squares, LISREL equations, robust hierarchical regression with a downward weighting of outliers and robust OLS, Tobit regression, Heckman model, logit model, logit multinomial model, probit model, and switching regression.

Table 8: Number of regressions estimated

Nr. Regress	Nr. Papers	% Papers	Total, Reg
1	28	60,86	28
2	13	28,26	26
3	4	8,69	12
4	1	2,17	4
Total	**46**	**100.00**	**70**

Table 8: Tourist Expenditure Microeconometric and Parametric Studies number of regressions estimated. Source: author´s elaboration from Scopus and WOS databases.

According to Table 10, analysing the dependent variables used in the regression models developed in the selected papers, the most used dependent variable is "Total tourist expenditure per person for all length of stay (LOS)" in almost 48% of cases. This result differs from Brida and Scuderi's (2013), where the most used dependent variable is "Total tourist expenditure for party size," with 63,9% but in the total regressions. In this section analysis the following dependent variable in the ranking is "Total tourist expenditure per person per day", almost 35% (Table 10). The latter is followed by "Household tourism expenditure per month," with a very low percentage of 6,5%, a variable used in some studies of domestic or outbound tourism (Table 10). The rest of the cases are distributed one by one in five different types of variables, which can be seen in Table 10.

Table 9: Number of Regressions for each Methodology

Methodology	N. Papers	%
OLS	34	48,50
Quantile Regression	9	12,80
Heckman	8	11,40
Tobit	4	5,70
Unconditional Quantile Regression	3	4,30
Mean Level Decomposition Regression	1	1,40
Regression Adjustment	1	1,40
Non-linear Betha Regression Method	1	1,40
Interval Regression Method	1	1,40
Poisson Regression Method	1	1,40
Logistic regression	1	1,40
Seemingly unrelated regression	1	1,40
Scad-elastic regression	1	1,40
Latent class regression	1	1,40
Hierarchical regression	1	1,40
Finite Mixture Modelling	1	1,40
Conditional Counterfactual Quantile Level Decomposition	1	1,40
Total	**70**	**100**

Table 9: Tourist Expenditure Microeconometric and Parametric Studies: number of regressions estimated for each methodology. Source: author´s elaboration from Scopus and WOS databases.

Table 10: Dependent Variables of the Studies

Variable	Nr. Papers	%
Total tourist expenditure per person for all LOS	22	47,82
Total tourist expenditure per person per day	16	34,78
Household tourism expenditure per month	3	6,52
Disaggregated by types of expenditures	1	2,17
Rate between expenditure at the destination at the origin	1	2,17
Tourism expenditure disaggregated in daily expenditure and length of stay	1	2,17
Total tourist expenditure and disaggregated by types of expenditure	1	2,17
Expenditures were higher than a specific value and 0 otherwise	1	2,17
Total	**46**	**100**

Table 10: Tourist Expenditure Microeconometric and Parametric Studies dependent variables. Source: author´s elaboration from Scopus and WOS databases.

Regarding the independent variables used in TEMPS reported in Table 11, most papers do not study a particular independent variable. In this sense, almost 78% of the cases study the determinants of tourist expenditure without highlighting a specific regressor. These studies argue that examining the impact and influencing factors of tourism spending and its components is crucial to destination management strategies. One of the most recent studies found that the duration of stay is the only significant factor across all categories, with a negative impact. Income, which has a positive influence, is the second most crucial determinant. Hotel visitors spend considerably more across all categories, whereas those travelling to visit friends and relatives (VFR) spend significantly less. Travellers interested in gastronomy and natural attractions are among the highest spenders (Massidda et al. ,2022).

Then, nearly 9% of the studies concentrate on psychographic variables associated with tourist satisfaction, controlling for socio-demographic and socio-economic factors. Satisfaction is a strong indicator of tourist behaviour and is frequently utilised in marketing and destination management (Cárdenas et al., 2016). This factor can assist tourism planners in increasing their market share by attracting visitors who will spend money on a wide range of services at the destination (Disegna & Osti, 2016). The findings indicate that there is indeed a correlation between tourist satisfaction and tourism expenditure at the destination. Thus, these results guide stakeholders in these locations to implement targeted policies to enhance this activity's economic impact (Cárdenas et al., 2016; Disegna & Osti, 2016). However, other researchers obtained different results. Perles et al. (2021) concluded that the output achieved did not imply a strong correlation between satisfaction and expenditure. Smolčić and Soldić (2016) found that only one dimension of satisfaction (related to the variety of facilities) was a significant predictor of tourist expenditure at the destination.

Lastly, six studies highlight six different independent variables as determinants of tourist expenditure, as seen in Table 11. According to David et al. (2018), the more frequently an activity is undertaken, the higher the total expenditure, with the average spend per activity also increasing. Age and some specific locations at the destination also have a positive impact on expenditure. Alfarhan et al. (2022) compare the lower- and upper-middle income

categories to the reference group earning less than $2,600 monthly. They found that planning for 3 to 4 months before the trip and visiting the destination for the first time increase tourism expenditures by approximately 13%. Baños and Boto (2021) study assesses the impact of the COVID-19 pandemic on tourists' length of stay and daily expenditure at a destination. They find clear evidence of a reduction in the length of stay by approximately 1.26 nights, representing a 23.8% decline. They also demonstrate that, although total expenditure per person per day has remained unchanged, there has been a shift in the distribution of spending across categories in the tourism budget.

Farías and Barić (2020) state that in addition to being key tourist attractions that stimulate local economic development, protected areas also encourage healthy habits through participation in various physical activities. Their results suggest that the intensity of physical activity had a marginally potentially significant impact on respondents' expenditure during their visits. Pulido, Cárdenas and Durán (2017) present an explanatory model of tourism expenditure based on the socio-economic characteristics of tourists. Their analysis confirms the presence of socio-economic factors that influence tourism expenditure. However, contrary to the suggestions of the reviewed literature, income and education levels do not affect tourism expenditure. Another article by Pulido, Cárdenas and Carrillo (2017) examines the extent to which trip characteristics influence tourism expenditure. They confirmed that specific trip characteristics, such as accommodation type, length of stay, trip planning and Internet use, determine tourism expenditure.

Table 11: Independent variable of interest

Variable	Nr. Papers	%
Determinants	36	78,20
Satisfaction	4	8,69
Activities	1	2,17
Age and income	1	2,17
Before and after COVID	1	2,17
Physical activities	1	2,17
Socio-economic	1	2,17
Trip characteristic	1	2,17
Total	**46**	**100**

Table 11: Tourist Expenditure Microeconometric and Parametric Studies independent variable of interest. Source: author´s elaboration from Scopus and WOS databases.

The income variable is the most used independent variable associated with economic constraints (Table 12-Annex 1). It is significant and positive in around 45% of the cases. This result for the variable income is in line with the literature. The rest of the variables considered in Table 12-Annex 1 have a very low frequency of use between one and two papers. About the determinants of tourist expenditure associated with socio-demographic variables, Table 13-Annex 1 shows that the most frequently used variable is age, with almost 39% of cases in which it is significant and positive and 19,5% of cases in which it is significant and negative. This aligns with what was found in preview reviews. Also, in line with prior reviews, Nationality

is the second most used variable, with almost 7% of cases in which it is significant and positive and nearly 35% of cases in which it is significant and negative. The third most used explanatory variable is gender, with almost 7% of cases in which female is significant and positive and only 2% of cases in which it is significant and negative. The variable Male is significant and negative in 11% of the selected papers and significant and positive in just over 13% of the cases. In contrast, it is not significant in 11% of the selected papers.

Then, the businessperson variable, which indicates that the tourist surveyed has this occupation, stands out, with slightly more than 13% of cases in which the regressor is significant and positive and no significant and negative cases. Another variable of occupation that stands out is worker, indicating that the tourist surveyed is a dependent worker, which turns out to be significant and positive in almost 9% of the cases and significant and negative in nearly 4%. The remaining independent variables have lower frequencies in the forty-six selected papers, as seen in Table 13- Anex1.

Regarding trip-related variables (table 14, Annex 1), the most used variable is the length of stay, with more than 39% of cases where the variable is significant and positive. The regressor was significant and negative in almost 22% of the estimated regressions. It is worth noting that at a very low percentage of just over 4%, LOS was not significant as a determinant of tourist expenditure. The following most used variable was hotel accommodation, with just over 30% of cases where the variable is significant and positive and almost 11% of papers where the regressor is significant and negative. On the other hand, the variable was non-significant at a very low percentage of just over 2%.

The third most used variable is party size, with over 15% of cases where it was significant and positive and around 17% of the cases where it was significant and negative. In a not-so-low percentage, almost 6,5%, the regressor was found to be non-significant as a determinant of tourist expenditure. These results agree with the existing literature reviews. Following the ranking, the next most used variable was repeated visits, with just over 10% of cases where it was significant and positive, 15% of the papers where it was significant and negative, and like party size with a non-negligible percentage of cases where the regressor was non-significant (6,5%). It is followed by holiday purpose with equal percentages of negative and positive significance of almost 11% and only one case where the variable was found to be non-significant. The last two regressors described are not mentioned in preview reviews as trip-related independent variables. The rest of the variables shown in Table 14-Annex 1 have percentages of non-use of the variable higher than 77%.

Considering the psychographic variables related to tourist satisfaction (Table 15-Annex 1), the most frequently used variables were culture and gastronomy, with just over 13% of the cases in which the variable was significant and positive. In 6,5% of regressions, both variables were significant and negative, and in no case were non-significant. The second most used psychographic variable is tourist destination satisfaction, with 6,5% of cases where the variable is significant and positive, just over 10% of cases where the regressor was significant and negative, and no cases of non-significance. It is followed in third place by atmosphere and safety satisfaction, with almost 9% of cases where the variable is significant and positive, 6,5% where the variable is significant and negative, and no cases of non-significance. In fourth place is tourist attractions satisfaction with almost 9% of significant and positive cases, just over 4% of papers in which the regressor was significant and negative, and no cases of non-

significance. The rest of the variables have a lower frequency of use and can be seen in Table 15 (Annex 1).

The importance of the tourist's opinion in TEMPS has grown. In general, there is a varied and increasing use of psychographic variables in contrast to what was found in the previous literature review of TEMPS. Therefore, scholars take note of what Brida and Scuderi (2013) stated: *"In general, the use of psychological variables in the literature is not very frequent"* and *"the importance of psychological factors for the choice of destination and spending decisions cannot be ignored."* (pp. 37). It is important to highlight that determinants of tourist expenditure related to their opinion on environmental care and the use of natural resources should be considered in future studies. Additionally, the type of accommodation known as a second home should be included more frequently as an option, as it has been rarely used in the papers analysed. Finally, it is worth noting that too many studies use many variables as determinants of tourist expenditure without studying a specific factor relevant to tourist destinations with specific characteristics. Future studies should focus on a specific factor while controlling the necessary variables to ensure greater robustness of the analysis.

3.1. Principal Components Analysis of the TEMPS meta-database

A data matrix's principal component analysis (PCA) takes out the essential patterns in the matrix regarding a complementary set of scores and loading plots. The analysis results depend on the matrix size (Wold et al., 1987). In the PCA, the latent variable combines highly correlated regressors with the observed variables. The latent variable scores are iteratively measured for each construct to ensure the validity of the constructs. The item reliability is inspected through the factor loadings that indicate the degree to which each indicator, which forms the construct, is correlated with its relevant latent variable. Cronbach's alpha (C.alpha) assesses the internal consistency and the variance of the sum of the variables in a block (Presenza et al., 2019). This section performs the PCA instead of factor analysis because this chapter aims to summarise data using fewer variables. Factor analysis is applied in other kinds of research if it aims to explain correlations between variables and examine the data structure, which is not the case (Hee-Ju, 2008).

Table 16 (Annex 1) presents the results of the PCA with varimax rotation. The varimax rotation is an orthogonal rotation method that simplifies the structure of the components by maximising the variance of squared loadings within each factor. This method helps improve interpretability by making the factor loadings more distinct. The analysis identifies 44 principal components. The eigenvalues column indicates the amount of variance explained by the component. The difference column shows the difference in variance explained between one component and the next. The proportion column is the proportion of the total variance explained by each component. The cumulative column displays the cumulative proportion of variance explained by adding up the components sequentially. Component 1 explains the highest variance (7.01451), corresponding to 8.06% of the total variance. The variance explained decreases with each subsequent component. The cumulative variance reaches 50% around Components 13 and 14, meaning these components together explain half the total variance. Components beyond Component 30 contribute little to explaining the data, as their variance is below 1.3.

Table 17 shows the loading rotation output, excluding values below 0.3. This means that only substantial loadings (absolute values ≥ 0.3) are displayed, making the interpretation easier. The rotated components will highlight which variables are most strongly associated with components 1 and 3, group household welfare variables. Destination Satisfaction is generated by variables grouped in Components 2 and 4. Information source factors come from Component 6, and seasonality from Component 7. These loadings indicate the strength and direction of the relationship between each variable and the principal components. Higher absolute values of the loadings suggest a stronger association of the variables with the principal components.

Household Welfare variables such as Earnings, Debt, Car Ownership, and Trust have relatively higher loadings (0.49), meaning they are strongly associated with this component. Other factors like Earning Members, Economic Dependents, Poor households, Residence areas, Remittances, and Own Cellular have moderate loadings (0.37). Destination Satisfaction factors capture dissatisfaction (Traffic, Internet) and satisfaction (Roads, Cleanliness) with loadings around 0.48-0.49. This suggests that perceptions of a destination's infrastructure and cleanliness are linked, possibly indicating an overall experience factor influencing tourists' satisfaction.

The information source component groups Relatives and Friends (0.49) and social media (0.54) have the highest loadings, indicating that this component represents sources of information influencing tourist decisions. Social media appears slightly more influential than personal recommendations, highlighting the growing role of digital sources in travel decisions. Regarding the seasonality component, Winter (0.60) has the highest loading, while Summer and Autumn (0.34) have lower associations. Spring is not considered because the loading is less than 0.3. Seasonality seems to play a role, with winter being a dominant factor, potentially due to tourism demand patterns, weather preferences, or travel costs.

HOUSEHOLD WELFARE:	**LOADINGS**	**DESTINATION SATISFACTION:**	**LOADINGS**
Earnings	0.49	Traffic Dissatisfaction	0.48
Earning Members	0.37	Internet Dissatisfaction	0.48
Economic Dependents	0.37	Roads Satisfaction	0.48
Poor Household	0.37	Clean Satisfaction	0.49
Residence Area	0.37	**INFORMATION SOURCE:**	
International Remittances	0.37	Relatives and Friends	0.49
Own cellular	0.37	Social media	0.54
Have Debt	0.49	**SEASONALITY:**	
Have Car	0.49	Winter	0.60
Have Trust	0.49	Summer	0.34
		Autumn	0.34

Table 17: Loading rotation output for selected components of the principal component analysis.

After the PCA, the analysis of this chapter continues by creating two groups of variables, exogenous and endogenous, to the paper (see Diagram 1). The exogenous to the paper factors are in the first group. These variables are Year, SCOPUS WOS, ScoWo, 2 Years Impact Factor, 5 Years Impact Factor, Cite Score, SNIP, and SJR. The first three variables are dummies

for articles found in SCOPUS, WOS, and both databases (ScoWo), respectively. The Impact Factors at 2 and 5 years were obtained from the metrics of each journal. The last three variables are obtained from each journal's metrics published by SCOPUS. Cronbach's alpha (C. alpha) tests the internal consistency of the variables that make up the group exogenous to the paper and obtained a reliable coefficient of 0,76, which exceeds the 0.70 threshold for all the constructs, as seen in Table 18.

Table 18: Constructs' Cronbach's Alpha

Construct	C. Alpha
Exogenous	0,76
Household Welfare	0,90
Destination Satisfaction	0,79
Information Source	0,79
Seasonality	0,83

Table 18: Principal Components Cronbach's Alpha. Source: author´s elaboration from Scopus and WOS databases.

In the group of variables endogenous to the paper, the analysis identified four main components associated with the original independent variables collected from the models used in the papers. These principal components are household welfare, destination satisfaction, information sources, and seasonality.

Diagram 1: Endogenous and exogenous variables groups

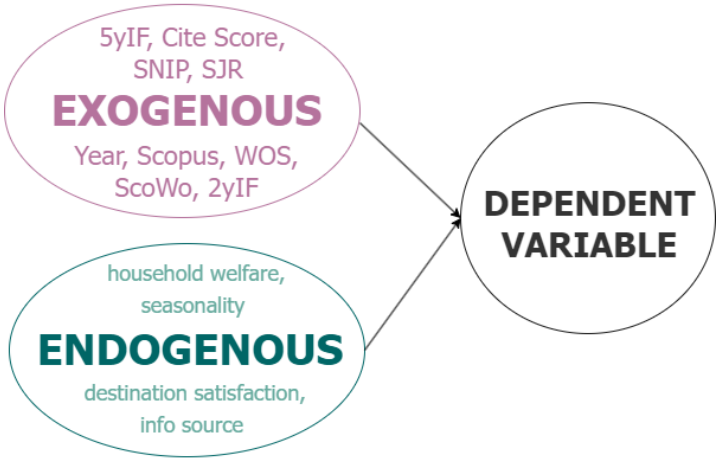


Diagram 1: Variables groups endogenous to the paper and exogenous to the paper. Source: author´s elaboration from Scopus and WOS databases..

3.2. Poisson Econometric Model for methodology complexity in TEMPS

This section shows the Poisson regression model estimation through quasi-maximum likelihood estimation. This aimed to find relationships between the selected papers' variables and methodology complexity. This model is applied because the dependent variable is discrete and takes non-negative values. A count variable or a discrete variable with few values cannot have a normal distribution. Then, the distribution for count data and discrete variables

with few values is the Poisson. Thus, this chapter models the expected conditional value of the dependent variable *methodology complexity* as an exponential function. (Wooldridge, 2012). *Methodology complexity* is a discrete variable that takes values from 1 to 15 according to the methodology's complexity level. Table 19 (Annex 1) shows the methods applied on each paper, indicating the level in each column. The relation intended to analyse between the dependent variable and the regressors is shown in Diagram 2. The model equations are as follows.

The variables exogenous to the paper are Year (YR), SCOPUS (S), WOS (W), 2 Years Impact Factor (2yIF), 5 Years Impact Factor (5yIF), Cite Score (CS), Source Normalised Impact per Paper (SNIP) and Scientific Journal Rankings- Scimago (SJR). The following equation 1 represents the Poisson model:

$$E(MC/\text{YR, S, W, SW, 2yIF, 5yIF, CS, SNIP, SJR, } X_2, X_3, X_4, X_5) =$$

$$\exp(\beta_0 + \alpha_1\text{YR} + \alpha_2\text{S} + \alpha_3\text{W} + \alpha_4\text{SW} + \alpha_5\text{2yIF} + \alpha_6\text{5yIF} + \alpha_7\text{CS} + \alpha_8\text{SNIP} + \alpha_9\text{SJR} +$$

$$\beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5) \qquad (1)$$

Therefore, using approximation properties, $100\beta_j$ or $100\alpha_j$ is roughly the percentage change in expected conditional value, given a one-unit increase in the independent variables (Wooldridge, 2012).

Diagram 2: Methodology Complexity

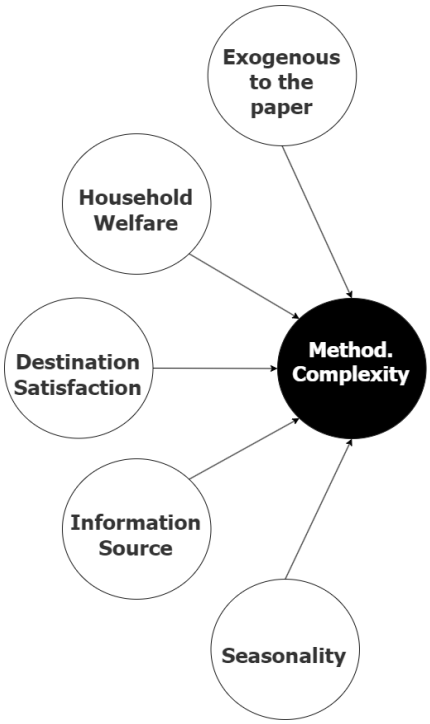


Diagram 2: Methodology Complexity Variables. Source: author´s elaboration from Scopus and WOS databases.

The importance of studying methodology complexity in research is highlighted across various disciplines. Complexity thinking challenges linear methodologies and traditional views of causality, offering a more nuanced approach to understanding complex systems

(Hetherington, 2013). Morin's "paradigm of complexity" and Le Moigne's "general system theory" provide a framework for critically conceiving the complexity of scientific research processes (Alhadeff-Jones, 2013). In this sense, the level of complexity in the methodologies applied in temps allows better and more accurate information regarding the determinants of tourist expenditure.

3.3. Poisson Econometric Model for Complexity of the Methodology: Results and Discussion

This section estimates a Poisson regression with the details of the variables associated with the exogenous factors (see Table 19). The log-likelihood values in Table 19 correspond to the estimation process of the Poisson regression model. During the iteration process, the log-likelihood starts at −102.0221 in the first iteration. By the second iteration, the log-likelihood improves slightly to −102.02084, which remains unchanged in the third iteration. This pattern suggests that the estimation algorithm refines the model to fit with each step. Stabilising the log-likelihood value at −102.02084 indicates that the model has successfully converged. Convergence is a crucial aspect of regression modelling, as it confirms that the optimisation process has found a solution where further iterations would not significantly improve the model's fitness. If the log-likelihood were still changing substantially after several iterations, it might suggest issues such as poor model specification or non-convergence, requiring further adjustments. The final log-likelihood value of −102.02084 represents the overall goodness of fit of the Poisson regression model to the given data. While log-likelihood values alone do not determine model quality, a higher (i.e., less negative) log-likelihood value generally indicates a better-fitting model. However, the interpretation of model fit should also consider other statistical measures, such as the likelihood ratio chi-square test, pseudo-R^2, and the significance of individual coefficients.

The Pseudo R^2 = 0.2542 suggests that the model explains about 25.42% of the variance in the dependent variable. In count data models like Poisson regression, lower Pseudo R^2 values are common, and interpretation should be complemented with other goodness-of-fit measures, such as the likelihood ratio chi-square test and the significance of individual coefficients. The Likelihood Ratio (LR) $Chi^2(12)$ = 69.56, with Prob > chi2 = 0.00, indicates that the model is statistically significant at the 5% level. Table 19 shows that Scopus, WOS and SNIP are the exogenous factors determining the complexity of the chosen methodology. Scopus has a negative influence of medium statistical significance on the complexity of the methodology (α_2 =-0,79327**). In contrast, both WOS and one of the performance indicators of the journal where the paper was published, SNIP, have a positive effect, with low and medium statistical significance, respectively (α_3 = 0,52304* and α_7 = 1,23327**). Thus, the fact that the paper is published only in WOS concerning the reference category (the paper was published only in Scopus or both), increases the complexity of the methodology used in the paper by approximately 52%. Furthermore, seasonality is the only endogenous variable that influences the complexity of the methodology used in the TEMPS. The negative influence of this variable is maintained at a medium level of statistical significance. Therefore, a one-unit increase in

the number of variables associated with seasonality for studying the determinants of tourist expenditure decreases the complexity of the methodology used for this purpose by approximately 13%. This result is because studies that use more variables associated with seasonality and are statistically significant develop more straightforward estimation methods. Moreover, higher SNIP scores are associated with a greater likelihood of employing complex methodologies, as journals with higher impact factors tend to require more sophisticated estimation techniques, such as Beta regression models. However, the influence of specific journal metrics on methodological complexity is not statistically conclusive in this model; a clear pattern emerges. Scopus-indexed journals generally feature more straightforward econometric techniques, whereas higher-impact WOS journals favour more complex methods. These results serve as a guide for researchers when publishing articles in terms of the impact they may generate according to the complexity of the methodology applied.

Iteration 1: log likelihood = -102.0221

Iteration 2: log likelihood = -102.02084

Iteration 3: log likelihood = -102.02084

Poisson regression **Number of obs = 45**

LR chi2 (12) = 69.56

Prob > chi2 = 0.0000

Pseudo R2 = 0.2542

Log likelihood = -102.02084

Complex_Meth	Coef.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
Year	-0.0725959	0.0530789	-1.37	0.171	-0.1766285	0.0314368
i_SCOPUS	-0.7932743	0.2828538	-2.80	0.005	-1.347658	-0.238891
i_WOS	0.5230425	0.2366171	2.21	0.027	0.0592816	0.9868034
i_ScoWo	0	(omitted)				
Impact_Factor2Y	-0.0053215	0.0707755	-0.08	0.940	-0.1440389	0.1333959
Impact_Factor5Y	-0.2276128	0.1248889	-1.82	0.068	-0.4723906	0.017165
Cite_Score	-0.1454326	0.0861188	-1.69	0.091	-0.3142224	0.0233572
SNIP	1.233267	0.474053	2.60	0.009	0.3041402	2.162394
SJR	0.2470857	0.3795852	0.65	0.515	-0.4968877	0.9910591
household_welfare	0.1598672	0.0943844	1.69	0.090	-0.0251228	0.3448573
dest_satisfaction	0.1118339	0.1534043	0.73	0.466	-0.188833	0.4125007
info_sourse	-0.2511919	0.1360733	-1.85	0.065	-0.5178907	0.0155069
seasonality	-0.1355018	0.050985	-2.66	0.008	0.2354305	-0.035573
_cons	148.0041	107.2758	1.38	0.168	-62.25261	358.2608

Table 19: Poisson estimation output for Complexity of the Methodology. Source: Author's elaboration from Scopus Database. Table of the results of the Maximum Likelihood Estimation for the Poison Model for Methodology Complexity

4. Conclusions

Although the number of TEMPS follows a higher annual average than the previous reviews, the number of TEMPS is much smaller than the non-parametric and macroeconomic tourist expenditure. This may show a trend toward the growth of this type of study and a greater complexity of the methodologies applied that can be added to the econometric study conducted in this paper. The Poisson regression analysis estimated for the dependent variable complex methodology highlights a positive and significant relationship with some exogenous factors of the paper. This shows that papers with better impact indicators and those of WOS tend to apply more complex methodologies.

Regarding the type of independent variables used in the TEMPS, there is greater interest in the tourist's opinion. This is reflected in an increase in psychographic variables, mainly linked to tourist satisfaction, which has also proved to be positive and significant in explaining tourist expenditure. For future researchers, the development of a TEMPS review enables a more effective pre-selection of the target and control explanatory variables. Future research should include environmental, social, and economic considerations of the destination, which influence tourists' spending behaviour.

A systematic review of the literature on non-parametric studies on tourist expenditure is essential for future research. Also should be of interest a systematic literature review of macroeconometric and parametric studies of tourists' expenditure. In addition, this literature review did not find many studies on tourist expenditure that apply complex systems using network analysis or agent-based models. Future research could be conducted along these lines to explore the patterns and networks in the relationships between tourist agents, hotel owners, government, tourist transport companies, and other tourism-related industries that may influence tourist consumption patterns.

It should also be noted that the TEMPS do not capture certain phenomena associated with accommodation. The great informality that exists in the second home sector in the world, in general, does not allow us to capture in the surveys carried out on tourists how many stay in their own or rented second homes. With the COVID-19 pandemic, the importance of tourism became evident. However, new spatial and time allocations of tourists were generated due to social distance, and less accommodation in hotels due to social distance (Müller, 2020).

As stated by Müller (2020): *"big data covering second homeowner's mobilities, expenses, and experiences further opens up for new, exciting research opportunities"*. This type of phenomenon should be on the agenda of the organisations in charge of conducting surveys or the ministries of tourism of the countries to capture this type of population that, to a certain extent, has been invisible to the eyes of tourism to date. Regarding the results of the different Poisson Models, government policies in tourist destinations and business managers should concentrate on endogenous factors to boost tourist expenditure. The unique attributes of each tourist destination must be considered. Nonetheless, economic policy

should prioritise these endogenous factors to ensure a positive economic impact on the destination.

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Annex 1

Table 4: Ranking of Journals

Journal	Nr.Papers	%
Tourism Economics	13	28,26
Tourism Management Perspectives	5	10,86
Tourism Management	3	6,52

Eco Mont-Journal on Protected Mountain Areas Research	1	2,17
Economics Letters	1	2,17
European Journal of Tourism Research	1	2,17
International Journal of Consumer Studies	1	2,17
Journal of Physics: Conference Series	1	2,17
Journal of Tourism and Development	1	2,17
Revista de Economia del Rosario	1	2,17
Tourism Planning and Development	1	2,17
Tourism Review	1	2,17
Total	**46**	**100**

Table 4: Tourist Expenditure Microeconometric and Parametric Studies Ranking of Journals. Source: author´s elaboration from Scopus and WOS databases.

Table 12: Economic constraints independent variables

Independent Variable		Significant Positive		Significant Negative		Not Significant		Not Considered	
Variable	**Label**	**Nr.**	**%**	**Nr.**	**%**	**Nr.**	**%**	**Nr.**	**%**
Economic constraints									
Inc	Income	21	45,65	0	0	5	10,86	20	46,47
PoorH	Poor household	0	0,00	1	2,17	0	0,00	44	95,65
GDPpc	Gross Domestic Product pc	1	2,17	0	0	1	2,17	43	93,47
Price	Consumer price index	2	4,34	2	4,34	0	0,00	41	89,13
IntRem	International remittances	1	2,17	0	0	0	0,00	44	95,65
CellH	Cellphone in the household	1	2,17	0	0	0	0,00	44	95,65
Debt	Debt	0	0,00	2	4,34	0	0,00	44	95,65
House	Own a house	3	6,52	0	0	1	2,17	42	91,30
Car	Own a car	1	2,17	0	0	0	0,00	44	95,65
Trust	Stocks in a trust	1	2,17	0	0	0	0,00	44	95,65
Anatolia						2	4,34		
Annals of Tourism Research						2	4,34		
Current Issues in Tourism						2	4,34		
International Journal of Tourism Research						2	4,34		
Journal of Sport and Tourism						2	4,34		
Journal of Travel and Tourism Marketing						2	4,34		
Journal of Travel Research						2	4,34		
Annals of Tourism Research Empirical Insights						1	2,17		
Decision Support Systems						1	2,17		

Table 12: Tourist Expenditure Microeconometric and Parametric Studies economic constraints independent variables. Source: author´s elaboration from Scopus and WOS databases.

Table 13: Socio-demographic independent variables

Independent Variable	Significant Positive	Significant Negative	Not Significant	Not Considered

Variable	Label	Nr.	%	Nr.	%	Nr.	%	Nr.	%
Socio-demographic									
Age	Age	14	38,88	9	19,56	11	23,9	12	26,08
AgeSq	Age squared	1	2,17	2	4,34	0	0	43	93,47
Educ	Education	9	19,56	1	2,17	1	2,17	35	76,08
Nat	Nationality	3	6,52	16	34,78	1	2,17	25	54,34
CLang	Common language	0	0,00	1	2,17	0	0,00	44	95,65
CCrurr	Common currency	0	0,00	1	2,17	0	0,00	44	95,65
M	Married	4	8,69	1	2,17	1	2,17	39	84,78
Fem	Gender (Female)	4	8,69	2	4,34	4	8,69	36	78,20
Male	Gender (Male)	6	13,04	5	10,86	5	10,86	29	63,04
Earn	Nr. of earners 2 or more	0	0,00	1	2,17	0	0,00	44	95,65
NrEarn	Nr. of earners	1	2,17	0	0,00	0	0,00	44	95,65
NrEcDep	Nr.of economic dep.	1	2,17	0	0,00	0	0,00	44	95,65
Res	Area of residence	1	2,17	0	0,00	0	0,00	44	95,65
DW	Divorced or widow	2	4,34	0	0,00	0	0,00	43	93,47
Une	Unemployed	0	0,00	3	6,52	2	4,34	41	89,13
Emp	Employed	1	2,17	3	6,52	2	4,34	40	86,95
PO	Public official, AAFF	1	2,17	0	0,00	1	2,17	43	93,47
BP	Businessperson	6	13,33	0	0,00	1	2,17	38	82,60
SW	Sales, manager	2	4,34	1	2,17	1	2,17	42	91,30
SE	Self-employee	4	8,69	1	2,17	0	0,00	41	89,13
HW	Housewife	2	4,34	0	0,00	1	2,17	42	91,30
Pro	Professional	1	2,17	0	0,00	1	2,17	43	93,47
W	Worker	4	8,69	4	8,69	1	2,17	37	80,43
St	Student	1	2,17	4	8,69	0	0,00	40	86,95
Ret	Retired	3	6,52	4	8,69	0	0,00	39	84,78

Table 13: Tourist Expenditure Microeconometric and Parametric Studies Sociodemographic Variables. Source: author´s elaboration from Scopus and WOS databases.

Table 14: Trip-related independent variables

		Significant Positive		Significant Negative		Not Signif.		Not Cons.	
	Independent Variable					**Nr**			
		Nr	**%**	**Nr**	**%**		**%**	**Nr**	**%**
Trip-related	**Variable Label**								
DestW	Tourist destination world	1	2,17	0	0,00	0	0,00	44	95,65
RdTr	Round trip	1	2,17	0	0,00	0	0,00	44	95,65
ForTr	Foreign trip	2	4,34	0	0,00	1	2,20	42	91,30
Visa	Visa required	1	2,17	1	2,17	0	0,00	43	93,47
TrFin	Trip cost total financed by me	1	2,17	0	0,00	0	0,00	44	95,65
Per	Travel by personally planning	3	6,52	0	0,00	1	2,20	41	89,13
Oper	Travel by a tour operator	4	8,69	3	6,52	3	6,52	35	76,08
InfTrAg	Info source travel agency	1	2,17	0	0,00	0	0,00	44	95,65
InfRF	Info source relatives and friends	1	2,17	2	4,34	0	0,00	42	91,30
InfInt	Info source internet	3	6,52	1	2,17	0	0,00	41	89,13
InfG	Info source traveller's guides	2	4,34	0	0,00	0	0,00	43	93,47
InfM	Info source media (tv, radio, np.)	1	2,17	0	0,00	2	4,34	42	91,30
InfTO	Info source tourist office, embassy	2	4,34	0	0,00	0	0,00	43	93,47
InfAH	Info source airlines or hotels	1	2,17	0	0,00	0	0,00	44	95,65
InfSM	Info source social media	1	2,17	0	0,00	0	0,00	44	95,65
InfPE	Info source personal experience	1	2,17	0	0,00	0	0,00	44	95,65
FVi	First Visit	3	6,52	3	6,52	2	4,30	37	80,43
RVi	Repeated Visit	5	10,86	7	15,21	3	6,50	30	65,21
NrPrVisit	Number of previous visits	1	2,17	0	0,00	0	0,00	44	95,65
LOS	Length of stay	18	39,13	10	21,74	2	4,30	16	34,78
LOSsq	Length of stay squared	1	2,17	0	0,00	0	0,00	44	95,65
NVS	Number of visited sites	2	4,34	2	4,34	0	0,00	41	89,13
VOP	Visiting other places	0	0,00	1	2,17	0	0,00	44	95,65
Hotel	Hotel accommodation	14	30,43	5	10,86	1	2,10	25	54,34
Hotel2	Hotel 2 stars' accommodation	0	0,00	1	2,17	0	0,00	44	95,65
Hos	Hostel accommodation	1	2,17	2	4,34	0	0,00	42	91,30
ApH	Apart Hotel	1	2,17	2	4,34	0	0,00	42	91,30
RHapa	Renting a house or apartment	1	2,17	4	8,69	0	0,00	40	86,95
OHap	Own house or apartment	1	2,17	2	4,34	0	0,00	42	91,30
FHap	Family home or apartment	0	0,00	4	8,69	0	0,00	41	89,13
TSh	Time shared	0	0,00	2	4,34	1	2,10	42	91,30
Camp	Camping	0	0,00	6	13,04	2	4,30	37	80,43
SunB	Sun and beach purpose	0	0,00	1	2,17	2	4,30	42	91,30
Hol	Holliday purpose	5	10,86	5	10,86	1	2,20	34	73,91
Shop	Shopping purpose	5	10,86	1	2,17	0	0,00	39	84,78
Bs	Business purpose	0	0,00	4	8,69	3	6,50	38	82,60
VFR	Visiting friends or relatives' purpose	0	0,00	7	15,21	2	4,30	36	78,26
Fam	Travel with family	6	13,04	0	0,00	2	4,30	37	80,43
Fr	Travel with friends	3	6,52	0	0,00	3	6,50	39	84,78
CW	Traveling with coworkers	0	0,00	2	4,34	1	2,20	42	91,30
PS	Party Size	7	15,22	8	17,39	3	6,50	27	58,70

PSSQ	Party Size Squared	1	2,17	0	0,00	1	2,20	43	93,48
BA	Booking in advance	1	2,17	0	0,00	1	2,20	43	93,48
Win	Travel in winter	0	0,00	1	2,17	0	0,00	44	95,65
Sum	Travel in summer	0	0,00	2	4,34	0	0,00	43	93,48
Au	Travel in autumn	0	0,00	0	0,00	2	4,30	43	93,48
LCC	Low-Cost Carrier	1	2,17	2	4,34	0	0,00	42	91,30
FCE	Flight Class Economic	0	0,00	1	2,17	1	2,20	43	93,48
TrCar	Travel by Car	2	4,34	2	4,34	1	2,20	40	86,96
TrBus	Travel by Bus	1	2,17	0	0,00	1	2,20	43	93,48
TrFerry	Travel by Ferry	1	2,17	0	0,00	1	2,20	43	93,48
TrTrain	Travel by Train	1	2,17	0	0,00	1	2,20	43	93,48
Natur	Visit natural attractions	6	13,04	1	2,17	3	6,50	35	76,09
Congr	Congress activities motive	0	0,00	1	2,17	0	0,00	44	95,65
ChF	Trip facilities motivation	0	0,00	2	4,34	0	0,00	43	93,48
WDist	Weighted distance	3	6,52	0	0,00	0	0,00	42	91,30
LocPdelE	Main destination Punta del Este	1	2,17	0	0,00	1	2,20	43	93,48
LocMdeo	Main destination Montevideo	1	2,17	0	0,00	1	2,20	43	93,48
LocRural	Main destination Rural Zone	0	0,00	1	2,17	0	0,00	44	95,65
LocBetw	Dest. between Mdeo. and P del E.	0	0,00	1	2,17	0	0,00	44	95,65
Surv3Q	Surveyed in the third quarter	0	0,00	1	2,17	0	0,00	44	95,65
Surv4Q	Surveyed in the fourth quarter	1	2,17	0	0,00	0	0,00	44	95,65

Table 14: Tourist Expenditure Microeconometric and Parametric Studies trip-related independent variables. Source: author´s elaboration from Scopus and WOS databases.

Table 15: Psychographic independent variables

Independent Variable		Significant Positive		Significant Negative		Not Significant		Not Considered	
Variable	Label	Nr.	%	Nr.	%	Nr.	%	Nr.	%
Psychographic (Satisfaction)									
Urb	Urban environment	2	4,34	0	0,00	2	4,34	41	89,13
TrafSat	Traffic and car parking	0	0,00	1	2,17	0	0,00	44	95,65
IntSat	Internet access	0	0,00	1	2,17	0	0,00	44	95,65
PTrSat	Public transport	2	4,34	0	0,00	0	0,00	43	93,48
Cult	Culture	6	13,04	3	6,52	0	0,00	36	78,26
Gast	Gastronomy	6	13,04	3	6,52	0	0,00	36	78,26
Beach	Beach	0	0,00	2	4,34	0	0,00	43	93,48
Night	Night	1	2,17	2	4,34	0	0,00	42	91,30
CFest	Concerts, shows	3	6,52	2	4,34	0	0,00	40	86,96
TA	T. Attractions	4	8,70	2	4,34	0	0,00	39	84,78
TSP	Tourist signposting	2	4,34	0	0,00	0	0,00	43	93,48
TInfoSat	Tourist information	1	2,17	0	0,00	1	2,17	43	93,48
RC	Roads and com.	1	2,17	0	0,00	0	0,00	44	95,65
Accommodation	Accommodation	2	4,34	0	0,00	0	0,00	43	93,48
AtCarSat	Attention and care	1	2,17	0	0,00	2	4,34	42	91,30
CleanSat	Cleaning	1	2,17	0	0,00	1	2,17	43	93,48
PrOp	Like prices	1	2,17	1	2,17	0	0,00	43	93,48
PrDis	Dislike prices	0	0,00	1	2,17	0	0,00	44	95,65
Atm	Atmosphere, safety	4	8,70	3	6,52	0	0,00	38	82,61
TDest	Tourist destination Sat.	3	6,52	5	10,87	0	0,00	37	80,43
Facil	Diversity of facilities	1	2,17	0	0,00	1	2,17	43	93,48
SatCas	Cassinos	1	2,17	0	0,00	0	0,00	44	95,65
SatPdelE	Punta del Este	1	2,17	0	0,00	0	0,00	44	95,65
Sport	Sports	2	4,34	0	0,00	2	4,34	41	89,13

Table 15: Tourist Expenditure Microeconometric and Parametric Studies psycographyc variables. Source: author´s elaboration from Scopus and WOS databases.

Eigenvalues Principal of Principal Components

Rotate, varimax blank (.3)

Principal components/correlation

Number of obs = 45

Number of comp. = 44

Trace = 87

Rotation: orthogonal varimax (Kaiser off) Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	7.01	2.74	0.08	0.08
Comp2	4.27	0.18	0.05	0.13

Comp3	4.09	0.60	0.05	0.18
Comp4	3.49	0.29	0.04	0.22
Comp5	3.20	0.06	0.04	0.25
Comp6	3.14	0.11	0.04	0.29
Comp7	3.03	0.17	0.03	0.32
Comp9	2.85	0.18	0.03	0.39
Comp8	2.86	0.00	0.03	0.36
Comp10	2.67	0.05	0.03	0.42
Comp11	2.62	0.06	0.03	0.45
Comp12	2.56	0.44	0.03	0.48
Comp13	2.12	0.08	0.02	0.50
Comp14	2.04	0.08	0.02	0.53
Comp15	1.96	0.04	0.02	0.55
Comp16	1.91	0.15	0.02	0.57
Comp17	1.76	0.01	0.02	0.59
Comp18	1.75	0.15	0.02	0.61
Comp19	1.59	0.01	0.02	0.63
Comp20	1.58	0.01	0.02	0.65
Comp21	1.57	0.02	0.02	0.67
Comp22	1.55	0.01	0.02	0.68
Comp23	1.54	0.01	0.02	0.70
Comp24	1.53	0.01	0.02	0.72
Comp25	1.52	0.04	0.02	0.74
Comp26	1.47	0.03	0.02	0.75
Comp27	1.44	0.00	0.02	0.77
Comp28	1.44	0.04	0.02	0.79
Comp29	1.40	0.08	0.02	0.80
Comp30	1.31	0.00	0.01	0.82
Comp31	1.31	0.01	0.01	0.83
Comp32	1.30	0.05	0.01	0.85
Comp33	1.25	0.04	0.01	0.86
Comp34	1.20	0.02	0.01	0.88
Comp35	1.19	0.01	0.01	0.89
Comp36	1.17	0.07	0.01	0.90
Comp37	1.10	0.02	0.01	0.92
Comp38	1.09	0.01	0.01	0.93
Comp39	1.07	0.02	0.01	0.94
Comp40	1.05	0.02	0.01	0.95
Comp41	1.03	0.02	0.01	0.97
Comp42	1.01	0.01	0.01	0.98
Comp43	1.00	0.06	0.01	0.99
Comp44	0.94	0.00	0.01	1.00

Table 16: Components Eigenvalues extracted from the PCA.

Table 19: Summary of the Methodology performed in each paper and the MCL (Methodology Complexity Level)

MCL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	OLS	Logistic	Tobit	Heckman	Q.Reg.	Unc. Q. Reg.	Reg. Adj.	Seemingly unrelated	Interv. Reg.	Scad-elastic	Latent class	Finite Mixture	Hierarchical	Quasi Max.Lik.	Non-linear
Abbruzzo et al. (2014)										X					
Aguiló et al. (2017)	X														
Alegre and Pou (2016)				X											
Alfarhan et al. (2022)					X										
Almeida and Garrod (2017)					X										
Baños & Boto (2021)							X								
Brida and Tokarchuk (2015)				X											
Brida and Tokarchuk (2017)				X											
Brida et al. (2013)				X											
Brida et al. (2014)				X											
Buning et al. (2016)			X												
Cárdenas et al. (2016)	X														

(Continued)

MCL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	OLS	Logistic	Tobit	Heckman	Q.Reg.	Unc. Q. Reg.	Reg. Adj.	Seemingly unrelated	Interv. Reg.	Scad-elastic	Latent class	Finite Mixture	Hierarchical	Quasi Max.Lik.	Non-linear
Castañeda et al. (2019)											X				
Chen et al. (2022)					X										
David et al. (2018)	X														
Dayour et al. (2016)	X														
Disegna and Osti (2016)			X												
Engström and Kipperberg (2015)	X														
Farías and Barić (2020)													X		
Ferreira and Carneiro (2021)	X														
Ferreira, M., et al. (2020)									X						
Gómez-Déniz et al. (2020)															X
Lin et al. (2021)				X											
Marksel et al. (2017)		X													
Marrocu et al. (2015)					X										

Massidda et al. (2020)					X										

(Continued)

MCL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	OLS	Logistic	Tobit	Heckman	Q.Reg.	Unc. Q. Reg.	Reg. Adj.	Seemingly unrelated	Interv. Reg.	Scad-elastic	Latent class	Finit Mixture	Hierarchical	Quasi Max.Lik.	Non-linear
Massidda et al. (2022)	X														
Melstrom (2017)														X	
Mora and Garcia (2020)			X												
Mortazavi and Lundberg (2019)												X			
Park et al. (2020)				X											
Pérez and Ledesma (2021)						X									
Perić et al. (2019)	X														
Perles et al. (2021)	X														
Pulido et al. (2016)	X														
Pulido, Cárdenas and Durán (2017)	X														
Pulido, Cárdenas and Carrillo (2017)	X														

Pulido et al. (2020)	X														
Rudkin and Sharma (2017)						X									
Serra et al. (2015)	X														
Sharma et al. (2019)						X									

(Continued)

MCL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	OLS	Logistic	Tobit	Heckman	Q.Reg.	Unc. Q. Reg.	Reg. Adj.	Seemingly unrelated	Interv. Reg.	Scad-elastic	Latent class	Finit Mixture	Hierarchical		
Smolčić and Soldić (2016)	X														
Soldić (2017)	X														
Subanti et al. (2018)	X														
Thrane (2015)								X							
Thrane (2016)				X											

Source: Author's elaboration from Scopus Database. The summary of the methodology performed in each paper and the Methodology Complexity Level (MCL).

