The real estate growth hypothesis in tourism destinations

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Abstract
This article proposes and theoretically develops the Real Estate Growth Hypothesis concept. It empirically investigates the connection between the expansion of tourism and the progress of real estate in Calp, an established tourist hotspot situated on the Mediterranean coast of Spain. Using annual data for the period 1967-2019 and a time series methodology that considers the possible nonlinearity of the relationship, the article draws conclusions from local and long-term perspectives. The results indicate that tourism causes real estate development, but only in the case of positive shocks. In view of this result, practical implications are outlined, and suggestions are made for managing tourist destinations.

Keywords: Real estate development, tourism growth, non-linear causality analysis, asymmetries

1. Introduction

Tourism has a carry-over effect on other economic activities and it is a viable economic alternative to traditional industries (Fleming & Toepper, 1990). Following the theoretical postulates of Balassa (1978) and the pioneering empirical work of Balaguer and Cantavella-Jorda (2002), this powerful relationship between tourism growth and the economic development of destinations has given rise to a whole branch of scientific literature on tourism known as the Tourism Led Growth Hypothesis (TLGH).

A myriad of articles on TLGH attempt to establish the relationship direction (one-way or bidirectional) of causality between tourism and economic growth for a large number of case studies using various econometric methodologies, most notably the Granger non-causality test (Brida et al., 2016).

One activity driven by this tourism growth is real estate development (Hall, 2014). Real estate provides various forms of accommodation for tourists, depending on the product in which the destination specializes. Once the industries start to become successful tourism and real estate development can interact with each other, promoting the growth of the destination through a mutually reinforcing mechanism (Fereidouni & Al-Mulali, 2014; Gopy-Ramdhany et al., 2021). Moreover, under even a partial operation of Say's Law, real estate development could precede or strongly drive the initial growth of the destination's own tourism growth.

If tourists constitute the basic demand for real estate products, once they become residents or semi-residents of the destination, the purchasers of these products can attract new tourists or residents through their beneficial word-of-mouth. Moreover, when selling their products, real estate developers can actively promote the destination by specializing in different markets, trying to attract new tourists and potential buyers for their products.

Therefore, exploring the relationship between tourism growth and the real estate development in destinations and asking whether the relationship is one-way (and in this case, in which direction) or whether it can be conceived as a bilateral relationship is a legitimate research topic. Expanding the relationship in this way, by using a methodology similar to that of the TLGH, a potential Real Estate Growth Hypothesis may be tested (Figure 1).
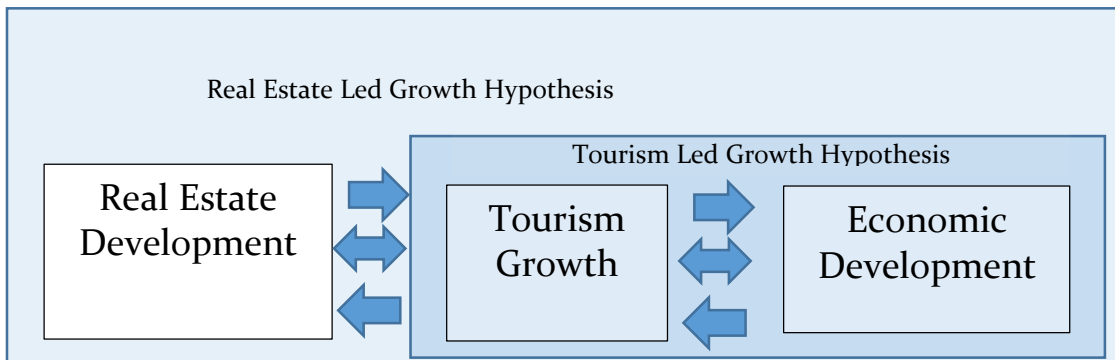
Figure 1: *The Real Estate Led Growth Hypothesis. Authors own elaboration.*

The literature has attempted to analyze this relationship using several proxies for the considered variables. Some studies (e.g., Tang et al., 2007 or Selvanathan et al, 2009) focus on the relationship between total international direct investment (FDI) and tourism development. However, recently, the research has been studying the relationship by disaggregating residential direct investment (FRDI) from total direct investment (Gopy-Ramdhany et al., 2021).