CHAPTER II

Second-Homes Tourism and Second-Homes Tourists: A Bibliometric Study and Definitions Explorations

1. Introduction

The issue of second homes has been extensively studied in literature from different perspectives. Some are from environmental, geographic, economic, sociocultural, mobility patterns, and tourism research perspectives. Recently, studies on the impact of COVID-19 on second-home tourism have also become relevant. Further, literature reviews have been carried out on this increasingly relevant object of study. Second homes have been a research and policy concern for decades, particularly in rural and tourist areas (Hall & Müller, 2004; Gallent & Tewdwr-Jones, 2001). Often used seasonally, these properties can have significant social, economic, and environmental impacts on local communities (Brida et al., 2011). The growth of second-home ownership has been linked to increased housing wealth, extended spatial mobility, and hyper-consumption in tourist countries (Paris, 2008). This phenomenon has been conceptualised as gentrification and has raised questions about housing affordability and community displacement (Paris, 2014; Gallent et al., 2005). Despite their prevalence in rural areas, second homes have been inadequately addressed in rural studies (Müller, 2011).

The governance and policy challenges associated with second homes are complex, as traditional regulatory structures struggle to address the mobility of people and capital across jurisdictions (Hall, 2014). Consequently, there is a growing need for comprehensive policy planning to manage the impacts of second homes (Brida et al., 2011). The effects of second-home tourism vary geographically, with significant differences between urban hinterlands and peripheral areas (Back & Marjavaara, 2017). To better understand this phenomenon, researchers suggest moving away from viewing second homes as a unitary category and instead considering them as an umbrella concept focusing on dwelling use (Back & Marjavaara, 2017). Second, homes play a significant role in tourism, impacting local economies and tourist behaviour. They can contribute to local tax revenues and economic development (Torres & Domínguez-Menchero, 2006; Mottiar, 2006). Second homes can influence property values and ownership patterns, potentially excluding lower-income groups (Hjalager et al., 2011). They also affect tourist behaviour, with many visitors developing strong place attachments over time (Tuulentie, 2006; Tuulentie, 2007). The growth of second homes can counteract declines in conventional tourism, stabilising resort areas (Strapp, 1988).

Second homes present opportunities and challenges for sustainable tourism development and local economies.

The methodologies applied in second-home tourism research are varied. Some papers adopt qualitative methodologies, while others use quantitative and mixed methods. Some researchers apply quantitative methods to measure the effect of second-home tourism on rural areas. Highlighting Anabestani's (2014) work, it explores the impact of second-home tourism growth on rural communities in Iran. The study used empirical and descriptive-analytical approaches. Most relevant results imply that second-home tourism development is closely linked to social, economic, physical, and environmental changes in rural life. Its overall impact was moderate, with a coefficient of 0.449. The most significant influence came from investments by non-local individuals.

One of the most recent qualitative approaches, Larsson and Müller (2017), examines how Western Sweden's public and private service providers cope with and respond to the challenges of second-home tourism. They analyse interview data geographically by municipality and then thematically use qualitative analysis to identify common themes in the service providers' responses to second-home owners. The main findings suggest that private service providers see second-home owners as an asset for business growth and adapt their strategies to meet their needs. Public service providers also adjust their approaches to handle the rising demands from second-home owners and tourists, prioritising efficient service delivery. However, there is no clear indication of full integration into the local community, though some stakeholders advocate for their transition to permanent residency.

A recent study by Munne et al. (2021) employed Q methodology, a combined quantitative and qualitative approach, to assess the viewpoints of 37 respondents, including specialists, academics, and professionals in the tourism sector. The authors investigate how second-home tourism can revitalise tourism destinations during the COVID-19 crisis. Their results reveal that short-haul trips within travel bubbles or local areas can boost international tourist arrivals during the COVID-19 crisis. Future second-home tourism can enhance community resilience through cultural preservation and knowledge exchange while aiding financial recovery by balancing demand and generating revenue. Second-home tourists can foster community involvement, promote cultural integrity and knowledge sharing, and support economic regeneration.

Hall (2014) reviews academic literature in two main parts. The first part charts the growth of second-home publications about authors' countries, leading journals, and the number of publications. The second part discusses significant themes in second-home research, including motivations, location, planning, housing, social and community dimensions, environmental dimensions, and governance. This author concludes that while mobility and multiple dwellings have implications for urbanisation processes and changing amenity environments, there was a need for greater attention to life course and relational approaches to better understand the temporal and spatial dimensions of second homes. In addition, Müller (2020) reviews Nordic research on second-home tourism since 2000 and relates it to international trends within this field. This Nordic author finds that after

being dominated by national overviews, research has more recently addressed issues such as environmental impacts, community tensions and displacement, internationalisation, and planning. Indeed, with this, Nordic authors have gained core positions in the international ecosystem of second-home research.

Furthermore, Alonsopérez et al. (2022) present a systematic literature review and a revision of the main issues studied. They found that the number of publications has grown steadily, reaching a maximum in 2018. The authors also conclude that American, Nordic, and South African authors dominate the research on the second home. They also added that publications have been shifted from Tourism Geography Journals to Tourism Journals, showing a more outstanding specification in the area. The newest review of Ismail et al. (2023) investigating general second-home research identifies environmental policies and their relevance to second-home tourism. It discusses the applicable environmental research themes undertaken and those that should still be researched. These authors advocate for greater academic scrutiny of the ecological aspects of second-home tourism to enable a comprehensive understanding of the phenomenon as part of tourism.

Unlike the literature reviews described above, this research aims to shed light on specific under-explored topics. First, it seeks to understand the definitions of *second-home tourism and second-home tourist* in the literature. Secondly, through a bibliometric analysis, the second chapter of this thesis describes the state of the art in research on second homes in general and second homes tourism in particular. This chapter aims to underscore the significance of tourism as a pertinent subject in the discourse surrounding second-home tourism within the literature. It also strives to investigate the key themes prevalent in the scholarly output concerning tourism related to second homes. The research questions of Chapter 2 of the thesis are as follows: i) What are the appropriate definitions of SH tourism and SH tourists? ii) What is state-of-the-art research on second homes and second-home tourism?

To address these research questions, the chapter follows two different methodologies. First, to undertake the definitions investigation, it thoroughly explored Google Scholar. The choice of this search engine is motivated by the absence of some articles in the Scopus database before 2000. Second, it employs Scopus, the preeminent research database, to conduct the bibliometric examination for second homes. This procedure begins with downloading a BibTeX-formatted database by applying filters on Scopus, encompassing the years "2000 to 2022," the subject areas of "business, management and accounting" and "economics, econometrics and finance," the document type as "article," the publication stage as "final," the source type as "journal," and the language as "English."

This second chapter of the thesis reveals a consensus among most perspectives on *second-home tourism* regarding the transient nature of the tourist's visit. Another recurring attribute in the interpretations of *second-home tourism* is using these properties for recreational purposes. Notably, all definitions of *second-home tourist* revolve around second-home owners, omitting those who rent second homes for leisure—an oversight that excludes the category of rental tourists from the *second-home tourist* definition.

Consequently, the literature focuses on the second-home owner as the central figure in second-home tourism.

The results of the bibliometric analysis show that the number of articles in second homes and second homes tourism annual production increased from 2000 to 2022. On the one hand, within the bibliometric analysis of second homes, the most prolific author emerges as Dieter Müller from Umeå University in Sweden, having published twelve articles from 2000 to 2022. Examining the countries of corresponding authors in second homes studies, the United States has a conspicuous prevalence, contributing 344 articles from 2000 to 2022.

On the other hand, regarding second home tourism studies, Spain takes the lead with twenty articles published between 2000 and 2022, showing limited collaboration with other countries (5%). The United States follows closely with nineteen published articles and no collaboration, securing the second position. Sweden has 17 published articles in third place, with relatively low collaboration among authors from other countries (6%). This result, and the one of the second home research about countries, differs from the results of Müllers' literature review that establishes the absolute dominance of Nordic countries in the second home papers' survey.

In addition, the bibliometric analysis of second homes and second-home tourism exposes distinctions in cluster analysis and keyword rankings. Thus, this emphasises the need to scrutinise the literature on second-home tourism independently. Notably, the author's keyword ranking in the Scopus database for second homes elucidates that "COVID-19" and "tourism" stand out as the most pertinent topics in the scholarly production related to second homes. Finally, the keywords-plus ranking in second-home tourism bibliometrics highlights "tourist destination" as the most recurrent concept, followed by "tourist behaviour" and "tourism development", revealing the most studied topics.

The exploration of existing literature unveils potential avenues for future research. For instance, scrutiny of the legislative evolution of second homes in specific nations would be advantageous. Investigating such legislation's positive or negative impact on second-home tourism would also be compelling. The scarcity of supply-side data in numerous countries, except Nordic nations, owing to extensive informality, poses a challenge for research on second home tourism from the supply side and cross-referencing data with microdata from tourist surveys. In this context, establishing a registry for second-home owners should be a priority for national governments. This registry would facilitate research efforts and promote equitable competition with other forms of tourist accommodation. Furthermore, if second-home owners are registered, they can constitute a sector supported by economic policies endorsed by the respective countries' governments.

The following section describes the studies' methodology and data sources to address the responses to the research questions. Then, the third displays the results and discussion divided into different subsections. Initially, it introduces the outcomes and discourse of examining definitions of *second-home tourism*, succeeded by those related to *second-home tourist* descriptions. Following this, the bibliometric findings are showcased. The

bibliometric analysis results for second homes are disclosed first, as they represent the most extensive collection of literature. Subsequently, the results of the bibliometric analysis on second-home tourism are exhibited, which is a component of the broader bibliometric examination on second homes. Finally, the last section concludes with all the results obtained and gives future research lines and policy implications.

2. Methodology and Data Sources

The procedure studies the definitions of *second homes* and *second-home tourists*. It conducts an exhaustive search on Google Scholar to carry out this study. The reason for using this search engine is that the Scopus database before 2000 is lacking in some articles. In addition, it was necessary to go back many years to analyse the evolution of the concepts of *second homes* and *second-home tourists*. The methodology searches for definitions of second homes and second-home tourists, presented in English articles from 1974 to 2022.

The Scopus database, the most extensive one, is used to perform bibliometric analysis for second homes. A database in BibTeX format obtained by filtering on Scopus the years "2000 to 2022"; the subject areas "business, management and accounting" and "economics, econometrics and finance"; the document type "article"; the publication stage "final"; the source type "journal"; and the language "English". The search criteria used in the two databases were the same:

(second-home) OR (second home*)*.

The search was performed by "Title, keywords, and abstract". Thus, the database resulted in 1786 articles on second-home research from 2000 to 2022. It first obtains a database of 207 articles from Scopus to conduct the literature review of second-home tourism. The search criteria used was the combination of the following keywords:

(second-home touris*) OR (second home* touris*)*

In addition, the procedure uses some filters to obtain the 207 items. It took articles between the years 2000 and 2022. It filters by subject areas: "Business management" and "Economics, Econometrics, and Finance." Then, it selects the document type *article*, publication stage *final*, source type *journal,* and language *English*. After applying the selection criteria, it exports the articles to a Bib Tex database to perform a bibliometric analysis of second-home tourism research.

3. Results and discussion

The first section presents the results and discussion of the analysis of *second-home tourism* definitions, followed by those of *second-home tourist* definitions. Subsequently, the bibliometric results are presented. The second-home bibliometric analysis results are

presented first as they constitute the largest body of literature. Then, the second-home tourism bibliometric analysis results and a subset of the bibliometric analysis on second homes are displayed.

3.1. Second-home Definitions Review

The oldest definition is Jaakson's (1986), with a wide range of accommodations considered *second homes*, which is not far from the most recent definitions. The second oldest meaning is that of Girard and Gartner (1993), derived from the sample used to survey second-home owners. This concept is unrefined, considering *second homes* as non-commercial alternative properties owned by non-residents. The latest definition by Back et al. (2022) refers only to permanent dwellings that became *second homes and houses explicitly built to be used as second homes*. Most second-home concepts agree with the temporary nature of the tourist's stay. Another characteristic repeated in the meanings of *second homes* is that they are used for recreational purposes. All definitions can be seen in Table 1 (Annex 2).

The definitions of second homes provided in Table 1 (Annex 2) highlight various perspectives, ranging from conceptual understandings to more operational classifications. These definitions can be evaluated based on their strengths and limitations, revealing key themes such as terminological variability, economic and recreational perspectives, and the role of mobility. Some definitions focus on the physical and structural characteristics of second homes. For instance, Back et al. (2022) distinguish between converted former permanent homes and purpose-built second homes. Similarly, Overvåg (2011) emphasises the recreational function of second homes and whether they were initially built for this purpose. However, both definitions overlook broader economic and social implications.

Other definitions, such as Bieger et al. (2007), adopt an economic perspective, defining second homes as self-catering accommodations financed by non-local investments, generating external income. While this perspective is valuable in assessing regional economic impacts, it does not address the social and recreational motivations behind second-home ownership. Several authors acknowledge the challenges of defining second homes due to terminological diversity. Hall (2014), Jaakson (1986), and Marjavaara (2008) highlight the wide range of terms used internationally, including “cottage,” “vacation home,” “summer house,” and “chalet.” While this approach helps recognise the global complexity of the phenomenon, it lacks a precise and measurable definition. Jaakson (1986) also points out the inconsistencies in statistical recording, which can lead to classification difficulties.

Definitions that emphasise usage patterns and mobility provide further insights. Hoogendoorn (2011) describes second homes as an intermediary form of mobility, bridging the gap between local and international travel. Similarly, Zoğal et al. (2022) link second homes to tourism, noting that owners do not exclusively use them but may also be rented out. These perspectives capture the broader dynamics of mobility and tourism but may

not be universally applicable, as second-home ownership varies significantly between countries. From a social perspective, Larsson and Müller (2017) conceptualise second homes as personal or family projects. This definition highlights second-home ownership's emotional and cultural significance but does not account for its economic or policy implications. Meanwhile, Stricker (2022) defines second homes based on non-permanent use, excluding residences used for work or education. This distinguishes it from primary residences but does not consider different ownership structures or investment patterns.

Girard and Gartner (1993) take a more structured approach. They classify second homes based on property ownership data, distinguishing local from non-local owners. This method offers a measurable criterion but is limited by its specific application, as zip-code filtering may not be a universally suitable method for classification. Vágner et al. (2011) adopt Shucksmith's (1983) definition, which describes a second home as a permanent building occasionally used by a household residing elsewhere, primarily for recreation. While this provides a functional description, it does not incorporate economic or social dimensions.

Some authors focus on a conceptual perspective, emphasising the variability of second-home definitions and their broader context within mobility and tourism (e.g., Hall, 2014; Jaakson, 1986; Hoogendoorn, 2011). Others take a more operational approach, defining second homes based on measurable factors such as ownership type (Girard & Gartner, 1993), economic impact (Bieger et al., 2007), or physical characteristics (Overvåg, 2011). Many definitions highlight the terminology associated with second homes, which varies by country and culture (e.g., Hall, 2014; Marjavaara, 2008; Jackson, 1986). This variability challenges international comparisons and policymaking as regions classify second homes differently.

Most definitions agree that second homes are primarily used for leisure and recreation (e.g., Hall, 2014; Vágner et al., 2011; Zoğal et al., 2022). Some also emphasise their economic role, particularly in tourism and regional development (e.g., Bieger et al., 2007; Zoğal et al., 2022). Others, such as Larsson and Müller (2017), explore second-home ownership's personal and social dimensions. Several definitions describe second homes as part of a mobility continuum, linking them to tourism and seasonal migration (e.g., Hoogendoorn 2011; Marjavaara, 2008; Zoğal et al., 2022). Others define them strictly based on occasional use and non-permanent residence (e.g., Stricker, 2022; Vágner et al., 2011).

Each definition offers valuable insights but also presents limitations. A comprehensive definition of second homes should integrate the following elements: Structural characteristics should be considered, distinguishing between converted and purpose-built second homes. The use and function dimensions are also important for identifying whether the home is used for recreation, tourism, or other purposes. The economic implications are suggested to be included, considering the role of second homes in investment, tourism,

and regional development. Mobility considerations are a requirement acknowledging their temporary use and links to seasonal migration.

3.2. Second-home tourist Definitions review

The definition of *second-home tourist* has changed significantly throughout history, from the oldest to the most current. The first concept of tourist did not consider the second-home tourist. Cohen (1974) established that the owner of the second residence was not a tourist due to the recurrent nature of his or her stays in the second residence. The most recent article (Baltaci & Kurar, 2022) implicitly refers to the second-home tourist as the second-home owner. It is worth noting that all definitions of second-home tourist seem to differentiate the second-home owner from the rest. This leaves out the definition of a second-home tourist, the consumer who rents a house for vacation. The second-home owner seems to be the central agent of second-home tourism. All definitions of *second-home tourist* can be seen in Table 2 (Annex 2).

The journey through the historical development of definitions related to *second-home tourism* and *second-home tourist* serves to review these concepts. It proves valuable in understanding their evolution and contributing to it. On the one hand, it makes sense to consider, for instance, second-home tourists who rent second residences when researching the demand for such properties, especially in the context of tourists as consumers. This is because these individuals engage in various activities offered at the tourist destination, contributing to the increased demand for tourism-related goods and services and ancillary activities. On the other hand, if the research is oriented towards second-home tourism from the supply perspective, it is logical to concentrate on the behaviour of the second-home owner as the provider of accommodation services. This approach allows for a closer examination of the offerings and services provided by second-home owners in the tourism sector.

The definitions of second-home tourists provided by various authors reveal distinct perspectives regarding their classification within the broad tourism sector. These perspectives revolve around key themes such as recurrence, mobility, economic considerations, and the distinction between ownership and tourist behaviour. Several definitions focus on whether second-home users qualify as tourists. Cohen (1974) argued that second-home owners do not fully fit the traditional definition of tourists due to the recurrence of their trips, as non-recurrence is a fundamental characteristic of tourism. This perspective is reinforced by Marjavaara (2008), who cites Cohen (1974) and Aronsson (2004) in suggesting that second-home owners occupy an "in-between" status, neither fully tourists nor permanent residents. However, this perspective may be too rigid, as it does not account for the significant impact second-home users can have on local economies and tourism infrastructure.

Conversely, Girard and Gartner (1993) challenge Cohen's notion by referencing Coppock (1977) and Jaakson (1986), who argue that second-home owners contribute to regional tourism through recreational activities and spending, making them an integral part of the tourism sector. Jaakson (1986) further suggests that second-home tourism is a normative type of tourism distinguished by recurrence rather than being disqualified by it. This view presents second-home owners as "permanent tourists," constantly anticipating their next visit. Hall (2014) provides a more nuanced approach, emphasising the importance of distinguishing between second-home owners and other tourists, particularly regarding their use of resources and spatial interactions. This differentiation is crucial, as second-home tourists may exert distinct pressures on local infrastructure and economies compared to short-term visitors. Larsson and Müller (2017) also highlight that second-home owners form a unique but limited group within tourism flows, further underscoring their distinct position.

Hoogendoorn (2011) explores economic perspectives on second-home tourism. He points out the absence of research on low-income second-home tourists, particularly in South Africa. He argues that for low-income earners, second-home tourism is not purely recreational but rather a survival strategy, allowing them to maintain economic stability while enjoying leisure activities. This highlights an often-overlooked aspect of second-home tourism, which extends beyond luxury and leisure to include economic necessity. Baltaci and Kurar (2022) adopt a similar economic lens and implicitly define second-home tourists as international second-home owners drawn to their properties. This view, however, is somewhat restrictive, as it excludes non-owning users of second homes, such as renters or family members who also engage in second-home tourism. Another perspective comes from Overvåg (2011), who defines second-home tourism within a broader mode of mobility, considering second homes as extensions of household living spaces rather than purely tourism-related assets. This viewpoint shifts the focus from conventional tourism classification towards a lifestyle-oriented understanding of second-home use.

Some definitions question whether second-home users qualify as tourists due to the recurring nature of their visits (e.g., Cohen, 1974; Marjavaara, 2008; Aronsson, 2004). Others argue that recurrence does not disqualify second-home users from tourism classification and that they actively contribute to tourism economies (e.g., Girard & Gartner, 1993; Jackson, 1986). Casado-Diaz (1999) offers an alternative classification, referring to second-home tourists as "new residents" due to their prolonged stays without formal residency status. Hoogendoorn (2011) highlights the role of low-income earners in second-home tourism, challenging the traditional notion of second-home tourism as an elite activity. Baltaci and Kurar (2022) focus on international second-home owners, but this perspective excludes non-owning users, such as renters.

Hall (2014) and Hiltunen et al. (2013) stress the importance of differentiating between second-home owners and other tourists, as their behaviours, resource usage, and impacts may differ. Larsson and Müller (2017) categorise second-home users as a limited segment

within overall tourism flows, suggesting that their tourism impact is distinct but not necessarily dominant. Overvåg (2011) describes second homes as part of a broader mode of living rather than strictly a tourism-related asset. Aronsson (2004) and Casado-Diaz (1999) view second-home tourists as occupying a middle ground between tourists and permanent residents, which presents classification challenges.

Each definition provides valuable insights but also exhibits certain limitations. A comprehensive definition of second-home tourists should integrate the following elements. Recognition of recurrence: acknowledging that repeat visits do not necessarily disqualify second-home users from being classified as tourists. Economic diversity: including high-income second-home tourists and low-income users for whom second-home ownership is part of a survival strategy. Differentiation from other tourists: recognising that second-home tourists may engage in different behaviours and exert distinct pressures on local economies and resources. Mobility considerations: Understanding second-home tourists as part of a broader mobility spectrum rather than categorising them as tourists or residents.

3.3. Literature review of second-homes research: bibliometric analysis

This analysis first performs a statistical analysis of the articles to review the general literature on second homes. Then, it proceeds to the study of the most productive authors. Thirdly, it evaluates the most productive countries based on the corresponding authors. Finally, it performs a cluster analysis of the keywords and compare the author's and indexed keywords. As shown in Figure 1, the number of articles has grown from 2000 to 2022, from twenty-seven to one hundred and fifty-six articles per year, respectively, which means an annual growth rate of 6.89%. However, some drops were observed in 2018 and 2016; the most pronounced was in 2012. Figure 2 shows the average total number of citations per year. As expected, the average number of citations has been low in recent years, which aligns with the article's growth. Despite this, some outliers are observed, such as the average of 606 citations in 2001. The sharp drop from that year onwards to less than 30 articles in 2004 is worth noting.

Further, Figure 3 shows the ranking of the most productive authors. The Swedish author from Umeå University, Dieter Müller, appears as the most productive author, with twelve articles published between 2000 and 2022. With the same affiliation and ten articles published in that period, Roger Marjavaara, who also co-authored several papers with Dieter Müller, appears in second place. Looking at the countries of the corresponding authors (Figure 4), the graph showa a marked predominance of the United States, with 344 articles from 2000-2022. However, this country has a low number of publications made in collaboration with authors from other countries, i.e., only ten multiple-country publications (MCP). In second place and far behind is the United Kingdom, with 120 articles

and a low number of MCPs of only 16 articles. China and Australia follow this with about 100 articles but a higher proportion of collaboration of about 50% of MCP. Finally, at the bottom of the ranking, with less than 50 articles but still among the most productive countries, are Canada, Germany, Spain, Italy, France, and India.

Therefore, the USA is the dominant force in second-home tourism literature but is highly self-sufficient with little international collaboration. The UK follows a similar pattern but with less output and slightly more collaboration. China and Australia have higher collaboration levels, making them key players in international research. The remaining countries contribute at a lower level but engage in more collaborative work than the USA and UK. This comparative analysis highlights the need for greater international cooperation in second-home tourism research, particularly from dominant countries like the USA and UK.

Moreover, concerning the keywords' cluster analysis performed with the first 30 most used terms, Figure 5 exposes two well-differentiated clusters. The red cluster is formed by words associated fundamentally with tourism, second homes, countries and continents where these studies are the most frequent: *second-home, tourist destination, tourist behaviour, price dynamics, China, and Europe*, among others. However, the blue cluster comprises concepts that refer to topics unrelated to tourism or second homes. The most frequently identified words by the most prominent circles are *human, article, United States, and economics*. Table 3-a shows the exact frequency of the keywords, both those of Scopus and the authors. As expected, *second-home* is the most frequent in the author's keywords, followed by *COVID-19* and third-place *tourism*. This shows that many studies relate second homes to tourism and the impacts generated by COVID-19.

The keywords plus (Scopus) show terms from the blue cluster: *United States*, *human,* and *article*. The latter concept appears with the same frequency as *second-home*, a word part of the red cluster. This is followed by *female* and *male*, which are blue cluster keywords, and then it finds again a red cluster word, *tourist destination,* with the same frequency as *male*.

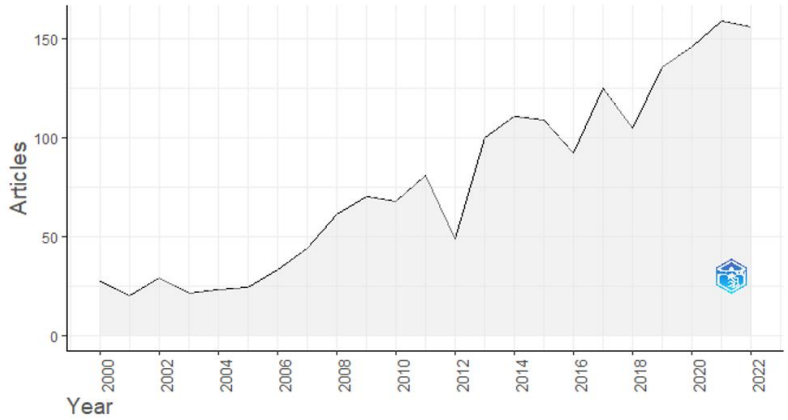

Figure 1: Temporal evolution of publications in second-home research. The temporal evolution in the number of annual articles published in Scopus.

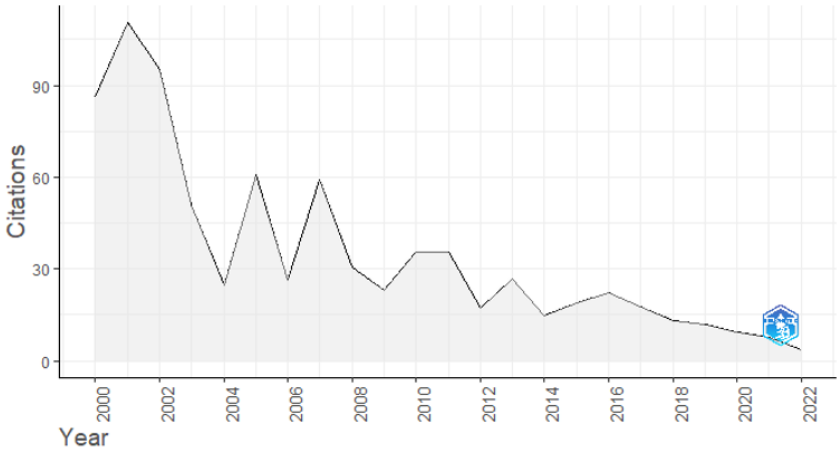

Figure 2: Average total citations per year. Temporal evolution in the average total citations per year of the articles published in Scopus.

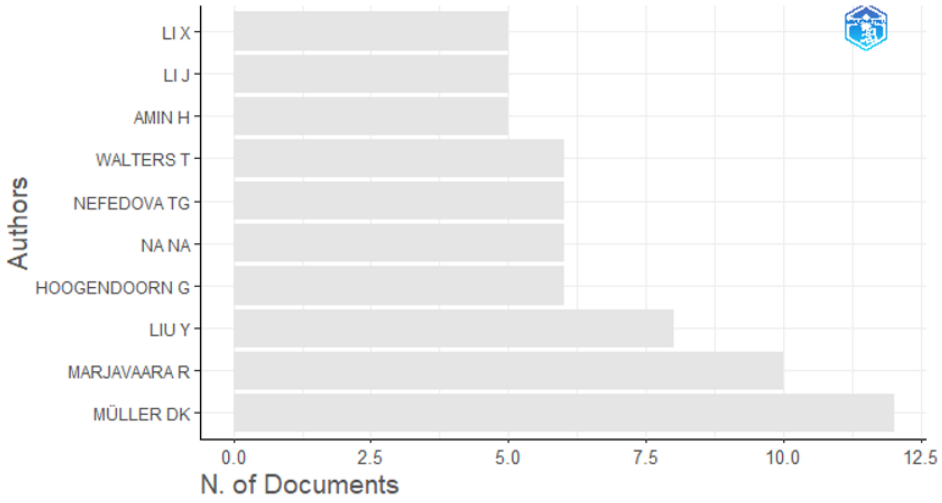

Figure 3: Most productive authors. Total of articles produced by the ten most productive authors.

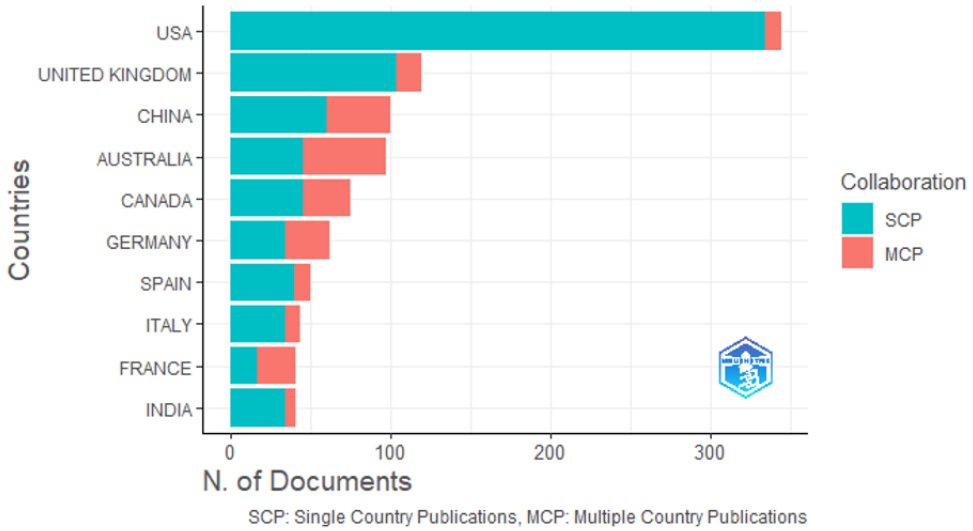

Figure 4: Most productive countries. Single Country Publications and Multiple Country Publications. Corresponding author´s countries.

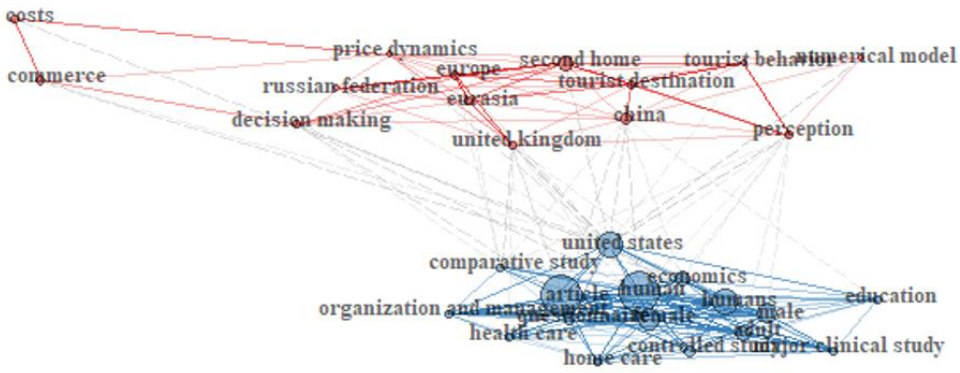

Figure 5: Keywords- Plus (Scopus) co-occurrences, with the top 30 keywords most used. Clusters were calculated from Louvain's algorithm.

Therefore, after obtaining the results of the bibliometric analysis of the general second-home literature, the next step is to concentrate on the bibliometric analysis of research articles studying second-home tourism in the following section. In the last part of this section, when the keyword analysis is performed, the studies on second-home tourism grouped in the red cluster are an essential part of the general second-home literature that should be studied carefully.

	Author Keywords	Number	Keywords-Plus	Number
1	SECOND-HOMES	82	UNITED STATES	57
2	COVID-19	46	HUMAN	48
3	TOURISM	41	ARTICLE	46
4	CHINA	36	SECOND-HOME	46
5	GENDER	30	FEMALE	30
6	SECOND-HOME	20	MALE	27
7	HOME BIAS	19	TOURIST DESTINATION	27
8	CONSUMER BEHAVIOUR	18	CHINA	26
9	CULTURE	17	HUMANS	24
10	HOUSING	17	EUROPE	22
11	SPAIN	16	TOURISM	22
12	MIGRATION	15	TOURIST BEHAVIOR	22
13	AUSTRALIA	14	ECONOMICS	20
14	FOREIGN DIRECT INVESTMENT	14	DECISION MAKING	19
15	SUSTAINABILITY	13	EDUCATION	19
16	AIRBNB	12	EURASIA	19
17	HOME	12	PERCEPTION	19
18	IDENTITY	12	TOURISM DEVELOPMENT	19
19	INDIA	12	ADULT	18
20	MOBILITY	12	HOUSING MARKET	18
21	PANDEMIC	12	PRICE DYNAMICS	18
22	SWEDEN	12	RUSSIAN FEDERATION	18
23	GLOBALIZATION	11	UNITED KINGDOM	18
24	HOMEOWNERSHIP	11	COMMERCE	16
25	INTERNATIONALIZATION	11	NUMERICAL MODEL	16

Table 3a: On the left, the number of articles for each author keyword. On the right is the number of articles for each keyword plus Scopus.

3.4. Literature review of second-homes tourism research: Bibliometric analysis

For the bibliometric analysis of second-home tourism, the procedure first performed a statistical exploration of the authors and articles in the bibliometric analysis. For this, the observed temporal evolution of the articles, the average number of total citations per year, and which were the most productive authors are presented in this chapter's section. The section developed a cluster analysis of the keywords to finalise the bibliometric analysis, obtaining Keywords-Plus (Scopus) co-occurrences with the top 30 most used keywords. It concludes the keyword study by ranking the number of articles for each author keyword and the number of articles for each keyword plus Scopus.

Figure 6 shows the evolution in the number of documents. The database started in 2000, and the trend is increasing. The highest production year was 2020, with almost 20 articles. After this peak, it starts to decrease until 2022. The average number of total citations per year of articles published in Scopus (Figure 7) shows a relatively constant evolution with some peaks in 2000, 2002 and 2005. In 2000, more than 200 citations were observed, and this is the highest peak. Around 75 citations were found, and in 2005, almost 150. However, since 2005, the number of citations has decreased from 150 to fewer in recent years. This last analysed section of the graph shows the usual evolution of citations since the most recent articles began to grow in the number of citations as the years progressed. Figure 8 shows the ten most productive authors. The author who published the most articles on second-home tourism in 2000-2022 was Müller, with ten. Marjavaara followed this with seven articles, Hoogendoorn with six, and Musa with five. Finally, several authors have published four articles: Back, Garriga, Hall, Hao, Long, and Perles-Ribes.

Figure 9 shows the ten most productive countries obtained from the origin of the corresponding author. In first place is Spain, with twenty articles published between 2000 and 2022 and a shallow collaboration with other countries (5%). The United States has nineteen published articles and zero collaboration in second place. In third place, Sweden has 17 published articles and low collaboration between authors from other countries (6%). In fourth place are Australia and Norway, with 13 articles. Australia is the most collaborative of the ten most productive countries, with eight out of thirteen articles published collaborating with authors from other countries (61%). In fifth place are the United Kingdom and Finland, with eleven articles. Finland has a non-negligible percentage of collaboration of 36%. However, the United Kingdom has a much lower collaboration percentage of 9%. Finally, in the last three places but among the most productive countries in second-home tourism literature, Malaysia, South Africa, and China, there are less than ten articles and a meagre percentage of collaboration between authors.

Spain's dominant position suggests an intense national research focus on second-home tourism. Despite being a global research leader in many fields, the USA has relatively little international collaboration in this domain. Australia, Norway, and Finland stand out for their higher international collaboration rates, which could indicate a greater integration of

second-home tourism research in global networks. Countries with fewer total publications (UK, Malaysia, South Africa, and China) still contribute meaningfully, but their role might be more regional than global.

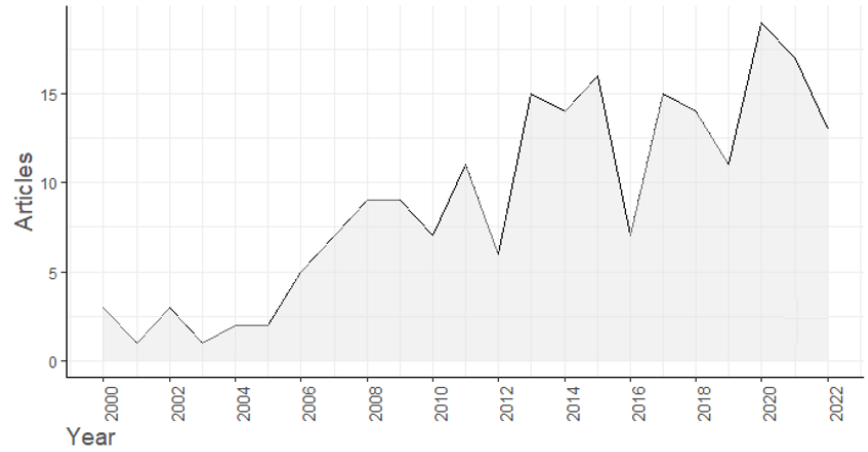

Figure 6: Temporal evolution of publications in this subject. The temporal evolution in the number of annual articles published in Scopus.

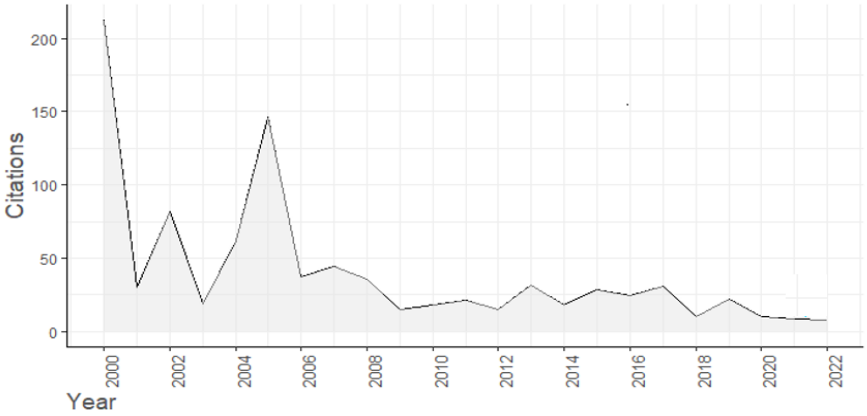

Figure 7: Average total citations per year. Temporal evolution in the average total citations per year of the articles published in Scopus.

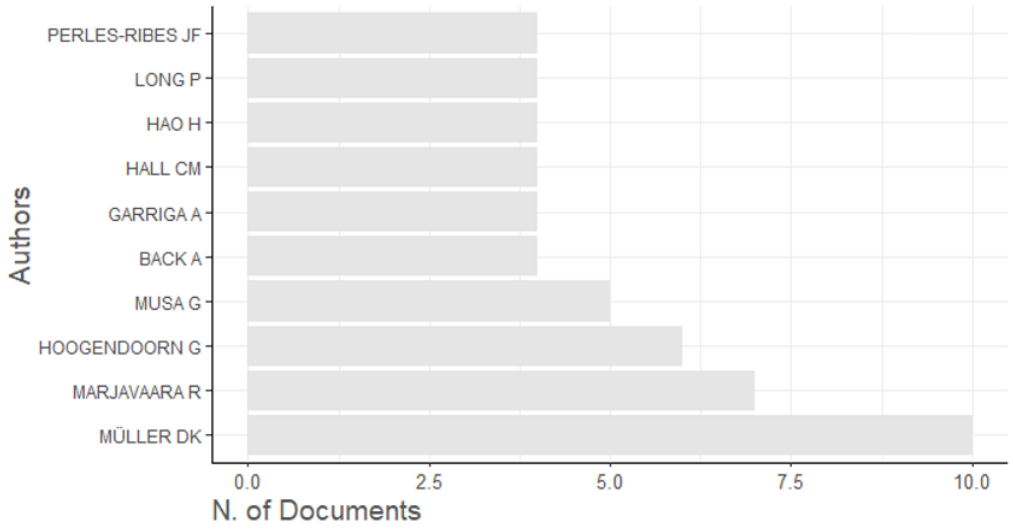

Figure 8: Most productive authors. Total of articles produced by the ten most productive authors.

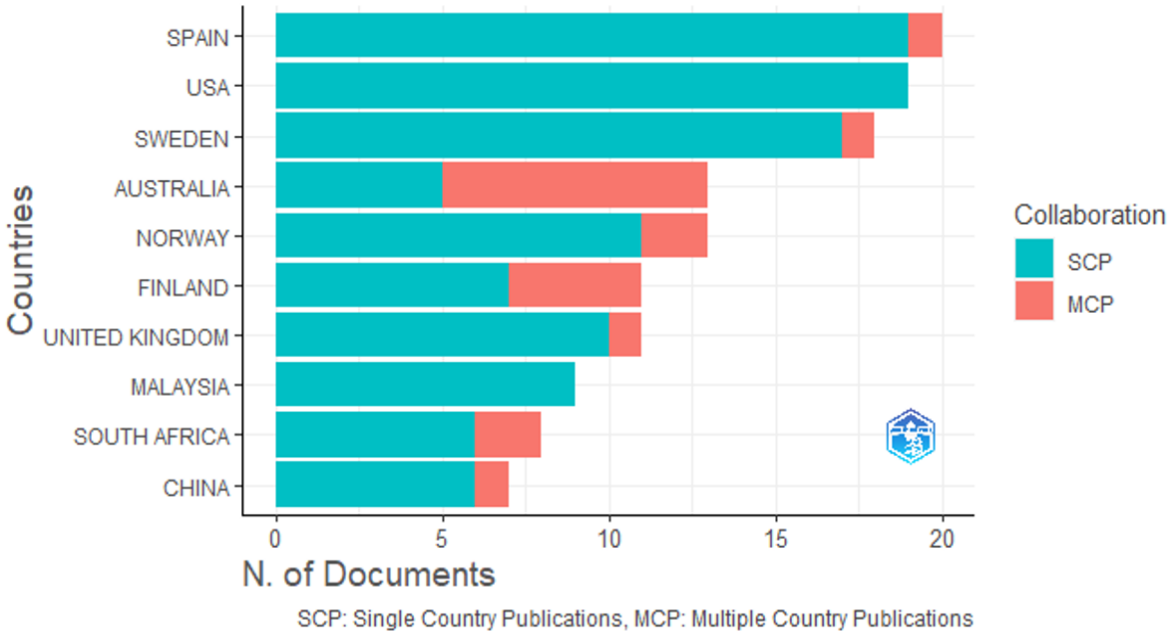

Figure 9: Most productive countries. Single Country Publications and Multiple Country Publications.

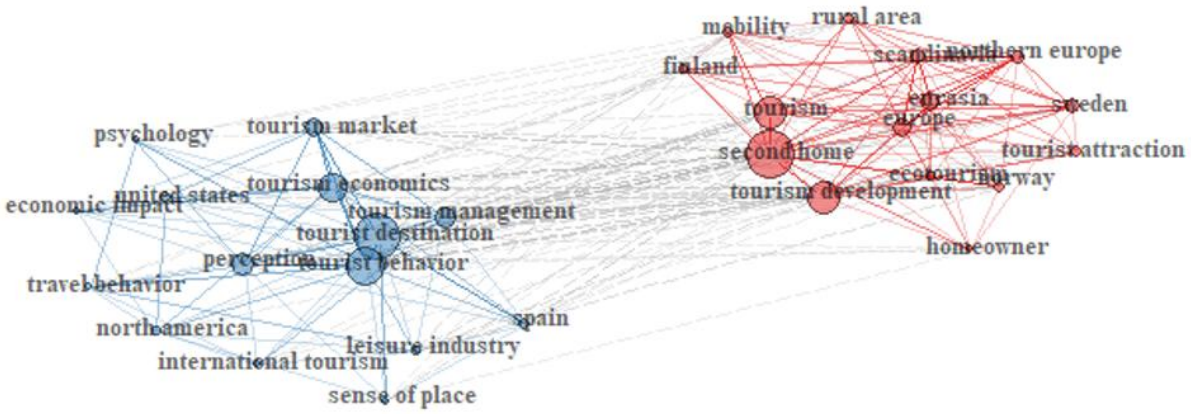

Figure 10: Keywords- Plus (Scopus) co-occurrences, with the top 30 keywords most used. Clusters were calculated from Louvain's algorithm.

	Author Keywords	Number	Keywords-Plus	Number
1	SECOND HOMES	54	SECOND HOME	28
2	TOURISM	41	TOURIST DESTINATION	27
3	SECOND HOME	15	TOURISM	22
4	AIRBNB	8	TOURIST BEHAVIOR	22
5	SECOND HOME TOURISM	8	TOURISM DEVELOPMENT	19
6	SWEDEN	8	TOURISM ECONOMICS	15
7	HOME	7	TOURISM MANAGEMENT	14
8	PLACE ATTACHMENT	7	PERCEPTION	13
9	FINLAND	6	TOURISM MARKET	11
10	RESIDENTIAL TOURISM	6	SWEDEN	10
11	SPAIN	6	EURASIA	8
12	SUSTAINABILITY	6	EUROPE	8
13	TOURISM DEVELOPMENT	6	SCANDINAVIA	8
14	COVID-19	5	MOBILITY	7
15	MIGRATION	5	NORWAY	7
16	MOBILITY	5	TOURIST ATTRACTION	7
17	MOTIVATION	5	LEISURE INDUSTRY	6
18	PLANNING	5	NORTHERN EUROPE	6
19	SOUTH AFRICA	5	RURAL AREA	6
20	TOURISM IMPACTS	5	SPAIN	6
21	DIASPORA TOURISM	4	ECOTOURISM	5
22	IDENTITY	4	FINLAND	5
23	MOUNTAIN TOURISM	4	HOMEOWNER	5
24	ROOTS TOURISM	4	INTERNATIONAL TOURISM	5
25	RURAL TOURISM	4	MALAYSIA	5

Table 4: On the left, the number of articles for each author's keyword. On the right is the number of articles for each keyword plus Scopus.