This article addresses this question for the case study of Calp, a consolidated destination located in the province of Alicante (Mediterranean Spanish coastline), using time series data for the period 1967-2019. The article is innovative in several respects. First, from a theoretical viewpoint, its main contribution is the proposal of the concept of the Real Estate Growth Hypothesis and the explanation of its main mechanisms. Second, from an empirical standpoint, as it uses an extensive timeframe, it enables us to examine the connections across a wide time spectrum and therefore to draw conclusions from a long-term perspective. To the best of the authors' knowledge, no study has used such a long time period. Third, instead of FDI or FRDI series, this article uses as a proxy for real estate development the building licenses granted to developers by the City Council. Therefore, it considers the effective real estate development on the ground. The fourth novelty of this article is that it uses a methodology that takes into account the possible asymmetry of the relationship, one of the existing forms of nonlinearity.

The structure of the article is as follows. After this brief introduction, the second and third sections review the existing literature on the phenomenon and describe the case study. The fourth section describes the methodology. The fifth section presents the data and results. Finally, the discussion of the results and the main conclusions are summarized.

2.Literature review

There is abundant scientific literature (Kabil et al., 2022; Coëffé & Stock, 2021, Gohar, 2021; Shoval, 2018; Luo et al., 2016; Bardhan et al, 2008) that theoretically and empirically explores the relationship between tourism growth and real estate development.

From a theoretical viewpoint, the relationship between the two phenomena is so close that in the mid-1990s it gave rise to a new term "tourism real estate" (Nguyen et al., 2021; Ying, 2021; Xu et al., 2012) coined by Chen (1996) and by Mazón & Aledo (1996) as a new industry that amalgamates tourism and real estate by seamlessly integrating activities such as planning and design, construction, marketing, and even hotel management.

As in the case of the TLGH, and according to Perles et al. (2018a), there is a whole body of scientific tourism literature on the subject under the concept of *residential tourism* or *second home* tourism. However, while *second home* literature focuses solely on second home ownership, *residential tourism* research covers both second home ownership and the rental of holiday homes, which has become increasingly popular since the 1960s on Southern European Mediterranean coasts. In this sense, according to Rodriguez and Bustillo (2010), tourism constitutes an initial phase prior to purchasing real estate overseas, and it continues to be a subsequent phase following the acquisition of property in the destination. This indicates the theoretical existence of a bilateral relationship between the two activities. Figure 2 reflects the principal potential mechanism linking residential development and tourism growth.

The tourism cycle begins with visitors coming to the destination. While some may only come once, others become loyal tourists who return periodically. Some of the latter may even become property owners in the area, using the property for vacation and investment purposes. As property owners, they actively promote the destination, seeking to maximize occupancy by renting to friends, relatives, or other tourists.

On the other hand, local or external real estate developers have a notable impact on the tourism sector. They seek out ideal locations for tourism before or after the destination has gained popularity and construct accommodation for both tourists and potential investors. In the latter scenario, developers

actively promote the destination to attract tourists and investors by participating in events such as specialized fairs or conducting marketing campaigns in the markets of origin.
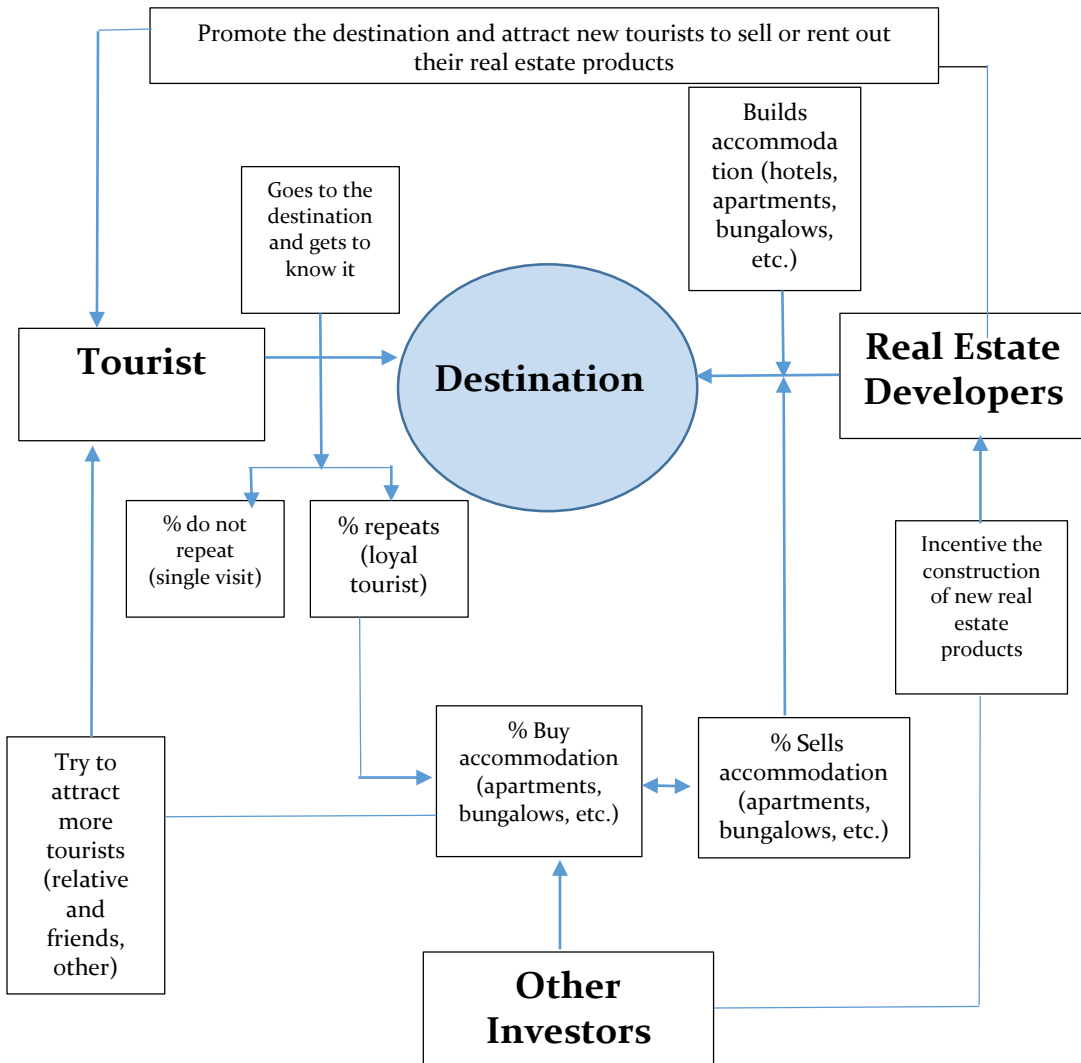
Figure 2: *Potential mechanisms linking real estate development and tourism growth. Authors own elaboration.*

External investors (investment funds or other agents) reinforce the interaction between tourists and real estate developers), seeking profitability in the exploitation of real estate products through maximum occupancy by new tourists coming to the destination.

This cycle of tourism-real estate interaction and growth in the destinations is beneficial, to some extent, in terms of the social acceptance by the destination's residents, who find in the cycle a source of wealth and employment that they formerly lacked. The local authorities also find a source of revenue from various taxes associated with real estate activity.

But this is not all. The conversion of non-tourism real estate to tourism real estate has played an important role in the shaping of destinations. On the one hand, traditional settlements are increasingly used for tourism purposes, favored by the collaborative economy platforms (Moreno-Izquierdo et al., 2019; Perles et al., 2018c; Gutiérrez et al., 2017; Lee, 2016). The transformation of older buildings into second homes, mainly in the centers of large cities, or the replacement of traditional dwellings in tourist areas with tourist apartments, generate one of the most prominent effects, namely touristification or gentrification (Milano et al., 2019; Gant, 2016; Zukin et al., 2015). This leads to the relocation of local communities from their original residences and the departure of those with lower incomes who find it difficult to attain housing (Simas et al., 2021). It drives up property prices and provokes an opposition between the center and the periphery, sparking cultural, social, and economic conflicts (Sousa et al., 2016). In general, this occurs due to the appreciation of property values and rents that surpass residents' earnings, attributed to the increased profit potential of revitalized or upgraded properties (Domínguez-Mujica et al., 2019). On the other hand, the real estate market has enabled individuals to acquire dwellings to rehabilitate them as second homes especially in small cities or rural areas where there are empty houses due to depopulation (Cáceres-Feria et al, 2021; Osti et al, 2019; Cuadrado-Ciuraneta & Durà-Guimerà, 2018). This fosters the societal rejuvenation and financial revival of these places, while enhancing the quality of life for rural populations (Salvatore et al, 2018), although it is still subject to risks (Gascón & Milano, 2018), similar to those in urban areas.

Recently, the relationship between the two phenomena has been linked to and reinforced by the rise of the sharing economy as a business model for channeling supply by individuals, companies or even the regulated supply of rental housing (Perles-Ribes et al., 2021) through platforms such as AirBnB (Kabil et al., 2022; Ortuño & Jiménez, 2019; Ram & Hall, 2018; Moreno-Izquierdo et al., 2019; Volgger & Huang, 2019).