The chapter uses clustering techniques to observe how the keywords from Scopus are grouped in the collected documents. Applying clustering analysis using Louvain's algorithm (Blondel et al., 2008) in a network of keyword co-occurrences (see Figure 10), well-differentiated groups are seen. The most extensive circles imply more frequency of the keyword appearance. Some peculiarities of this network are observed: in blue, words related to general tourism topics: tourism market, tourism market, tourism management,

tourist destination, tourist behaviour, economic impact, travel behaviour, international tourism, and leisure industry.

Also, concepts like psychology are linked with perception, tourist behaviour, travel behaviour, and sense of place. The latter shows a growing interest in the tourists' opinions and behaviour. In addition, words related to countries or continents in the blue cluster can be seen in Spain, North America, and the United States. This situation accounts for the significant number of articles on second homes that relate to the topics of this cluster. In the red cluster, there are more words related to second homes, and this cluster has several links with the blue cluster.

Then, keywords related to second homes can be seen in Figure 10: second-home, homeowner, and mobility. In addition, general tourism topics are linked with second-home issues: tourism, tourism development, and tourism attraction. Moreover, the keywords related to natural tourism are ecotourism and rural areas. Finally, in the red cluster, countries and continents appear: Norway, Sweden, Scandinavia, Northern Europe, Eurasia, and Europe. Like in the blue cluster, this situation accounts for the significant number of articles on second homes that relate to the topics of this cluster. According to Table 4, there are some differences between author keywords and keywords plus. As expected, second homes or second homes appear first in the ranking. Then, as can be appreciated, some words related to general topics of tourism in the first ten places of keywords plus but also some in author keywords. Surprisingly, COVID-19 appears only in the author keywords and five articles.

Sweden, Finland, and Scandinavia are the most frequent Nordic countries' keywords due to their long tradition of second-home ownership. The concept is deeply ingrained in their cultures, making these regions significant case studies in second-home tourism research. Sweden and Finland have well-documented policies related to second-home ownership, land use, and planning regulations, making them valuable subjects for research on governance, spatial planning, and environmental impacts. (Müller, 2020; Marjavaara, 2008; Hall, 2004).

The most used keywords in second-home tourism are second-homes, tourism, tourist destination, tourism development, and tourism behaviour. The literature on second-home tourism frequently uses such keywords, reflecting this field's central themes and research focus. First, the prominence of *second-homes* and *tourism* highlights the dual nature of these properties, which serve both as private residences and as key elements of the tourism sector. The term *tourist destination* is commonly used because second-home owners often choose locations that are already well-established tourist areas or contribute to the development of new tourism hubs. Meanwhile, *tourism development* is a crucial concept in this field, as second-home tourism influences local economies, infrastructure, and land use, prompting discussions about sustainable development, investment, and planning. Lastly, *tourism behaviour* is relevant because it encompasses the travel patterns, motivations, and activities of second-home owners, who may differ from traditional tourists in their frequency of visits, levels of engagement with the local community, and consumption patterns (Hall, 2014). Overall, these keywords reflect the interdisciplinary

nature of second-home tourism research, which intersects with geography, economics, sociology, and urban planning.

4. Conclusions

Examining the definitions of *second-home tourism* and *second-home tourist* reveals that most notions regarding second-home tourism align with the transient duration of the visit. Another aspect consistently reiterated in the interpretations of second-home tourism is its application for leisure activities.

Notably, all descriptions of second-home tourists highlight the second-home proprietor as distinct from others. This overlooks the definition of the second-home tourist, who rents a residence for vacation reasons. Consequently, the second-home owner appears to be the pivotal figure in second-home tourism. For this reason, it is crucial to broaden the definition of SH to encompass property owners and those renting a second home if the focus is on understanding the demand side, as the study of second-home tourists' expenditures.

The bibliometric analysis of second homes and second-home tourism plays a crucial role in distinguishing between the concepts of second-home tourism and second-home tourists, helping to refine theoretical frameworks. Bibliometric analysis helps clarify these distinctions by identifying key research trends, dominant themes, and collaboration networks, making it easier to separate the macro-level impacts of second-home tourism from the micro-level behaviours of second-home tourists. Integrating bibliometric findings into the chapter enhances engagement by structuring the discourse around key thematic differences, supporting a more precise and more nuanced discussion of second-home tourism and second-home tourists.

In the bibliometric analysis, notable distinctions and resemblances were identified concerning the rankings of countries, the clustering analysis, and the temporal progression of the annual production series. Consequently, this underscores the significance of independently examining the literature on second-home tourism. Notably, from the cluster analysis of the overall literature on second homes, it emerges that one of the clusters pertains to second-home tourism. This reinforces the notion that this subject of study has gained significance in literature and should be thoroughly examined.

From the literature review, future lines of research emerge. For example, an analysis of the evolution of legislation regarding second homes in specific countries would be valuable. It would also be interesting to examine how this legislation positively or negatively impacts second-home tourism. The lack of data from the supply side in most countries (not the case in Nordic countries) due to high informality hinders research in second home tourism from the supply side and cross-referencing data with microdata from surveys conducted to tourists. In this regard, creating a registry of second-home owners should be on the agenda of national governments. This registry would help conduct

research and foster fair competition with other forms of tourist accommodation. Additionally, if second-home owners are registered, they can be a sector supported by economic policy fostered by the countries' governments.

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Annex 2

Authors & Year	Second-home Definition
Back et al. (2022)	It is comprised of converted former permanent homes and purpose-built second homes, respectively (Müller, 2006; Müller et al., 2004)
Bieger et al. (2007)	Second homes are self-catering accommodations financed by external investments (non-locals), creating additional income from outside the region (cp. Also Müller et al., 2004).
Girard & Gartner (1993)	The county tax office was contacted to obtain a list of all property owners. A computer search was conducted using zip codes as a delineator to separate all county residents from non-county residents. The search produced 1,620 non-resident listings, which were reviewed to eliminate duplicate listings and property-zoned commercials. This resulted in 869 non-resident listings; they all received the mail questionnaire (the 869 were treated as second homes).
Hall C. (2014)	There is no internationally accepted definition of a second-home (Coppock, 1977; *Czarnecki* & Frenkel, 2015; Hall & Müller, 2004; Jaakson, 1986; Müller, 2004; Visser, 2003, 2006). The term acts as an umbrella expression for a variety of cognate terms, including "cabin," "cottage," "crib," "holiday home," "hut," "leisure home," "recreational home," "summer home," "summer house," "vacation home," and "weekend home" as well as dacha in Russia (Struyk & Angelici, 1996), and bach in New Zealand. The common element of these terms is that the primary use of the second-home is leisure and recreation-oriented.
Hoogendoorn (2011)	Second homes are an intermediary type of mobility between local and international scales and between day-tripping excursions and extended seasonal travel.
Jaakson (1986)	The extent of second-home ownership is difficult to estimate accurately because statistics are often poorly measured, and definitions vary considerably. A "hunt camp" may not be considered a second home, but a seaside villa would; a permanently parked house trailer may be recorded as a recreation vehicle, and a hobby farm may be classed as an agricultural property, not a second-home. The terms used to describe second homes vary greatly and, to some extent, reveal their varied purposes: cottage, holiday home, vacation house, summer house, weekend house, cabin, the Swedish "stuga," country house, beach house, and ski chalet.
Larsson & Müller D. (2017)	Second homes have mainly been conceptualised as personal/family projects.

Marjavaara R. (2008)	Throughout the world, many different terms are used to describe a second-home. Examples include vacation homes, summer homes, recreation homes, cabins, lodges, cottages, huts, flats, apartments, chalets, villas, sports cabins, farmhouses, etc. Other types of dwellings used similarly and sometimes labeled as second-homes include caravans, tents, and boats. The vast flora of terms and definitions used worldwide causes some problems for researchers who aim to make comprehensive international comparisons. However, even if differences in defining the phenomenon do occur, the similarities between the terms and definitions are apparent; a second-home is a dwelling used for temporal visits by the owner or someone else and is not the user's permanent residence.
Overvåg K. (2011)	Second-homes can be defined as buildings and devices used mainly for recreational purposes (Overvåg, 2009) and are specifically built to serve as second homes, i.e. purpose built second homes.
Stricker L. (2022)	Habitations that are not permanently used by people with legal residence in the municipality and that are not used by persons for working or educational purposes.
Vágner et al. (2011)	We use Shucksmith's (1983) second-home definition: "a permanent building which is the occasional residence of a household that usually lives elsewhere, and which is primarily used for recreation purposes".
Zoğal V., et al. (2022)	Second-homes also referred to as recreational homes, holiday/vacation homes, summer homes, cottages or weekend homes are considered as an idiosyncratic element of contemporary tourism and mobility (Hall & Müller, 2004). They are generally used for a limited time and for recreational purposes. However, their use is not exclusively restricted to their owners, familiars, and relatives; many tourists with preference for independence opt to rent this type of accommodation over traditional accommodation types, such as hotels or campings (Flognfeldt & Tjørve, 2013).

Table 1: Second-home definitions of different authors.

Authors & Year	**Second-home Tourist Definition**
Baltaci & Kurar (2022)	Implicit definition: international second-home tourists pulled to their second homes. So, SH tourists are SH owners.
Cohen (1974)	In his landmark paper, "Who is a Tourist? A Conceptual Clarification," Cohen (1974) identified weekend and summer-house owners as not fully qualifying as tourists

	since their trips are characterised by recurrence; nonrecurrence was considered as one of the six elements of who a tourist is.
Girard & Gartner (1993)	Coppock (1977) contends that second-home owners may be more touristic than initially thought because of the recreation aspects of second-home ownership. Jackson (1986) supports the notion of second-home owners as tourists: they, too, can bring touristic activities and prospects to many regions. Second-home owners cannot be rejected as non-tourists. They comprise an essential domestic tourism segment in the United States and elsewhere.
Hall C. (2014)	However, there are also considerable opportunities to better understand the similarities and differences between second-home owners and other tourists, especially as pressures emerge for the use of the same spaces and resources (Opačić, 2009; Opačić & Mikačić, 2009). Indeed, research on second homes also needs to differentiate between the behaviours and attitudes of owners versus those of non-owning users (Hiltunen et al., 2013).
Hoogendoorn (2011)	In South Africa and globally, second-home research focusing on poor people as second-home tourists, users, or owners is almost absent. Low-income earners as second-home tourists are not investigated within mainstream second-home tourism research but should be. Second homes are indeed part of a life course strategy; however, in the case of low-income earners, it is part of a life course survival strategy, in which they need both homes to survive economically and spend their small yet disposable incomes and leisure time.
Jaakson (1986)	Second-home use is a normative type of tourism characterised by recurrence. A degree of recurrence may characterise all tourism rather than disqualifying some types of activity as non-touristic. The frequency and periodicity of trips differentiate second-home tourism from other domestic and international tourism types. The second-home owner is a “permanent tourist” in a perpetual state of travel anticipation.
Larsson & Müller (2017)	Compared to permanent residents and visiting tourists during high season, second-home owners are a limited group and are often regarded as part of overall tourism flows.
Marjavaara R. (2008)	In the mid-1970s, Cohen (1974) noted that second-home owners did not fully qualify as being labelled as tourists. This was due to the characteristics of recurrence in second-home use, where the owners frequently returned to second-home destinations. Non-recurrence was one of six essential elements of tourism, implying that tourism is an activity characterised by the continuous search for ‘new’ destinations. Aronsson (2004) states that second-home owners are neither tourists nor permanent residents but rather ‘in-between’. Casado-Diaz (1999) labels second-home tourists as ‘new residents’ because they usually spend long periods in their second homes without being officially registered as residents. This differentiates second-home owners from both tourists and permanent residents.

Overvåg K. (2011)	The first mode of mobility concerns the perspective on households as second-home owners, in which second homes can be seen as part of households' homes in an extensive mode of living.

Table 2: Second-home tourist definitions of different authors.

CHAPTER III

Foreign Second-Home and Natural Amenities Tourists' Expenditure in Italy: A Dynamic Perspective

1. Introduction

Behaviours related to second homes vary across nations, shaped by specific urban conditions and their practical use in addressing the lack of access to green spaces near urban areas (Hall & Müller, 2004). The desire for a recreational property often stems from the need to engage in activities that offer psychological rejuvenation in a setting removed from the pressures of urban life while being close to natural landscapes and tranquil environments (Müller, 2004). The COVID-19 pandemic has also highlighted the demand for second homes (Müller, 2020).

Most leisure homes are typically found in rural areas, particularly coastal regions, near lakes (Hartig & Fransson, 2009). These locations offer a desirable escape from urban life and proximity to nature, enhancing their appeal as second-home destinations. Given the popularity of natural amenities locations and the limited availability of suitable land for construction, there have been calls for stringent planning measures on a national scale to avert land use issues. Following a public debate about the unintended side effects of densification, there appears to be a growing discussion about the need to transition from a highly liberal, multilevel planning model for second-home areas to a more robust and transparent planning approach (Hjalager et al.,2022). This led to national and municipal authorities being urged to facilitate and strategise the planning and developing areas for recreational residences. These measures significantly affect land planning and environmental conservation (Hartig & Fransson, 2009; Hochstenbach & Ronald, 2020).

Second-homes contribute to local economies through tourism and property taxes. However, increasing demand can negatively impact local communities. As tourism grows, it may displace permanent residents and exclude local practitioners (Colomb & Novy, 2017; Gotham, 2005; Adamiak & Marjavaara, 2023). Cocola-Gant (2018) argues that tourism and intensified land usage accelerate gentrification by driving up land values and pushing out long-term residents. This dynamic is exacerbated by property owners' potential to profit more from short-term rentals than long-term leases, creating rent disparities and contributing to geographical inequalities (Wachsmuth & Weisler, 2018; Katsinas, 2021). Rising house prices driven by external demand may also exacerbate affordability issues and displacement in local communities. Additionally, tourism specialisation can lead to congestion, crime, noise, and higher property taxes (Biagi et al., 2015).

The recent flooding disaster in Valencia, caused by a severe DANA (isolated depression at high altitudes), has highlighted the vulnerability of regions that rely heavily on tourism,

particularly those with significant second-home development. This event underscores the environmental and infrastructural challenges faced by popular tourist destinations. Valencia has implemented regulations on vacation rentals to manage the effects of over-tourism, such as prohibiting tourist and residential housing from sharing the same floor and banning new buildings solely for tourists. Despite these restrictions, Valencia continues to see a high volume of Airbnb listings, with 9,261 properties listed in 2019, representing 1.15% of all housing in the city (Moreno-Izquierdo et al., 2023).

This ongoing trend highlights the difficulty of balancing tourism growth with urban sustainability and environmental protection, which is crucial for sustainable land use and economic growth in these areas. Nevertheless, the literature still needs to explore the relationship between tourism activity, natural amenities, and second-homes. This study addresses this gap by investigating the long-term causal relationship between second homes and the expansion of tourism related to natural amenities after controlling for exogenous variables. The case of Italy is the focus, primarily known for its cultural attractions, while also acknowledging the increasing significance and prominence of nature tourism in the country over time.

Indeed, according to foreign tourist data from Banca d'Italia (2023)[1], spending by foreign tourists on nature-related activities increased from €6.837 million in 2002 to €13.810 million in 2022. Even accounting for possible under-declarations, second-home tourism in Italy shows a notable increase, with expenditures rising from €4.733 million in 2002 to €7.587 million in 2022, constant values. In addition, according to the observatory of the trend of the tourist real estate market in Italy, FIAIP (2023), there was a significant increase in the purchase of second homes in Italy, rising from 25.5% of total residential sales in the first quarter of 2021 to 37% in the fourth quarter of 2022, confirms a continuously growing sector.

Utilising data from the Banca d'Italia, collected through interviews with foreign tourists, this study reconstructs a time series on expenditure before analysing the spending patterns of tourists staying in second-homes—both owners and renters—from January 2002 to December 2019. Moreover, it aggregates spending on ecotourism, rural tourism, coastal tourism, and mountain tourism as proxies for natural amenities tourism. Therefore, tourists' expenditure on natural amenities destinations is taken as a proxy for natural amenities tourism.

Despite the noted significance of second-home tourism for local development and its strong connection with natural amenities tourism, studies on the economic impact of second homes in tourist destinations have not been abundant in the literature (Müller, 2020). Even less so, a long-term relationship has been established between the economic impact of second-home tourism and natural amenities tourism. One way to measure the economic impact of second

[1] Since 1996, Banca d'Italia has conducted a survey on international tourism, employing interviews and traveller counts at Italian borders. The primary aim of the survey is to compile data for the "Travel" and "International passenger transport" items of the Italian Balance of Payments, following International Monetary Fund conventions. More at: https://www.bancaditalia.it/statistiche/tematiche/rapporti-estero/turismo-internazionale/index.html?com.dotmarketing.htmlpage.language=1.

homes is through foreign tourists' expenditure. Therefore, to gather the economic impact of second-home tourists in a country, it is necessary to study the expenditure of such tourists. Similarly, to establish the existence of a shared long-term trajectory between second-home tourism and natural amenities tourism, it is also necessary to analyse the natural amenities tourists' expenditure.

The primary purpose of this thesis section is to fill the gap in the literature on second homes' tourist expenditure by studying the long-term trajectories of the tourist expenditure series. It analyses the monthly total expenditure series to show that it has patterns different from the monthly second-home tourists' expenditure series. Therefore, it establishes the importance of exploring the last one separately from the first one. Also, it compares with the series of equal frequency of expenditure of second-home tourists for inbound tourism in Italy, including COVID-19 and after it. The chapter also evaluates those and natural amenities tourist expenditure series before COVID-19. Finally, it addresses the cointegration study between the expenditure of second-home tourists and natural amenities tourists.

Then, the research questions of this section of the thesis are the following:

i) What are the temporal dynamics of foreign tourist expenditure in Italy?

- Are there any differences in the temporal dynamics of inbound tourism in Italy between total and second-home tourists' expenditures?
- Are there any differences in the temporal dynamics of inbound tourism in Italy between total and natural amenities tourists' expenditures?
- Are there any differences in the temporal dynamics of inbound tourism in Italy between the expenditures of second-home and natural amenities tourists?

ii) Is there a short-run relationship between foreign second-home tourists' and natural amenities tourists' expenditure?

iii) Is there a cointegration between foreign second-home tourists' and natural amenities tourists' expenditure?

The methodology used to address the first research question, i.e. time series univariate models, is one of the Model-based signal extraction procedures. The analysis creates the series from the Banca d'Italia foreign tourist expenditure database from 1997 to 2022. Model-based methods explicitly propose a representation for each of the components of the series: trend, seasonal, cyclical, and irregular. Model-based methods include those based on reduced-form and structural time series models (Harvey, 1983). A frequent form of representation in the structural modelling of time series is the Basic Structural Model (BSM) (Harvey, 1990). The cycles were not possible to identify. For this reason, the structural model is decomposed into trend, seasonal, and irregular components without including the cycle.

The analysis applies the ARDL model as an alternative to the Vector Error Correction Model to ascertain a short-term correlation between the second-home tourists' expenditure and the natural amenities tourist expenditure series. The focal series for explanation is second home tourists' expenditure. The model, utilising differences of the logarithm estimated through Ordinary Least Squares, incorporates the natural amenities tourists' expenditure series as a

regressor—secondary series of interest—and controls for other variables. Moreover, to develop a long-term model, the analysis establishes a Vector Error Correction Model (VECM) (Johansen, 2008). Following this, the procedure continues with the Johansen test to confirm the presence of this relationship and assess whether both datasets demonstrate a shared trend in the long term.

The results of the comparison of the BSM of the second-homes tourist expenditure series show some points of contrast concerning the total tourist expenditure series BSM. On the one hand, the dynamics of the logarithm of the expenditure of second-home tourists and the level plus interventions is very similar to that of the total expenditure series. The same is true for the dynamics of seasonality and irregular components. On the other hand, both had similar behaviours before the COVID-19 crisis, but in the case of the second-home tourist expenditure series, the recovery of the year 2022 is at a considerably higher level than in the case of the total expenditure series. These two series are compared with the monthly natural amenities' tourist expenditure series. However, due to a lack of data in some periods, this series is analysed from January 2002 to December 2019. Significant differences are also found between this series dynamics and those previously analysed, highlighting the importance of studying it independently.

The study finds a positive and statistically significant short-term relationship between second-home and natural amenities tourists' expenditure, corroborating the conclusions drawn from the literature review. The study shows a common trend in the long term. This analysis is conducted while considering exogenous factors, including the Manufacturing Price Competitiveness Index, which is significant at a 5% level for Germany, Canada, France, and the United Kingdom. Additionally, it accounts for outliers, seasonal variations, and calendar dummies. This research has potential applicability to other countries sharing similar data profiles. Additionally, exploring domestic tourists' expenditure series in Italy and correlating it with natural amenities for tourists presents a promising avenue for future investigation. A policy implication involves advocating for collecting tourist data from the supply side, specifically from second-home owners. This could open new research pathways and enhance the validation of data obtained from the demand side.

Despite the valuable contributions of this work, some limitations should be acknowledged. The Manufacturing Price Competitiveness Index (MPCI) lacks information on service prices, which are crucial in the context of tourism. While this might not be drastic given the common trend of service prices increasing with manufacturing prices, it remains a limitation. Another constraint is that the MPCI is the sole monthly series available for Italy to establish a long-term relationship between second-home tourists' expenditure and natural amenities tourists' expenditure for inbound tourism. Lastly, the study could be limited by the potential under-declaration of foreign tourists owning second homes in Italy, as indicated by the survey from Banca d'Italia. Hence, having a database from the supply side becomes crucial, as previously mentioned.

Concerning the content of the following subsections of this third thesis chapter, the methodology and data creation are described in the second section. In the third point, the characterisation and identification of each time series are performed. The following two

chapters create the structural time series models from 1997 to 2022 (including COVID-19) and 1997 to 2019 (before COVID-19). Part six addresses the results and discussion of the multivariate time series models. Finally, the last section describes the conclusions, future lines of research and policy implications.

2. Methodology Description

2.1. Data sources

The procedure is compiled from the Banca d'Italia tourism databases, including the total, second-home, and natural amenities tourist expenditures series. It utilises the Indagine sul turismo internazionale dell' Italia and provided for foreign tourists entering Italy between January 1997 and December 2022. The expenditure series of second-home tourists includes the accommodation typologies considered: rented second-homes and owned second-homes. This way, the compilation per month obtains the total expenditure of second-home tourists (not only the expenditure on accommodation). To create the natural amenities tourist expenditure series, the analysis considers the following vacation categories: lake, sea, mountain, and natural amenities- rural tourism. This classification for vacation types was not surveyed before January 2002 and during 2020.

The Manufacturing Competitiveness Index (MPCI) used to establish the cointegration relationship between SHTE and NATE is obtained from the Banca d'Italia's database for the countries that proved significant at a 5% level in the VECM model. In this way, Italy's MPCI is taken as an endogenous variable, and Germany, Canada, France, and the United Kingdom's MPCIs are taken as exogenous variables. The Manufacturing Competitiveness Index can be applied to cointegration analysis between tourist spending and nature tourism to assess Italy's competitiveness with the most relevant competitors in the tourism sector. This explains the cointegration relationship between the expenditure of second-home tourists and natural amenities. Some studies have examined tourism competitiveness models and indicators (Serrano-Amado et al., 2021; Goffi, 2013). These models often incorporate sustainability dimensions and consider factors like labour productivity, wages, and exchange rates. Market share is a standard competitiveness indicator but has limitations in tourism contexts due to sustainability concerns (Perles Ribes et al., 2014).

2.2. Univariate Analysis: Structural Model

The methodology used to analyse the different time series univariate models is one of the Model-Based Signal Extraction procedures. Model-based methods explicitly propose a representation for each of the series' components: trend, seasonal, cyclical, and irregular. This type of method considers each time series's characteristics, making it more reliable than empirical methods (Espasa & Peña, 1995).

Model-based methods include those based on reduced-form models (Maravall, 1987) and those based on structural time series models (Harvey, 1983). The components in the

structural model are usually represented as stochastic processes, each of which evolves according to its structure over a specific perturbation. In structural models, the components are defined in advance with properties according to the characteristics of the data (Espasa & Peña, 1995).

A frequent form of representation in the structural modelling of time series is the Basic Structural Model (BSM) (Harvey, 1983). The series decomposed in the study through the BSM in this thesis are on a monthly frequency. This analysis brings a detailed description of the series relevant to knowing their dynamics, which is one of the research questions objectives. The total tourists' expenditure (TTE) and second-home tourists' expenditure (SHTE) go from January 1997 to December 2022 (26 years). Due to a lack of data, the Natural Amenities Tourists' Expenditure (NATE) series runs from January 2002 to December 2019 (18 years). The structural model is decomposed into trend, seasonal, and irregular components because the analysis of the next section did not detect the cycles. Therefore, for such series, the BSM is represented by the following equations, where Y_t represents each of the series:

$$\ln Y_t = \mu_t + \gamma_t + \varepsilon_t \qquad (1)$$

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t \qquad (2)$$

$$\beta_t = \beta_{t-1} + \xi_t \qquad (3)$$

$$\gamma_t = -\sum \gamma_{t-1} + \emptyset_t \qquad (4)$$

This BSM represents the observed values of the log transformation of the series t = 1997/01, ..., 2022/12 or t = 2002/01, ..., 2019/12, from the sum of a stochastic trend μ_t seasonal component γ_t and irregular component ε_t. It is assumed that ε_t, η_t, ξ_t, and $\emptyset_t$ are stochastic disturbances. These white noise processes are independent of each other and with variances σ_ε, σ_η, σ_ξ and $\sigma_\emptyset$, respectively. β_t is the slope of the trend component of $\ln Y_t$ (Commandeur et al., 2011).

The key feature of the BSM is that it allows both the level and the slope of the trend component to evolve smoothly over time, according to random walk schemes in which the variances of the respective innovations are lower than the variance of the original series (Commandeur et al., 2011). BSM is based on State Space Models. State space methods originated in control engineering from the groundbreaking paper by Kalman (1960). By the 1980s, scientists working in various fields of control engineering recognised that these ideas could be perfectly applied to time series analysis. Since then, state space methods have been applied to various subjects such as economics, finance, political science, environmental science, road safety, and medicine.

Nowadays, state space methods are also used to fit the ARIMA models of Box and Jenkins (1976), since they can be presented in state space form and analysed employing the

Kalman filter. The state space framework facilitates a structural approach to time series analysis. In this approach, the various unobserved components responsible for the dynamics of the series, such as trend, seasonality, cycle, and the effects of explanatory and intervening variables, are identified separately before being put all together in a state space model (Commandeur et al., 2011).

2.3. Multivariate Analysis: Short and long-run models for SHTE and NATE

To perform the multivariate analysis, the chapter first performed an Autoregressive Distributed Lag Model (ARDL) (Pesaran & Pesaran, 1997; Pesaran & Shin, 1999; Pesaran et al., 2001) to obtain a short-run model for the second homes tourists' expenditure (SHTE) series establishing the relationship with natural amenities tourists' expenditure (NATE). The ARDL is estimated as an alternative to the VECM analysis for the most robustness of the results.

In addition, to develop a long-run model and determine a cointegration relationship between these series, the analysis creates a Vector Error Correction Model (VECM) (Johansen, 2008). Then, it performs the Johansen test to determine if this relationship holds and if both series have a common trend in the long run. Both models adjusted the series sample between January 2002 and December 2019 due to the data restriction on the NATE series.

Several studies have applied time series methodologies to understand the impact of tourism on the environment (Chien et al., 2023; Gedikli et al., 2022; Gao & Zhang, 2019; Liu et al., 2019, among others). The impact of second-home tourists on the environment addressed by the time series methodology approach has not been extensive in the literature. Some papers analyse the relationship between housing prices and pollution (Das et al., 2022). Others explore the nexus between urbanisation and environmental damage (Aslan et al., 2021).

2.3.1. Short-run ARDL Model

This section performs an ARDL model to establish a short-term relationship between the SHTE and NATE series as an alternative to the VECM. The series to be explained is SHTE. It includes the NATE series, the second series of interest, as a regressor of the model in differences of the logarithm estimated by Ordinary Least Squares and control for other variables. The control variables that it includes are significant lags, seasonality dummies (SD), and calendar dummies (CD), and adds a constant (C). Calendar dummies are based on phenomena that affect the seasonality of the series but are rather deterministic: the day of the week and the last day of the month. None of the outliers proved to be significant in the short run. The equation of the short-term model would then be as follows:

$$Dlog(SHTE) = \gamma_1 Dlog(NATE) + \gamma_2 Dlog(NATE_{-3}) + \gamma_3 Dlog(NATE_{-11}) + \gamma_4 Dlog(SHTE_{-1}) + \gamma_5 Dlog(SHTE_{-2}) + \gamma_6 Dlog(SHTE_{-3}) + \sum_1^{12} \gamma_i SD_i + \sum_1^7 \gamma_i CD_i + C \quad (5)$$

2.3.2. Long-run VECM Model and Johansen Test

Macroeconomic relations are formulated as linear between economic variables. It has long been recognised that many macroeconomic variables are not stationary, and the concept of cointegration formulates a linear economic relation as a stationary linear combination between non-stationary variables, see Engle and Granger (1987) (Johansen, 2008). Cointegration analysis studies the existence of some equilibrium relationship between two or more variables in a model. If these relationships exist, they imply that the variables' trends follow the same long-run path. Therefore, the existence of a cointegrating relationship implies that the variables cannot move independently of each other. The long-run dynamics are represented by cointegrating relationships, i.e., a multi-equation version of the error correction mechanism (Johansen, 2004).

As for whether the variables included should be stationary, some authors favour not differentiating the series when they have unit roots (Sims, 1980; Doan & Litterman, 1992). Otherwise, the VAR (autoregressive vector model) included in the VECM would not capture cointegration relationships between the series of interest. The long-term equation for this research will be as follows:

$$Log(SHTE_t) = \beta_1 Log(NATE_t) + \beta_2 Log(ITALY_t) + C + Z_t \quad (6)$$

Z_t is the long-run irregular component integrated of order zero according to Engle and Granger's (1987) theorem, and ITALY is Italy's Manufacturing Prices Competitiveness Index. The rest of the variables are already defined in the previous section. NATE and ITALY are considered endogenous apriori variables.

If the component series are integrated of order one and, in addition, are cointegrated, the Granger Representation Theorem allows us to express the VAR as a VECM (assuming ***r*** cointegrating relationships for each series Y_t) (Johansen, 2004):

$$\Delta Y_t = A_1 \Delta Y_{t-1} + \cdots + A_k \Delta Y_{t-k+1} + \pi Y_{t-k} + \mu + \Phi D_t + \varepsilon_t \quad (7)$$

with t = 1… T series observations

where innovations $\mathcal{E}_t$ are independent and identically distributed, μ is a vector of constants representing the deterministic component in the trend evolution of each of the series Y_t and D_t contains a set of seasonal dummies and other qualitative variables influencing the evolution of Y_t (Johansen, 2004).

This way of representing the vector of endogenous variables contains information on the short-run dynamics by considering one matrix A_i, with $i = 1 \dots k\ endogenous$ variables. Also, incorporate knowledge in the long run, including the matrix Π (Johansen, 2004).

The procedure proposed by Johansen (Johansen, 1988, 1995) for the study of the cointegration of the n integrated variables of order one focuses on the study of the matrix Π of the VECM. To describe the characteristics of the long-run equilibrium, three possible cases about the rank of the matrix Π are to be considered, called $\boldsymbol{r}$:

1) $\boldsymbol{r = n}$, i.e., the matrix Π has total rank, indicates that the process Y_t is stationary, and a VAR procedure with the variables in levels could estimate the multivariate model.

2) $\boldsymbol{r = 0}$, i.e., the matrix Π has zero rank, corresponding to the case of a VAR in first differences.

3) $\boldsymbol{0 < r < n}$ implies that there exist two matrices $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ of 'orders $\boldsymbol{n \times r}$ such that $\boldsymbol{\Pi = \alpha\beta}$. (Johansen, 2004)

Stock and Watson (1988) showed that a set of n random variables integrated into order one, which has r cointegration relations, has n—$\boldsymbol{r}$ common trends. This contribution is crucial since it allows us to determine the number of stochastic trends that move an n-dimensional vector of variables integrated into order one. The test contrast in the rank of the long-run coefficient matrix is the first step in analysing the dynamic interrelationships between the components of the vector of endogenous variables. The hypothesis can be formulated as $H_0(r) = \alpha\beta' Y_t$. Johansen's method provides an algorithm to develop the contrast. The estimation procedure starts from the concentration of the likelihood function concerning the parameters A_1,, ..., A_{k-1}, μ, Φ.

The likelihood ratio statistic for the hypothesis $H_0(r)$, being $\boldsymbol{\lambda i}$ the Eigenvalues of $\boldsymbol{\Pi}$ is:

$$\hat{\alpha_{trace}} = -T \prod_{t=r+1}^{n}(1 - \hat{\lambda}_i) \quad \textbf{(8)}$$

$\hat{\alpha_{trace}}$ statistic is referred to as the **Trace Statistic**. An alternative statistic to carry out the contrast is the **Maximum Eigenvalue, $\boldsymbol{\lambda_{max}}$**. What this statistic does is to compare the hypothesis $H_0(r)$ against $H_1(r + 1)$:

$$\hat{\alpha_{max}} = -T \prod_{t=r+1}^{n}(1 - \hat{\lambda}_{r+1}) \quad \textbf{(9)}$$

The coefficients of $\alpha_{i1} = [\alpha_{11}, \alpha_{21}, \alpha_{31}]$ ' indicate the speed with which each of the variables of the vector ΔY_t., adjust in the direction indicated by the long-run relationship. If one of the rows of the matrix α, for example, row i, has only null values, then the cointegrating relationships play no role in the equation that determines the behaviour of the i, the component of the vector ΔY_t. Therefore, the variable is weakly exogenous to the effects of the system of equations considered. It is valid to condition it because it is part of the long-run equilibrium. In a scheme such as the one proposed, the exogeneity of a variable does not have to be assumed but can be tested. The contrast of weak exogeneity in the complete system requires that: H_j: $\alpha_{ij} = 0$, $i = 1, \ldots, r$ and can be performed from the likelihood ratio statistic between the restricted and unrestricted model. In cases where multiple cointegrating relationships exist, a variable can be exogenous concerning the parameters of one cointegrating relationship and not be exogenous for others. This is so because the weak exogeneity conditions are defined about a given vector and not to the whole system.

3. Description and Characterisation of the Series

Following Box and Jenkins' (1976) methodology, the series is explored through visual inspections (Figures 1–24), correlograms (Figures 2, 4, 10, 12, 14, 18, 20, and 22—Annex 3), and unit root tests (Tables 1–6) before applying the Kalman filter. Graphical analysis reveals non-stationarity in mean but stationarity in variance, with evident seasonality across all expenditure series. Total tourist expenditure (Figures 1–8) shows stable behaviour until 2019, sharp declines in 2020–2021 due to COVID-19, and recovery in 2022. Second-home tourist expenditure (Figures 9–16) follows a similar pattern but with a less pronounced COVID-19 impact. Natural amenities tourist expenditure (Figures 17–24) also displays seasonality and lacks mean stationarity.

ADF tests confirm that all three series are integrated of order 1, as tests in first differences (Tables 1, 3, and 5) reject two unit roots, while tests in levels (Tables 2, 4, and 6) do not reject one unit root. Logarithmic transformations (Figures 3, 11, and 19) reduce variance but do not alter stationarity properties. Seasonality is evident in all series, as shown by separate and stacked line graphs (Figures 7, 8, 15, 16, 23, and 24). The first differences (Figures 5, 6, 13, and 21) confirm stationarity in the mean. Therefore, all expenditure series are seasonal and non-stationary in levels but become stationary in first differences, confirming the integration of order 1. Other tests like KPSS were not used in this analysis because sometimes they did not yield conclusive results that did not correspond to reality (Cappuccio & Lubian, 2010). Since the series are about tourist expenditure and have seasonality, stacked line graphs prove that the mean differs each month. Therefore, there is no chance that the series are stationary because the mean is not constant over time which is a must for stationarity.

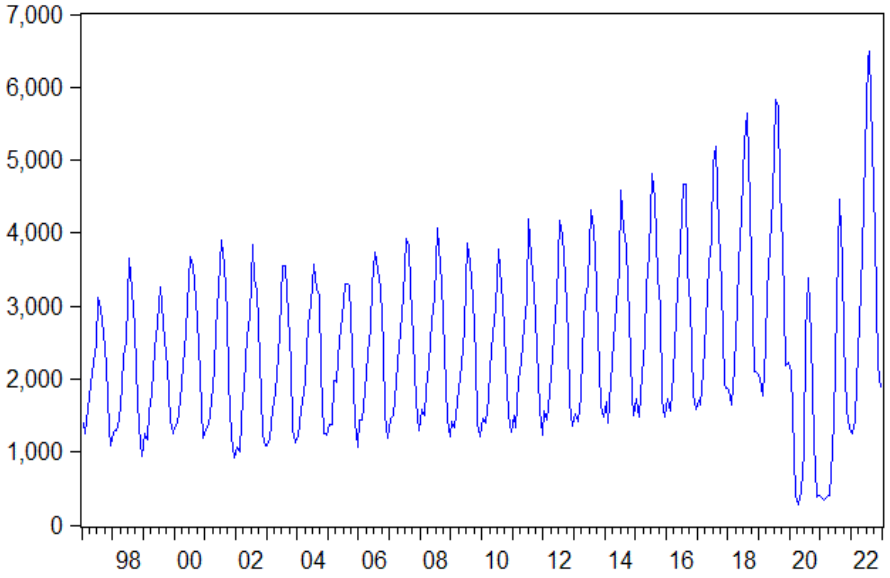

Figure 1: Monthly series of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

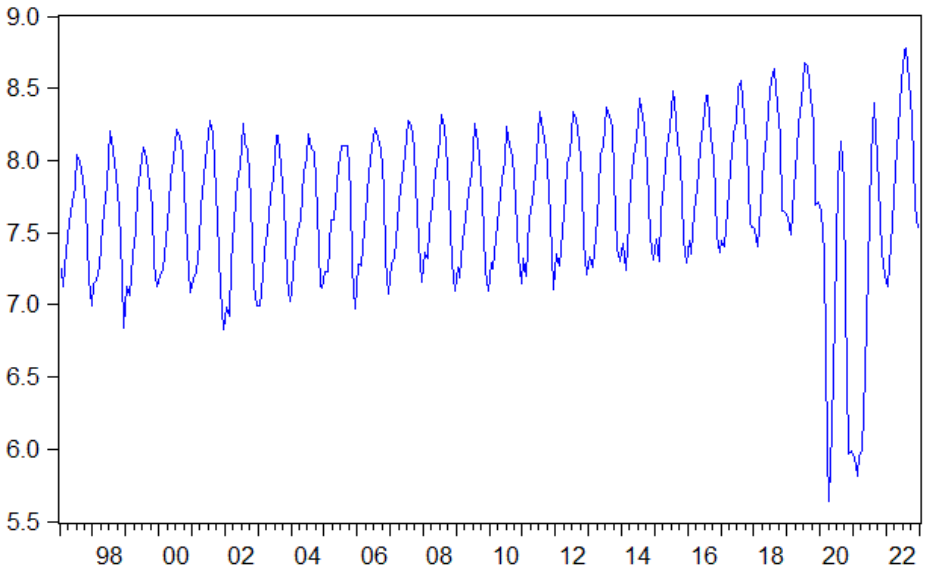

Figure 3: Monthly series in the logarithm of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

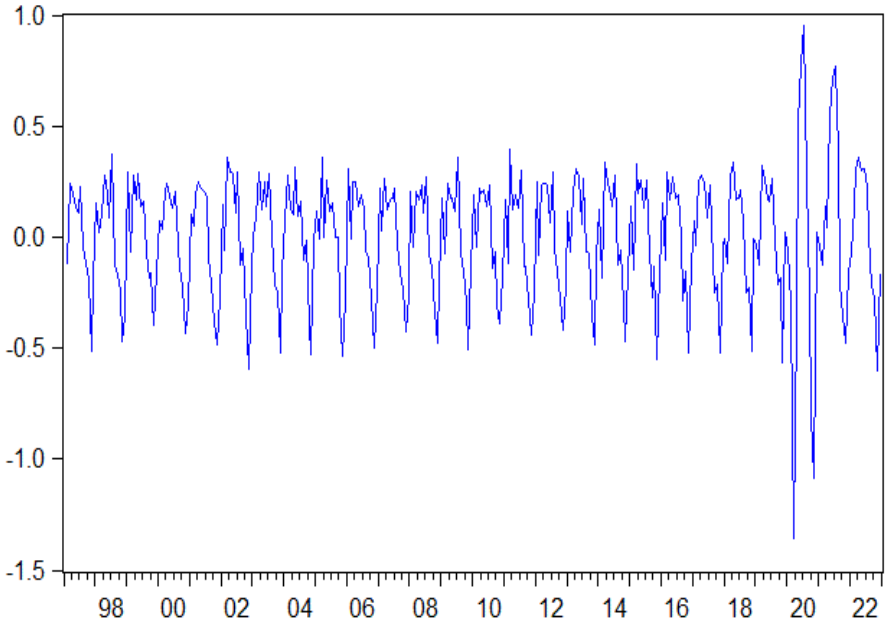

Figure 5: Monthly series in first differences in the logarithm of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Null Hypothesis: D(In(Total Tourist Expenditure)) has a unit root Exogenous: Constant Lag Length: 8 (Automatic – based on SIC, maxlag=10)			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-13.78621	0.0000
Test critical values:	1% level	-3.451847	
	5% level	-2.870899	
	10% level	-2.571828	
*MacKinnon (1996) one-sided p-values.			

Table 1: Augmented Dickey-Fuller Test for first difference monthly series in logarithms of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Null Hypothesis: In(Total Tourist Expenditure) has a unit root Exogenous: Constant, Linear Trend Lag Length: 9 (Automatic – based on SIC, maxlag=10)			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-2.285751	0.4400
Test critical values:	1% level	-3.988737	
	5% level	-3.424775	
	10% level	-3.135465	
*MacKinnon (1996) one-sided p-values.			

Table 2: Augmented Dickey-Fuller Test for monthly series in *logarithms of total expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

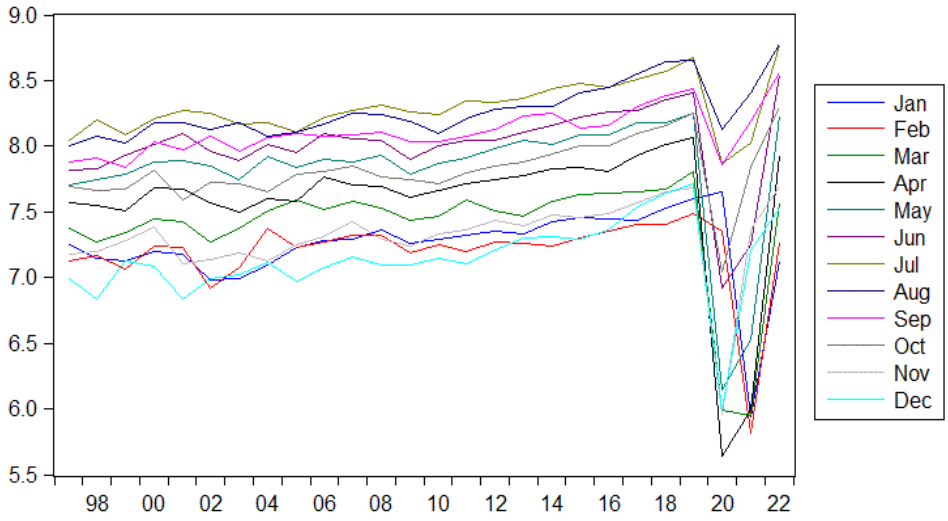

Figure 7: Separate lines per month seasonality graph of the *logarithm of total expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

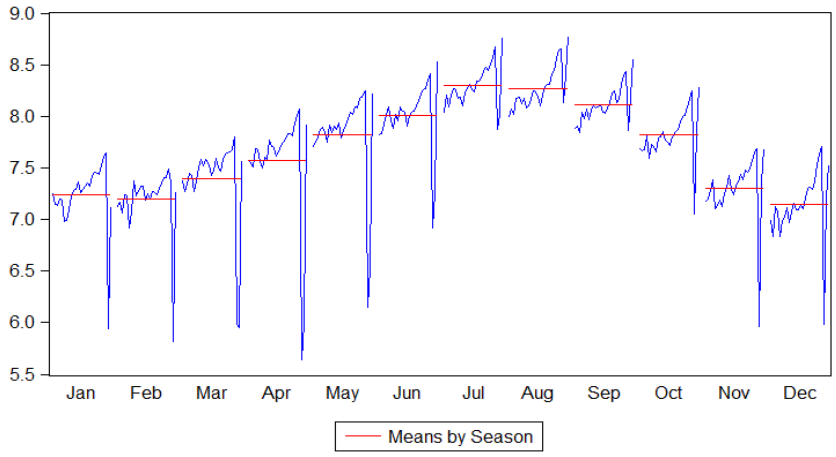

Figure 8: Stacked lines per month seasonality graph of the *logarithm of total expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

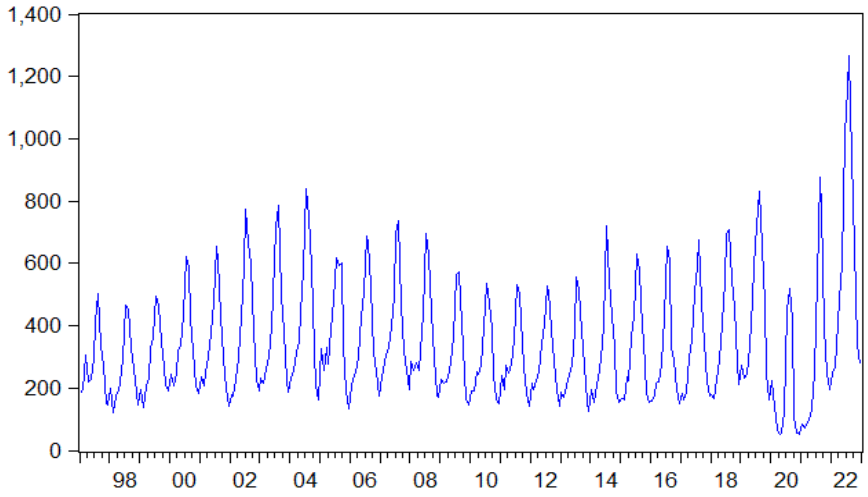

Figure 9: Monthly series of *second-home expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

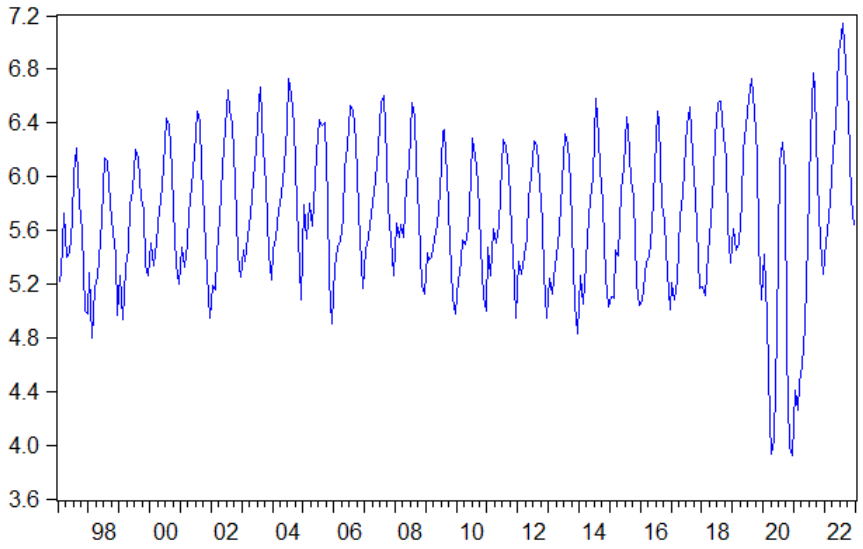

Figure 11: Monthly series of *second-home expenditure in logarithms* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

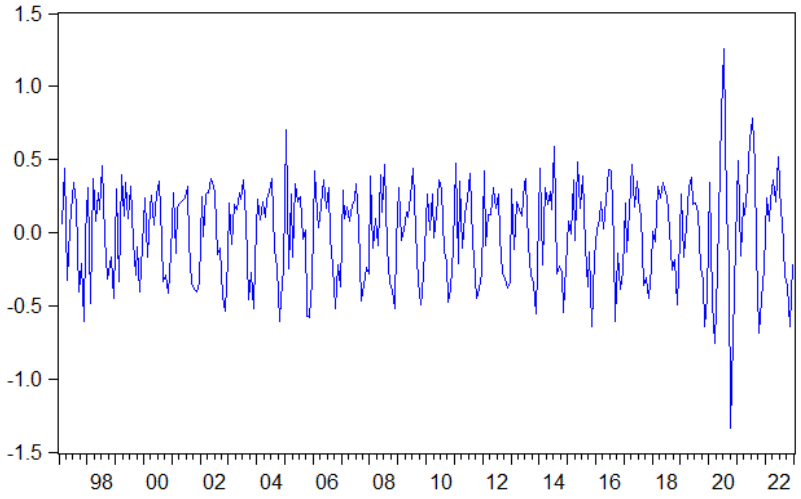

Figure 13: Monthly series of *second-home expenditure in logarithms first difference* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Null Hypothesis: D(In(Second Homes Tourist Expenditure)) has a unit root Exogenous: Constant Lag Length: 8 (Automatic – based on SIC, maxlag=10)			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-16. 21153	0.0000
Test critical values:	1% level	-3.451847	
	5% level	-2.870899	
	10% level	-2.571828	
*MacKinnon (1996) one-sided p-values.			