Perles et al. (2016) suggest that crises and booms can affect the carry-over capacity of tourism activity and economic growth through various transmission mechanisms based on economic competitiveness determinants. This can lead to asymmetric behavior in TLGH, as seen in their proposed model. Following the same rationale, the described mechanism may be more or less intense depending on the expansionary or contractionary phase of the economic cycle. This suggests that the relationship between tourism and real estate has a non-linear or asymmetric nature.

In any case, once the destination reaches a certain threshold, resistance to the continuation of the tourism-real estate cycle may arise from both residents and tourists. Uncontrolled growth can lead to a substantial deterioration of the destination's environment and cause overcrowding, ultimately degrading the overall tourist experience.

For these reasons, in general, *residential tourism* and *second home* tourism has been critically analyzed by the literature (e.g., Aledo & Mazón, 1997), which highlights the most harmful effects of the phenomenon, describing it as an excessively rapid and unplanned urban-tourist growth, driven by economic-speculative expectations (...) which has led to a real waste of optimal tourism preconditions and natural resources (Aledo & Mazón, 1997).

Similarly, Gohar (2021) asserts that the progress of tourism has closely followed the advancement of the construction activity. Urbanization history, in particular, plays a crucial role within an interdisciplinary approach to tourism. Clearly, tourism brings about land alteration, population growth (both temporary and permanent) and consequently necessitates urban amenities and resources (Bernini et al., 2020; Honggang et al., 2012), generating waste that must be managed. Real estate development is a

prerequisite for the advancement of tourism (Fereidouni & Al-Mulali, 2014). While proposing strategies to encourage tourism as a means of urbanization, it is essential to formulate policies that prevent extensive real estate expansion under the pretext of tourism, thus avoiding unfavorable outcomes (Avond et al., 2019, Colomb & Novy, 2016; Seraphin et al., 2018).

According to Harvey (2008), cities transform in line with the socio-economic attributes of their residents, their behaviors, and ways of living, which influence and reshape their constructed surroundings. In tourist destinations, visitors also influence this remodeling. The importance of elements such as accessibility (Cordera et al, 2019, Eichhorn et al., 2010), or accommodation (Kabil et al, 2022) heavily influence the degree of tourism development of destinations. Mullins et al. (1999) also observe that the urbanization of cities driven by tourism relies on establishing areas based on consumption rather than production. This gives rise to fresh requirements in terms of land use and employment structure.

Tourism is frequently perceived as an agent of urbanization, leading to the establishment, alteration, or enlargement of locations primarily engaged in the activity (Kabil et al., 2022; Ashworth, & Page, 2011; Huang & Ke, 2001). However, according to Mullins (2003) tourism urbanization should be distinguished from urban tourism (Qian et al., 2012). Tourism-led urbanization underscores tourism's function as the prime impetus behind urban development. Urban tourism, meanwhile, regards the city as a destination rather than a result of tourism, where the city's amenities serve tourists' requirements but are not exclusively constructed for tourism purposes (Ashworth & Page, 2011) as is the case with tourism urbanization. Moreover, unlike traditional real estate projects, tourism-driven urbanization is characterized by the establishment of tourism assets such as theme parks or large-scale resorts. (Henry et al., 2016), in conjunction with residential real estate, operating on the premise of escalating property prices.

Theoretical linkages aside, from an empirical viewpoint, the relationship between tourism growth and real estate development has been extensively analyzed for both developing and developed countries (Gopy-Ramdhany et al., 2021; Nguyen et al., 2021; Gascón & Milano, 2018; Fereidouni & Al-Mulali, 2014) in European countries and cities (Shoval, 2018; Sokhanvar, 2019), China (Tang et al., 2007; Zheng, 2022; Luo et al., 2016; Qian et al., 2012, Honggang et al., 2012; Xu et al., 2012), France (Coëffé, & Stock, 2021; Fernández & Barrado, 2011), India (Selvanathan et al, 2009) or Mexico (González-Torreros et al., 2020). Early efforts focused on exploring the relationship between FDI and tourism development. Along these lines, Tang et al (2007) and Selvanathan et al (2009) found, for the case of China and India respectively, a one-way causality relationship from FDI to tourism.

Subsequent efforts have sought to purge the residential component from total FDI. In this sense, exploring the specific case of residential direct investment (FRDI), the studies by Gopy-Ramdhany et al. (2021) and Fereidouni and Al-Mulali (2014) conclude that there is a bidirectional long-term relationship between tourism growth and real estate development. They also find that FRDI has been a determinant for tourism development in developing countries. However, not all the literature draws the same conclusions. Studies such as Gascón and Milano (2018) or Qian et al. (2012) affirm the opposite for some areas of Latin America or China respectively.