Table 3: Augmented Dickey-Fuller Test for the first difference of monthly series in *logarithms of second-home tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Null Hypothesis: In(Second Homes Tourist Expenditure) has a unit root Exogenous: Constant, Linear Trend Lag Length: 9 (Automatic – based on SIC, maxlag=10)			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-1.904855	0.6495
Test critical values:	1% level	-3.988737	
	5% level	-3.424775	
	10% level	-3.135465	
*MacKinnon (1996) one-sided p-values.			

Table 4: Augmented Dickey-Fuller Test for monthly series in *logarithms of second-home tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

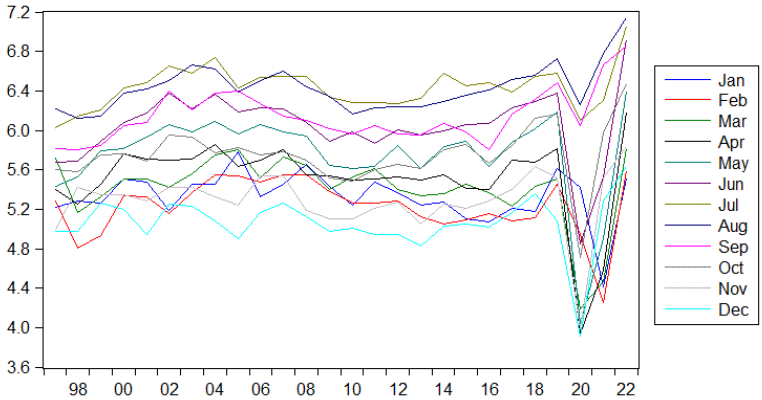

Figure 15: Separate lines per month seasonality graph of *logarithm of second-home tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

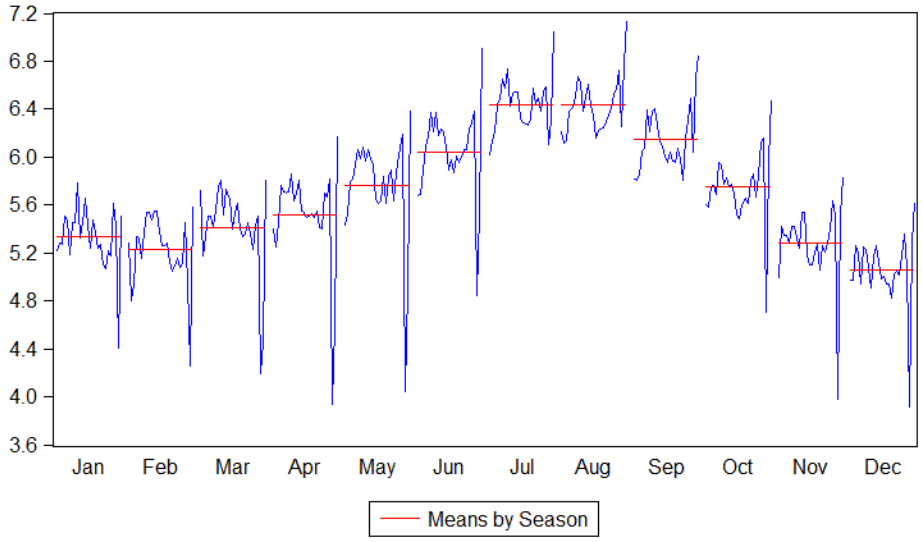

Figure 16: Stacked lines per month seasonality graph of the *logarithm of second-home tourists expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

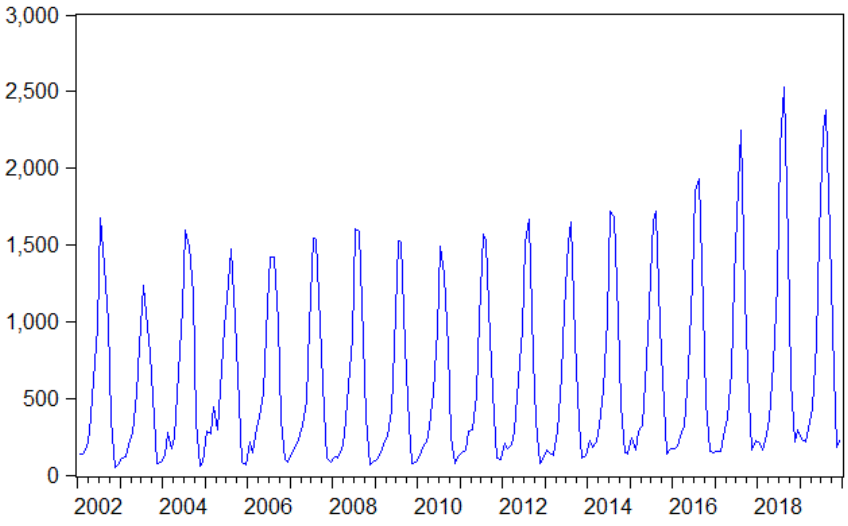

Figure 17: Monthly series of *natural amenities tourist expenditure* by foreign tourists in Italy from January 2002 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

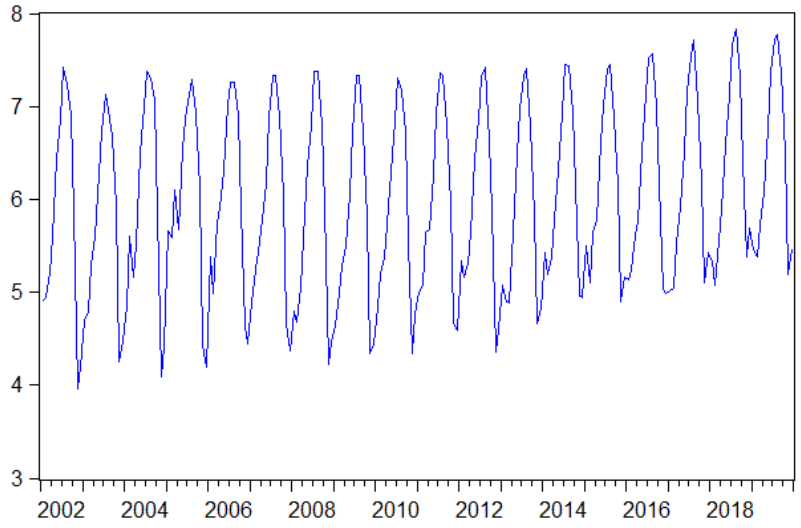

Figure 19: Monthly series of *natural amenities tourist expenditure in logarithms* by foreign tourists in Italy from January 2002 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

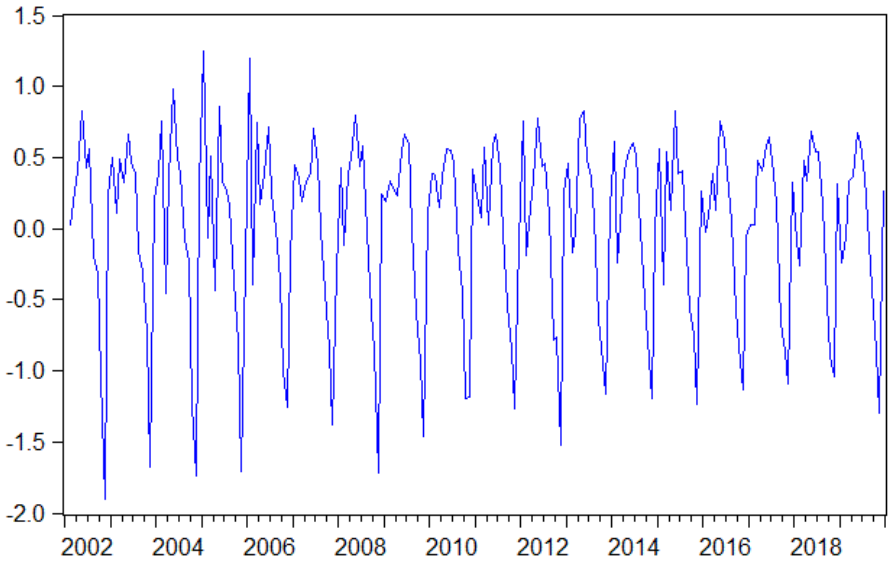

Figure 21: Monthly series of *natural amenities tourist expenditure in logarithms first difference* by foreign tourists in Italy from January 2002 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Null Hypothesis: D(In(Green Tourist Expenditure)) has a unit root Exogenous: Constant Lag Length: 10 (Automatic – based on SIC, maxlag=10)			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-28.03519	0.0000
Test critical values:	1% level	-3.462412	
	5% level	-2.875538	
	10% level	-2.574309	
*MacKinnon (1996) one-sided p-values.			

Table 5: Augmented Dickey-Fuller Test for the first difference of monthly series in *logarithms of green tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Null Hypothesis: In(Green Tourist Expenditure) has a unit root Exogenous: Constant, Linear Trend Lag Length: 10 (Automatic – based on SIC, maxlag=10)			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-2.692429	0.2409
Test critical values:	1% level	-4.003449	
	5% level	-3.431896	
	10% level	-3.139664	
*MacKinnon (1996) one-sided p-values.			

Table 6: Augmented Dickey-Fuller Test for the monthly series in *logarithms of green tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

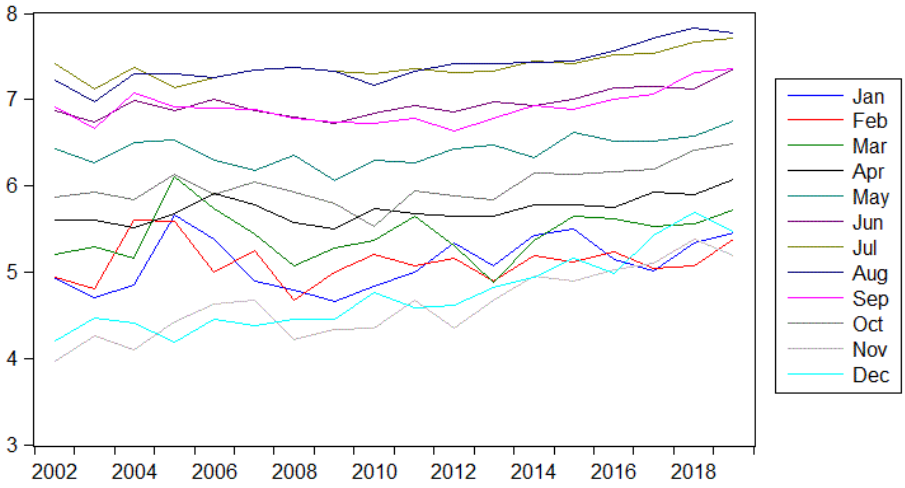

Figure 23: Separate lines per month seasonality graph of the *logarithm of natural amenities tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

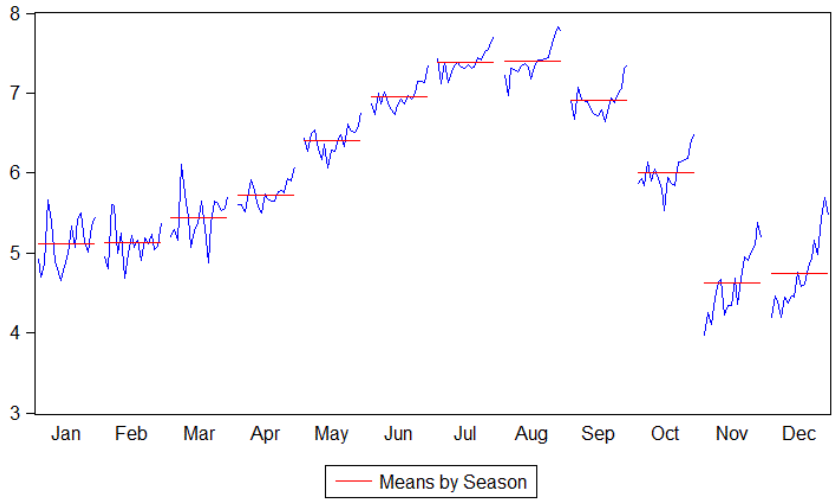

Figure 24: Stacked lines per month seasonality graph of the *logarithm of natural amenities tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

4. Structural Time Series Models from 1997 to 2022: COVID-19 included

All the expenditure series have been affected by the COVID-19 pandemic or other unexpected events that may have caused abrupt movements and essential repercussions on the behaviour of the series. For this reason, outlier modelling is included in the structural models of total and second-home tourists' expenditures.

4.1. Structural Model for Total Tourist Expenditure Series

The estimated model for Y = total tourists' expenditure has the components specified in the following equation:

$$Y = Trend + Seasonal + Irregular + Interventions$$

The interventions performed were in the year 2020 in months 3, 4, 6, 7, 7, 8, 10 and 11; in the year 2021 in months 3, 6, 7 and 8; and the year 2022 in months 2 and 6 (see Annex 3 Table 1). The criterion used to include interventions due to outliers is that of more than three deviations (Box & Tiao, 1975). However, only those that turn out to be significant do not affect the requirements of estimated variances of the BSM and normality of the residuals included. The estimated variance of the irregular component must be grater than the estimated variances of the rest of the components, as seen in Table 7. The same table shows the Skewness values for the irregular component and the level not rejecting, in both cases, the null hypothesis of normality. Regarding the seasonal component, the structural model does not report Skewness statistics. In the case of the slope, the total tourist

expenditure series presents a unit root, either the slope or the trend level should be fixed. Hence, the zero value is reported for the estimated slope variance. Therefore, in this case, the BSM estimation results in the slope being fixed and the level stochastic.

Figure 25 shows the graphs of the structural model. The first graph is the logarithm of the total tourism expenditure and the level plus the interventions, which can also be seen in the second graph, where it is observed that the outliers are of the downward level shift type. The third graph represents the level of total tourism expenditure without interventions. The fourth graph shows the seasonal component, which presents a constant behaviour of the seasonal cycles over time for the logarithm. The fifth graph shows the irregular component that oscillates around a mean of zero, being stationary in the mean. Finally, the sixth graph shows the representation of the series level in question, the irregular component, and the interventions. The first, second and sixth graphs show the devastating effect of COVID-19 to a greater extent in 2020, then in 2021 and to a lesser extent in 2022. Figure 25 graphs show the negative effects of COVID-19, with outliers between 2020 and 2021 and a recovery in 2022, leading to a slight increase in the level before the COVID-19 crisis.

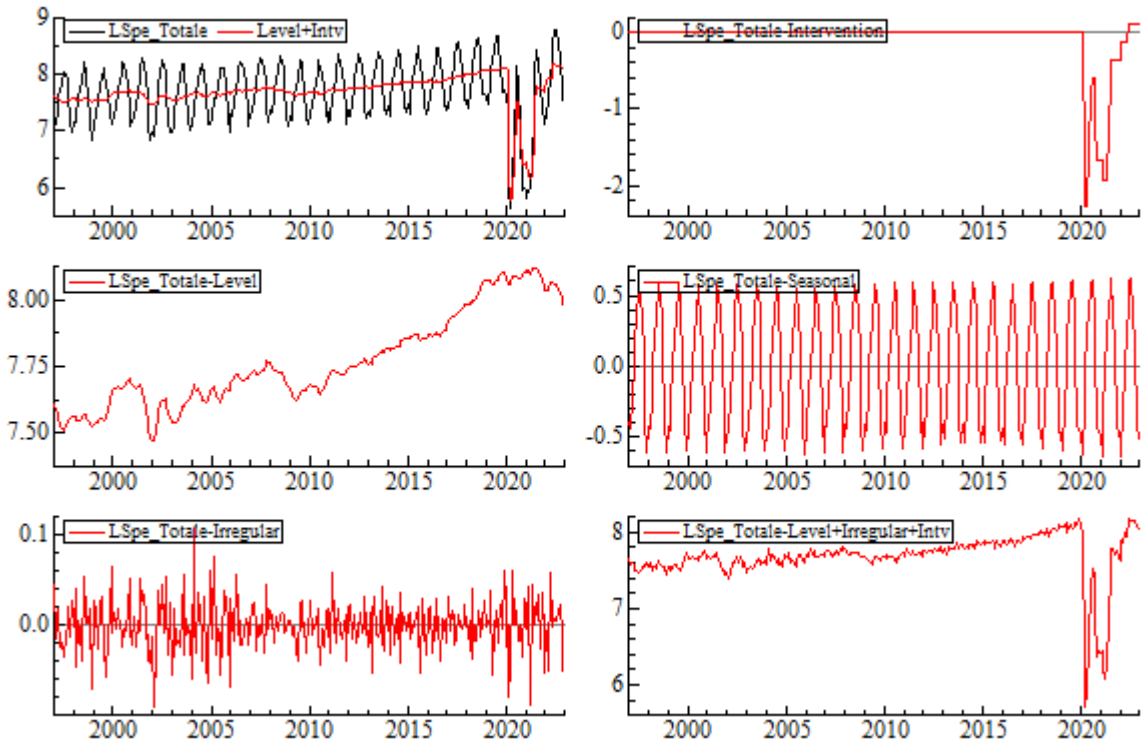

Figure 25: Components graph of Structural Model of the *logarithm of total expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Structural Model Estimated Disturbances		
Component	**Estimated Variance**	**Skewness p-value**
Irregular	0.0016	0.3148
Seasonal	$7.06e^{-006}$	-
Level	0.0007	0.4036
Slope	0	-

Table 7: Variance and Skewness of estimated disturbances of the Structural Model Components for the *logarithm of total expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

The structural model provides strong evidence of COVID-19's impact on tourism expenditure, with significant downward level shifts in 2020–2021 and a slow recovery in 2022. Despite these shocks, the seasonal component remains stable, confirming the seasonal nature of tourism expenditure. The irregular component dominates variance, while the trend remains stochastic due to the presence of a unit root. The findings underscore the resilience of seasonal tourism patterns amid external disruptions and the gradual return to pre-crisis expenditure levels in 2022. General ouputs of the series are included in Table 1- Annex 3.

4.2. Structural Model for second-homes Tourist Expenditure Series

As in the series described in the previous section, the BSM equation, where Y in this case is the ln of the expenditure of second-home tourists, is as follows:

Y = Trend + Seasonal + Irregular + Interventions

In the BSM of the second-home tourist expenditure series, the number of outliers that needed to be incorporated in the interventions was lower. The criteria for inclusion of outliers were the same as those detailed in the previous section. Likewise, the model includes outliers, considering that the variance of the irregular component should be greater than that of the rest of the components (see Table 8). In addition, the normality of the estimated residuals for the irregular component and the level whose Skewness statistics are shown in Table 8 and checked. Also, in this series, as seen in the sixth section, the presence of a unit root was checked, which indicates that, in this case, there is also a fixed slope and a stochastic level. The interventions for outliers made in the BSM of second-home tourist expenditure were in 2020 in months 3, 4, 6, 7, and 10 and 2021 in months 6, 7, and 8. Eight interventions against thirteen had to be made in the case of the BSM of the total tourists' expenditure series (see Annex 1 Table 2).

About the structural model graphs in Figure 26, there are some points of comparison to highlight for the total tourist expenditure series. On the one hand, the first graph of the logarithm of the expenditure of second-home tourists and the level plus interventions is very similar to that of the total expenditure series. The same applies to the seasonality graphs (fourth) and the irregular component (fifth). On the other hand, both the second and the sixth graphs have similar behaviours before the COVID-19 crisis, but in the case of the second-home tourist expenditure series, the recovery of the year 2022 is at a considerably higher level than in the case of the total expenditure series.

In turn, the third graph showing the level of expenditure by second-home tourists without the interventions is entirely different from that of the total expenditure series. The graph shows short cycles of 4 years and long cycles of just over 10 years. Such cycles are not seen in the total expenditure series, which shows increasing behaviour with a fall starting in 2021 and continuing in 2022. This last aspect is a significant difference from the second-home tourist expenditure graph, which shows a sharp drop at the beginning of 2020 with a sharp increase from mid-2020 to 2022.

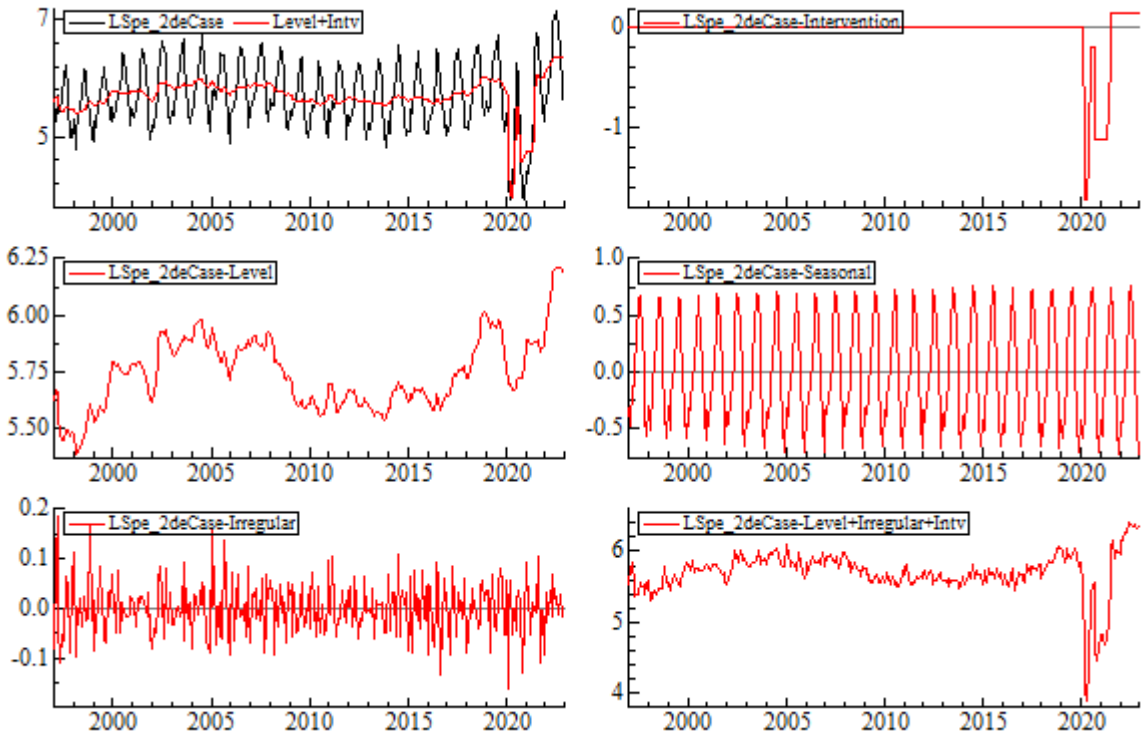

Figure 26: Components graph of Structural Model of the *logarithm of second-home tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Structural Model Estimated Disturbances		
Component	**Estimated Variance**	**Skewness p-value**
Irregular	0.0055	0.4145
Seasonal	$1.73e^{-005}$	-
Level	0.0029	0.2792
Slope	0	-

Table 8: Variance and Skewness of estimated disturbances of the Structural Model Components for the *logarithm of second-homes tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Overall, these findings highlight the second-homes tourism sector's resilience and capacity to gradually return to pre-crisis expenditure levels by 2022. A stable seasonal component and a recovering trend suggest that second-homes tourism demand is structurally robust, although vulnerable to short-term shocks. This underscores the importance of policy interventions, financial support, and adaptive business strategies to mitigate future crises while preserving tourism expenditure's cyclical and long-term stability. General output statistics of the three series are included in Tables 17-19 (Annex 3).

5. Structural Time Series Models from 1997 to 2019: Before COVID-19

This section creates a structural model between 1997 and 2019 to perform a refined dynamic analysis of COVID-19, whose outliers considerably affect the total and second-home tourists' expenditure series. In the case of the natural amenities tourists' expenditure series, the structural model is built between 2002 and 2019 because data before 2002 and after 2019 are unavailable. The BSM estimated for all tourism expenditure series from 1997 to 2019 or 2002 to 2019 is the same as the previous series estimated:

$$Y = Trend + Seasonal + Irregular + Interventions$$

5.1. Structural Model for Natural Amenities Tourists' Expenditure, 2002-2019

The criterion for the intervention by outliers was the same as in the two previous series analysed. As mentioned, the period analysed in this series is narrower and goes from January 2002 to December 2019, so the COVID-19 crisis is not included. It included outliers greater than three significant deviations. The analysis considers the estimated variance of

the irregular component greater than that of the rest of the components (see Table 9). The normality of the irregular and level components was also maintained according to the values of the Skewness statistic shown in Table 9, which implies that the null hypothesis of normality was not rejected. Months 2004-1, 2005-1, 2005-2, 2005-3, 2006-1 and 2013-3 were incorporated as additive outliers. It was necessary to incorporate only one level shift outlier in 2007-12 (see Annex 3-Table 3 b). The structural model graphs presented in Figure 27 show essential differences from those of the previous series analysed. However, it cannot be an exact comparison because the period analysed for these natural amenities tourists' expenditure series is shorter and does not include the COVID-19 crisis. So, looking at the first graph of the level plus interventions and the second graph showing only interventions, the outliers already described.

In the third graph, which only shows the level, the growth from 2002 to 2019 can be appreciated. The fourth graph shows seasonality, which slightly decreases over time. Then, as in the previous series, an irregular stationary component on average can be seen in the fifth graph. Finally, the sixth graph shows the seasonally adjusted series with the level plus the interventions and the irregular component, which shows significant variability and growth in the level over time. From 2008 onwards, there has been solid growth in the trend after the level change. Before this growth, there was significant growth from 2002 to mid-2005, when a sharp drop began and ended with a level change in December 2007.

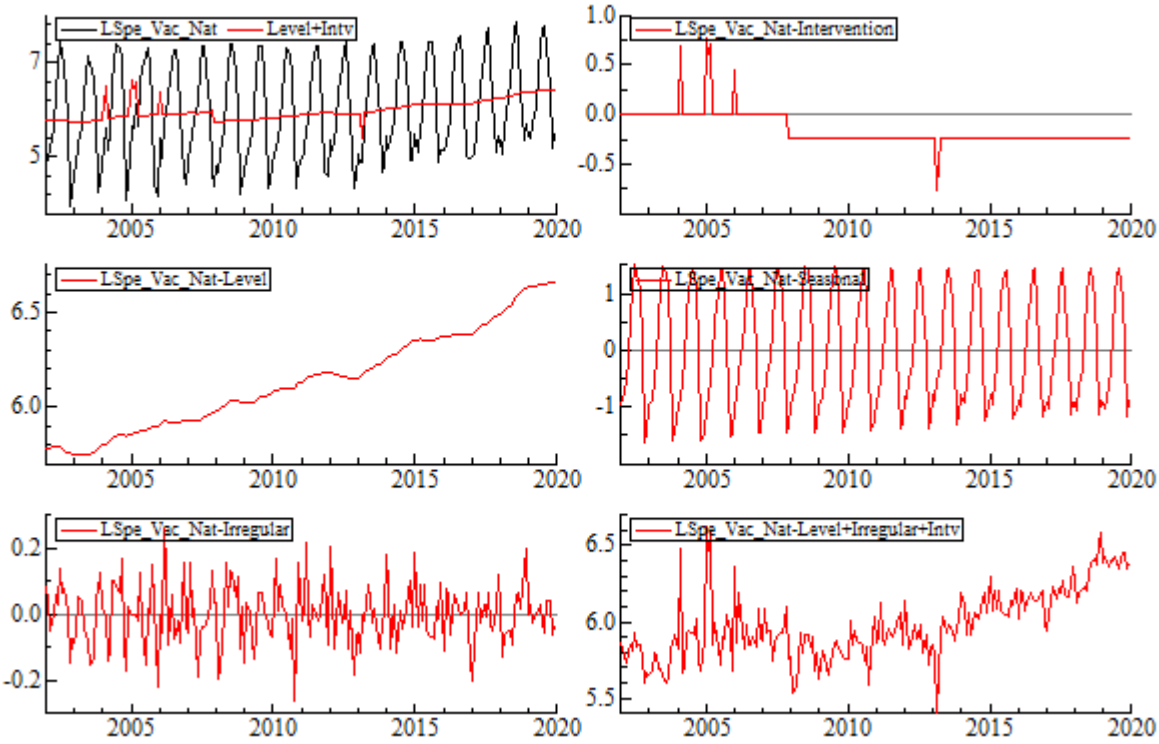

Figure 27: Components graph of Structural Model of the *logarithm of natural amenities tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Structural Model Estimated Disturbances		
Component	**Estimated Variance**	**Skewness p-value**
Irregular	0.0121	0.6028
Seasonal	$4.55e^{-005}$	-
Level	0.0004	0.7213
Slope	0	-

Table 9: Variance and Skewness of estimated disturbances of the Structural Model Components for the *logarithm of natural amenities tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

5.2. Structural Model for Total Tourists' Expenditure, 1997-2019

The outliers used to intervene with the model are shown in Table 4 of Annex 3, where it is observed that all are significant in the final state (12/2019). The analysis incorporates two additive outliers into the model: 12/1998 and 02/2004. The remaining outliers constitute level shifts and are 11/2002, 10/2001, 04/2002, 11/1999, 05/1997, and 10/2008 immediately following the crisis. These outliers can be seen separately in the second graph in Figure 31. The structural model plots in Figure 28 show that the dynamics before COVID-19 were very different. In addition, modelling until 2019 has implied the intervention for outliers other than those associated with that crisis. The first graph shows the increasing level plus the interventions.

The second graph shows only the interventions already described. The third graph shows only the level without interventions, where it grows over time. The fourth graph presents the seasonal component, which is stable over time. The fifth graph displays the irregular stationary component on average. Finally, the last graph in Figure 31 is the seasonally adjusted series with increasing behaviour and outliers that seem less drastic than those associated with COVID-19 in the series of the previous section. To finish describing the BSM, Table 10 shows the estimated variances of the residuals of the components as well as their normality test. As can be seen, the estimated variance of the residual of the irregular component is grater than the variances of the residuals of the rest of the components. Likewise, the residuals were normally distributed in the cases that corresponded to test them.

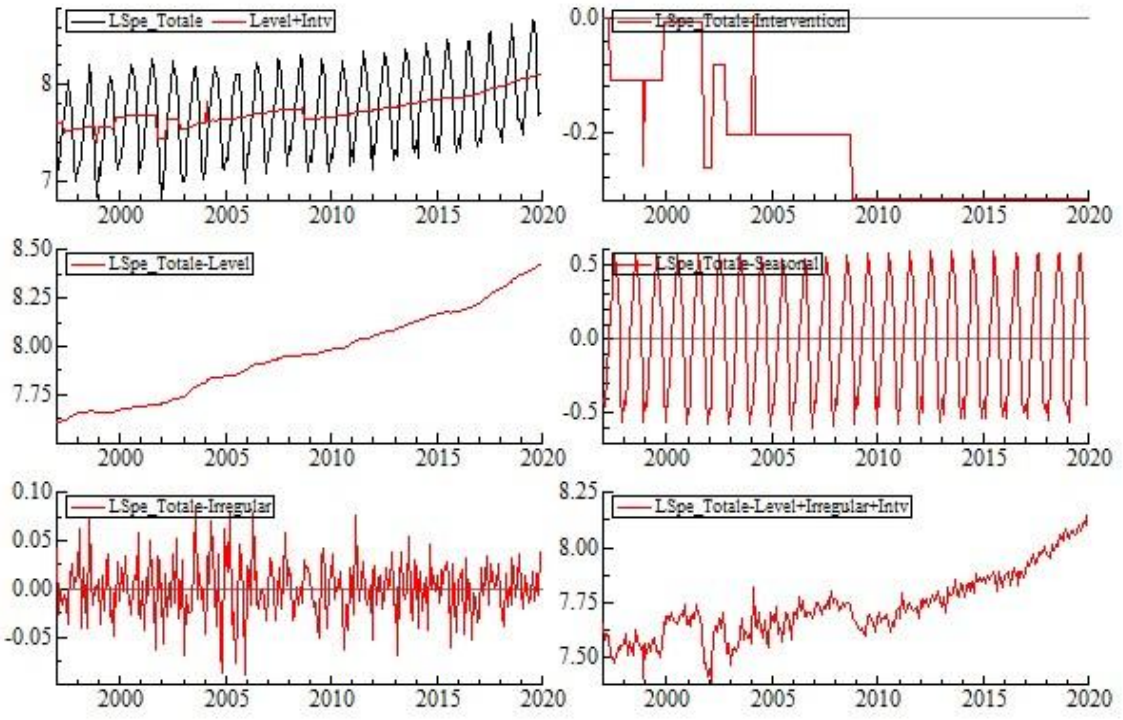

Figure 28: Components graph of Structural Model of the *logarithm of total tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Structural Model Estimated Disturbances		
Component	**Estimated Variance**	**Skewness p-value**
Irregular	0.001369	0.8506
Seasonal	$5.51e^{-006}$	-
Level	$6.29e^{-005}$	0.4113
Slope	0	-

Table 10: Variance and Skewness of estimated disturbances of the Structural Model Components for the *logarithm of total tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

5.3. Structural Model for Second-Homes Tourists Expenditure, 1997-2019

In the BSM of the second-home tourists expenditure series, the interventions for outliers were fewer than in the total expenditure series, with only one downward outlier. Table 5 of Annex 3 shows these interventions, all significant in the final state, two upward additive outliers (11/1998 and 01/2005), three upward level shift outliers (10/1999, 04/2002 and 02/1997) and one downward level shift (04/1997). As can be seen, second-home tourism reacted differently to the 2008 crisis with a drop in expenditure levels but of less than three standard deviations, which was not the case for total tourists' expenditure.

The BSM graphs (Figure 29) of the second-home tourists expenditure series (1997-2019) show notable differences again with the BSM graphs of the total tourists' expenditure series for the same period. The first graph shows a relatively constant level and the interventions already mentioned. The second graph shows these interventions independently, where upward additive level shifts and outliers are visible. The third graph shows a completely different behaviour from the total expenditure series, with an inverted U-shape up to 2008 and after 2008 with a U-shape. It looks like there were two cycles of approximately ten years. The drop in spending occurred until 2010; there was some stagnation until mid-2016 when spending began to grow until the end of the analysis period. The seasonal component of this BSM also shows a different behaviour from that of the total tourist expenditure series, showing a slight increase in seasonality throughout the analysis period (Figure 33). The fifth graph of Figure 29 shows an irregular seasonal component on average. The last graph (Figure 29) shows the series and the seasonally adjusted interventions again with that pattern that would appear to be cycles of approximately ten years.

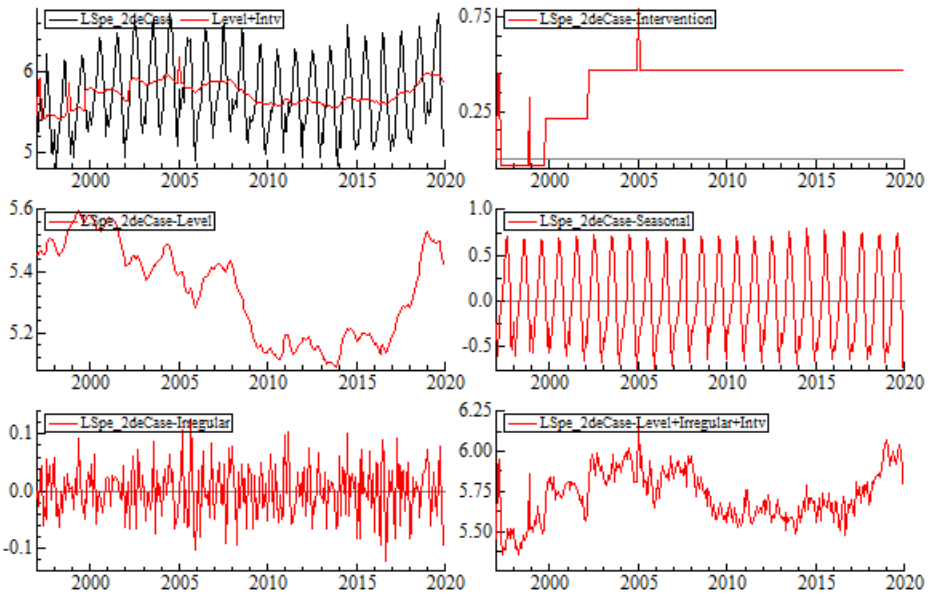

Figure 29: Components graph of Structural Model of logarithm *of second-homes tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

To conclude the analysis of the structural model of the second-home tourists expenditure series, Table 11 shows that the variance of the estimated disturbance of the irregular component is greater than that of the rest of the components. Likewise, these disturbances are normally distributed in the corresponding test cases (i.e., irregular and level).

Structural Model Estimated Disturbances		
Component	**Estimated Variance**	**Skewness p-value**
Irregular	0.004018	0.9751
Seasonal	$2.77e^{-005}$	-
Level	0.00095	0.4347
Slope	0	-

Table 11: Variance and Skewness of estimated disturbances of the Structural Model Components for the *logarithm of second-home tourists' expenditure* by foreign tourists in Italy from January 1997 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

6. Results and discussion: Multivariate Time Series Models

To conduct multivariate analysis, this section initially executed an Autoregressive Distributed Lag Model (ARDL) (Pesaran & Pesaran, 1997; Pesaran & Shin, 1999; Pesaran et al., 2001) as an alternative to the VECM to give more robustness to the analysis. Furthermore, to formulate a long-term model and identify a co-integration relationship between these variables, the study includes estimating a VECM (Johansen, 2008). Both analytical models were executed by adjusting the sample period of the series, spanning from January 2002 to December 2019, to adjust the data limitations associated with the NATE series.

6.1. Short-run Autoregressive Distributed Model (ARDL)

This section conducts an Autoregressive Distributed Lag (ARDL) model as an alternative to the VECM to establish a connection between the SHTE and NATE series (Pesaran & Pesaran, 1997; Pesaran & Shin, 1999; Pesaran et al., 2001). The series to be explored is SHTE. As predictors in the model, differentiated logarithms were estimated through Ordinary Least Squares, encompassing the NATE series and the second series of interest while controlling for other variables. The included control variables consist of significant lags, differentiated seasonality dummies ($D(SD_6)$), differentiated calendar dummies *(D(CD))*, and the addition of a constant *(C)*. Calendar dummies are derived from deterministic factors influencing the seasonality of the series, such as the day of the week and the last day of the month. None of the outliers demonstrated significance in the short term, so

none is included. Therefore, the formulation of the short-term model's equation with the coefficients estimated is presented in Table 12 (Annex 3).

As can be seen in the results (Table 12-Annex 3), the Dlog (NATE) coefficient, $\gamma_1 \approx 0.15$, is positive and significant. This means there is a short-run positive relationship between SHTE and NATE after controlling significant lags, seasonality dummies, and calendar dummies. The constant (*C*) turned out to be non-significant, as did the June seasonal dummy (*D(SD₆)*) and all calendar variables except the one related to Thursday (*D(CD₄)).* After examining the coefficient results in Table 12 (Annex 3), some relevant statistics on the model's robustness are observed. The table shows that the joint significance F-statistic, with a p-value of 0, is significant at the 5% level (p-value < 0.05). Additionally, the model exhibits a high R-squared of nearly 89% and a Durbin-Watson statistic above 2, the reference value. Therefore, the relationship between SHTE and NATE found in the short term is robust, even though the coefficient of 0.15 is not close to 1.

6.2. Long-run VECM and Johansen Cointegration Test

First, this section performs the Vector Error Correction Model (VECM). As proved in the previous chapters, the series are not differentiated because they exhibit unit roots (Sims, 1980; Doan & Litterman, 1992). Table 14 shows the long-term relationship between the series SHTE and NATE examined through the following long-run equation, establishing the estimated coefficients:

$$Log(SHTE) = 0.89 * Log(NATE) + 4.95 * Log(ITALY) + 22.45 + Zt$$

Zt represents the non-seasonal irregular component integrated of order zero as per Engle and Granger's (1987) theorem. Italy's Manufacturing Prices Competitiveness Index (MPCI) is denoted as ITALY and is considered an endogenous variable. The remaining variables have been previously defined in the preceding sections. NATE and ITALY are considered endogenous variables (apriori). This equation indicates that the long-term elasticity of natural amenities tourists' expenditure to second-home tourists' expenditure is 0.89, very close to 1, a high elasticity level. The model introduces ITALY (MCPI of Italy) to control domestic prices. In Table 14, the previously described long-run equation is presented at the top, and at the bottom is the Weak Exogeneity Test. Weak Exogeneity of the series is enough to infer the long-run equation. The latter indicates that the variables ITALY and SHTE are endogenous at a significance level of 5%. In comparison, the variable NATE is weakly exogenous at 10% (according to the t-statistics shown in square brackets). The next step is to check for the cointegration relationship between SHTE and NATE with the Johansen Test.

Table 15 (Annex 3) shows the long-run relationship for the Cointegration Matrix of the lags of the variables SHTE, NATE, the exogenous variables derived from the significative MPCI of the countries that have commercial relationship with Italy (Germany, Canada, France and United Kingdom), the calendar dummies (DLU, DMA, DMI, DJU, DVI, DSA, DMES), the seasonal dummies (CM1 to CM11) an the outliers (AO 02/2004, AO 01/2005, AO 02/2005, AO 03/2005, AO 01/2006, AO 03/2013 and FE>= 12/2007). According to Table 15 (Annex 3), the variables associated with the long-term relationship for SHTE are the third lag of

NATE, all seasonal dummies except for the one for November, the MPCI of Canada, one calendar variable and the additive outlier of January 2005. The variables in the long-term relationship with NATE are the first two lags of NATE, all seasonal dummies, four calendar dummies, the MPCI of Canada, the MPCI of the United Kingdom and all the outlier dummies. Concerning Italy, only the first two lags of NATE, the first lag of Italy, one seasonal variable, and one calendar dummie have a long-run association.

Before running the Johansen Test, it should be checked that the residuals of the long-run equation, Z_t are normally distributed. According to Table 17, the three normality tests result in non-rejecting the null of normality because all the p-values are greater than 5% significant level. The normality of Z_t can also be appreciated in Figure 30, showing that the residual autocorrelations always stay between 2 standard error bounds.

Table 16 shows the Johansen Test. The trace statistics and the maximum eigenvalue statistic indicate that the variables SHTE and NATE are cointegrated, suggesting that they follow a common trend at a 5% significance level in the long run. The null hypothesis of a non-cointegration relationship in the two tests is rejected. Therefore, a long-run relationship exists between second-home tourists' and natural amenities' expenditures.

Cointegrating Eq:	**Coefficient**	**Standard Error**	**T-Statistic**
LOG(SHTE)	1	-	-
LOG(NATE)	0.896997	0.16497	-5.43739
LOG(ITALY)	4.959233	0.97603	-5,08104
C	22.45407	-	-
Error Correction: Weak exogeneity test	**D(LOG(SHTE))**	**D(LOG(NATE))**	**D(LOG(ITALY))**
	-0.106128	0.122582	0.014462
Standard error in ( )	(0.06093)	(0.09642)	(0.00384)
T-statistic in [ ]	[-1.74193]	[1.27130]	[3.76792]

Table 14: VECM, long-run co-integration model and weak exogeneity test.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No.of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob. **
None *	0.121866	32.65298	29.79707	0.0228
At most 1	0.021049	5.362158	15.49471	0.7692
At most 2	0.004252	0.894782	3.841466	0.3442

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
** MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Eigenvalue)

Hypothesized No.of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob. **
None *	0.121866	27.29082	21.13162	0.0060
At most 1	0.021049	4.467375	14.26460	0.8070
At most 2	0.004252	0.894782	3.841466	0.3442

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
** MacKinnon-Haug-Michelis (1999) p-values

Table 16: Johansen Test between NATE and SHTE

Component	Skewness	Chi-sq	df	Prob.*
1	-0.222927	1.739374	1	0.1872
2	-0.108948	0.415438	1	0.5192
3	-0.042387	0.062883	1	0.8020
Joint		2.217695	3	0.5285

Component	Kurtosis	Chi-sq	df	Prob.
1	3.230063	0.463127	1	0.4962
2	3.379818	1.262290	1	0.2612
3	3.781939	5.349997	1	0.0207
Joint		7.075415	3	0.0695

Component	Jarque-Bera	df	Prob.
1	2.202501	2	0.3325
2	1.677728	2	0.4322
3	5.412881	2	0.0668
Joint	9.293109	6	0.1578

*Approximate p-values do not account for coefficient estimation

Table17: VEC Residual Normality Test.

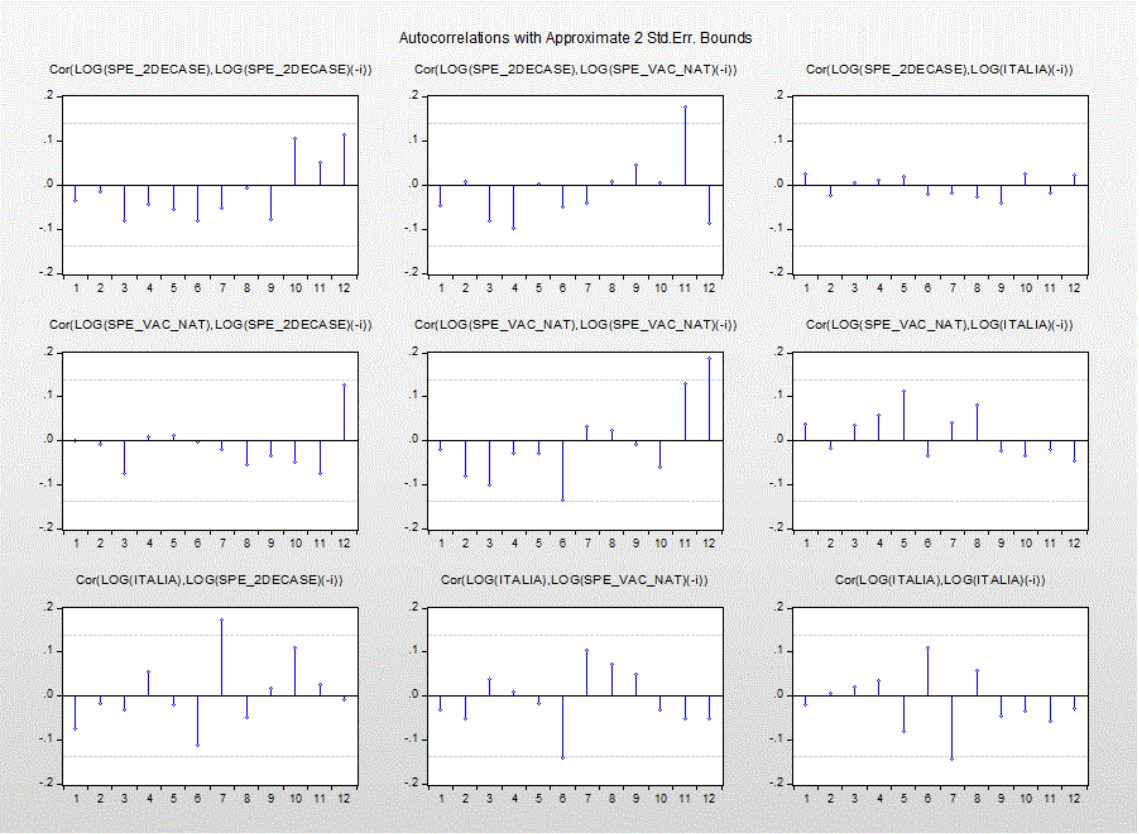

Figure 30: Autocorrelations of Z_t with approximate 2 standard error bounds

7. Conclusions

Comparing the BSM of the expenditure series for second-home tourists reveals several points of contrast concerning the BSM of the total tourist expenditure series, both for inbound tourism in Italy. On the one hand, the dynamics of the logarithm of second-home tourist expenditure and the level plus interventions closely resemble the total expenditure series. The same holds for the dynamics of seasonality and irregular components. On the other hand, both exhibited similar behaviours before the COVID-19 crisis. However, in the case of the second-home tourist expenditure series, the recovery in 2022 reaches a significantly higher level than the total expenditure series. These two series are juxtaposed with the monthly tourist expenditure on natural amenities. Nevertheless, this series is examined from January 2002 to December 2019 due to data gaps in specific periods. Substantial differences in dynamics are also identified between this series and those analysed earlier, underscoring the importance of studying it separately. Therefore, this study offers insights into the significance of exploring second-home and natural amenities tourists' expenditure as the dynamics of SHTE differ from those of Traditional Tourism Expenditure.

A positive and statistically significant short-term relationship between SHTE and NATE supports the findings of the literature review. The coefficient of approximately 0.15

suggests that a rise in NATE leads to a proportional but modest increase in SHTE. However, in the long run, the Vector Error Correction Model (VECM) and Johansen Cointegration Test reveal a strong cointegration relationship between SHTE and NATE, meaning they follow a common trend over time. The estimated long-term elasticity of SHTE concerning NATE is 0.89, suggesting that nearly every 1% increase in NATE results in a 0.89% increase in SHTE. Additionally, Italy's Manufacturing Prices Competitiveness Index (MPCI) was found to be a crucial endogenous factor in the long-run equation. Including various control variables (such as seasonal and calendar dummies) further solidifies the model's reliability.

This finding reinforces the importance of planning space in those areas heavily reliant on second-home tourism and natural amenities. It is necessary to reorganise the excessive, often repetitive, and confusing regulations (FIAIP, 2023). A fragile environmental and social balance in tourist destinations can easily be disrupted (Biagi et al., 2015). With a common long-run trend between SHTE as a proxy for second-home tourism and NATE as a proxy for nature tourism, it is crucial to underscore the significance of environmental conservation policies in such tourist destinations. This aligns with the literature on second homes' environmental impact and contributes to the limited, scarce literature in this line of research (Ismail et al., 2023). This study has potential applicability to other countries with similar data. Also, research on domestic tourists' expenditure series in Italy can be conducted, and a cointegration analysis of natural amenities tourists' expenditure is a promising avenue for future research.

Overall, the findings provide valuable insights for policymakers and stakeholders involved in environmental and land use planning, highlighting the importance of considering the interplay between second-homes and natural amenities in shaping tourism dynamics. Tourists generally underreport spending and second-home tourism on surveys due to the high level of informality in the sector. Therefore, it is highly likely that the cointegration between spending by second-home tourists and tourists on natural amenities is much stronger than the one unveiled in this research. In 2022, there was a 24% increase in second homes sold in Italy compared to 2021, and projections for 2023 indicate a further increase of about 10% (FIAIP, 2023).

The findings imply that public policies should incorporate controls into the construction and land use regulations. Therefore, it could reverse the long-term trend between second-home and nature tourism, thus mitigating the environmental impacts on land use more effectively. Despite the contributions generated by this work, some limitations should be noted. The models lack information on service prices, which are crucial in tourism. This could not be serious if it is considered that many service prices in tourism increase when manufacturing prices also increase. Another limitation is that the MPCI represents the only monthly series available for Italy to control prices while establishing a long-term relationship between SHTE and NATE for inbound tourism.

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ANNEX 3

Outlier	Coefficient	p-values
Level break 2021(7)	0.52974	0.00000
Level break 2021(8)	0.3411	0.00000
Level break 2021(3)	-0.25199	0.00001
Level break 2020(8)	0.22449	0.00115
Level break 2020(6)	0.76435	0.00000
Level break 2021(6)	0.70686	0.00000
Level break 2022(6)	0.22858	0.00017
Level break 2022(2)	0.22129	0.00012
Level break 2020(3)	-1.79064	0.00000
Level break 2020(4)	-0.49384	0.00000
Level break 2020(7)	0.71076	0.00000
Level break 2020(10)	-0.57947	0.00000
Level break 2020(11)	-0.51211	0.00000

Table 1: Coefficients and statistics of the outliers incorporated in the BSM of total tourists' expenditure at final state 12/2022

Outlier	Coefficient	p-values
Level break 2020(7)	1.10327	0.00000
Level break 2020(3)	-1.16193	0.00000
Level break 2020(6)	0.41104	0.00127
Level break 2020(10)	-0.92519	0.00000
Level break 2021(8)	0.40769	0.00097
Level break 2021(7)	0.59123	0.00004
Level break 2021(6)	0.28392	0.02406
Level break 2020(4)	-0.55373	0.00001

Table 2: Coefficients and statistics of the outliers incorporated in the BSM of second-home tourists' expenditure at final state 12/2022

Outlier	Coefficient	p-values
Outlier 2005(3)	0.71776	0.00000
Outlier 2005(1)	0.77114	0.00000
Outlier 2004(2)	0.68049	0.00000
Outlier 2013(3)	-0.51452	0.00015
Outlier 2005(2)	0.60144	0.00002
Outlier 2006(1)	0.45268	0.00109
Level break 2007(12)	-0.24623	0.00059

Table 3 b: Coefficients and statistics of the outliers incorporated in the BSM of natural amenities tourists' expenditure at final state 12/2019

Outlier	Coefficient	p-values
Outlier 1998(12)	-0.15245	0.00145
Outlier 2004(2)	0.20690	0.00001
Level break 2002(11)	-0.12206	0.00001
Level break 2001(10)	-0.25448	0.00000
Level break 2002(4)	0.17947	0.00000

Level break 1999(11)	0.10024	0.00020
Level break 1997(5)	-0.10672	0.00102
Level break 2008(10)	-0.11292	0.00002

Table 4: Coefficients and statistics of the outliers incorporated in the BSM of total tourists' expenditure at final state 12/2019

Outlier	Coefficient	p-values
Outlier 1998(11)	0.36018	0.00010
Outlier 2005(1)	0.32815	0.00023
Level break 1997(4)	-0.48738	0.00000
Level break 1999(10)	0.24702	0.00065
Level break 2002(4)	0.25411	0.00041
Level break 1997(2)	0.45418	0.00013

Table 5: Coefficients and statistics of the outliers incorporated in the BSM of second-home tourists' expenditure at final state 12/2019

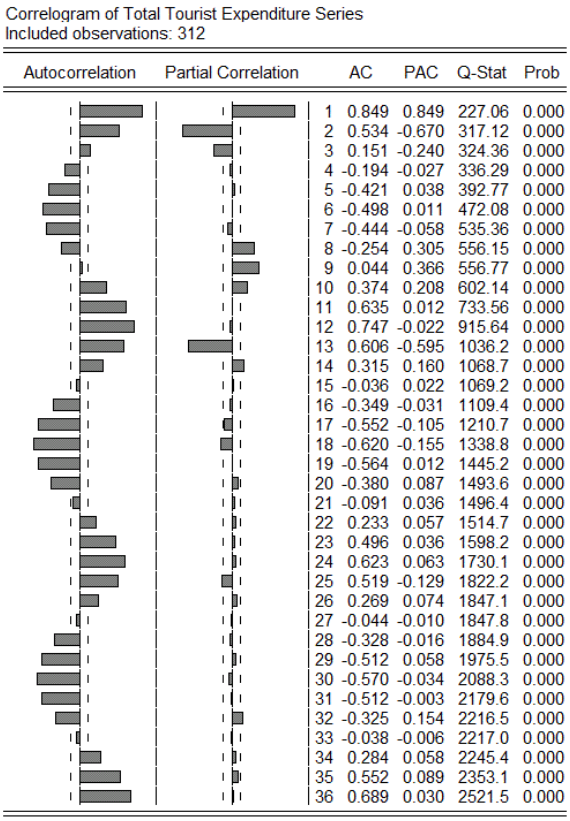
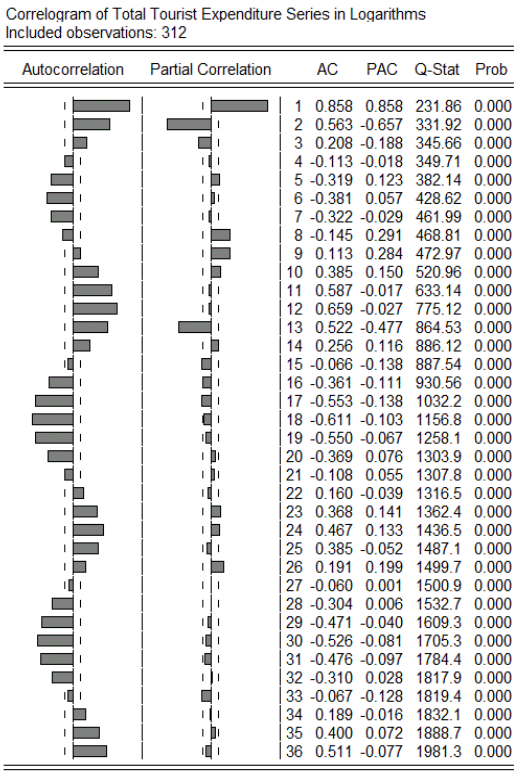
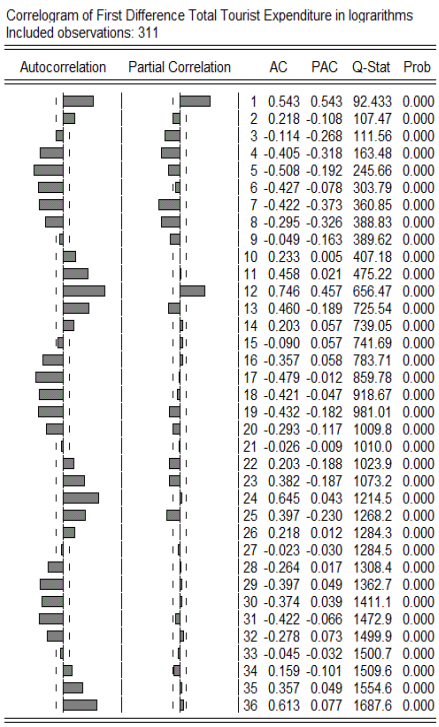


Figure 2: Correlogram of Monthly series of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of Total Tourist Expenditure Series in Logarithms
Included observations: 312

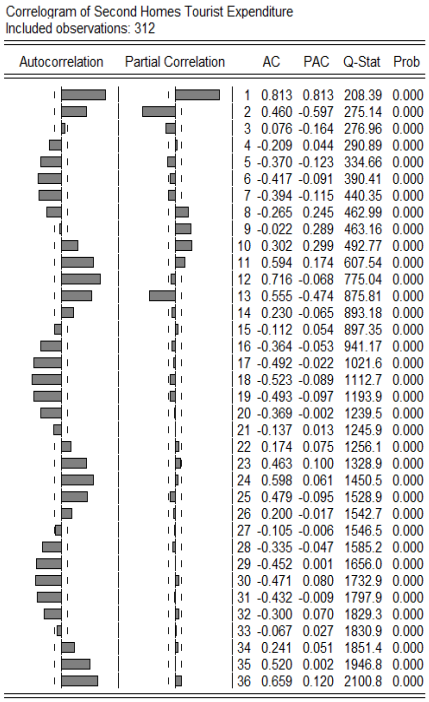
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.858	0.858	231.86	0.000
		2	0.563	-0.657	331.92	0.000
		3	0.208	-0.188	345.66	0.000
		4	-0.113	-0.018	349.71	0.000
		5	-0.319	0.123	382.14	0.000
		6	-0.381	0.057	428.62	0.000
		7	-0.322	-0.029	461.99	0.000
		8	-0.145	0.291	468.81	0.000
		9	0.113	0.284	472.97	0.000
		10	0.385	0.150	520.96	0.000
		11	0.587	-0.017	633.14	0.000
		12	0.659	-0.027	775.12	0.000
		13	0.522	-0.477	864.53	0.000
		14	0.256	0.116	886.12	0.000
		15	-0.066	-0.138	887.54	0.000
		16	-0.361	-0.111	930.56	0.000
		17	-0.553	-0.138	1032.2	0.000
		18	-0.611	-0.103	1156.8	0.000
		19	-0.550	-0.067	1258.1	0.000
		20	-0.369	0.076	1303.9	0.000
		21	-0.108	0.055	1307.8	0.000
		22	0.160	-0.039	1316.5	0.000
		23	0.368	0.141	1362.4	0.000
		24	0.467	0.133	1436.5	0.000
		25	0.385	-0.052	1487.1	0.000
		26	0.191	0.199	1499.7	0.000
		27	-0.060	0.001	1500.9	0.000
		28	-0.304	0.006	1532.7	0.000
		29	-0.471	-0.040	1609.3	0.000
		30	-0.526	-0.081	1705.3	0.000
		31	-0.476	-0.097	1784.4	0.000
		32	-0.310	0.028	1817.9	0.000
		33	-0.067	-0.128	1819.4	0.000
		34	0.189	-0.016	1832.1	0.000
		35	0.400	0.072	1888.7	0.000
		36	0.511	-0.077	1981.3	0.000

Figure 4: Correlogram of Monthly series in logarithms of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of First Difference Total Tourist Expenditure in lograrithms
Included observations: 311

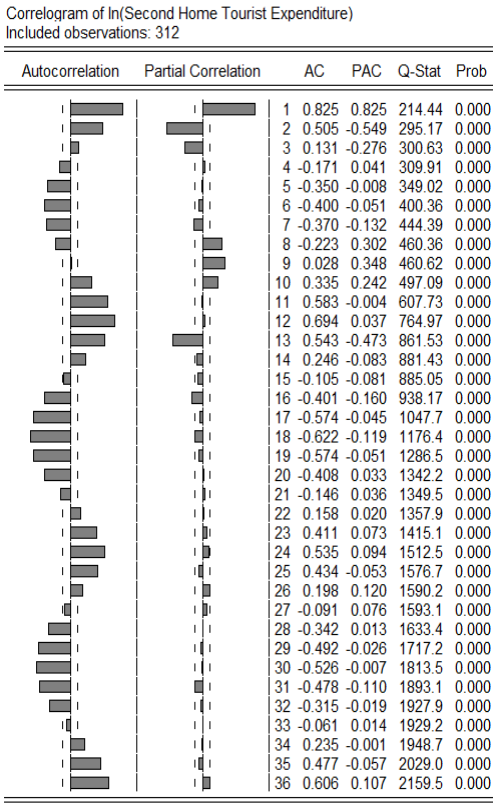
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.543	0.543	92.433	0.000
		2	0.218	-0.108	107.47	0.000
		3	-0.114	-0.268	111.56	0.000
		4	-0.405	-0.318	163.48	0.000
		5	-0.508	-0.192	245.66	0.000
		6	-0.427	-0.078	303.79	0.000
		7	-0.422	-0.373	360.85	0.000
		8	-0.295	-0.326	388.83	0.000
		9	-0.049	-0.163	389.62	0.000
		10	0.233	0.005	407.18	0.000
		11	0.458	0.021	475.22	0.000
		12	0.746	0.457	656.47	0.000
		13	0.460	-0.189	725.54	0.000
		14	0.203	0.057	739.05	0.000
		15	-0.090	0.057	741.69	0.000
		16	-0.357	0.058	783.71	0.000
		17	-0.479	-0.012	859.78	0.000
		18	-0.421	-0.047	918.67	0.000
		19	-0.432	-0.182	981.01	0.000
		20	-0.293	-0.117	1009.8	0.000
		21	-0.026	-0.009	1010.0	0.000
		22	0.203	-0.188	1023.9	0.000
		23	0.382	-0.187	1073.2	0.000
		24	0.645	0.043	1214.5	0.000
		25	0.397	-0.230	1268.2	0.000
		26	0.218	0.012	1284.3	0.000
		27	-0.023	-0.030	1284.5	0.000
		28	-0.264	0.017	1308.4	0.000
		29	-0.397	0.049	1362.7	0.000
		30	-0.374	0.039	1411.1	0.000
		31	-0.422	-0.066	1472.9	0.000
		32	-0.278	0.073	1499.9	0.000
		33	-0.045	-0.032	1500.7	0.000
		34	0.159	-0.101	1509.6	0.000
		35	0.357	0.049	1554.6	0.000
		36	0.613	0.077	1687.6	0.000

Figure 6: Correlogram of first difference monthly series in logarithms of total expenditure by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of Second Homes Tourist Expenditure
Included observations: 312

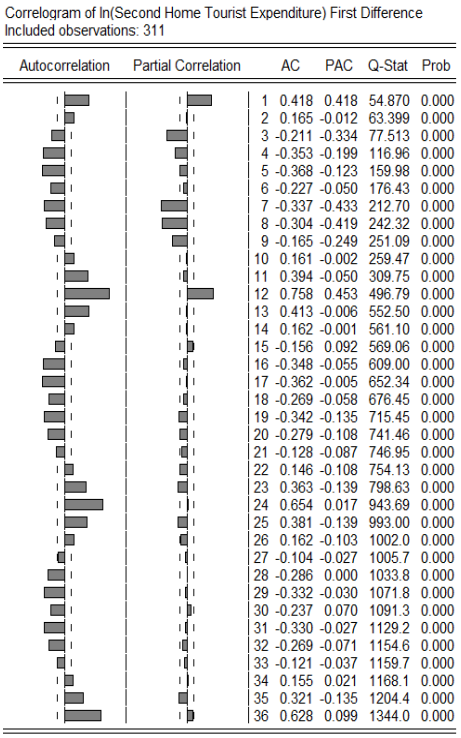
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.813	0.813	208.39	0.000
		2	0.460	-0.597	275.14	0.000
		3	0.076	-0.164	276.96	0.000
		4	-0.209	0.044	290.89	0.000
		5	-0.370	-0.123	334.66	0.000
		6	-0.417	-0.091	390.41	0.000
		7	-0.394	-0.115	440.35	0.000
		8	-0.265	0.245	462.99	0.000
		9	-0.022	0.289	463.16	0.000
		10	0.302	0.299	492.77	0.000
		11	0.594	0.174	607.54	0.000
		12	0.716	-0.068	775.04	0.000
		13	0.555	-0.474	875.81	0.000
		14	0.230	-0.065	893.18	0.000
		15	-0.112	0.054	897.35	0.000
		16	-0.364	-0.053	941.17	0.000
		17	-0.492	-0.022	1021.6	0.000
		18	-0.523	-0.089	1112.7	0.000
		19	-0.493	-0.097	1193.9	0.000
		20	-0.369	-0.002	1239.5	0.000
		21	-0.137	0.013	1245.9	0.000
		22	0.174	0.075	1256.1	0.000
		23	0.463	0.100	1328.9	0.000
		24	0.598	0.061	1450.5	0.000
		25	0.479	-0.095	1528.9	0.000
		26	0.200	-0.017	1542.7	0.000
		27	-0.105	-0.006	1546.5	0.000
		28	-0.335	-0.047	1585.2	0.000
		29	-0.452	0.001	1656.0	0.000
		30	-0.471	0.080	1732.9	0.000
		31	-0.432	-0.009	1797.9	0.000
		32	-0.300	0.070	1829.3	0.000
		33	-0.067	0.027	1830.9	0.000
		34	0.241	0.051	1851.4	0.000
		35	0.520	0.002	1946.8	0.000
		36	0.659	0.120	2100.8	0.000

Figure 10: Correlogram of monthly series of *second-home expenditure* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of ln(Second Home Tourist Expenditure)
Included observations: 312

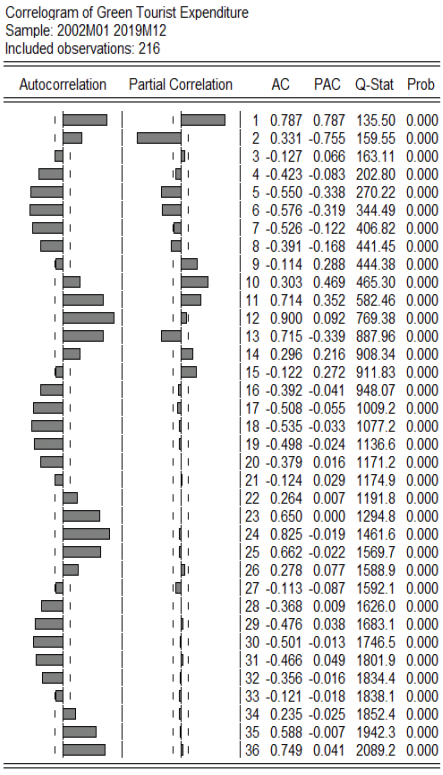
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.825	0.825	214.44	0.000
		2	0.505	-0.549	295.17	0.000
		3	0.131	-0.276	300.63	0.000
		4	-0.171	0.041	309.91	0.000
		5	-0.350	-0.008	349.02	0.000
		6	-0.400	-0.051	400.36	0.000
		7	-0.370	-0.132	444.39	0.000
		8	-0.223	0.302	460.36	0.000
		9	0.028	0.348	460.62	0.000
		10	0.335	0.242	497.09	0.000
		11	0.583	-0.004	607.73	0.000
		12	0.694	0.037	764.97	0.000
		13	0.543	-0.473	861.53	0.000
		14	0.246	-0.083	881.43	0.000
		15	-0.105	-0.081	885.05	0.000
		16	-0.401	-0.160	938.17	0.000
		17	-0.574	-0.045	1047.7	0.000
		18	-0.622	-0.119	1176.4	0.000
		19	-0.574	-0.051	1286.5	0.000
		20	-0.408	0.033	1342.2	0.000
		21	-0.146	0.036	1349.5	0.000
		22	0.158	0.020	1357.9	0.000
		23	0.411	0.073	1415.1	0.000
		24	0.535	0.094	1512.5	0.000
		25	0.434	-0.053	1576.7	0.000
		26	0.198	0.120	1590.2	0.000
		27	-0.091	0.076	1593.1	0.000
		28	-0.342	0.013	1633.4	0.000
		29	-0.492	-0.026	1717.2	0.000
		30	-0.526	-0.007	1813.5	0.000
		31	-0.478	-0.110	1893.1	0.000
		32	-0.315	-0.019	1927.9	0.000
		33	-0.061	0.014	1929.2	0.000
		34	0.235	-0.001	1948.7	0.000
		35	0.477	-0.057	2029.0	0.000
		36	0.606	0.107	2159.5	0.000

Figure 12: Correlogram of monthly series of *second-home expenditure in logarithms* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of ln(Second Home Tourist Expenditure) First Difference
Included observations: 311

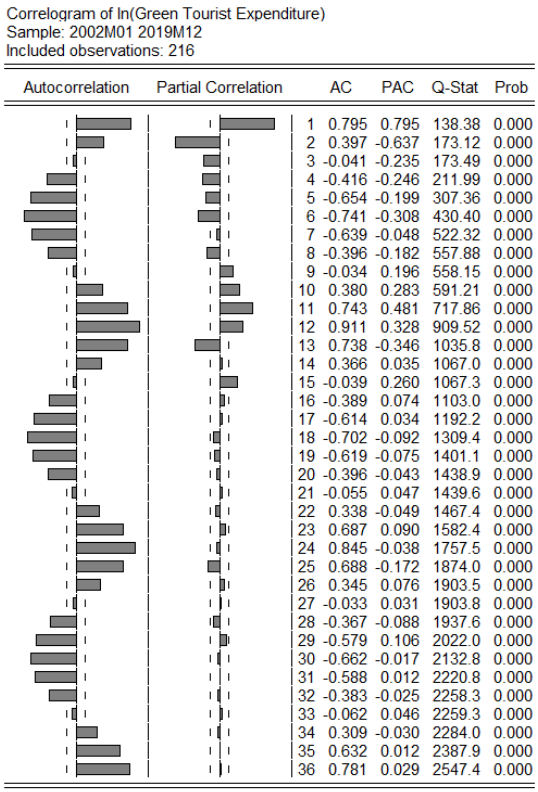
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.418	0.418	54.870	0.000
		2	0.165	-0.012	63.399	0.000
		3	-0.211	-0.334	77.513	0.000
		4	-0.353	-0.199	116.96	0.000
		5	-0.368	-0.123	159.98	0.000
		6	-0.227	-0.050	176.43	0.000
		7	-0.337	-0.433	212.70	0.000
		8	-0.304	-0.419	242.32	0.000
		9	-0.165	-0.249	251.09	0.000
		10	0.161	-0.002	259.47	0.000
		11	0.394	-0.050	309.75	0.000
		12	0.758	0.453	496.79	0.000
		13	0.413	-0.006	552.50	0.000
		14	0.162	-0.001	561.10	0.000
		15	-0.156	0.092	569.06	0.000
		16	-0.348	-0.055	609.00	0.000
		17	-0.362	-0.005	652.34	0.000
		18	-0.269	-0.058	676.45	0.000
		19	-0.342	-0.135	715.45	0.000
		20	-0.279	-0.108	741.46	0.000
		21	-0.128	-0.087	746.95	0.000
		22	0.146	-0.108	754.13	0.000
		23	0.363	-0.139	798.63	0.000
		24	0.654	0.017	943.69	0.000
		25	0.381	-0.139	993.00	0.000
		26	0.162	-0.103	1002.0	0.000
		27	-0.104	-0.027	1005.7	0.000
		28	-0.286	0.000	1033.8	0.000
		29	-0.332	-0.030	1071.8	0.000
		30	-0.237	0.070	1091.3	0.000
		31	-0.330	-0.027	1129.2	0.000
		32	-0.269	-0.071	1154.6	0.000
		33	-0.121	-0.037	1159.7	0.000
		34	0.155	0.021	1168.1	0.000
		35	0.321	-0.135	1204.4	0.000
		36	0.628	0.099	1344.0	0.000

Figure 14: Correlogram of monthly series of *second-home expenditure in logarithms first difference* by foreign tourists in Italy from January 1997 to December 2022. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of Green Tourist Expenditure
Sample: 2002M01 2019M12
Included observations: 216

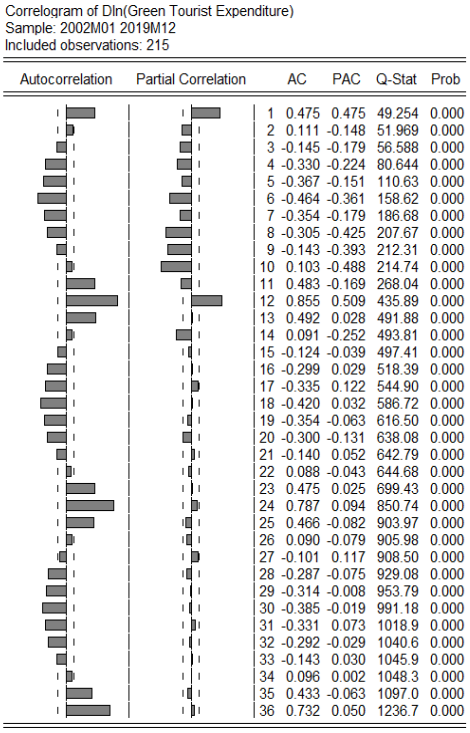
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.787	0.787	135.50	0.000
		2	0.331	-0.755	159.55	0.000
		3	-0.127	0.066	163.11	0.000
		4	-0.423	-0.083	202.80	0.000
		5	-0.550	-0.338	270.22	0.000
		6	-0.576	-0.319	344.49	0.000
		7	-0.526	-0.122	406.82	0.000
		8	-0.391	-0.168	441.45	0.000
		9	-0.114	0.288	444.38	0.000
		10	0.303	0.469	465.30	0.000
		11	0.714	0.352	582.46	0.000
		12	0.900	0.092	769.38	0.000
		13	0.715	-0.339	887.96	0.000
		14	0.296	0.216	908.34	0.000
		15	-0.122	0.272	911.83	0.000
		16	-0.392	-0.041	948.07	0.000
		17	-0.508	-0.055	1009.2	0.000
		18	-0.535	-0.033	1077.2	0.000
		19	-0.498	-0.024	1136.6	0.000
		20	-0.379	0.016	1171.2	0.000
		21	-0.124	0.029	1174.9	0.000
		22	0.264	0.007	1191.8	0.000
		23	0.650	0.000	1294.8	0.000
		24	0.825	-0.019	1461.6	0.000
		25	0.662	-0.022	1569.7	0.000
		26	0.278	0.077	1588.9	0.000
		27	-0.113	-0.087	1592.1	0.000
		28	-0.368	0.009	1626.0	0.000
		29	-0.476	0.038	1683.1	0.000
		30	-0.501	-0.013	1746.5	0.000
		31	-0.466	0.049	1801.9	0.000
		32	-0.356	-0.016	1834.4	0.000
		33	-0.121	-0.018	1838.1	0.000
		34	0.235	-0.025	1852.4	0.000
		35	0.588	-0.007	1942.3	0.000
		36	0.749	0.041	2089.2	0.000

Figure 18: Correlogram of monthly series of *natural amenities tourist expenditure* by foreign tourists in Italy from January 2002 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of ln(Green Tourist Expenditure)
Sample: 2002M01 2019M12
Included observations: 216

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.795	0.795	138.38	0.000
		2	0.397	-0.637	173.12	0.000
		3	-0.041	-0.235	173.49	0.000
		4	-0.416	-0.246	211.99	0.000
		5	-0.654	-0.199	307.36	0.000
		6	-0.741	-0.308	430.40	0.000
		7	-0.639	-0.048	522.32	0.000
		8	-0.396	-0.182	557.88	0.000
		9	-0.034	0.196	558.15	0.000
		10	0.380	0.283	591.21	0.000
		11	0.743	0.481	717.86	0.000
		12	0.911	0.328	909.52	0.000
		13	0.738	-0.346	1035.8	0.000
		14	0.366	0.035	1067.0	0.000
		15	-0.039	0.260	1067.3	0.000
		16	-0.389	0.074	1103.0	0.000
		17	-0.614	0.034	1192.2	0.000
		18	-0.702	-0.092	1309.4	0.000
		19	-0.619	-0.075	1401.1	0.000
		20	-0.396	-0.043	1438.9	0.000
		21	-0.055	0.047	1439.6	0.000
		22	0.338	-0.049	1467.4	0.000
		23	0.687	0.090	1582.4	0.000
		24	0.845	-0.038	1757.5	0.000
		25	0.688	-0.172	1874.0	0.000
		26	0.345	0.076	1903.5	0.000
		27	-0.033	0.031	1903.8	0.000
		28	-0.367	-0.088	1937.6	0.000
		29	-0.579	0.106	2022.0	0.000
		30	-0.662	-0.017	2132.8	0.000
		31	-0.588	0.012	2220.8	0.000
		32	-0.383	-0.025	2258.3	0.000
		33	-0.062	0.046	2259.3	0.000
		34	0.309	-0.030	2284.0	0.000
		35	0.632	0.012	2387.9	0.000
		36	0.781	0.029	2547.4	0.000

Figure 20: Correlogram of monthly series of *natural amenities tourist expenditure in logarithms* by foreign tourists in Italy from January 2002 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.


Correlogram of Dln(Green Tourist Expenditure)
Sample: 2002M01 2019M12
Included observations: 215

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.475	0.475	49.254	0.000
		2	0.111	-0.148	51.969	0.000
		3	-0.145	-0.179	56.588	0.000
		4	-0.330	-0.224	80.644	0.000
		5	-0.367	-0.151	110.63	0.000
		6	-0.464	-0.361	158.62	0.000
		7	-0.354	-0.179	186.68	0.000
		8	-0.305	-0.425	207.67	0.000
		9	-0.143	-0.393	212.31	0.000
		10	0.103	-0.488	214.74	0.000
		11	0.483	-0.169	268.04	0.000
		12	0.855	0.509	435.89	0.000
		13	0.492	0.028	491.88	0.000
		14	0.091	-0.252	493.81	0.000
		15	-0.124	-0.039	497.41	0.000
		16	-0.299	0.029	518.39	0.000
		17	-0.335	0.122	544.90	0.000
		18	-0.420	0.032	586.72	0.000
		19	-0.354	-0.063	616.50	0.000
		20	-0.300	-0.131	638.08	0.000
		21	-0.140	0.052	642.79	0.000
		22	0.088	-0.043	644.68	0.000
		23	0.475	0.025	699.43	0.000
		24	0.787	0.094	850.74	0.000
		25	0.466	-0.082	903.97	0.000
		26	0.090	-0.079	905.98	0.000
		27	-0.101	0.117	908.50	0.000
		28	-0.287	-0.075	929.08	0.000
		29	-0.314	-0.008	953.79	0.000
		30	-0.385	-0.019	991.18	0.000
		31	-0.331	0.073	1018.9	0.000
		32	-0.292	-0.029	1040.6	0.000
		33	-0.143	0.030	1045.9	0.000
		34	0.096	0.002	1048.3	0.000
		35	0.433	-0.063	1097.0	0.000
		36	0.732	0.050	1236.7	0.000

Figure 22: Correlogram of monthly series of *natural amenities tourist expenditure in logarithms first difference* by foreign tourists in Italy from January 2002 to December 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

Dependent Variable: Dlog(SHTE)
Method: Least Squares
Observations: 204 after adjustments

Variable	Coefficient	Standard Error	t-Statistic	Prob.
C	-0.0014	0.00719	-0.19533	0.84540
Dlog(NATE)	0.14702	0.03583	4.10301	0.00010
Dlog(NATE$_{-3}$)	-0.10059	0.03589	-2.80223	0.00010
Dlog(NATE$_{-11}$)	0.12521	0.03466	3.61236	0.00040
Dlog(SHTE$_{-1}$)	-0.29907	0.06757	-4.42596	0.00000
Dlog(SHTE$_{-2}$)	-0.21028	0.06928	-3.03498	0.00280
Dlog(SHTE$_{-3}$)	-0.19203	0.07006	-2.74099	0.00670
D(SD$_1$)	-0.45035	0.08796	-2.74099	0.00000
D(SD$_2$)	-0.67817	0.12941	0.12941	0.00000
D(SD$_3$)	-0.61245	0.09037	0.09037	0.00000
D(SD$_4$)	-0.46676	0.06629	0.06629	0.00000
D(SD$_5$)	-0.33246	0.06467	0.06494	0.00000
D(SD$_6$)	-0.02880	0.07326	0.07326	0.69460
D(SD$_7$)	0.41044	0.08211	0.08211	0.00000
D(SD$_8$)	0.70996	0.09743	0009743	0.00000
D(SD$_9$)	0.78549	0.10520	0.10520	0.00000
D(SD$_{10}$)	0.72191	0.10950	0.10950	0.00000
D(SD$_{11}$)	0.29730	0.09309	0.09309	0.00170
D(CD$_1$)	-0.01236	0.01197	0.01197	0.30330
D(CD$_2$)	0.00032	0.01269	0001269	0.97930
D(CD$_3$)	-0.00102	0.01206	0.01206	0.93240
D(CD$_4$)	0.02677	0.01279	0.01279	0.03780
D(CD$_5$)	-0.01729	0.01222	-1.41727	0.15810
D(CD$_6$)	0.01035	0.01220	0.831816	0.40660
D(CD$_7$)	0.02053	0.04333	0.47379	0.63620
R-squared	0.89468	Mean dependent variable		-0.00082
Adjusted R-squared	0.88056	S.D. dependent variable		0.29725
S.E. of regression	0.10272	Akaike info criterion		-1.59909
Sum squared resid	1.88901	Schwarz criterion		-1.19245
Log-likelihood	188.107	Hannan-Quinn criterion		-1.43460
F-statistic	63.3623	Durbin-Watson statistic		2.09808
Prob(F-statistic)	0.00000			

Table 12: ARDL for SHTE, Jan 2002-Dec 2019. Source: author's elaboration by Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

VECTOR ERROR CORRECTION MATRIX FOR THE ENDOGENOUS AND EXOGENOUS VARIABLES AND ITS' LAGS

Variable	SHTE	T-Stat.	NATE	T-Stat.	ITALY	T-Stat.
SHTE (-1)	-0.288	-3.073	0.055	0.372	-0.012*	-2.115
SHTE (-2)	-0.18*	-1.977	0.131	0.886	-0.004	-0.654
SHTE (-3)	-0.15*	-1.679	-0.082	-0.573	-0.004	-0.817
SHTE (-4)	-0.087	-1.000	0.014	0.099	-0.003	-0.540
SHTE (-5)	-0.058	-0.740	-0.050	-0.400	-0.002	-0.519
NATE (-1)	-0.099	-1.541	-0.211*	-2.068	0.008*	2.160
NATE (-2)	-0.083	-1.360	-0.195*	-2.014	0.008*	2.018

NATE (-3)	-0.17*	-2.866	-0117	-1.251	0.004	1.249
NATE (-4)	-0.072	-1.374	-0.114	-1.370	0.002	0.881
NATE (-5)	-0.053	-1.184	-0.014	-0.209	0.002	1.051
ITALIA (-1)	0.167	0.140	0.534	0.283	0.259*	3.462
ITALIA (-2)	1.072	0.908	1.995	0.642	-0.097	-1.309
ITALIA (-3)	1.585	1.288	2.822	1.449	0.044	0.575
ITALIA (-4)	-1.250	-1.039	-1.402	-0.736	-0.013	-0.180
ITALIA (-5)	1.352	1.164	2.833	1.541	-0.023	-0.323
C	0.000	0.124	0.006	0.526	-0.000	-0.360
D(CM1)	-0.73*	-6.043	-1.197*	-6.268	0.008	1.133
D(CM2)	-0.88*	-5.220	-1.385*	-5.166	0.012	1.159
D(CM3)	-1.02*	-6.291	-1.250*	-4.846	0.002	0.218
D(CM4)	-0.72*	-4.357	-0.848*	-3.221	-0.009	-0.094
D(CM5)	-0.37*	-2.767	-0.104	-0.481	-0.007	-0.816
D(CM6)	0.22*	2.197	0.727*	4.674	-0.007	-1.242
D(CM7)	0.773*	9.176	1.480*	11.098	-0.009*	-1.744
D(CM8)	1.132*	10.047	1.861*	10.437	-0.006	-0.956
D(CM9)	1.169*	7.411	1.653*	6.622	-0.002	-0.237
D(CM10)	0.773*	4.226	0.847*	2.927	-0.003	-0.030
D(CM11)	0.200	1.163	-0.687*	-2.523	0.004	0.366
D(DLU)	-0.006	-0.473	-0.005	-0.257	0.000	1.073
D(DMA)	-0.009	-0.718	-0.047*	-2.208	0.000	0.141
D(DMI)	0.008	0.664	0.043*	2.107	0.000	0.489
D(DJU)	0.030	2.278	0.037*	1.769	-0.001	-1.197
D(DVI)	-0.02*	-1.675	-0.035*	-1.662	-0.000	-0.449
D(DSA)	0.009	0.690	-0.009	-0.448	0.001*	2.187
D(MONTH)	0.075	1.480	0.017	0.217	0.001	0.599
GERMANY	-1.012	-1.248	-0.909	-0.708	-0.053	-1.029
CANADA	-1.23*	-3.889	-1.151*	-2.300	-0.030	-1.529
FRANCE	1.314	1.270	1.714	1.047	0.033	0.508
UNIT KING	0.282	1.261	0.693*	1.927	-0.006	-0.457
D(AO2004.2)	0.008	0.089	0.687*	4.578	0.004	0.715
D(AO2005.1)	0.247*	2.312	0.619*	3.657	-0.006	-0.908
D(AO2005.2)	0.091	0.736	0.498*	2.530	-0.004	-0.575
D(AO2006.1)	-0.083	-0.955	0.451*	3.250	0.005	1.015
D(AO2013.3)	-0.029	-0.352	-0.419*	-3.219	-0.007	-1.369
D(FE>=2007.12)	-0.004	-0.033	-0.469*	-2.488	-0.011	-1.502

Table 15: VECM of the Cointegration Matrix. Differentiated and in logarithms: SHTE, NATE, GERMANY, FRANCE, CANADA, AND UNITED KINGDOM. (*) variables are significative at the 5% level.

Log Likelihood is 577.622 (-2 LogL = -1155.24).
Prediction error variance is 0.0153355

Summary Statistics

	SHTE
T	312.00
P	3.0000
std.error	0.12384
Normality	3.2450
H(97)	0.96249
DW	1.7821
r(1)	0.10807
q	24.000

r(q)	-0.020988
Q(q,q-p)	35.907
Rs^2	0.49003

Table 16: Basic Structural Model Statistics for Second-home tourists' expenditure (SHTE), COVID-19 included.

Log Likelihood is 741.757 (-2 LogL = -1483.51).
Prediction error variance is 0.00444124

Summary Statistics

	TTE
T	312.00
P	3.0000
std.error	0.066643
Normality	19.257
H(95)	0.69832
DW	1.8270
r(1)	0.072964
q	24.000
r(q)	-0.086497
Q(q,q-p)	32.801
Rs^2	0.82098

Table 17: Basic Structural Model Statistics for Total tourists' expenditure (TTE), COVID-19 included)

Log Likelihood is 348.258 (-2 LogL = -696.516).
Prediction error variance is 0.0211449

Summary Statistics

	NATE
T	216.00
P	3.0000
std.error	0.14541
Normality	0.37404
H(65)	0.67197
DW	1.5512
r(1)	0.21434
q	24.000
r(q)	-0.049200
Q(q,q-p)	31.155
Rs^2	0.59321

Table 18: Output of the Basic Structural Model Statistics for Natural Amenities tourists' expenditure (NATE).

CHAPTER IV

ITALIAN TOURISTS' EXPENDITURE ABROAD: A MACROECONOMIC PERSPECTIVE

1. Introduction

Although tourism can foster economic growth, excessive concentration may result in adverse effects, impacting the quality of life for local communities (Biagi et al., 2019; Meleddu, 2014). Literature categorised tourism externalities into three fundamental economic, environmental, and socio-cultural components. Maintaining an equilibrium between the costs and benefits of such components (Meleddu, 2014). Developing second homes in areas with natural attractions can favour economic development while presenting challenges, highlighting the importance of sustainable planning. Conservation of the natural environment and balanced development are crucial for sustainable land management and economic progress in regions where second homes are built. There is a crucial need for a more nuanced understanding of the second home phenomenon and its interconnections with other research fields, such as the environment (Müller, 2020).

More research is needed to explore the relationship between second-home development, natural features, and their economic effects in the context of inbound and outbound tourism. This study addresses this gap in the literature by examining the long-term causal relationship between second homes and the expansion of tourism based on natural amenities of outbound tourism in Italy. Natural amenities tourists' expenditure on lakes, mountains, beaches and rural tourism. The second homes considered are rented and owned by tourists. Some studies have explored the relationship between tourism expenditure and different factors. In Italy, Bernini et al. (2017) and Di Giacinto and Migliardi (2014) found that location-specific attributes and the expansion of low-cost carriers can influence tourism participation and expenditure.

Bernini and Galli (2019) further highlighted the role of satisfaction in shaping the expenditure behaviour of Italian tourists abroad. Boto-García and Baños-Pino (2024) and Disegna and Osti (2016) delved into the differences in expenditure between tourists staying at market accommodations and second homes. Volo (2011) and Hilber and Schöni (2020) examined the social and economic impacts of second-home tourism, with the latter finding that constraining second-home investments can negatively affect local economies. Lastly, Massidda and Mattana (2013) identified bidirectional causality between GDP and international tourism arrivals in Italy. So far, the relationship between second homes and natural amenities in outbound tourists' expenditures in Italy has not been addressed. This thesis chapter contributes to a better understanding of this matter.

The literature has concentrated mainly on inbound tourism and its economic contribution. However, outbound tourism is crucial in determining a country's welfare (Bernini & Galli, 2019) and understanding the impact that Italian tourists, in this case, have on the environment of their preferred destinations. Outbound tourism was mainly addressed in studies of the impacts of Chinese tourists' growth (Tse, 2013; Jin & Wang, 2016; Keating & Kriz, 2008; Johnson et al., 2020; Qi, 2014). As Dai et al. (2017) highlighted, outbound tourism should be encouraged due to its positive impact on tourists' satisfaction, the development of the tourism sector, and the nation's wealth. Outbound tourism promotes a national tourism development strategy that enhances international exchanges (Dai et al., 2017). Furthermore, outbound tourism helps spread a country's culture and values abroad and fosters collaboration and integration among nations (Bernini & Galli, 2019). Also, outbound tourism expenditure research has shifted from economic to social concerns, focusing on sustainability by considering social, cultural, environmental, and political factors (Mehran & Olya, 2018).

Outbound tourism has significant environmental impacts, mainly through CO2 emissions (Okagbue & Ezeachikulo, 2020; Nguyen et al., 2022). While moderate tourism can help preserve the environment, mass tourism poses risks to ecosystems and natural resources (Cohen, 1978; Sunlu, 2003). The tourism industry affects the environment through transportation, development, and tourist activities (Davies & Cahill, 2000; Romeril, 1989). However, the industry can also contribute to environmental protection through awareness and conservation efforts (Sunlu, 2003). Socioeconomic factors influence outbound tourism demand, including urbanisation and ageing populations (Nguyen et al., 2022). Urbanisation is intrinsically linked with second-home expansion. As tourism grows, balancing economic benefits with environmental protection becomes crucial for sustainable development (Guo et al., 2007; Romeril, 1989).

Second- home development as part of the urbanisation and tourism development in coastal and rural areas has significant environmental impacts. These activities increase population density, land use changes, and ecosystem degradation (Lanfranchi et al., 2015; Da Silva, 2021). Rapid and uncontrolled tourism development exposes fragile coastal ecosystems to environmental risks, including coastal erosion, pollution, and loss of natural attractions (Zahedi, 2008). Studies from various countries demonstrate that urbanisation and tourism prioritise economic growth over environmental sustainability (Dandapath & Mondal, 2013). In Bangladesh, for example, rapid urbanisation in Cox's Bazar has led to significant land use changes and environmental concerns (Rasel & Parvez, 2021). Similarly, Acapulco's development process highlights the negative consequences of unplanned urban growth and tourism on the environment and quality of life (Ramírez Sáiz, 1987). To mitigate these impacts, sustainable tourism planning, environmental policies, and local community involvement are crucial for preserving coastal and rural ecosystems.

The primary focus of this thesis chapter is to study the cointegration between second-home tourists' expenditure of Italians abroad and natural amenities tourists expenditure of Italians abroad. In addition, the procedure studies the dynamics present in total

outbound tourism compared to second homes and natural amenities in Italian tourists' expenditures abroad. The analysis also compared the GDP of Italy with second-home and total tourist expenditure overseas. In addition, it investigates if a short-term correlation exists between second homes and natural amenities in Italian tourists' expenditures abroad. This research is addressed by creating two monthly time series from 1997 to 2023 for total and second homes for Italian tourists' expenditure in other countries. The procedure also consists of creating a monthly series of natural amenities for Italian tourists who were out of the country from 2002 to 2019. Additionally, it studied cointegration from 2002 to 2019 because the expenditure on natural amenities for tourists was not surveyed during the 2020 pandemic. Consequently, the research questions are determined as follows. Q1) What are the differences in the dynamics of total, second homes, natural amenities, Italian tourists' expenditures abroad, and Italy's GDP? Q2) Is there a short-term correlation between second homes and natural amenities in Italian tourists' expenditures abroad? Q3) Are second homes and natural amenities expenditures for Italian tourists cointegrated?

According to Bernini & Galli (2019), in Italy, the 2007-2008 and 2011-2013 crises have led to a decline in the number of households engaging in tourism and a reduction in the tourism expenditure of those households who did go on holiday. Specifically, tourism dynamics during the recessions are driven by two distinct factors: a decrease in the proportion of tourists and a reduction in the average tourism expenditure. As Bernini and Cerqua (2019) suggest, those who went on holiday could afford a more extended stay; this evidence may indicate a shift in travel patterns, with fewer trips being made but longer durations. Italy's general outbound tourism crisis patterns have changed after the COVID-19 pandemic. According to the Banca d'Italia data, an increasing amount of Italian tourist expenditure abroad is on accommodation in second homes (see Figure 1 of the Annex). This increase is principally observed after the COVID-19 pandemic, which increased 14% from 2019 to 2023. Also, there has been an 18% increase in natural amenities for Italian tourists' expenditure abroad from 2019 to 2023. Figure 2 of Annex 4 shows natural amenities outbound tourism expenditure has been on rice since 2014. It is also essential to consider those increases in total outbound tourism expenditure framework in Italy, 17%, from 2019 to 2023 (see Figure 3 of the Annex) (Banca d'Italia, 2023).

The results show that second homes, natural amenities, total Italian tourists' expenditure abroad, and Italy's GDP follow different trends throughout the period under analysis (see Figures 1 to 4 of the Annex). The different dynamics of outbound tourism variables of interest reinforce the importance of separately studying them. Cycles of approximately ten years are identified in second-home Italian tourists' expenditure overseas between 1997's first quarter and 2023's fourth quarter.

No cycles are found for total tourist expenditure in the same period. Regarding Italy's GDP, cycles of around five years are observed in the timespan. The analysis performed the cross-correlations of second-home Italian tourists' expenditure and Italy's GDP quarterly series cycles. This evaluation demonstrates no systematic relationship between the cyclical

components of Italy's GDP and second-home Italian tourists' expenditure abroad. An ADL model was conducted to study the short-term relationship between second-home tourism and nature tourism, using Italian tourists' expenditure abroad from 2022 to 2019 as proxies for these tourism typologies. The model shows a significant positive coefficient, indicating an elasticity of 0.11, suggesting a short-term relationship between the variables of interest, consistent with the literature. However, a minimal significant and negative coefficient (0.06) was estimated for the long-term relationship between the series. Nevertheless, the Johansen test confirmed a cointegration relationship between second-home and natural amenities in Italian tourists' expenditure abroad.

Spain, France, and Greece are the destinations where Italian second-home and natural amenities tourists spend the most, at 12%, 32 %, and 23% respectively (Banca d'Italia, 2023). Contrary to the literature, the long-term elasticity found is minimal and negative. Low coefficients' short- and long-term elasticity suggests a possible sub-declaration of Italian tourists owning or renting a second home abroad or increasing policy constraints in constructing second homes in the leading Italian destinations. The literature reinforces Spain's lack of second-home restriction construction policies, which cannot explain the low elasticity (Carrascal-Incera & Gutiérrez-Posada, 2021; Hilber & Schöni, 2020). However, Hilber and Schöni (2020) establish that some countries, like France, have implemented stringent policies to curb second-home construction. Therefore, this fact partly explains the low elasticity between the variables of interest, with a negative sign in the long term. Consequently, economic policy implications are directed to equilibrate restrictions on second-home construction in Spain to control damage to natural amenities, which are one of the main inputs of tourism growth.

Despite the possible under-declaration, Italian tourists abroad do not seem to be a significant environmental threat when accounting for second-home tourism. Nevertheless, new studies should focus on data from the supply side, like the Airbnb database of Italian tourists overseas. This kind of study is also essential to make proper policy recommendations when analysing second-home tourism and its relationship with other factors, such as natural amenities tourism.

The following section of this thesis chapter describes the applied methodology. First, it discusses the data sources within this framework and provides some descriptive statistics. Next, it delves into the exploration and identification of the series by conducting the appropriate tests. The third part of the methodology describes the series' univariate analysis using the Basic Structural Model. The fourth subsection outlines the methodology for studying the cyclical co-movements between Italy's GDP and Second-Home Italian Tourists' expenditure. Subsection 5, describes the methodology for multivariate analysis applied to obtain both short-term correlation and long-term causality between the variables second-home and 'natural amenities tourists' expenditure.

The third section of this thesis chapter explains the results obtained and initiates a discussion about them. The first subsection analyses the results of univariate models. The

second subsection presents the results and discusses the cyclical co-movements between Italy's GDP and the expenditure of second-home Italian tourists abroad. The final subsection examines the results of multivariate analyses in both the short and long term, considering the expenditure of second homes and natural amenities of Italian tourists overseas. Lastly, the fourth and final section explains the conclusions drawn from the results, proposed implications for economic policy, and new lines for research.

2. Methodology Description

2.1. Data sources and descriptive statistics

Italian tourists' total expenditures on second homes (SHTEI) and natural amenities (NATEI) were extracted from the Banca d'Italia tourism data.[2] These series were derived from Indagine sul turismo internazionale dell'Italia, which focused on Italian tourists returning to Italy from January 1997 to December 2023. Specifically, the analysis of natural amenities' tourist expenditures covered January 2002 to December 2019, as data before 2002 and during the 2020 pandemic were unavailable. Multiple studies have utilised time series methodologies to examine the effects of tourism on the environment (Chien et al., 2023; Gedikli et al., 2022; Gao & Zhang, 2019; Liu et al., 2019, among others). However, the influence of second-home tourists on the environment, as investigated through time series methodology, has not been widely explored in the literature. Some related research examines the connection between property prices and pollution (Das et al., 2022), while others investigate the link between urban expansion and environmental degradation (Aslan et al., 2021).

To construct the expenditure series for second-home tourists, the procedure examined two types of accommodation: rented houses and owned houses. By doing so, the analysis obtaines the overall expenditure of second-home tourists, encompassing accommodation expenses and other monthly costs. It focuses on specific vacation categories for the natural amenities' tourists' expenditure series: lake, sea, mountain, and rural tourism. On the Banca d'Italia survey, tourists respond if they perform one, two or all kinds of natural tourism. Therefore, the creation of the series utilizes all these categories of expenditure. It is important to note that this classification of vacation types was not surveyed before January 2002, and during 2020, it was also excluded from the survey. The quarterly GDP of Italy used to compare cycles of the SHTEI quarterly series was obtained from the OECD.Stat database.

Regarding the descriptive statistics, Tables 1 and 2 show the percentages for each category of the variables of interest, NATEI and SHTEI, represented in the total. Table 1 reveals that natural amenities tourism is the holiday category in which Italian tourists spend the most

[2] Banca d'Italia, Indagine sul turismo internazionale dell'Italia, available at https://www.bancaditalia.it/statistiche/tematiche/rapporti-estero/turismo-internazionale/distribuzione-microdati/index.html?com.dotmarketing.htmlpage.language=1

overseas. Table 2 includes all types of tourism; therefore, the holiday is included in that total. As expected, hotels appear where Italian tourists spend the most overseas. However, the percentage of second-home accommodation, which includes owned or rented, is not neglectable. Considering that the under-declaration of second homeowners and renters used to be high, 14% of the expenditure abroad is not a low percentage.

Italian Tourists' Expenditure Abroad by Holiday Type in 2023, in millions of Euros

Holiday Type	2023	Percentage
Natural Amenities	6.798	51%
Cultural in Art Cities	5.817	43%
Other	739	6%
Total	**13.354**	**100%**

Table 1 The "Other" type includes eno-gastronomy and sports tourism. This table includes only holiday purposes, not business, shopping, or purposes other than holiday ones. Source: author's elaboration from Banca Italia Indagine sul turismo internazionale dell'Italia.

Italian Tourists' Expenditure Abroad by Accommodation in 2023, in millions of Euros

Accommodation	2023	Percentage
Hotel	19.031	62%
Family/Friends Home	4.921	16%
Second-Home	4248	14%
Other	2041	8%
Total	**30241**	**100%**

Table 2 The "Second-Home category includes rented and owned homes. The "Other" category includes tourist farms, communities, motor caravans, campers, hostels, tents, cruises and motorhomes. This classification includes holidays and other travel purposes like business, shopping, or other activities. Source: author's elaboration with Banca Italia Indagine sul turismo internazionale dell'Italia.

2.2. Exploration and Identification of the series

NATEI, Log (NATEI), SHTEI, Log (SHTEI), total tourist expenditure of Italian tourists' abroad (TTEI), Log (TTEI), GDP of Italy (GDP) and Log (GDP) series graphs and the correlograms of the two series show no stationarity neither in mean nor variance (Figures 1 to 4-Annex 4, 7 to 10-Anex 4, 13 to 16-Annex 4 and 19 to 22-Annex 4). Also, the variables show seasonality in all these graphs. The first difference graphs and their correlograms show stationarity in the mean (Figures 5, 6, 11, 12-Annex 4, 17, 18, 23 and 24- Anex 4). The Augmented Dickey-Fuller (ADF) tests for two unit roots of the logarithms of the series of interests[3] shows p-values of $0 < 0.05$, resulting in the rejection of the null hypothesis of one unit root of the first differences of the Logarithms of the variables (Tables 3, 5, 7, 9). This means that there exists evidence to support the idea that all the series in logarithms

[3] It is the ADF test of the first differences of the logarithms.

do not have two unit roots. Consequently, the next step is to run the ADF tests for one unit root of the logarithms of all variables.

The ADF tests for one unit root in the logarithms of all the series results in a non-rejection of the null (Tables 4, 6, 8, 10). So, with a 5% significance level, there is enough evidence to say these series have one unit root. This implies that the logarithms of all the variables are integrated into order one. Series integrated into order one are the ones the analyst must differentiate once to obtain one unit root in the characteristic polynomial. These kinds of variables are appropriate for developing cointegration analysis. Other tests like KPSS were not used because sometimes they did not yield conclusive results that did not correspond to reality (Cappuccio & Lubian, 2010). Since the series are about tourist expenditure and have seasonality, stacked line graphs prove that the mean differs each month. Therefore, there is no chance that the series are stationary because the mean is not constant over time which is a must for stationarity.

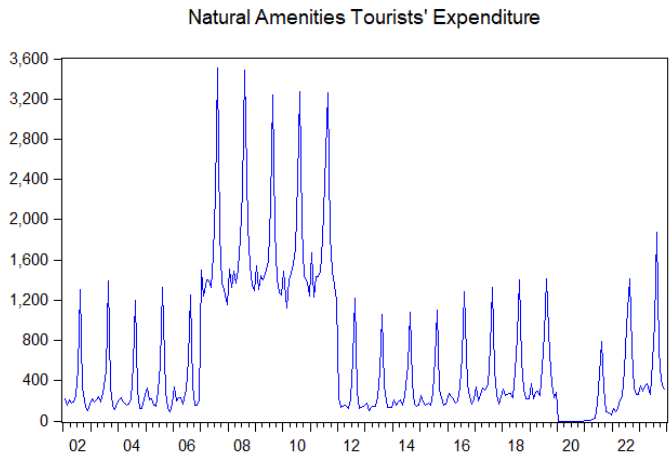


Figure 1: Natural Amenities Italian Tourists' Expenditure from January, 2002 to December, 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Banca d'Italia, Indagine sul turismo internazionale dell'Italia.

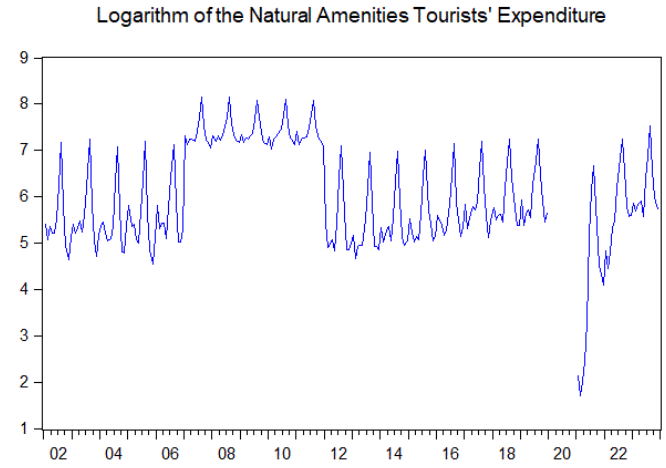


Figure 2: Logarithm of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

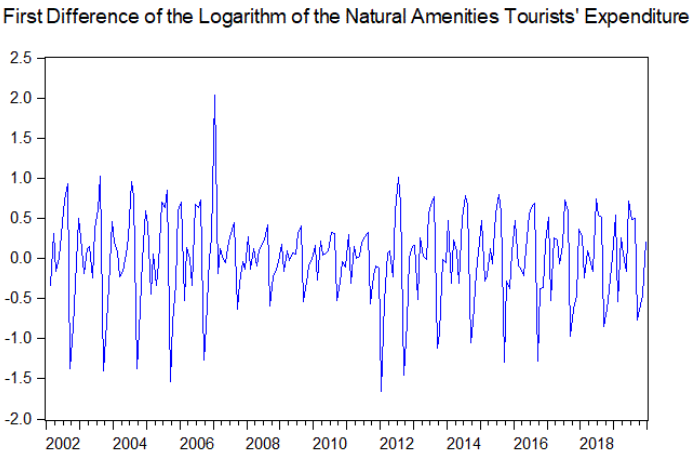


Figure 5: First Difference of the Logarithm of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2023. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

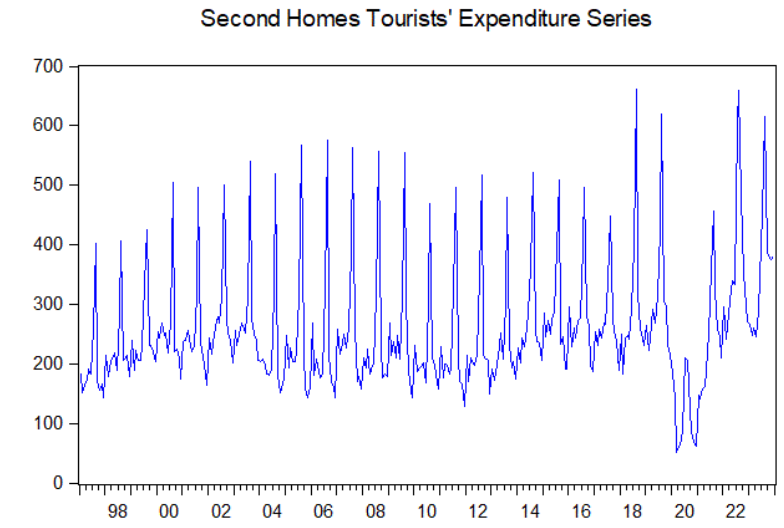


Figure 7: Second Homes Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

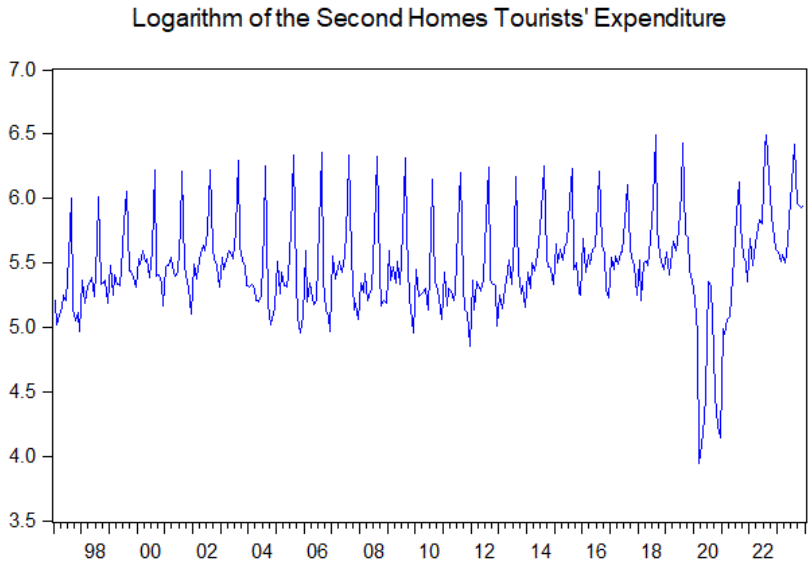


Figure 8: Logarithm of the Second Homes Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

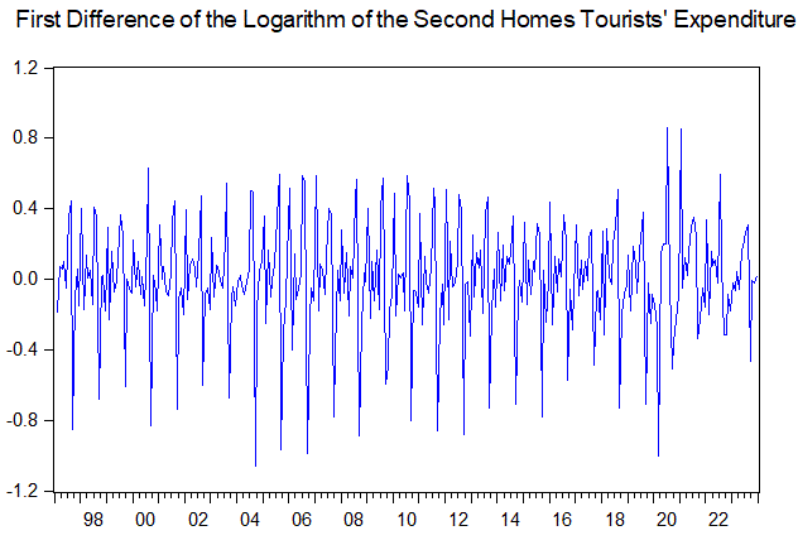


Figure 11: First Difference of the Logarithm of the Second Homes Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

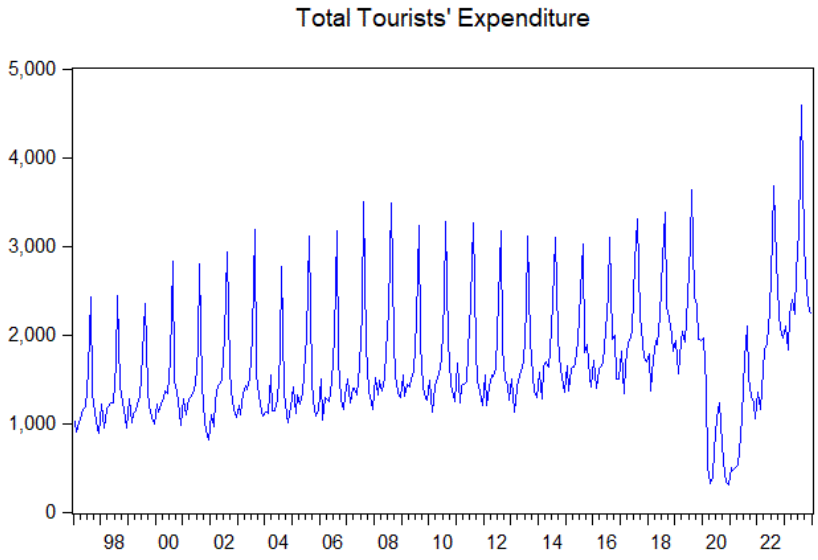


Figure 13: Total Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

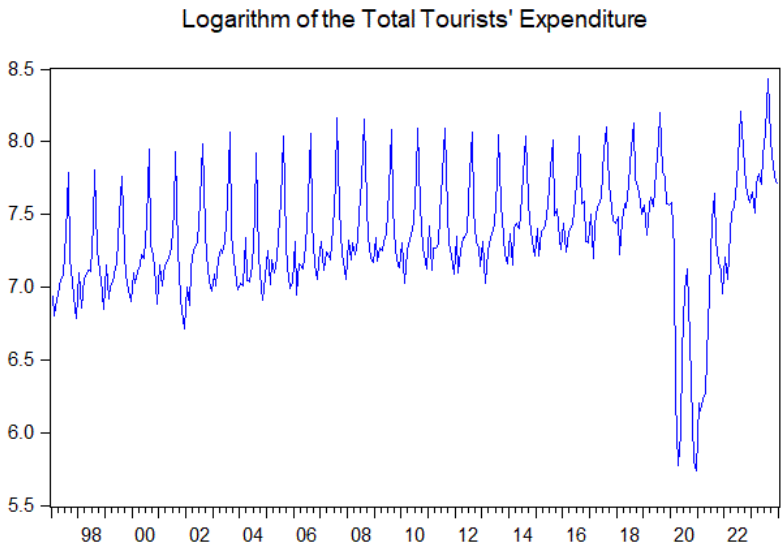


Figure 14: Logarithm of the Total Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

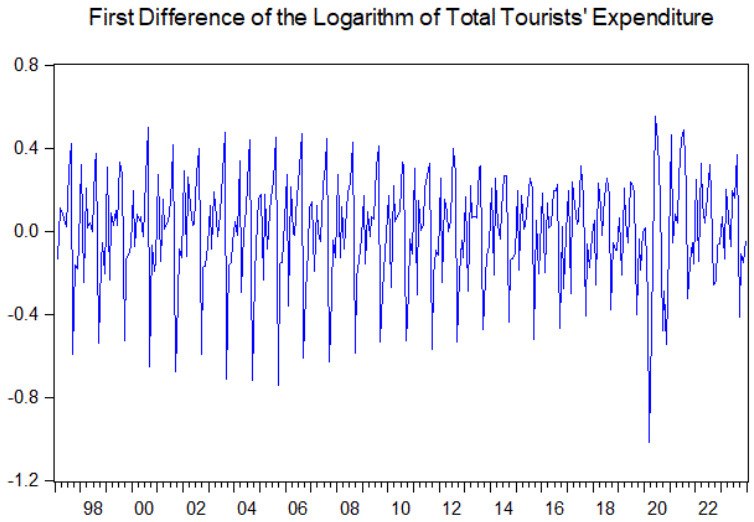


Figure 17: First Difference of the Logarithm of the Total Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.

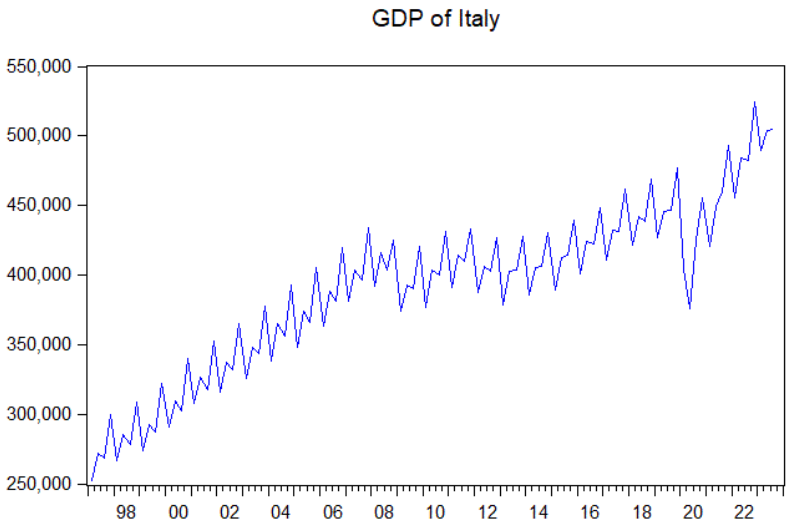


Figure 19: Gross Domestic Product of Italy from first quarter 1997 to third quarter 2023 in millions of Euros. Source: author's elaboration by OECD.Stat database.

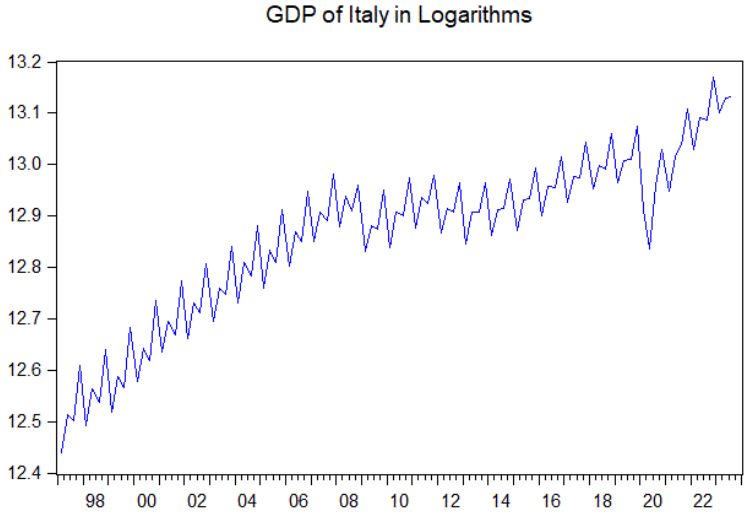


Figure 20: Gross Domestic Product of Italy in Logarithms from first quarter 1997 to third quarter 2023 in millions of Euros. Source: author's elaboration by OECD.Stat database.

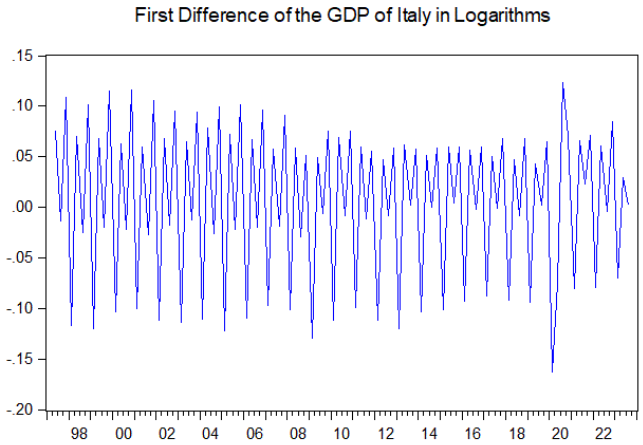


Figure 23: First Difference of the Logarithm of the Gross Domestic Product of Italy from the first quarter of 1997 to the third quarter of 2023 in millions of Euros. Source: author's elaboration by OECD.Stat database.

ADF Test for Two Unit Roots of Logarithm of Natural Amenities Italian Tourist's Expenditure			
Null Hypothesis: D (Log NATEI) has a unit root Exogenous: Constant			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-9.239764	0.0000
Test critical values:	1% level	-3.460035	
	5% level	-2.874495	
	10% level	-2.573751	
*MacKinnon (1996) one-sided p-values.			

Table 3: ADF Test for Two Unit Roots of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2019, performed to the First Difference of this series. Source: author's elaboration from Banca d'Italia Indagine sul turismo internazionale dell'Italia.

ADF Test for One Unit Root of Logarithm of Natural Amenities Italian Tourist's Expenditure			
Null Hypothesis: Log (NATEI) has a unit root Exogenous: Constant, Linear Trend			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-2.308697	0.4271
Test critical values:	1% level	-3.999180	
	5% level	-3.429834	
	10% level	-3.138449	
*MacKinnon (1996) one-sided p-values.			

Table 4: ADF Test for One Unit Root of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2019. Source: author's elaboration from Banca d'Italia Indagine sul turismo internazionale dell'Italia.

ADF Test for Two Unit Roots of Logarithm of Second Homes Italian Tourist's Expenditure

Null Hypothesis: D(Log SHTEI) has a unit root
Exogenous: Constant

		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-5.037329	0.0000
Test critical values:	1% level	-3.451351	
	5% level	-2.870682	
	10% level	-2.571711	

*MacKinnon (1996) one-sided p-values.

Table 5: ADF Test for Two Unit Roots of the Second Homes Italian Tourists' Expenditure from January 1997 to December 2023. Source: author's elaboration from Banca d'Italia Indagine sul turismo internazionale dell'Italia.

ADF Test for One Unit Roots of Logarithm of Second Homes Italian Tourist's Expenditure

Null Hypothesis: Log (SHTEI) has a unit root
Exogenous: Constant, Linear Trend

		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-2.414552	0.3712
Test critical values:	1% level	-3.987649	
	5% level	-3.424247	
	10% level	-3.135153	

*MacKinnon (1996) one-sided p-values.

Table 6: ADF Test for One Unit Root of the Second Homes Italian Tourists' Expenditure from January 1997 to December 2023. Source: author's elaboration from Banca d'Italia Indagine sul turismo internazionale dell'Italia.

ADF Test for Two Unit Roots of Logarithm of Total Italian Tourist's Expenditure

Null Hypothesis: D(Log TTEI) has a unit root
Exogenous: Constant

		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-3.970446	0.0018
Test critical values:	1% level	-3.451491	
	5% level	-2.870743	
	10% level	-2.571744	

*MacKinnon (1996) one-sided p-values.

Table 7: ADF Test for One Unit Root of the Total Italian Tourists' Expenditure from January 1997 to December 2023. Source: author's elaboration from Banca d'Italia Indagine sul turismo internazionale dell'Italia.

ADF Test for One Unit Root of Logarithm of Total Italian Tourist's Expenditure			
Null Hypothesis: Log (TTEI) has a unit root Exogenous: Constant			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-1.518906	0.5229
Test critical values:	1% level	-3.451078	
	5% level	-2.870561	
	10% level	-2.571647	
*MacKinnon (1996) one-sided p-values.			

Table 8: ADF Test for One Unit Root of the Total Italian Tourists' Expenditure from January 1997 to December 2023. Source: author's elaboration from Banca d'Italia Indagine sul turismo internazionale dell'Italia.

ADF Test for Two Unit Roots of the Logarithm of Italy's GDP			
Null Hypothesis: D(GDP_OUTPUT_NOTADJ) has a unit root Exogenous: None			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-3.395605	0.0009
Test critical values:	1% level	-2.587831	
	5% level	-1.944006	
	10% level	-1.614656	
*MacKinnon (1996) one-sided p-values.			

Table 9: ADF Test for Two Unit Roots of the Logarithm of Italy's GDP from January 1997 to December 2023. Source: author's elaboration from OECD.Stat database.

ADF Test for One Unit Root of the Logarithm of Italy's GDP			
Null Hypothesis: GDP_OUTPUT_NOTADJ has a unit root Exogenous: Constant, Linear Trend			
		t-Statistics	Prob*
Augmented Dickey-Fuller test statistic		-2.488394	0.3333
Test critical values:	1% level	-4.050509	
	5% level	-3.454471	
	10% level	-3.152909	
*MacKinnon (1996) one-sided p-values.			

Table 10: ADF Test for One Unit Root of the Logarithm of Italy's GDP from January 1997 to December 2023. Source: author's elaboration from OECD.Stat database.

2.3. Univariate Analysis: Basic Structural Models

The approach employed to analyse the various univariate time series models involves the Model-Based Signal Extraction procedures. These model-based methods explicitly define a representation for each series component: trend, seasonal, cyclical, and irregular (Espasa & Peña, 1995). Model-based methods encompass two main categories: those relying on reduced-form models (Maravall, 1987) and those built upon structural time series models (Harvey, 1983). In structural models, the components are typically represented as stochastic processes, each evolving according to a specific structure in response to perturbations. These models define the components in advance, considering their properties based on the data characteristics (Espasa & Peña, 1995).

The Basic Structural Model (BSM) (Harvey, 1983) is a commonly used representation in structural time series modelling. The analysis applies the BSM to the tourists' expenditure series and Italy's GDP. Specifically, it studies TTEI and SHTEI from January 1997 to December 2023 (27 years). However, due to data limitations, the NATEI series covers only the period from January 2002 to December 2019 (18 years). The BSM could not find cycles for NATE and TTE. In structural models, the variance of the irregular component must be less than that of the other components. As a result, structural models are decomposed into trend, seasonal, and irregular components in the case of NATEI and TTEI. However, in the case of SHTEI and GDP, the BSM is decomposed into trend, seasonal, cycle and irregular components. The BSM is represented by equations 1-4, where Y_t represents each of the series:

$$\ln \boldsymbol{Y_t} = \boldsymbol{\mu_t} + \boldsymbol{\gamma_t} + \boldsymbol{\varepsilon_t} \qquad (1)$$

$$\boldsymbol{\mu_t} = \boldsymbol{\mu_{t-1}} + \boldsymbol{\beta_t} + \boldsymbol{\eta_t} \qquad (2)$$

$$\boldsymbol{\beta_t} = \boldsymbol{\beta_{t-1}} + \boldsymbol{\xi_t} \qquad (3)$$

$$\boldsymbol{\gamma_t} = -\sum \boldsymbol{\gamma_{t-1}} + \emptyset_t \qquad (4)$$

This BSM shows the observed values of the log transformation of the series t = 1997/01, ..., 2023/12 or t = 2002/01, …., 2019/12, from the sum of a stochastic trend, μ_t , a seasonal component, γ_t , and an irregular component ε_t. It is assumed that ε_t, η_t, ξ_t, and $\emptyset_t$ are stochastic disturbances. These white noise processes are independent ofd have variances σ_ε,σ_η, σ_ξ and $\sigma_\emptyset$, respectively. β_t is the slope of the trend component of $\ln Y_t$ (Commandeur et al., 2011).

The BSM model can be extended to incorporate a cyclical component $\boldsymbol{\Psi}_t$. A deterministic cycle with frequency $\boldsymbol{\lambda}_c$ can be expressed as a combination of sines and cosines: $\boldsymbol{\Psi}_t = \boldsymbol{\alpha}\cos\boldsymbol{\lambda}_{ct} + \boldsymbol{\beta}\sin\boldsymbol{\lambda}_{ct}$ Furthermore, $(\boldsymbol{\alpha}^2 + \boldsymbol{\beta}^2)^{½}$ represents the amplitude, and $\tan^{-1}(\boldsymbol{\beta}/\boldsymbol{\alpha})$ represents the phase (Commandeur et al., 2011).

The defining characteristic of the BSM lies in its ability to allow both the level and the slope of the trend component to evolve seamlessly over time. This evolution follows random walk patterns, where the variances of the respective innovations are smaller than the variance of the original series (Commandeur et al., 2011). BSM is based on State Space Models. State space methods originated in control engineering from the groundbreaking paper by Kalman (1960). By the 1980s, researchers across various fields of control engineering recognised that these ideas could be effectively applied to time series analysis. Since then, state space methods have found applications in diverse domains, including economics, finance, political science, environmental science, road safety, and medicine. In modern times, state space methods have found utility in fitting ARIMA models proposed by Box and Jenkins (1976). These methods can be expressed in state space form and analysed using the Kalman filter. The state space framework provides a structural approach to time series analysis. This approach identifies the various unobserved components responsible for the series' dynamics—such as trend, seasonality, cycle, and the effects of explanatory and intervening variables—before being integrated into a comprehensive state space model (Commandeur et al., 2011).

2.4. Cycles Co-movements between Italy's GDP and Second Home Italian Tourists' Expenditure

This section is based on obtaining the cycles co-movements between Italy's GDP and SHTEI. GDP data is frequently obtained quarterly, so it also obtain the SHTEI quarterly series. Both series were obtained from the first quarter of 1997 to the fourth quarter of 2023. In both series, the variance requisite of BSM, meaning that the variance of the irregular component must be smaller than that of the other components, is not accomplished. However, to obtain the cycle of a quarterly series, twenty-seven years should be enough. For this reason, it extract the cycles of these two series anyway.

The cyclical component of time series aggregates systematic deviations from the trend, distinct from seasonality. Empirical regularities observed in cyclical fluctuations are primarily described through autocorrelation and cross-correlations of the cyclical components of the variables of interest (Kamil & Lorenzo, 1998). The cross-correlation coefficients between a given series, $SHTEI_{it}$, and the cyclical component of GDP at time t, denoted as $r_i(j)$ (where j represents the order of correlation), are interpreted differently based on the value of $r_i(j)$ and the value of j. These coefficients range between -1 and 1 and provide insight into the direction and degree of co-movement between the series $SHTEI_{it}$ and the reference cycle defined by the cyclical pattern of GDP. Specifically, $r_i(j)$ for j=0 describes the degree of contemporary co-movement between SHTEI and GDP. A positive value close to 1 indicates that SHTEI is highly procyclical, while a value with the opposite sign suggests that the variable is countercyclical. A value not significantly different from zero implies that the variable is uncorrelated with the reference cycle, indicating no

systematic relationship between its short-term fluctuations and the cyclical behaviour of GDP.

For j different from 0, the correlation coefficients aim to capture the phase shift of the cyclical component of SHTEI relative to the cyclical component of GDP. If the absolute value of $r_i(j)$ ($|r_i(j)|$) reaches a maximum for j<0 (or j>0), it is said that the cycle of $SHTEI_{it}$ leads (or lags behind) the cycle of GDP. If the maximum absolute value occurs at j=0, $SHTEI_{it}$ synchronises or coincides with the reference cycle (Kamil & Lorenzo, 1998).

2.5. Multivariate Analysis: Short and long-run models

The multivariate analysis initially applied an Autoregressive Distributed Lag Model (ARDL) (Pesaran & Pesaran, 1997; Pesaran & Shin, 1999; Pesaran et al., 2001). This allowed us to derive a short-run model for the SHTEI series, establishing its relationship with NATEI. In addition, to develop a long-run model and determine a cointegration relationship between these series, a Vector Error Correction Model (VECM) was created (Johansen, 2008). Then, the Johansen test is performed to determine if this relationship holds and if both series have a common trend in the long run. Both models were performed by adjusting the series sample between January 2002 and December 2019 due to the data restriction on the NATEI series.

2.5.1. Short-run ARDL Model

This section conducts an Autoregressive Distributed Lag Model (ARDL) to establish the short-term relationship between the SHTEI and NATEI series. The series aimed to explain is the SHTEI series. As regressors in the model (estimated using Ordinary Least Squares), the procedure includes the NATEI series—the second series of interest—and controls for other variables.

The short-term model includes several control variables: significant lags, seasonality dummies (SD) and outliers (additive of 9/2019 and level shift of 1/2012). All non- significant regressors were excluded. The equation for the short-term model became as follows:

$$Dlog(SHTEI) = \delta Dlog(NATEI) + \varphi_1 Dlog(SHTEI_{-1}) + \varphi_2 Dlog(SHTEI_{-2}) + \varphi_3 Dlog(SHTEI_{-10}) + \rho_1 SD_1 + \rho_2 SD_2 + \rho_3 SD_3 + \rho_4 SD_4 + \rho_7 SD_7 + \rho_8 SD_8 + \rho_9 SD_9 + \rho_{11} SD_{11} + d(AO201909) + d(LS201201) \quad (5)$$

2.5.2. Long-run VECM Model and Johansen Test

In macroeconomics, relationships are often expressed as linear connections between economic variables. However, it is widely acknowledged that many macroeconomic variables are non-stationary. The concept of cointegration addresses this by formulating an economic relation as a stationary linear combination of these non-stationary variables. This idea was first introduced by Engle and Granger (1987) and further developed by Johansen (2008).

Cointegration analysis investigates whether an equilibrium relationship exists between two or more variables in a model. When such relationships exist, it implies that the variables' trends converge to the same long-run path. Consequently, the presence of a cointegrating relationship indicates that the variables cannot move independently of each other. Cointegrating relationships capture these long-run dynamics, which can be seen as a multi-equation version of the error correction mechanism (Johansen, 2004). Regarding whether the included variables should be stationary, some authors advocate not differentiating the series when they exhibit unit roots (Sims, 1980; Doan & Litterman, 1992). Otherwise, the VAR (Vector Autoregressive) model incorporated in the VECM (Vector Error Correction Model) would fail to capture the cointegration relationships between the relevant series. The long-term equation for this research will be as follows:

$$Log(SHTEI_t) = \beta Log(NATEI_t) + C + Z_t \quad (6)$$

Z_t is the long-run irregular component integrated of order zero according to Engle and Granger's (1987) theorem. C is the independent term or constant. The rest of the variables are already defined in the previous section. SHTEI and NATEI are considered endogenous variables a priori.

Suppose the component series are integrated of order one and, additionally, are cointegrated. In that case, the Granger Representation Theorem enables us to express the VAR (Vector Autoregressive) model as a VECM (Vector Error Correction Model). This assumption considers r cointegrating relationships for each series Yt (Johansen, 2004), as in equation 7:

$$\Delta Y_t = A_1 \Delta Y_{t-1} + \cdots + A_k \Delta Y_{t-k+1} + \pi Y_{t-k} + \mu + \Phi D_t + \varepsilon_t \quad (7)$$

with t = 1… T series observations

where innovations $\mathcal{E}_t$ are independent and identically distributed, μ is a vector of constants representing the deterministic component in the trend evolution of each of the series Y_t and D_t contains a set of seasonal dummies and other qualitative variables influencing the evolution of Y_t (Johansen, 2004).

The approach of representing the vector of endogenous variables provides insights into both short-run dynamics through a matrix A_i (where i ranges from 1 to k for endogenous variables) and long-run knowledge, which includes the matrix Π (Johansen, 2004).

The method introduced by Johansen (Johansen, 1988, 1995) for studying the cointegration of n-integrated variables of order one centres around analysing the Π matrix within the VECM. To describe the characteristics of the long-run equilibrium,there are three possible cases related to the rank of the Π matrix, denoted as r:

1) $\boldsymbol{r = n}$, i.e., the matrix Π has a total rank, which indicates that the process Y_t is stationary, and a VAR procedure with the variables in levels could estimate the multivariate model.

2) $\boldsymbol{r = 0}$, i.e., the matrix Π has zero rank, corresponding to the case of a VAR in first differences.

3) $0 < r < n$ implies that there exist two matrices α and β of 'orders $n \times r$ such that $\Pi = \alpha\beta$. (Johansen, 2004)

In their work, Stock and Watson (1988) demonstrated that a set of n random variables integrated in order one, which exhibits r cointegration relations, share n - r common trends. This insight is crucial because it allows us to determine the number of stochastic trends that impact an n-dimensional vector of variables integrated into order one. The difference in rank of the long-run coefficient matrix serves as the initial step in analysing the dynamic interrelationships among the components of the vector of endogenous variables. The hypothesis can be formulated as $H_0(r) = \alpha\beta' Y_t$. Johansen's method provides an algorithm to develop the contrast. The estimation procedure starts from the concentration of the likelihood function concerning the parameters, A_1,, ..., A_{k-1}, μ, Φ.

The likelihood ratio statistic for the hypothesis $H_0(r)$, being λi the Eigenvalues of Π is:

$$\hat{\alpha_{trace}} = -T \prod_{t=r+1}^{n}(1 - \hat{\lambda}_i) \qquad (8)$$

$\hat{\alpha_{trace}}$ statistic is referred to as the **Trace Statistic**. An alternative statistic to carry out the contrast is the **Maximum Eigenvalue, λ_{max}**. What this statistic does is to compare the hypothesis $H_0(r)$ against $H_1(r + 1)$:

$$\hat{\alpha_{max}} = -T \prod_{t=r+1}^{n}(1 - \hat{\lambda}_{r+1}) \qquad (9)$$

The coefficients of $\alpha_{i1} = [\alpha_{11}, \alpha_{21}, \alpha_{31}]$ ' indicate the speed with which each of the variables of the vector ΔY_t., adjust in the direction indicated by the long-run relationship. If one of the rows of the matrix α, for example, row i, has only null values, then the cointegrating relationships play no role in the equation that determines the behaviour of the i, the component of the vector ΔY_t. Consequently, the variable is weakly exogenous to the impacts of the system of equations under consideration. Conditioning on it is permissible since it forms part of the long-run equilibrium. In a framework like the one proposed, the exogeneity of a variable need not be assumed. Instead, it can be empirically tested. The contrast of weak exogeneity in the complete system requires that: H_j: $\alpha_{ij} = 0$, $i = 1, \ldots, r$ and can be performed from the likelihood ratio statistic between the restricted and unrestricted model. In cases where multiple cointegrating relationships exist, a variable can be exogenous concerning the parameters of one cointegrating relationship and not be exogenous for others. This is so because the weak exogeneity conditions are defined about a given vector and not to the whole system.

3. Results and Discussion

3.1. Results of the univariate analysis

The GDP of Italy is analysed quarterly because it is the most frequently available data. Figure 25 shows the different components of the GDP's BSM. The first graph in Figure 25 displays the seasonal component's decreasing variance over time. The second graph

represents the cycles of approximately five years. It is essential to highlight that the study extracts the cyclical component even though the requirement that the variance of the irregular component should be the smallest among all components was not met. While variance is crucial in the structural model, extracting the observable cyclical component is important. The third graph represents the irregular component stationary in the mean but not in variance. The fourth graph represents the seasonal, irregular component, cycle and interventions graph and shows the consequences of the COVID-19 crisis, principally in the first quarter of 2021. The last graph shows the level, irregular component, cycle and interventions. The interventions of outliers included those with values more extensive than three standard errors; his coefficients and p-values can be observed in Table 11. All the outliers included are significant at a 5% significance level. All quarters of 2020 are declining outliers, showing the COVID-19 crisis. However, the first three quarters of 2008, right after the 2007 Crisis, stand out as an upward outlier.

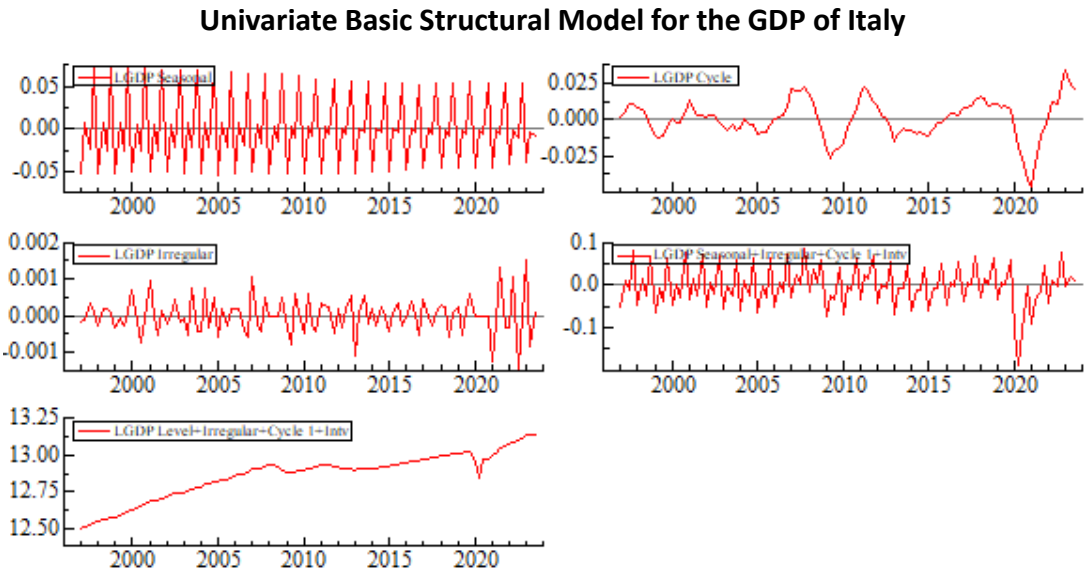


Figure 25: Graphs of the Univariate Basic Structural Model for the GDP of Italy from the first quarter of 1997 to the fourth quarter of 2023. Source: authors elaboration with OECD. Stat database.

Regression effects in final state at time 2023(3)

Variable	Coefficient	RMSE	t-value	Prob.
Outlier 2020(1)	-0.05596	0.00750	-7.45796	[0.00000]
Outlier 2020(2)	-0.16604	0.00906	-18.33037	[0.00000]
Outlier 2020(3)	-0.03025	0.00908	-3.33274	[0.00123]
Outlier 2020(4)	-0.01806	0.00754	-2.39611	[0.01853]
Outlier 2008(1)	0.01873	0.00742	2.52299	[0.01330]
Outlier 2008(2)	0.02533	0.00829	3.05582	[0.00291]
Outlier 2008(3)	0.02067	0.00742	2.78449	[0.00647]

Table 11: Interventions for outliers for Italy's GDP with values larger than three standard deviations of the irregular component. Source: author's elaboration with OECD. Stat database.

The SHTEI is also analysed quarterly to study the cycle co-movements between this variable and Italy's GDP. Figure 26 shows the different components of the SHTEI's BSM. The first graph displays the level plus the interventions for outliers where it can appreciate the COVID-19 crisis. The second graph represents the seasonal component with an increasing variance until 2010 and a decreasing one after that. The third graph displays the cycles of approximately twelve years. For the structural model to be more robust, the variance of the irregular component must be less than the other variances. Although this requirement was not met, it was possible to extract the cyclical component (the cycles in the graphs are shown). The fourth graph represents the irregular component stationary in the mean but not variance, which is enough for the BSM. The interventions of outliers included those with values more extensive than three standard errors; their coefficients and p-values can be observed in Table 12. All the outliers included are significant at a 5% significance level. All interventions are declining outliers, including the COVID-19 crisis and the last quarters of the series.

Univariate Basic Structural Model for Second-Home Italian Tourists' Expenditure

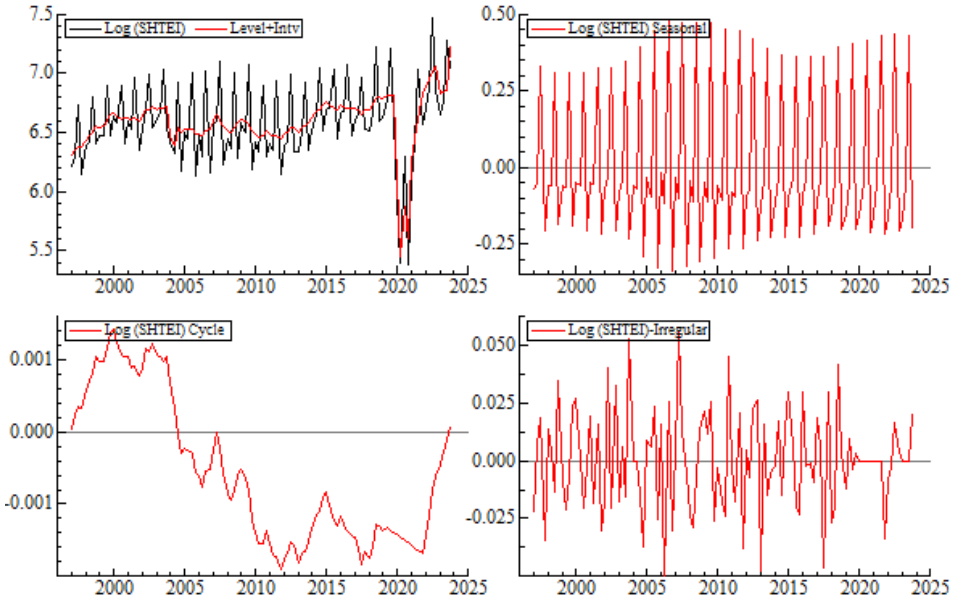


Figure 26: Graphs of the Univariate Basic Structural Model for the Second-Home Italian Tourists' Expenditure from the first quarter of 1997 to the fourth quarter of 2023. Source: authors elaboration with Banca d'Italia Indagine sul turismo internazionale dell'Italia.

Regression effects in final state at time 2023(3)

Variable	Coefficient	RMSE	t-value	Prob.
Outlier 2020(1)	-0.72343	0.08404	-8.60797	[0.00000]
Outlier 2020(2)	-1.36785	0.09091	-15.04611	[0.00000]
Outlier 2020(3)	-0.94286	0.09500	-9.92514	[0.00000]
Outlier 2020(4)	-1.22344	0.08994	-13.60223	[0.00000]
Outlier 2021(1)	-0.56483	0.09585	-5.89266	[0.00000]
Outlier 2021(2)	-0.37216	0.09239	-4.02819	[0.00012]
Outlier 2021(3)	-0.21549	0.08579	-2.51192	[0.01377]

Outlier 2004(1)	-0.18916	0.07517	-2.51633	[0.01361]
Outlier 2004(2)	-0.21415	0.07517	-2.84870	[0.00543]
Outlier 2023(1)	-0.27824	0.09407	-2.95785	[0.00395]
Outlier 2023(2)	-0.30273	0.09550	-3.16981	[0.00208]
Outlier 2023(3)	-0.32258	0.09646	-3.34432	[0.00120]

Table 12: Interventions for outliers for SHTEI with values larger than three standard deviations of the irregular component. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

The TTEI is analysed quarterly in the first place to obtain the cycle co-movements with GDP and SHTEI. However, the attempts to extract a cycle from TTEI yielded inconclusive results; there appears to be no discernible cycle. Therefore, the next step is to obtain the BSM through the monthly series of the TTEI. Figure 27 shows the different components of the TTEI's BSM. The first graph shows the level plus interventions to see the COVID-19 crisis. The second graph displays the seasonal component decreasing in variance over time. The third graph represents the irregular component stationary in the mean but not in variance. The interventions of outliers included those with values more extensive than three standard errors; their coefficients and p-values can be observed in Table 13. All the outliers included are significant at a 5% significance level. All outliers of 2020 and 2021 corresponding to the COVID-19 Crisis are declining. However, the third month of 2004 stands out as an upward outlier.

Univariate Basic Structural Model for Total Italian Tourists' Expenditure

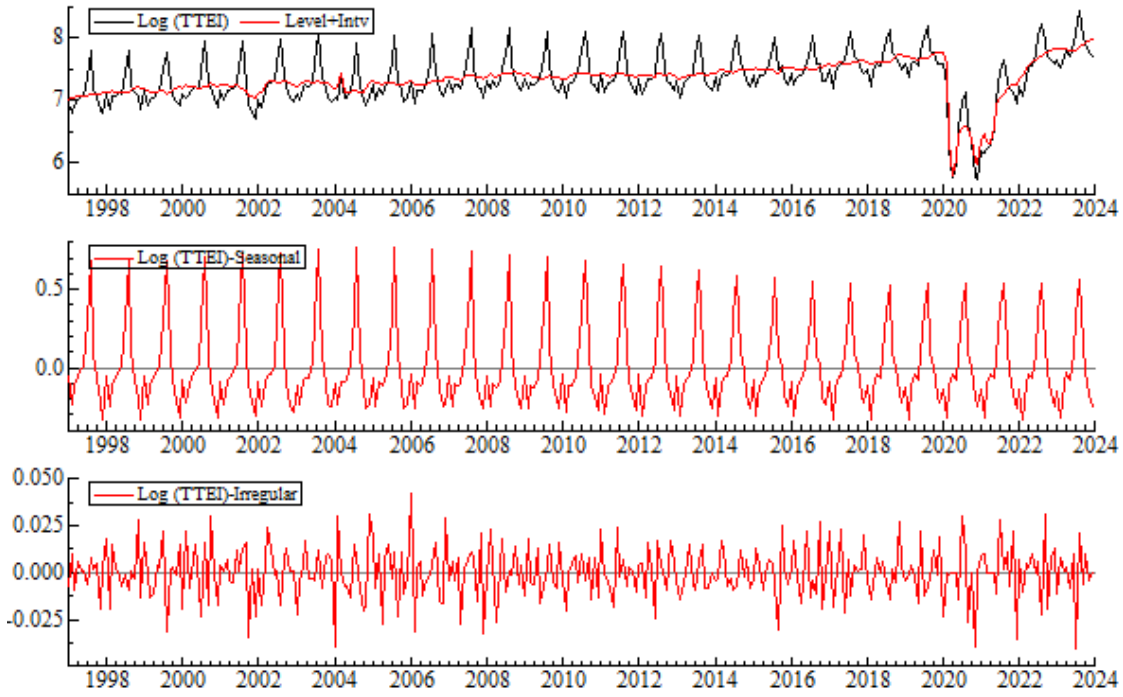


Figure 27: Graphs of the Univariate Basic Structural Model for the Total Italian Tourists' Expenditure from the first quarter of 1997 to the fourth quarter of 2023. Source: authors elaboration with Banca d'Italia Indagine sul turismo internazionale dell'Italia.

Regression effects in final state at time 2023(3)

Variable	Coefficient	RMSE	t-value	Prob.
Outlier 2004(3)	0.26124	0.05169	5.05418	[0.00000]
Level break 2020(3)	-1.46926	0.08080	-18.18315	[0.00000]
Outlier 2021(5)	-0.20713	0.05915	-3.50190	[0.00053]
Level break 2020(11)	-0.64285	0.07952	-8.08377	[0.00000]
Outlier 2020(2)	-0.20613	0.06506	-3.16818	[0.00169]
Outlier 2020(4)	-0.58019	0.05823	-9.96389	[0.00000]
Outlier 2020(5)	-0.37012	0.05703	-6.49027	[0.00000]
Outlier 2021(3)	-0.23918	0.05873	-4.07246	[0.00006]
Outlier 2021(4)	-0.37933	0.06214	-6.10403	[0.00000]
Outlier 2020(10)	-0.25596	0.06508	-3.93318	[0.00010]
Outlier 2020(12)	-0.19548	0.05311	-3.68100	[0.00028]
Outlier 2023(3)	-0.32258	0.09646	-3.34432	[0.00120]

Table 13: Interventions for outliers for TTEI with values larger than three standard deviations of the irregular component. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

NATEI was analysed monthly from 2002 to 2019 due to the lack of data before 2022. In 2020, it was not surveyed due to the COVID-19 pandemic. Figure 28 shows the different components of the NATEI's BSM. The first graph shows the level plus interventions, whose level breaks in January 2007 and 2012 are the most remarkable.

An upward trend of NATEI occurred in 2007 when the level increased significantly. Indeed, it might seem surprising considering the global financial crisis during that period. Tourists might have shifted preferences toward more cost-effective destinations, such as natural amenities, in response to global uncertainty. Another explanation could be that exchange rate fluctuations could have made foreign nature destinations more attractive for Italian tourists. Also, natural amenities tourism costs less than cultural tourism because they are free for tourists regardless of the taxes paid in museums. After the jump, the level remained elevated until 2014, suggesting a structural change in the tourism expenditure pattern. This could indicate that whatever caused the increase had lasting effects.

The second graph displays the seasonal component with less variance in the period between the level brakes. The third graph represents the irregular component stationary in the mean but not in variance. It was impossible to obtain a variance of the irregular component less than the other components. However, the procedure applies the BSM anyway to separate them. The interventions of outliers included those with values more extensive than three standard errors; their coefficients and p-values can be observed in Table 14. All the outliers included are significant at a 5% significance level. The level brakes of January 2012 and August 2008 are downward outliers. Nevertheless, the level-brake of January 2007 and July and August 2012 are upward outliers.

Univariate Basic Structural Model for Natural Amenities Italian Tourists' Expenditure

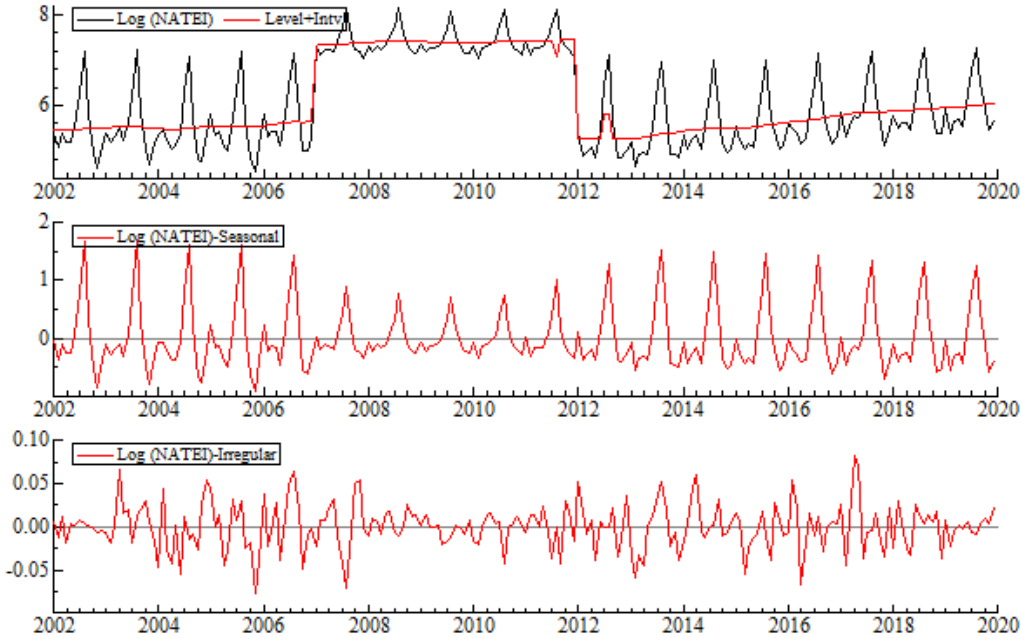


Figure 28: Graphs of the Univariate Basic Structural Model for the Natural Amenities Italian Tourists' Expenditure from the first quarter of 1997 to the fourth quarter of 2023. Source: authors elaboration with Banca d'Italia Indagine sul turismo internazionale dell'Italia.

Regression effects in final state at time 2019-12-01

Variable	Coefficient	RMSE	t-value	Prob.
Level-break 2007(1)	1.66674	0.06937	24.02733	[0.00000]
Level-break 2012(1)	-2.18679	0.07142	-30.61734	[0.00000]
Outlier 2011(8)	-0.36924	0.14837	-2.48862	[0.01365]
Outlier 2012(7)	0.55725	0.13451	4.14283	[0.00005]
Outlier 2012(8)	0.54344	0.14800	3.67188	[0.00031]

Table 14: Interventions for outliers for the Natural Amenities Italian Tourists' Expenditure with values larger than three standard deviations of the irregular component. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

All the univariate models analysed passed the residuals' normality tests, showing a Skewness p-value greater than a 5% significance level, which means they did not reject the null of normality (see Table 15).

Normality Skewness Test

Series Residual	Skewness p-value
GDP	0.6075
SHTEI	0.8624
TTEI	0.1367
NATEI	0.3772

Table 15: Normality Skewness Test for Italy's GDP, Second-home, total and natural amenities Italian tourists' expenditure. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

Composing Italy's GDP using the BSM approach provides significant insights into its structural dynamics. The seasonal component's decreasing variance over time suggests a shift in economic seasonality, possibly due to structural changes in the economy or policy interventions. The five-year cyclical pattern highlights medium-term economic fluctuations, which align with broader business cycle theories. While variance plays a crucial role in structural modelling, extracting a visible cyclical component remains valuable for economic interpretation. Although stationary in the mean, the irregular component exhibits heteroskedasticity, indicating that unpredictable shocks affecting the economy vary in intensity over time.

The intervention analysis underscores the profound impact of exogenous shocks on GDP. The COVID-19 crisis, particularly in early 2021, stands out as a significant disruptive event, leading to a sharp downturn. The 2007–2008 financial crisis also left a noticeable mark, but with a contrasting effect—while 2020 showed consistent downward shocks, the first three quarters of 2008 emerged as upward outliers, suggesting a temporary counter-effect or delayed response in GDP trends. The statistical significance of these interventions at a 5% level confirms their robustness, reinforcing the importance of accounting for external disruptions in economic modelling.

Regarding the TTEI, initial attempts to extract a cycle at a quarterly frequency proved inconclusive, suggesting that tourism-related economic activity does not exhibit explicit cyclical behaviour in the same way as GDP. However, analysing the TTEI at a monthly frequency provided a more nuanced perspective. The seasonal component also displayed decreasing variance over time, which may reflect evolving tourism patterns influenced by globalisation, climate change, or policy adjustments. The irregular component showed similar characteristics to GDP, remaining stationary in the mean but with non-constant variance. The intervention analysis revealed the expected substantial downturn in 2020 and 2021 due to the pandemic. However, the upward outlier in March 2004 suggests an exceptional positive shock—possibly linked to a unique tourism-driven event or policy shift.

Finally, the robustness of all univariate models is validated by the normality of residuals, as evidenced by the skewness p-values exceeding the 5% threshold. This confirms that the models do not violate key statistical assumptions, reinforcing the reliability of the findings. These results highlight the sensitivity of GDP and tourism-related indicators to external shocks, the evolving nature of seasonal and cyclical dynamics, and the need for high-frequency data to capture tourism's economic fluctuations. Future research could further explore the underlying causes of these trends, particularly the long-term impact of crises on structural economic components. The last Tables 24 to 27 of Annex 4 show the main statistics of the univariate analysis of all the series.

3.2. Results of the Cycles Co-movements: GDP and Second-Home Tourists' Expenditure

The section examines the cross-correlations between the cyclical components of second-home Italian tourists' expenditure and Italy's GDP quarterly series to analyse the cycle co-movements. The contemporary value of the cross-correlations, meaning the first-row value of 0.0476, is not significantly different from zero (see Figure 29). This implies that the SHTEI is uncorrelated with the reference cycle, indicating no systematic relationship between its short-term fluctuations and the cyclical behaviour of GDP. This analysis reveals no consistent relationship between Italy's GDP cycles and the short-run spending patterns of second-home Italian tourists abroad. Consequently, second-home outbound tourism in Italy appears to operate independently of GDP fluctuations. Therefore, second-home tourists' expenditure of Italians abroad can survive an economic crisis, making this tourism resilient.

The lag and lead correlation coefficients in Figure 29 (Annex 4) aim to capture the phase shift of the cyclical component of SHTEI relative to the cyclical component of GDP. The absolute value of the cross-correlation coefficient reaches a maximum for lead 23 (0.1734). Consequently, the cycle of Italy's GDP could lead to the cycle of SHTEI. However the procedure must determine if this cross-correlation coefficient is significant at a 5% level. The t-statistic value for $r = 0.1734$ and $n = 107$ is $t = r\sqrt{n-2}/\sqrt{1-r^2} = 0.1734(\sqrt{105})/\sqrt{1-0.1734^2} \approx 1.805$. Since | 1.805 | is smaller than the critical value of 1.983, it does not reject the null hypothe.sis of $r = 0$. This means there is insufficient evidence to conclude that the correlation coefficient significantly differs from zero at the 5% level. Therefore, there is not enough evidence to affirm that Italy's GDP temporarily precedes SHTEI. Consequently, this result implies a non-systematic relationship between the variables' cycles in the long run.

These findings highlight a crucial insight: Second-home tourism expenditure by Italians abroad does not exhibit a consistent cyclical dependency on GDP contemporaneously or with a time lag. This lack of co-movement suggests that the spending behaviour of second-home tourists is influenced by factors beyond domestic economic conditions, such as personal wealth, lifestyle preferences, or external economic environments in host destinations. Moreover, the resilience of this sector implies that second-home tourism may serve as a stabilising force in the tourism economy, maintaining expenditure levels even during financial crises.

3.3. Short-run ADL model for Second Homes and Natural Amenities Italians Tourists' Expenditure Abroad

The estimated short-run Autoregressive Distributed Lag (ADL) model provides a comprehensive picture of the dynamic relationship between second-home tourism expenditure (SHTEI) and natural amenities tourism expenditure (NATEI). The results highlight key short-term dependencies, seasonal effects, and the impact of structural shifts on expenditure patterns (see Table 16). The coefficient for DLOG(NATEI) = 0.110182 is positive

and highly significant (t = 4.305838, p < 0.0001). This suggests that an increase in natural amenities tourism expenditure (NATEI) is associated with a contemporaneous increase in second-home tourism expenditure (SHTEI). The positive relationship indicates that tourists spending on natural amenities (e.g., eco-tourism, national parks, scenic destinations) tend to also invest in second-home tourism. This supports the notion that these two types of tourism are complementary rather than substitutes. The estimated elasticity (0.11) is relatively small, suggesting that while the relationship exists, changes in NATEI do not lead to proportionally significant changes in SHTEI.

Several lagged values of SHTEI are included in the model to capture persistence and potential adjustments over time. The negative and significant coefficients indicate that an increase in SHTEI in each period reduces expenditures in subsequent periods. This effect is most potent in the first and second quarters, suggesting that tourists tend to adjust their spending behaviour in the short term, possibly due to budget constraints, saturation effects, or seasonal factors. The impact of the 10th lag (DLOG (SHTEI -10)) suggests a long-term cyclical pattern, meaning past spending decisions continue to influence current expenditure even after multiple periods.

The seasonal dummies (SD1–SD11) indicate significant seasonal fluctuations in expenditure patterns. These results indicate that second-home tourism expenditures significantly drop in the winter and early spring months, likely due to colder weather, fewer travel opportunities, and lower demand for second-home rentals or purchases. The winter and early spring months experience a significant drop in second-home tourism expenditure, likely due to colder weather, fewer travel opportunities, and lower demand for second-home rentals or purchases. Summer months (July-August) are the peak periods for second-home tourism expenditure, reflecting traditional holiday seasons when tourists are most likely to travel and stay in second-homes. The positive and significant coefficient for AO2 dummy suggests an exceptional event (e.g., policy reform, macroeconomic shock, or temporary economic stimulus) that caused a temporary surge in SHTEI. The LS201201 dummy (level shift in 2012) indicates a structural change in expenditure behaviour, potentially linked to economic reforms, changes in taxation, or new regulations affecting second-home tourism investments.

The model demonstrates a strong fit, with an R-squared value of 0.909637, explaining 90.96% of the variation in second-home tourism expenditure. The adjusted R-squared of 0.903793, which accounts for degrees of freedom, further confirms the model's explanatory power. Additionally, the Durbin-Watson statistic of 2.108721 indicates that residual autocorrelation is not a significant issue, reinforcing the model's reliability.

Variable	Coefficient	Standard Error	T-Statistic	Prob
DLOG (NATEI)	0.110182	0.025589	4.305838	0.0000
DLOG (SHTEI (-1))	-0.189636	0.061883	-3.064439	0.0025
DLOG (SHTEI (-2))	-0.213678	0.029218	-7.313347	0.0000
DLOG (SHTEI (-10))	-0.113853	0.028500	-3.994867	0.0001
SD_1	-0.111813	0.030383	-3.680109	0.0003

SD_2	-0.217343	0.023098	-9.409531	0.0000
SD_3	-0.057817	0.024472	-2.362513	0.0191
SD_4	-0.100633	0.019105	-5.267388	0.0000
SD_7	0.238176	0.028422	8.379842	0.0000
SD_8	0.666066	0.043511	15.30802	0.0000
SD_9	0.154103	0.051521	2.991049	0.0031
SD_{11}	-0.193990	0.030462	-6.368241	0.0000
D (AO2 DUMMY)	0.236838	0.074077	3.197181	0.0016
D (LS 201201)	0.387345	0.117971	3.283397	0.0012
R-Squared	0.909637	**Mean dependent var**		-0.000608
Adjusted R -squared	0.903793	**S.D dependent var**		0.327798
S.E.of regression	0.101674	**Akaike info criterion**		-1.671193
Sum squared resid	2.077854	**Schwarz criterion**		-1.451710
Log likelihood	193.6532	**Hannan-Quinn criterion**		-1.582512
Durbin-Watson stat	2.108721			

Table 16: Short-run ADL model for Second-home and natural amenities Italian tourists' expenditure abroad. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

3.4. Long-Run Model Applying Johansen Methodology

A negative and significant (t value greater than 1.68) coefficient of 0.06 was estimated for the long-term relationship between the series of interests. Although long-term elasticity is with a negative sign and is not very high, cointegration reinforces what the literature has established regarding the connection between these variables. Johansen Tests indicate one cointegration equation at the 5% significance level and reject the null of the non-cointegration relationship between the variables (see Table 20). Consequently, it confirms a cointegration relationship between SHTEI and NATEI, meaning that the series share a common trend in the long run. The long-run equation and Table 17 of the Long-run VECM Model are as follows.

$$Log(SHTEI_t) = -0.06Log(NATEI_t) - 5.89 + Z_t \quad (11)$$

Long-Run Model Applying Johansen Methodology

Cointegration Eq.	**Coefficient**	
LOG (SHTEI (-1))	1.0000000	
LOG (NATEI (-1))	0.069006	
	(0.03408)	
	[2.02499]	
C	-5. 917946	
Error Correction	D(LOG(SHTEI))	D(LOG(NATEI))
CointEq1	-0.249192	-0.082878
	(0.05110)	(0.10422)
	[-4.87639]	[-0.79521]

Table 17: Long-run VECM model for second-home and natural amenities Italian tourists' expenditure abroad from 2002 to 2019, using Johansen Methodology. Standard errors in () and t-statistics in []. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

The elasticity of -0.069 in the long-run equation suggests that natural amenities tourists' expenditure is not very responsive to second-home tourists' expenditure changes (see Table 17 above). However, the Johansen test indicates that the variables are cointegrated, meaning they share a long-term trend (see Table 19). This low elasticity and even negative sign imply a low risk for the environmental impact of the leading destinations for Italian second-home tourists overseas. The coefficients in the cointegration equation (Table 17 below side), also known as the 'error correction term, represent the speed of adjustment with which dependent variables return to their long-term equilibrium after a deviation. The DLOG (NATEI) error correction coefficient in the cointegration equation (CoinEq1) is -0.082, with a t-value of -0.79. Although the coefficient is negative, it is not statistically significant (low t-value), suggesting that this variable does not adjust to equilibrium in the long run, probably because it is weakly exogenous.

Regarding the Error Correction Term, the coefficient in the D(LOG(SHTEI)) cointegration equation is -0.24, with a t-value of -4.87. This result indicates that approximately 24% of the long-term equilibrium deviation is corrected in the next period by SHTEI. In other words, if LOG(SHTEI) deviates from the equilibrium value determined by the cointegration relationship, the model adjusts approximately 24% of this deviation in the next period (month). The negative sign indicates that the adjustment is towards long-term equilibrium. If LOG(SHTEI) is above the equilibrium value, it will decrease in subsequent periods and vice versa.

A t-value of -4.87 suggests that the coefficient is statistically significant at conventional levels (i.e., 1% or 5%). This means that the error correction term is significant, and the adjustment process towards equilibrium is a relevant model component. Therefore, the SHTEI's coefficient in CointEq1 indicates that there is an adjustment mechanism that acts to correct any deviation from long-term equilibrium, and this mechanism is statistically significant. An adjustment of 24% per period implies a relatively rapid adjustment towards equilibrium. As can be appreciated, the VECM helps understand short-term and long-term relationships between variables. The results indicate a significant cointegration relationship, and the variables exhibit adjustment toward long-term equilibrium.

In contrast, the error correction term for DLOG(NATEI) is -0.082, but it is not statistically significant (t-value = -0.79). This suggests that natural amenities tourism expenditure does not adjust significantly in response to deviations from the long-run equilibrium, likely because NATEI is weakly exogenous. In practical terms, this means that while second-home tourism expenditure responds dynamically to changes in natural amenities tourism expenditure, the latter remains relatively stable over time and does not react to fluctuations in second-home tourism demand.

Normality tests for the residuals of the multivariate models

Multivariate Model	Skewness Test p-value
Short-run	-0.2087
Long-run	0.0744

Table 18: Normality Tests for the residuals of the Short-Run ADL Model and the Long-Run VECM. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

The normality tests for residuals (Skewness p-values) indicate that the long-run model residuals are normally distributed, which supports the validity and reliability of the VECM results. This ensures that statistical inferences drawn from the model are robust and that non-normal residuals do not bias the adjustment process captured by the ECM. (Table 18).

Johansen Trace Test for the endogenous variables

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No.of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob. **
None *	0.110229	26.17458	15.49471	0.0009
At most 1	0.006075	1.297996	3.841466	0.2546
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
** MacKinnon-Haug-Michelis (1999) p-values				

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No.of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob. **
None *	0.110229	24.87659	14.26460	0.0008
At most 1	0.006075	1.297996	3.841466	0.2546
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
** MacKinnon-Haug-Michelis (1999) p-values				

Table 19: Johansen Test for the Long-run VECM model for Second-home and natural amenities expenditures by Italian tourists abroad. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

Johansen's test results show one cointegration relationship, as shown in Table 19. Regarding the exclusion tests performed by the beta coefficients, both results were statistically significant with p-values below 5%, as seen in Tables 20 and 21 (Annex 4). Therefore, both variables of interest contribute a highly desirable result to the cointegration relationship under study. In addition, exogeneity tests (see Tables 22 and 23 in Annex 4) confirm that the alpha coefficient for NATEI is not significant at a 5% significance level; therefore, the variable is weakly exogenous. However, the alpha coefficient for SHTEI

is significant at 5%, indicating that this variable is endogenous and contributes to the long-term equilibrium adjustment. The condition of weak exogeneity for the series is sufficient for conducting inference on the long-run equation.

4. Conclusions

While existing research has predominantly focused on inbound tourism and its economic impact, outbound tourism plays a vital role in shaping a country's well-being (Bernini & Galli, 2019). This research fills a void in existing literature by investigating the enduring causal link between second homes and the growth of tourism associated with natural amenities. Studies on outbound tourism have primarily examined the effects of Chinese tourists' expansion (Tse, 2013; Jin & Wang, 2016; Keating & Kriz, 2008; Johnson et al., 2020; Qi, 2014). Furthermore, studies on outbound tourism expenditure have transitioned from purely economic considerations to addressing social aspects. Researchers now emphasise sustainability by considering social, cultural, environmental, and political factors (Mehran & Olya, 2018).

Up to this point, the causal relationship between second homes and natural amenities in outbound tourists' expenditure has not been explored. An application to Italian tourists constitutes the central focus of this thesis chapter. Additionally, the procedure examines the dynamics associated with total outbound tourism compared to second homes and natural amenities in Italian tourists' expenditures abroad. Furthermore, the analysis compared Italy's GDP with second-home and overall tourist expenditure overseas. Lastly, it investigates whether a short-term correlation exists between second homes and natural amenities in Italian tourists' spending abroad. Specifically, the research questions are as follows: Q1) What variations exist in the dynamics of total outbound tourism, second homes, natural amenities, Italian tourists' spending abroad, and Italy's GDP?; Q2) Is there a short-term correlation between second homes and natural amenities in Italian tourists' overseas expenditures?; Q3) Are Italian tourists' expenditures on second homes and natural amenities cointegrated?

The research findings reveal distinct trends in second homes, natural amenities, total Italian tourists' spending abroad, and Italy's GDP over the analysis period. The varying dynamics of outbound tourism variables underscore the importance of studying them separately. There are cycles of approximately twelve years in second-home Italian tourists' overseas expenditure between the first quarter of 1997 and the fourth quarter of 2023. As for Italy's GDP, cycles of around five years are observed within the given timespan. Additionally, the study explores cross-correlations between second-home Italian tourists' expenditure and Italy's quarterly GDP series cycles. Surprisingly, this evaluation reveals no systematic relationship between the cyclical components of Italy's GDP and second-home Italian tourists' spending abroad in the short and long run. From a policy perspective, understanding this independence is essential for economic planning and crisis management. Unlike other tourism segments that may contract during recessions, second-home tourism appears less sensitive to macroeconomic fluctuations, making it a potential buffer for the tourism sector. Future research could further explore the underlying drivers of this resilience, including socio-demographic factors and external economic influences, to refine strategies for sustaining and leveraging this form of tourism.

The positive short-run relationship between NATEI (Natural Amenities Tourism Expenditure Index) and SHTEI (Second-Home Tourism Expenditure Index) suggests that second-home tourism is significantly influenced by spending on natural amenities. This underscores the crucial role of eco-tourism and environmental attractions in driving second-home investments. The results highlight how tourists are drawn to destinations that offer a balance between recreational value and environmental appeal, reinforcing the link between nature-based tourism and second-home demand. The negative and significant lagged effects indicate that past increases in SHTEI lead to subsequent reductions, suggesting a spending correction mechanism. This cyclical adjustment in the short run may be attributed to budget constraints, shifting consumer preferences, or economic factors affecting disposable income. The findings imply that tourists adjust their second-home expenditure dynamically, possibly due to changes in travel habits, broader economic conditions, or investment considerations in the real estate market.

Second-home tourism exhibits a strong seasonal pattern, with peak spending occurring in July and August, followed by a sharp decline in winter and early spring. This seasonality presents challenges for policymakers and tourism businesses, as it emphasises the need to capitalise on peak seasons while mitigating the impact of low-demand periods. Encouraging year-round tourism through incentives, infrastructure improvements, and diversified offerings could help smooth out seasonal fluctuations and enhance the economic stability of tourism-dependent regions. The structural shift observed in 2012 suggests a long-term transformation in second-home tourism dynamics, potentially influenced by economic reforms, regulatory changes, or evolving market trends. Additionally, temporary expenditure surges, captured by AO2 DUMMY, highlight the impact of external shocks such as policy changes, financial crises, or global disruptions on spending behaviour. These results reinforce adaptive policymaking's importance in response to structural trends and short-term economic volatility.

The complementarity between natural amenities and second-home tourism suggests that investment in environmental conservation and tourism infrastructure can have mutually reinforcing benefits. Policymakers should consider strategies to mitigate seasonality, such as promoting off-peak tourism through incentives or developing alternative tourism products. Additionally, understanding the impact of economic reforms and external shocks on expenditure patterns is essential for designing resilient and adaptive tourism policies that can withstand economic downturns and market fluctuations.

The short-run ADL model provides strong evidence that second-home tourism expenditures are influenced by short-term adjustments and long-term structural changes. Seasonal fluctuations, external shocks, and expenditures on natural amenities shape the second-home tourism market, affecting demand patterns and investment decisions. Future research should further explore the interaction between macroeconomic conditions, real estate trends, and policy interventions to provide deeper insights into the sustainability and resilience of second-home tourism.

The weak exogeneity of NATEI suggests that policymakers should consider investments in environmental conservation and infrastructure as a stable, long-term strategy for attracting second-home tourists. Since natural amenities expenditure does not adjust significantly to deviations in second-home tourism spending, protecting and enhancing

environmental assets remains a key factor in sustaining tourism demand. The faster adjustment of SHTEI compared to NATEI implies that second-home tourism spending is more sensitive to economic, policy, and external shocks. At the same time, expenditures on natural amenities are more structurally stable. Policy interventions should focus on stabilising second-home tourism during economic downturns while leveraging natural amenities as a long-term attraction factor.

Since SHTEI adjusts relatively quickly, tourism planners should design off-peak incentives and real estate investment programs and diversify tourism experiences to smooth out fluctuations and reduce the adverse effects of economic cycles on second-home tourism demand. However, while second-home tourism expenditure fluctuates and adjusts quickly in response to changes in natural amenities expenditure, the latter remains structurally stable and exogenous in the long run. This supports the idea that environmental investments should be viewed as a long-term asset for sustaining tourism demand rather than as a variable that reacts to short-term market conditions.
Moreover, the statistically significant error correction mechanism for SHTEI confirms that second-home tourism expenditure follows a predictable adjustment path back to equilibrium, implying that seasonal, regulatory, and economic shocks can temporarily disrupt the market but will not permanently alter its long-term trajectory. Future research should explore macroeconomic influences, real estate trends, and policy interventions to refine strategies for stabilising and optimising second-home tourism expenditure in response to external shocks and economic cycles.

The low elasticities of the two models could respond to the increasing policy constraints in constructing second homes in Spain, France or Greece. The literature underscores Spain's lack of stringent second-home construction policies. Since Spain is one of the destinations of Italian second-home natural amenities tourists spend the most, the unrestricted second-home market fails to explain the low elasticity (Carrascal-Incera & Gutiérrez-Posada, 2021; Hilber & Schöni, 2020). However, Hilber and Schöni (2020) note that some countries, like France, have implemented strict measures to curb second-home construction. Hence, this partially accounts for the observed low elasticity between the variables of interest. Consequently, economic policy implications should focus on balancing restrictions on second-home construction in Spain and Greece to mitigate harm to natural amenities—a critical input for tourism growth. Future studies should explore supply-side data, such as the overseas Airbnb database of Italian tourists. Also, it could be interesting to explore Italian tourists' preferences in domestic and outbound tourism abroad and their connection with environmental impact. Such research is essential for making informed policy recommendations when analysing second-home tourism for other factors, including natural amenities tourism.

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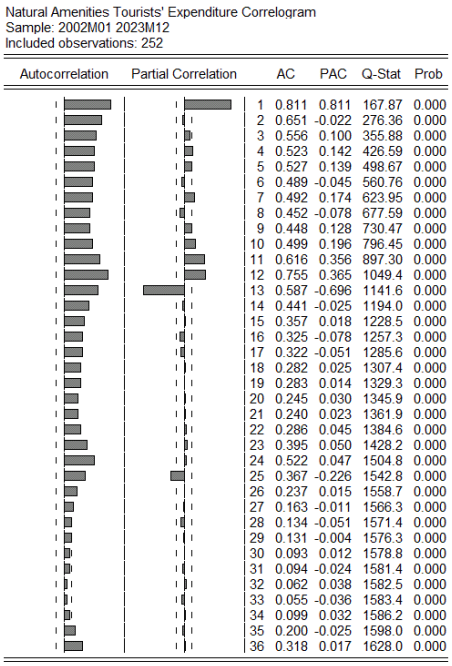
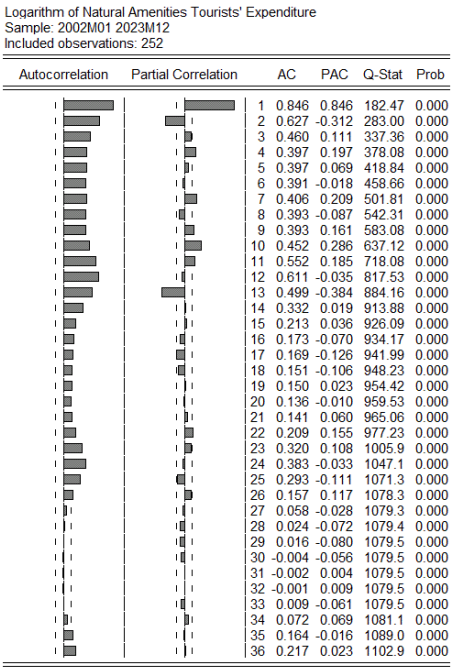
Annex 4


Natural Amenities Tourists' Expenditure Correlogram
Sample: 2002M01 2023M12
Included observations: 252

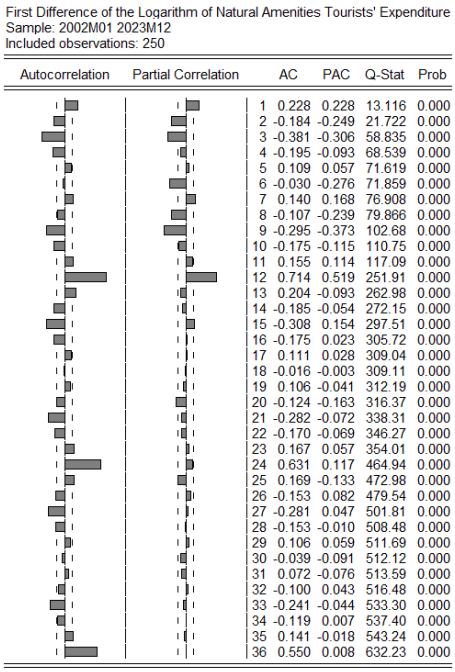
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.811	0.811	167.87	0.000
		2	0.651	-0.022	276.36	0.000
		3	0.556	0.100	355.88	0.000
		4	0.523	0.142	426.59	0.000
		5	0.527	0.139	498.67	0.000
		6	0.489	-0.045	560.76	0.000
		7	0.492	0.174	623.95	0.000
		8	0.452	-0.078	677.59	0.000
		9	0.448	0.128	730.47	0.000
		10	0.499	0.196	796.45	0.000
		11	0.616	0.356	897.30	0.000
		12	0.755	0.365	1049.4	0.000
		13	0.587	-0.696	1141.6	0.000
		14	0.441	-0.025	1194.0	0.000
		15	0.357	0.018	1228.5	0.000
		16	0.325	-0.078	1257.3	0.000
		17	0.322	-0.051	1285.6	0.000
		18	0.282	0.025	1307.4	0.000
		19	0.283	0.014	1329.3	0.000
		20	0.245	0.030	1345.9	0.000
		21	0.240	0.023	1361.9	0.000
		22	0.286	0.045	1384.6	0.000
		23	0.395	0.050	1428.2	0.000
		24	0.522	0.047	1504.8	0.000
		25	0.367	-0.226	1542.8	0.000
		26	0.237	0.015	1558.7	0.000
		27	0.163	-0.011	1566.3	0.000
		28	0.134	-0.051	1571.4	0.000
		29	0.131	-0.004	1576.3	0.000
		30	0.093	0.012	1578.8	0.000
		31	0.094	-0.024	1581.4	0.000
		32	0.062	0.038	1582.5	0.000
		33	0.055	-0.036	1583.4	0.000
		34	0.099	0.032	1586.2	0.000
		35	0.200	-0.025	1598.0	0.000
		36	0.318	0.017	1628.0	0.000

Figure 3: Correlogram of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2023. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.


Logarithm of Natural Amenities Tourists' Expenditure
Sample: 2002M01 2023M12
Included observations: 252

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.846	0.846	182.47	0.000
		2	0.627	-0.312	283.00	0.000
		3	0.460	0.111	337.36	0.000
		4	0.397	0.197	378.08	0.000
		5	0.397	0.069	418.84	0.000
		6	0.391	-0.018	458.66	0.000
		7	0.406	0.209	501.81	0.000
		8	0.393	-0.087	542.31	0.000
		9	0.393	0.161	583.08	0.000
		10	0.452	0.286	637.12	0.000
		11	0.552	0.185	718.08	0.000
		12	0.611	-0.035	817.53	0.000
		13	0.499	-0.384	884.16	0.000
		14	0.332	0.019	913.88	0.000
		15	0.213	0.036	926.09	0.000
		16	0.173	-0.070	934.17	0.000
		17	0.169	-0.126	941.99	0.000
		18	0.151	-0.106	948.23	0.000
		19	0.150	0.023	954.42	0.000
		20	0.136	-0.010	959.53	0.000
		21	0.141	0.060	965.06	0.000
		22	0.209	0.155	977.23	0.000
		23	0.320	0.108	1005.9	0.000
		24	0.383	-0.033	1047.1	0.000
		25	0.293	-0.111	1071.3	0.000
		26	0.157	0.117	1078.3	0.000
		27	0.058	-0.028	1079.3	0.000
		28	0.024	-0.072	1079.4	0.000
		29	0.016	-0.080	1079.5	0.000
		30	-0.004	-0.056	1079.5	0.000
		31	-0.002	0.004	1079.5	0.000
		32	-0.001	0.009	1079.5	0.000
		33	0.009	-0.061	1079.5	0.000
		34	0.072	0.069	1081.1	0.000
		35	0.164	-0.016	1089.0	0.000
		36	0.217	0.023	1102.9	0.000

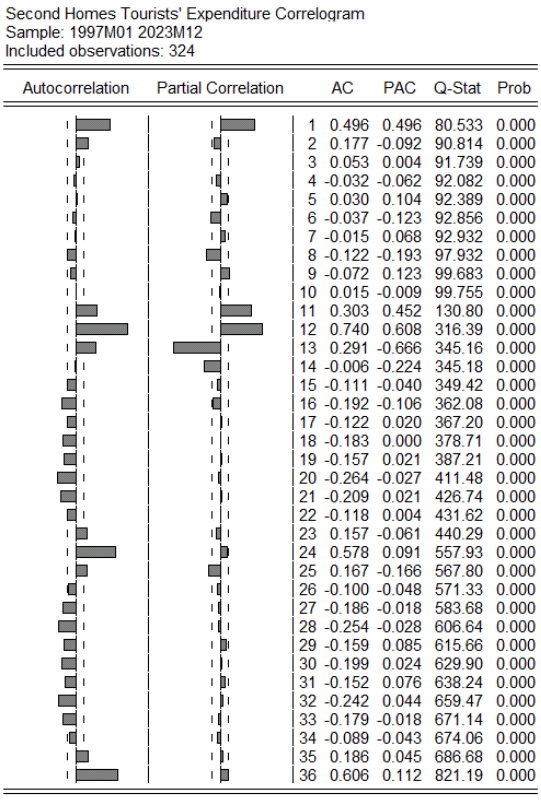
Figure 4: Correlogram of the Logarithm of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2023. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



First Difference of the Logarithm of Natural Amenities Tourists' Expenditure
Sample: 2002M01 2023M12
Included observations: 250

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.228	0.228	13.116	0.000
		2	-0.184	-0.249	21.722	0.000
		3	-0.381	-0.306	58.835	0.000
		4	-0.195	-0.093	68.539	0.000
		5	0.109	0.057	71.619	0.000
		6	-0.030	-0.276	71.859	0.000
		7	0.140	0.168	76.908	0.000
		8	-0.107	-0.239	79.866	0.000
		9	-0.295	-0.373	102.68	0.000
		10	-0.175	-0.115	110.75	0.000
		11	0.155	0.114	117.09	0.000
		12	0.714	0.519	251.91	0.000
		13	0.204	-0.093	262.98	0.000
		14	-0.185	-0.054	272.15	0.000
		15	-0.308	0.154	297.51	0.000
		16	-0.175	0.023	305.72	0.000
		17	0.111	0.028	309.04	0.000
		18	-0.016	-0.003	309.11	0.000
		19	0.106	-0.041	312.19	0.000
		20	-0.124	-0.163	316.37	0.000
		21	-0.282	-0.072	338.31	0.000
		22	-0.170	-0.069	346.27	0.000
		23	0.167	0.057	354.01	0.000
		24	0.631	0.117	464.94	0.000
		25	0.169	-0.133	472.98	0.000
		26	-0.153	0.082	479.54	0.000
		27	-0.281	0.047	501.81	0.000
		28	-0.153	-0.010	508.48	0.000
		29	0.106	0.059	511.69	0.000
		30	-0.039	-0.091	512.12	0.000
		31	0.072	-0.076	513.59	0.000
		32	-0.100	0.043	516.48	0.000
		33	-0.241	-0.044	533.30	0.000
		34	-0.119	0.007	537.40	0.000
		35	0.141	-0.018	543.24	0.000
		36	0.550	0.008	632.23	0.000

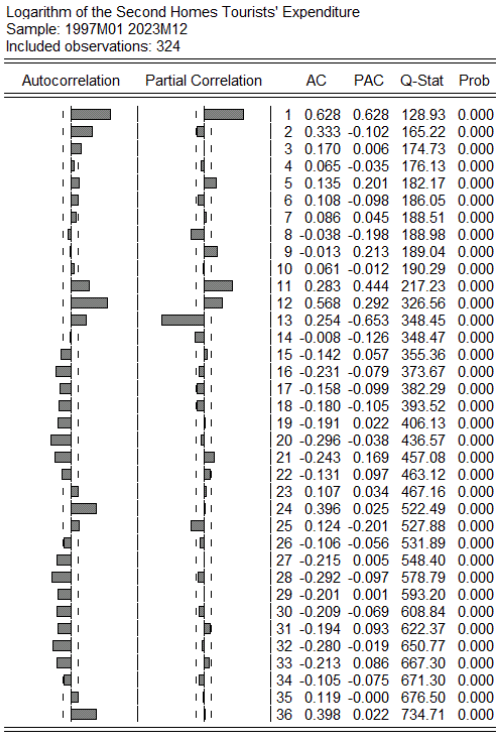
Figure 6: Correlogram of the First Difference of the Logarithm of the Natural Amenities Italian Tourists' Expenditure from January 2002 to December 2023. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



Second Homes Tourists' Expenditure Correlogram
Sample: 1997M01 2023M12
Included observations: 324

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.496	0.496	80.533	0.000
		2	0.177	-0.092	90.814	0.000
		3	0.053	0.004	91.739	0.000
		4	-0.032	-0.062	92.082	0.000
		5	0.030	0.104	92.389	0.000
		6	-0.037	-0.123	92.856	0.000
		7	-0.015	0.068	92.932	0.000
		8	-0.122	-0.193	97.932	0.000
		9	-0.072	0.123	99.683	0.000
		10	0.015	-0.009	99.755	0.000
		11	0.303	0.452	130.80	0.000
		12	0.740	0.608	316.39	0.000
		13	0.291	-0.666	345.16	0.000
		14	-0.006	-0.224	345.18	0.000
		15	-0.111	-0.040	349.42	0.000
		16	-0.192	-0.106	362.08	0.000
		17	-0.122	0.020	367.20	0.000
		18	-0.183	0.000	378.71	0.000
		19	-0.157	0.021	387.21	0.000
		20	-0.264	-0.027	411.48	0.000
		21	-0.209	0.021	426.74	0.000
		22	-0.118	0.004	431.62	0.000
		23	0.157	-0.061	440.29	0.000
		24	0.578	0.091	557.93	0.000
		25	0.167	-0.166	567.80	0.000
		26	-0.100	-0.048	571.33	0.000
		27	-0.186	-0.018	583.68	0.000
		28	-0.254	-0.028	606.64	0.000
		29	-0.159	0.085	615.66	0.000
		30	-0.199	0.024	629.90	0.000
		31	-0.152	0.076	638.24	0.000
		32	-0.242	0.044	659.47	0.000
		33	-0.179	-0.018	671.14	0.000
		34	-0.089	-0.043	674.06	0.000
		35	0.186	0.045	686.68	0.000
		36	0.606	0.112	821.19	0.000

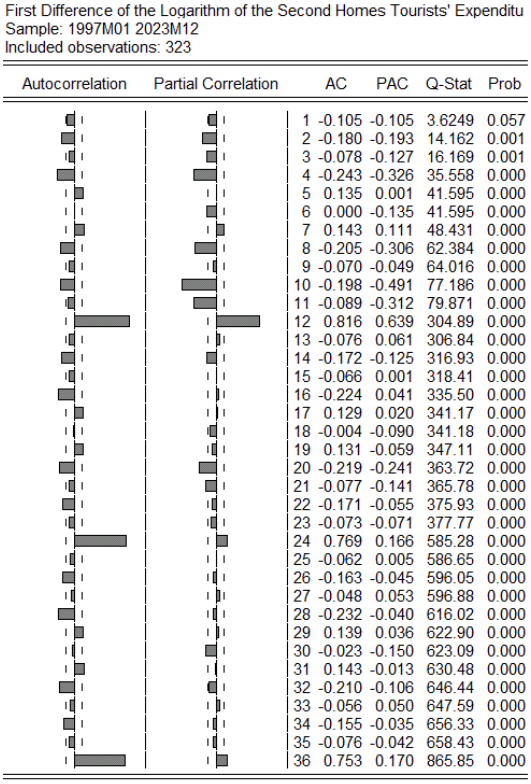
Figure 9: Correlogram of Second Homes Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



Logarithm of the Second Homes Tourists' Expenditure
Sample: 1997M01 2023M12
Included observations: 324

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.628	0.628	128.93	0.000
		2	0.333	-0.102	165.22	0.000
		3	0.170	0.006	174.73	0.000
		4	0.065	-0.035	176.13	0.000
		5	0.135	0.201	182.17	0.000
		6	0.108	-0.098	186.05	0.000
		7	0.086	0.045	188.51	0.000
		8	-0.038	-0.198	188.98	0.000
		9	-0.013	0.213	189.04	0.000
		10	0.061	-0.012	190.29	0.000
		11	0.283	0.444	217.23	0.000
		12	0.568	0.292	326.56	0.000
		13	0.254	-0.653	348.45	0.000
		14	-0.008	-0.126	348.47	0.000
		15	-0.142	0.057	355.36	0.000
		16	-0.231	-0.079	373.67	0.000
		17	-0.158	-0.099	382.29	0.000
		18	-0.180	-0.105	393.52	0.000
		19	-0.191	0.022	406.13	0.000
		20	-0.296	-0.038	436.57	0.000
		21	-0.243	0.169	457.08	0.000
		22	-0.131	0.097	463.12	0.000
		23	0.107	0.034	467.16	0.000
		24	0.396	0.025	522.49	0.000
		25	0.124	-0.201	527.88	0.000
		26	-0.106	-0.056	531.89	0.000
		27	-0.215	0.005	548.40	0.000
		28	-0.292	-0.097	578.79	0.000
		29	-0.201	0.001	593.20	0.000
		30	-0.209	-0.069	608.84	0.000
		31	-0.194	0.093	622.37	0.000
		32	-0.280	-0.019	650.77	0.000
		33	-0.213	0.086	667.30	0.000
		34	-0.105	-0.075	671.30	0.000
		35	0.119	-0.000	676.50	0.000
		36	0.398	0.022	734.71	0.000

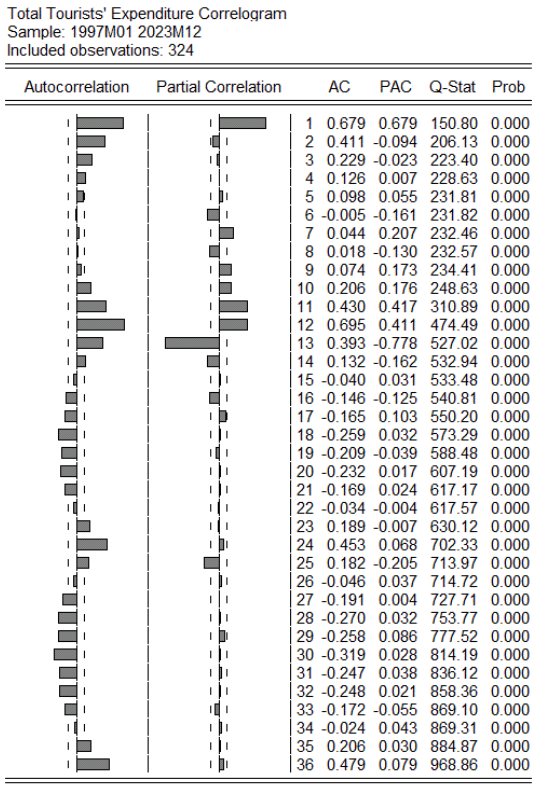
Figure 10: Correlogram of the Logarithm of the Second Homes Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



First Difference of the Logarithm of the Second Homes Tourists' Expenditu
Sample: 1997M01 2023M12
Included observations: 323

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.105	-0.105	3.6249	0.057
		2	-0.180	-0.193	14.162	0.001
		3	-0.078	-0.127	16.169	0.001
		4	-0.243	-0.326	35.558	0.000
		5	0.135	0.001	41.595	0.000
		6	0.000	-0.135	41.595	0.000
		7	0.143	0.111	48.431	0.000
		8	-0.205	-0.306	62.384	0.000
		9	-0.070	-0.049	64.016	0.000
		10	-0.198	-0.491	77.186	0.000
		11	-0.089	-0.312	79.871	0.000
		12	0.816	0.639	304.89	0.000
		13	-0.076	0.061	306.84	0.000
		14	-0.172	-0.125	316.93	0.000
		15	-0.066	0.001	318.41	0.000
		16	-0.224	0.041	335.50	0.000
		17	0.129	0.020	341.17	0.000
		18	-0.004	-0.090	341.18	0.000
		19	0.131	-0.059	347.11	0.000
		20	-0.219	-0.241	363.72	0.000
		21	-0.077	-0.141	365.78	0.000
		22	-0.171	-0.055	375.93	0.000
		23	-0.073	-0.071	377.77	0.000
		24	0.769	0.166	585.28	0.000
		25	-0.062	0.005	586.65	0.000
		26	-0.163	-0.045	596.05	0.000
		27	-0.048	0.053	596.88	0.000
		28	-0.232	-0.040	616.02	0.000
		29	0.139	0.036	622.90	0.000
		30	-0.023	-0.150	623.09	0.000
		31	0.143	-0.013	630.48	0.000
		32	-0.210	-0.106	646.44	0.000
		33	-0.056	0.050	647.59	0.000
		34	-0.155	-0.035	656.33	0.000
		35	-0.076	-0.042	658.43	0.000
		36	0.753	0.170	865.85	0.000

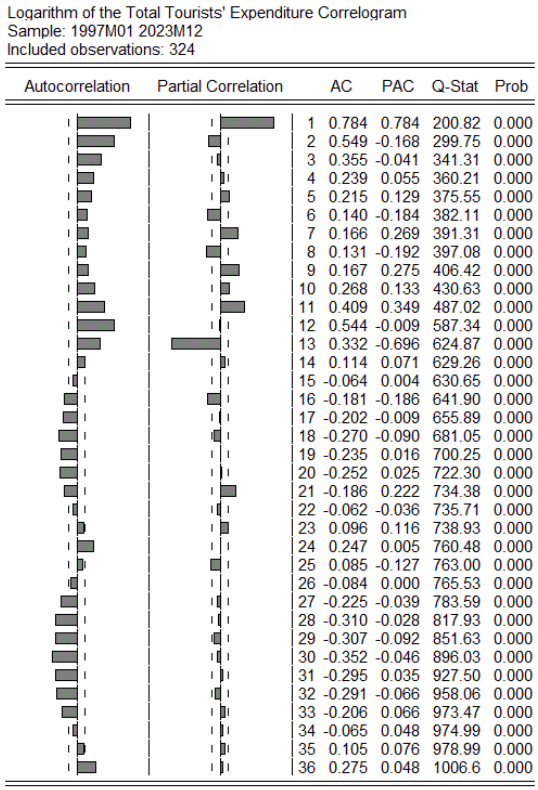
Figure 12: Correlogram of First Difference of the Logarithm of the Second Homes Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



Total Tourists' Expenditure Correlogram
Sample: 1997M01 2023M12
Included observations: 324

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.679	0.679	150.80	0.000
		2	0.411	-0.094	206.13	0.000
		3	0.229	-0.023	223.40	0.000
		4	0.126	0.007	228.63	0.000
		5	0.098	0.055	231.81	0.000
		6	-0.005	-0.161	231.82	0.000
		7	0.044	0.207	232.46	0.000
		8	0.018	-0.130	232.57	0.000
		9	0.074	0.173	234.41	0.000
		10	0.206	0.176	248.63	0.000
		11	0.430	0.417	310.89	0.000
		12	0.695	0.411	474.49	0.000
		13	0.393	-0.778	527.02	0.000
		14	0.132	-0.162	532.94	0.000
		15	-0.040	0.031	533.48	0.000
		16	-0.146	-0.125	540.81	0.000
		17	-0.165	0.103	550.20	0.000
		18	-0.259	0.032	573.29	0.000
		19	-0.209	-0.039	588.48	0.000
		20	-0.232	0.017	607.19	0.000
		21	-0.169	0.024	617.17	0.000
		22	-0.034	-0.004	617.57	0.000
		23	0.189	-0.007	630.12	0.000
		24	0.453	0.068	702.33	0.000
		25	0.182	-0.205	713.97	0.000
		26	-0.046	0.037	714.72	0.000
		27	-0.191	0.004	727.71	0.000
		28	-0.270	0.032	753.77	0.000
		29	-0.258	0.086	777.52	0.000
		30	-0.319	0.028	814.19	0.000
		31	-0.247	0.038	836.12	0.000
		32	-0.248	0.021	858.36	0.000
		33	-0.172	-0.055	869.10	0.000
		34	-0.024	0.043	869.31	0.000
		35	0.206	0.030	884.87	0.000
		36	0.479	0.079	968.86	0.000

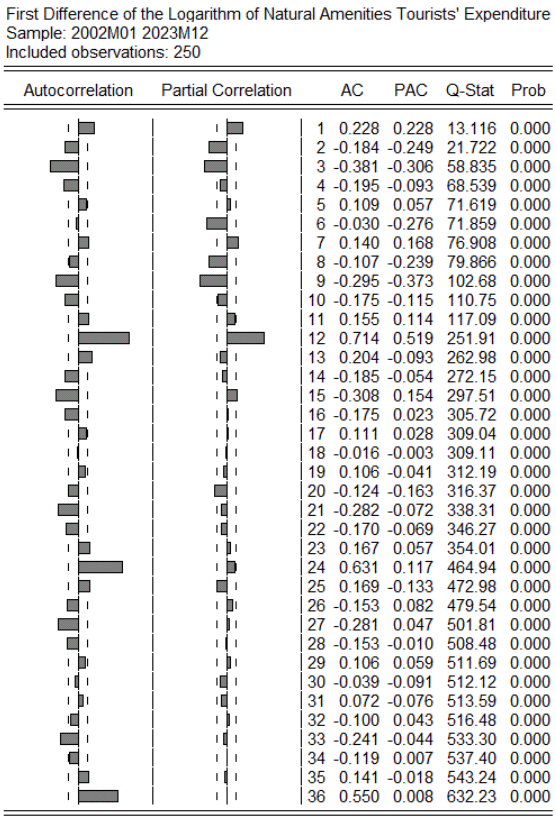
Figure 15: Correlogram of the Total Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



Logarithm of the Total Tourists' Expenditure Correlogram
Sample: 1997M01 2023M12
Included observations: 324

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.784	0.784	200.82	0.000
		2	0.549	-0.168	299.75	0.000
		3	0.355	-0.041	341.31	0.000
		4	0.239	0.055	360.21	0.000
		5	0.215	0.129	375.55	0.000
		6	0.140	-0.184	382.11	0.000
		7	0.166	0.269	391.31	0.000
		8	0.131	-0.192	397.08	0.000
		9	0.167	0.275	406.42	0.000
		10	0.268	0.133	430.63	0.000
		11	0.409	0.349	487.02	0.000
		12	0.544	-0.009	587.34	0.000
		13	0.332	-0.696	624.87	0.000
		14	0.114	0.071	629.26	0.000
		15	-0.064	0.004	630.65	0.000
		16	-0.181	-0.186	641.90	0.000
		17	-0.202	-0.009	655.89	0.000
		18	-0.270	-0.090	681.05	0.000
		19	-0.235	0.016	700.25	0.000
		20	-0.252	0.025	722.30	0.000
		21	-0.186	0.222	734.38	0.000
		22	-0.062	-0.036	735.71	0.000
		23	0.096	0.116	738.93	0.000
		24	0.247	0.005	760.48	0.000
		25	0.085	-0.127	763.00	0.000
		26	-0.084	0.000	765.53	0.000
		27	-0.225	-0.039	783.59	0.000
		28	-0.310	-0.028	817.93	0.000
		29	-0.307	-0.092	851.63	0.000
		30	-0.352	-0.046	896.03	0.000
		31	-0.295	0.035	927.50	0.000
		32	-0.291	-0.066	958.06	0.000
		33	-0.206	0.066	973.47	0.000
		34	-0.065	0.048	974.99	0.000
		35	0.105	0.076	978.99	0.000
		36	0.275	0.048	1006.6	0.000

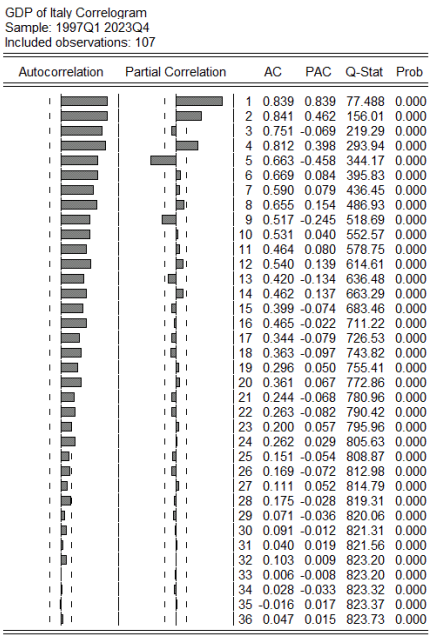
Figure 16: Correlogram of the Logarithm of the Total Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



First Difference of the Logarithm of Natural Amenities Tourists' Expenditure
Sample: 2002M01 2023M12
Included observations: 250

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.228	0.228	13.116	0.000
		2	-0.184	-0.249	21.722	0.000
		3	-0.381	-0.306	58.835	0.000
		4	-0.195	-0.093	68.539	0.000
		5	0.109	0.057	71.619	0.000
		6	-0.030	-0.276	71.859	0.000
		7	0.140	0.168	76.908	0.000
		8	-0.107	-0.239	79.866	0.000
		9	-0.295	-0.373	102.68	0.000
		10	-0.175	-0.115	110.75	0.000
		11	0.155	0.114	117.09	0.000
		12	0.714	0.519	251.91	0.000
		13	0.204	-0.093	262.98	0.000
		14	-0.185	-0.054	272.15	0.000
		15	-0.308	0.154	297.51	0.000
		16	-0.175	0.023	305.72	0.000
		17	0.111	0.028	309.04	0.000
		18	-0.016	-0.003	309.11	0.000
		19	0.106	-0.041	312.19	0.000
		20	-0.124	-0.163	316.37	0.000
		21	-0.282	-0.072	338.31	0.000
		22	-0.170	-0.069	346.27	0.000
		23	0.167	0.057	354.01	0.000
		24	0.631	0.117	464.94	0.000
		25	0.169	-0.133	472.98	0.000
		26	-0.153	0.082	479.54	0.000
		27	-0.281	0.047	501.81	0.000
		28	-0.153	-0.010	508.48	0.000
		29	0.106	0.059	511.69	0.000
		30	-0.039	-0.091	512.12	0.000
		31	0.072	-0.076	513.59	0.000
		32	-0.100	0.043	516.48	0.000
		33	-0.241	-0.044	533.30	0.000
		34	-0.119	0.007	537.40	0.000
		35	0.141	-0.018	543.24	0.000
		36	0.550	0.008	632.23	0.000

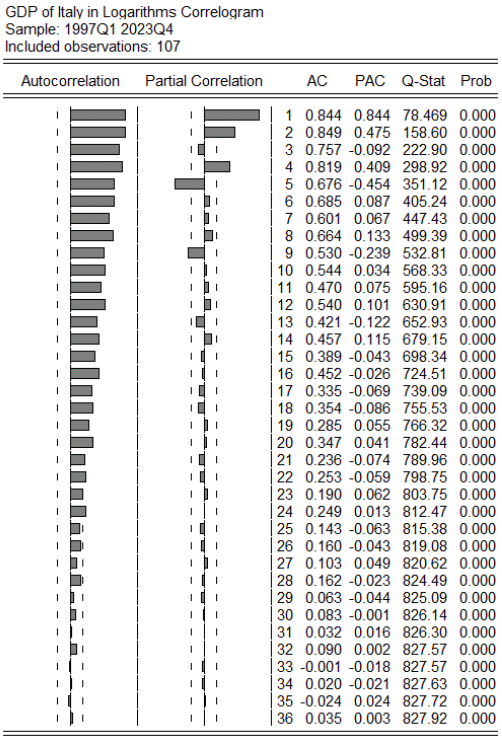
Figure 18: Correlogram of the First Difference of the Logarithm of the Total Italian Tourists' Expenditure from January 1997 to December 2023 in millions of Euros. Source: author's elaboration by Banca d'Italia Indagine sul turismo internazionale dell'Italia.



GDP of Italy Correlogram
Sample: 1997Q1 2023Q4
Included observations: 107

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.839	0.839	77.488	0.000
		2	0.841	0.462	156.01	0.000
		3	0.751	-0.069	219.29	0.000
		4	0.812	0.398	293.94	0.000
		5	0.663	-0.458	344.17	0.000
		6	0.669	0.084	395.83	0.000
		7	0.590	0.079	436.45	0.000
		8	0.655	0.154	486.93	0.000
		9	0.517	-0.245	518.69	0.000
		10	0.531	0.040	552.57	0.000
		11	0.464	0.080	578.75	0.000
		12	0.540	0.139	614.61	0.000
		13	0.420	-0.134	636.48	0.000
		14	0.462	0.137	663.29	0.000
		15	0.399	-0.074	683.46	0.000
		16	0.465	-0.022	711.22	0.000
		17	0.344	-0.079	726.53	0.000
		18	0.363	-0.097	743.82	0.000
		19	0.296	0.050	755.41	0.000
		20	0.361	0.067	772.86	0.000
		21	0.244	-0.068	780.96	0.000
		22	0.263	-0.082	790.42	0.000
		23	0.200	0.057	795.96	0.000
		24	0.262	0.029	805.63	0.000
		25	0.151	-0.054	808.87	0.000
		26	0.169	-0.072	812.98	0.000
		27	0.111	0.052	814.79	0.000
		28	0.175	-0.028	819.31	0.000
		29	0.071	-0.036	820.06	0.000
		30	0.091	-0.012	821.31	0.000
		31	0.040	0.019	821.56	0.000
		32	0.103	0.009	823.20	0.000
		33	0.006	-0.008	823.20	0.000
		34	0.028	-0.033	823.32	0.000
		35	-0.016	0.017	823.37	0.000
		36	0.047	0.015	823.73	0.000

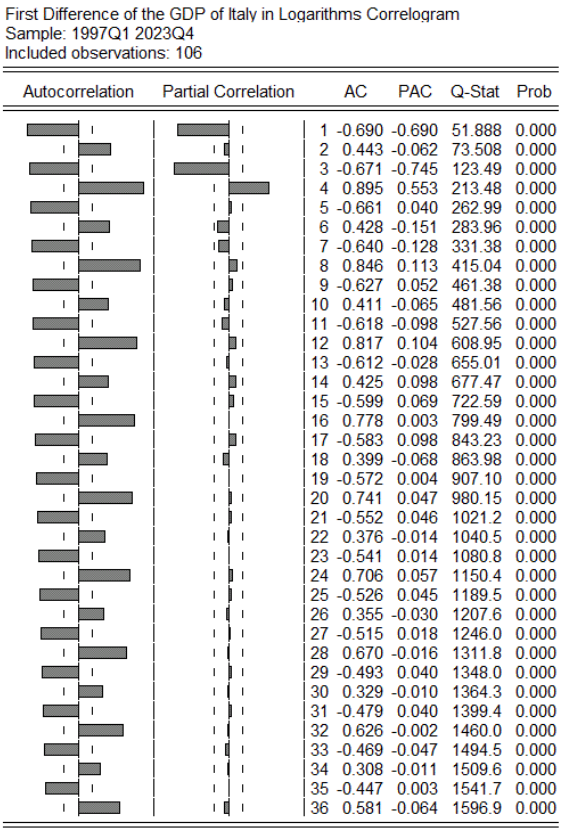
Figure 21: Correlogram of the Gross Domestic Product of Italy from the first quarter of 1997 to the third quarter of 2023 in millions of Euros. Source: author's elaboration by OECD.Stat database.



GDP of Italy in Logarithms Correlogram
Sample: 1997Q1 2023Q4
Included observations: 107

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.844	0.844	78.469	0.000
		2	0.849	0.475	158.60	0.000
		3	0.757	-0.092	222.90	0.000
		4	0.819	0.409	298.92	0.000
		5	0.676	-0.454	351.12	0.000
		6	0.685	0.087	405.24	0.000
		7	0.601	0.067	447.43	0.000
		8	0.664	0.133	499.39	0.000
		9	0.530	-0.239	532.81	0.000
		10	0.544	0.034	568.33	0.000
		11	0.470	0.075	595.16	0.000
		12	0.540	0.101	630.91	0.000
		13	0.421	-0.122	652.93	0.000
		14	0.457	0.115	679.15	0.000
		15	0.389	-0.043	698.34	0.000
		16	0.452	-0.026	724.51	0.000
		17	0.335	-0.069	739.09	0.000
		18	0.354	-0.086	755.53	0.000
		19	0.285	0.055	766.32	0.000
		20	0.347	0.041	782.44	0.000
		21	0.236	-0.074	789.96	0.000
		22	0.253	-0.059	798.75	0.000
		23	0.190	0.062	803.75	0.000
		24	0.249	0.013	812.47	0.000
		25	0.143	-0.063	815.38	0.000
		26	0.160	-0.043	819.08	0.000
		27	0.103	0.049	820.62	0.000
		28	0.162	-0.023	824.49	0.000
		29	0.063	-0.044	825.09	0.000
		30	0.083	-0.001	826.14	0.000
		31	0.032	0.016	826.30	0.000
		32	0.090	0.002	827.57	0.000
		33	-0.001	-0.018	827.57	0.000
		34	0.020	-0.021	827.63	0.000
		35	-0.024	0.024	827.72	0.000
		36	0.035	0.003	827.92	0.000

Figure 22: Correlogram of the Logarithm of the Gross Domestic Product of Italy from the first quarter of 1997 to the third quarter of 2023 in millions of Euros. Source: author's elaboration by OECD.Stat database.



First Difference of the GDP of Italy in Logarithms Correlogram
Sample: 1997Q1 2023Q4
Included observations: 106

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.690	-0.690	51.888	0.000
		2	0.443	-0.062	73.508	0.000
		3	-0.671	-0.745	123.49	0.000
		4	0.895	0.553	213.48	0.000
		5	-0.661	0.040	262.99	0.000
		6	0.428	-0.151	283.96	0.000
		7	-0.640	-0.128	331.38	0.000
		8	0.846	0.113	415.04	0.000
		9	-0.627	0.052	461.38	0.000
		10	0.411	-0.065	481.56	0.000
		11	-0.618	-0.098	527.56	0.000
		12	0.817	0.104	608.95	0.000
		13	-0.612	-0.028	655.01	0.000
		14	0.425	0.098	677.47	0.000
		15	-0.599	0.069	722.59	0.000
		16	0.778	0.003	799.49	0.000
		17	-0.583	0.098	843.23	0.000
		18	0.399	-0.068	863.98	0.000
		19	-0.572	0.004	907.10	0.000
		20	0.741	0.047	980.15	0.000
		21	-0.552	0.046	1021.2	0.000
		22	0.376	-0.014	1040.5	0.000
		23	-0.541	0.014	1080.8	0.000
		24	0.706	0.057	1150.4	0.000
		25	-0.526	0.045	1189.5	0.000
		26	0.355	-0.030	1207.6	0.000
		27	-0.515	0.018	1246.0	0.000
		28	0.670	-0.016	1311.8	0.000
		29	-0.493	0.040	1348.0	0.000
		30	0.329	-0.010	1364.3	0.000
		31	-0.479	0.040	1399.4	0.000
		32	0.626	-0.002	1460.0	0.000
		33	-0.469	-0.047	1494.5	0.000
		34	0.308	-0.011	1509.6	0.000
		35	-0.447	0.003	1541.7	0.000
		36	0.581	-0.064	1596.9	0.000

Figure 24: Correlogram of the First Difference of the Logarithm of the Gross Domestic Product of Italy from the first quarter of 1997 to the third quarter of 2023 in millions of Euros. Source: author's elaboration by OECD.Stat database.

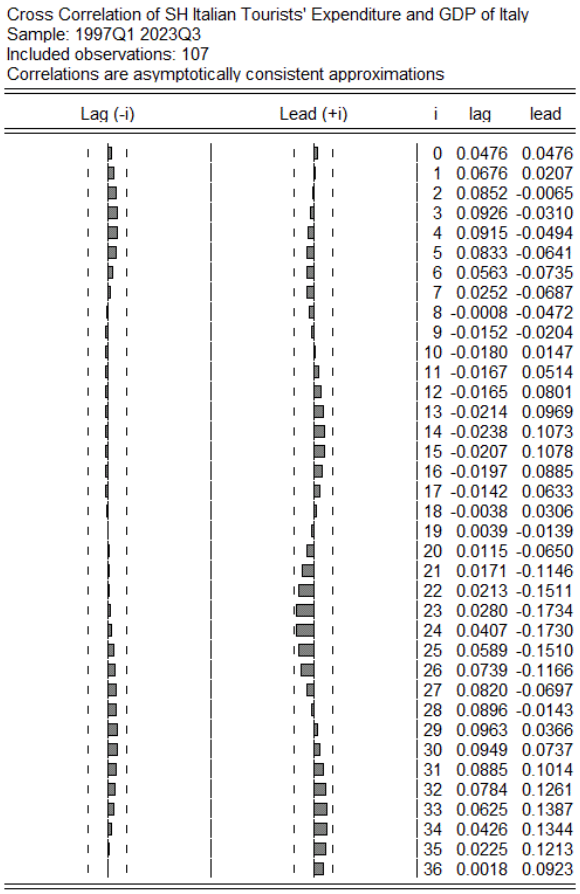


Figure 29: Cross-Correlation of SH Italian Tourists' expenditure from the first quarter of 1997 to the third quarter of 2023. Source: authors elaboration with Banca d'Italia Indagine sul turismo internazionale dell'Italia.

Cointegration Restrictions: B(1,1)=0

Convergence is achieved after 1 iteration.

Not all cointegrating vectors are identified

LR test for binding restrictions (rank=1):

Chi-square(1)	22.66752
Probability	0.000002

Cointegration Eq:	**CointEq1**
LOG(EXP SH(-1))	0.000000
LOG(EXP_NAT_A(-1))	-0.244955
C	1. 496490

Table 20: Exclusion Test for the long-run VECM model for SHTEI beta coefficient. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

Cointegration Restrictions: B(1,2)=0	
Convergence achieved after 1 iterations.	
Not all cointegrating vectors are identified	
LR test for binding restrictions (rank=1):	
Chi-square(1)	4.064550
Probability	0.043792
Cointegrating Eq:	**CointEq1**
LOG(EXP SH(-1))	-6.659044
LOG(EXP_NAT_A(-1))	0.000000
C	36.60058

Table 21: Exclusion Test for the long-run VECM model for NATEI beta coefficient. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

Cointegration Restrictions: A(2,1)=0		
Convergence achieved after 3 iterations.		
Not all cointegrating vectors are identified		
LR test for binding restrictions (rank=1):		
Chi-square(1)	0.665754	
Probability	0.414536	
Cointegrating Eq.	**CointEq1**	
LOG(EXP SH(-1))	-7.357205	
LOG(EXP_NAT_A(-1))	-0.462070	
C	43.26082	
Error Correction	D(LOG(EXP SH))	D(LOG(EXP_NAT_A))
CointEq1	0.033122	0.000000
	(0.00688)	(0.000000)
	[4.81469]	[NA]

Table 22: Exogeneity Test for the long-run VECM model for NATEI alpha coefficient. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

Cointegration Restrictions: A(1,1)=0		
Convergence achieved after 4 iterations.		
Not all cointegrating vectors are identified		
LR test for binding restrictions (rank=1):		
Chi-square(1)	23.57230	
Probability	0.000001	
Cointegrating Eq.	**CointEq1**	
LOG(EXP SH(-1))	-27.04690	
LOG(EXP_NAT_A(-1))	14.42916	
C	60.50871	
Error Correction	D(LOG(EXP SH))	D(LOG(EXP_NAT_A))
CointEq1	0.000000	-0.001153
	(0.000000)	(0.00106)
	[NA]	[-1.08626]

Table 23: Exogeneity Test for the long-run VECM model for SHTEI alpha coefficient. Source: author's elaboration with Banda d'Italia Indagine sul turismo internazionale dell'Italia.

Log Likelihood is 428.719 (-2 LogL = -857.438).
Prediction error variance is 9.14735e-005

Summary Statistics

	LGDP_output_notadj
T	107.00
P	6.0000
std.error	0.0095642
Normality	0.72504
H(97)	2.4951
DW	2.1797
r(1)	-0.097328
q	14.000
r(q)	0.093904
Q(q,q-p)	17.997
Rs^2	0.87798

Variances of disturbances:

	Value	(q-ratio)
Level	0.000000	(0.0000)
Slope	1.04007e-006	(0.3314)
Seasonal	8.08449e-007	(0.2576)
Cycle	3.25707e-005	(10.38)
Irregular	3.13885e-006	(1.000)

Table 24: GDP of Italy's principal statistics: summary statistics and variances of disturbances.

Log Likelihood is 182.495 (-2 LogL = -364.989).
Prediction error variance is 0.0227331

Summary Statistics

	LExp_Total
T	108.00
P	6.0000
std.error	0.15078
Normality	357.71
H(34)	12.854
DW	2.0222
r(1)	-0.031495
q	15.000
r(q)	-0.0072180

Q(q,q-p)	10.699
Rs^2	0.16135

Variances of disturbances:

	Value	(q-ratio)
Level	0.000377989	(0.03665)
Slope	0.000000	(0.0000)
Seasonal	1.70046e-005	(0.001649)
Cycle	0.0103122	(1.000)
Irregular	0.00414633	(0.4021)

Table 25: TTE in logarithms principal statistics: summary statistics and variances of disturbances.

Log Likelihood is 172.609 (-2 LogL = -345.218).
Prediction error variance is 0.0291706

Summary Statistics

	LExp_SH
T	108.00
P	6.0000
std.error	0.17079
Normality	34.125
H(34)	4.2713
DW	2.0074
r(1)	-0.032098
q	15.000
r(q)	-0.073210
Q(q,q-p)	10.539
Rs^2	0.11114

Variances of disturbances:

	Value	(q-ratio)
Level	0.00851625	(1.000)
Slope	0.000000	(0.0000)
Seasonal	7.97970e-005	(0.009379)
Cycle	0.00428213	(0.5028)
Irregular	0.00452819	(0.5317)

Table 26: SHTEI in logarithms principal statistics: summary statistics and variances of disturbances.

Log-Likelihood is 318.193 (-2 LogL = -636.386).
Prediction error variance is 0.0339639

Summary Statistics

	LSpe_Vac_Nat
T	216.00
P	3.0000
std.error	0.18429
Normality	20.822
H(97)	0.32466
DW	1.6741
r(1)	0.16086
q	24.000
r(q)	-0.090149
Q(q,q-p)	38.456
Rs^2	0.32327

Variances of disturbances:

	Value	(q-ratio)
Level	0.00104467	(0.05580)
Slope	0.000000	(0.0000)
Seasonal	5.52473e-005	(0.002951)
Irregular	0.0187212	(1.000)

Table 27: NATEI in logarithms principal statistics: summary statistics and variances of disturbances.

Concluding remarks

It is essential to have a nuanced understanding of the second-home phenomenon, its interconnections with other research fields (such as the environment), and its economic implications. Previous studies have explored the relationships between tourism expenditure and various factors, including location-specific attributes and satisfaction levels. This thesis research contributes to this evolving landscape, emphasising the need for holistic perspectives and informed decision-making in second-home tourism. Inbound tourism in Italy has proven to be of special attention to environmental concerns. This conclusion stems from the significant, positive, and high elasticity of natural amenities to second homes tourists' expenditures of foreign tourists. Regarding outbound tourism, the elasticity between natural amenities and second-home tourists' expenditures is also significant but negative and far from one. This shows that Italians abroad do not seem to be a big menace to the environment concerning second homes or an important under-declaration in tourist surveys.

In the first chapter, the findings indicate that factors external to the paper positively affect the complexity of the methodology chosen to study the determinants of Tourist Expenditure in Microeconometric and Parametric Studies (TEMPS). However, two factors internal to the

paper negatively influence the choice of methodological complexity, as papers utilising variables associated with these components tend to perform the most straightforward analysis, such as Simple Linear Regression. These two principal components are information source and seasonality. Conversely, the main internal components, household welfare and destination satisfaction, do not have a statistically significant relationship with the dependent variable complexity of the methodology used in the TEMPS. Concerning the outcomes of the Poisson Models, government policies in tourist destinations and business managers should focus on internal factors to enhance tourist expenditure. The distinctive characteristics of each tourist destination must be considered. Nevertheless, economic policy should prioritise these internal factors to ensure a beneficial economic impact on the destination.

The second thesis chapter reveals a consensus among most perspectives on second-home tourism regarding the temporary nature of the tourist's visit. Another recurring characteristic in the interpretations of second-home tourism is using these properties for leisure. Notably, all definitions of second-home tourists revolve around second-home owners, omitting those who rent second homes for recreation—an oversight that excludes the category of rental tourists from the second-home tourist definition. Consequently, the literature focuses on the second-home owner as the central figure in second-home tourism.

Moreover, the bibliometric analysis of second homes and second-home tourism (chapter two) reveals distinctions in cluster analysis and keyword rankings. This underscores the necessity to examine the literature on second-home tourism independently. Notably, the author's keyword ranking in the Scopus database for second homes clarifies that 'COVID-19' and 'tourism' emerge as the most relevant topics in the academic output related to second homes. Finally, the keywords-plus ranking in second-home tourism bibliometrics highlights 'tourist destination' as the most recurrent concept, followed by 'tourist behaviour' and 'tourism development', indicating the most researched topics.

The results of Chapter Three compare the Basic Structural Model (BSM) of the second-home tourist expenditure series, revealing some points of contrast with the total tourist expenditure series BSM. Firstly, the dynamics of the logarithm of the expenditure of second-home tourists and the level plus interventions are very similar to those of the total expenditure series. The same applies to the dynamics of seasonality and irregular components. Conversely, both exhibited similar behaviours before the COVID-19 crisis, but in the case of the second-home tourist expenditure series, the recovery in 2022 is considerably higher than in the total expenditure series. These two series are compared with the monthly natural amenities' tourist expenditure series. However, due to a lack of data in some periods, this series is analysed from January 2002 to December 2019. Significant differences are also found between this series' dynamics and those previously analysed, highlighting the importance of studying it independently.

In addition, also in chapter three, a positive and statistically significant short-term relationship is discovered between second-home and natural amenities tourists' expenditure for foreign tourists in Italy, corroborating the conclusions drawn from the literature review. A cointegration relationship is discerned between second-home and natural amenities tourists' expenditure, signifying a common trend in the long term. This analysis is conducted while

considering exogenous factors, including the Manufacturing Price Competitiveness Index, which is significant at a 5% level for Germany, Canada, France, and the United Kingdom. Additionally, the model includes outliers, seasonal variations, and calendar dummies.

The research findings in Chapter Four indicate that second homes, natural amenities, total Italian tourists' expenditure abroad, and Italy's GDP exhibit different trends throughout the analysis period. The varying dynamics of outbound tourism variables of interest underscore the importance of studying them separately. Cycles of approximately ten years are identified in second-home Italian tourists' expenditure overseas between the first quarter of 1997 and the fourth quarter of 2023. No cycles are found for total tourist expenditure in the same period.

Regarding Italy's GDP, cycles of around five years are observed within the timespan of the fourth part of this thesis. The analysis incorporates the cross-correlations of second-home Italian tourists' expenditure and Italy's GDP quarterly series cycles. This evaluation demonstrates no systematic relationship between the cyclical components of Italy's GDP and second-home Italian tourists' expenditure abroad.

An ARDL model was conducted to study the short-term relationship between second-home tourism and nature tourism, using Italian tourists' expenditure abroad from 2022 to 2019 as proxies for these tourism typologies. The model shows a significant positive coefficient, indicating an elasticity of 0.11, suggesting a short-term relationship between the variables of interest, consistent with the literature. However, a minimal significant and negative coefficient (-0.06) was estimated for the long-term relationship between the series. Nevertheless, the Johansen test confirmed a cointegration relationship between second-home and natural amenities in Italian tourists' expenditure abroad.

Some limitations of this work should be considered. Tourist surveys rely on tourists' honesty, which does not always occur. This situation is of particular importance in the case of second-home tourists, renters, and owners. For this reason, government planning and control in the second-home market are crucial. Also, policymakers should play an essential role in restricting the construction of second homes to mitigate environmental damage. In addition, future lines of research surge from this thesis. Working from the supply side using Airbnb databases can complement the demand side studies in this thesis. Other lines of research could apply the same empirical methods as this thesis to specific destinations with natural amenities, such as mountain destinations. Also, it can be interesting to study the cointegration between second homes and cultural tourism through the same methodology.

This thesis highlights the need for nuanced, independent analysis of second-home tourism to inform effective economic, environmental, and regulatory strategies. Future research should focus on the supply side, including platforms like Airbnb, to expand the understanding of demand and supply dynamics. Additionally, investigating connections between second-home tourism and other types, such as cultural tourism, could provide a more comprehensive view of second-home tourism's place within the broader tourism ecosystem. The overall conclusion of this research emphasises the complex and multifaceted nature of second-home tourism and its varied impacts on domestic and international contexts. Each chapter

contributes insights that build a cohesive understanding of second-home tourism's economic, environmental, and methodological dimensions, offering practical implications for policymakers and stakeholders.

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