Focusing on the case of Torremolinos in Spain (a mature and consolidated sun and beach destination similar but of a larger size to Calpe), Jiménez-Morales et al. (2021) highlight that the demand for permanent housing and the obsolescence of much of its supply of holiday accommodation have favored the residential nature of the municipality due to a change in the original tourist use over the last few decades.

On the other hand, Hof and Blázquez-Salom (2013) claim that in Mallorca, visitors who once frequented the island for hotel stays are now progressively opting to stay in tourism real estate or procuring secondary residences on the island. This evolution positions the destination as a real estate market with an added allure rooted in sun and beach tourism.

Focusing on the Costa Blanca (Alicante), where Calp, our case study, is located, Díaz-Orureta and Lourés (2006) highlight the negative effects on housing prices for the local population caused by a development based on tourism and real estate growth. Likewise, González and Mantecón (2014) highlight the poor sustainability of a development based on the tourism-real estate business in the southeast of Spain, comparing it with cases in Argentina and Canada. Finally, Pontes et al. (2020) analyze the evolution of this relationship in Spain and its extension to Brazil. However, no empirical causality analysis between tourism and real estate has been carried out by any of these authors.

On the contrary, using an empirical approach, such as the one adopted in this article, Rodriguez and Bustillo (2010) perform a cointegration analysis on FRDI and tourism receipts for the whole of Spain, finding for the period 1995-2007 that tourism has a positive influence on real estate development. However, no Granger causality was performed and the inverse of the relationship (from tourism growth to real estate development) was not tested.

Recently, Sokhanvar (2019) has empirically explored the relationship between total FDI, tourism development and economic growth for a set of seven European countries. The findings show, in the case of Spain, that no causality was detected from tourism receipts to FDI and vice-versa. Finally, Sokhanvar and Jenkins (2022) explore the relationship between FDI, tourism development and economic growth in Spain using non-linear Autoregressive Distributed Lag (non-linear ADRL) analysis and data for the period 2000-2019. The findings show that boosting FDI improves economic growth when it is targeted at the most productive sectors. However, the direct relationship between tourism growth and FDI is not analyzed. Therefore, the full outcome on the relationship remains undetermined. In short, although theoretically there is a clear link between tourism growth and real estate development, the empirical studies carried out are not conclusive and different types of relationships have been found (one-way, bilateral) depending on the type of destination, its territorial scale, its tourism specialization and its level of maturity.

3. Calp, tourism and real estate development: a case study
Calp is a popular destination located in the province of Alicante (Costa Blanca, Spain). Perles et al (2018b) describe the destination as being specialized in the residential "sun and beach" model where accommodation and hospitality infrastructure, real estate development and construction and retail are the main economic activities.

According to the annual number of building licenses granted by the municipality, Calpe's tourism boom began in 1962. The opening of Alicante airport to charter flights in 1968, which permitted the entrance of British tourists via this route, was a watershed moment in this tourist boom (Perles, 2004). The arrival of German tourists to the destination, on the other hand, began in 1971.
According to Perles (2004), the main motivation of Calpe's tourists was to enjoy the good weather, the sun, the beach, the scenery, and the tranquility, together with the low prices, which were common to Spanish tourism in general. In Calp, as in other neighboring towns, and unlike Benidorm, a residential tourism model emerged. This option combined what we now consider two different products: the "sun and beach" holiday of summer tourism, and winter or semi-residential tourism. From an urban-architectural point of view of these products, the standard formats were high-rise apartment towers on

the seafront on the one hand, and urbanizations based on bungalows or villas in the sprawl, on the other.

Given that both types of tourism require and demand housing, the tourism growth immediately fostered the rise of a very powerful real estate and construction sector. This latter activity ended up becoming the catalyst for economic expansion in the municipality.

Tourism in Calp has evolved over several stages, each being influenced by the overall economic conditions. The oil crisis in the 1970s, the German crisis of 1991, the terrorist attacks of 11S in the United States in 2001 and 11M in Madrid in 2004, the international financial crisis of 2007-2013, and the COVID-19 epidemic have alternated with expansion periods.

The dynamics of the growth process seems clear. Originally, tourism clearly constituted the driving force behind real estate development. However, once the process had started, it cannot be ruled out that real estate development, in turn, became a driving force behind tourism growth. In Calp, this is evident in the territorial distribution of the different nationalities of residents in the municipality.

This distribution, which can still be seen today in the destination, is due to the fact that initially, the developers and builders of different nationalities, specialized in certain markets (German, Belgian, French, etc.) and after building their developments, they sold them to citizens of these different places, according to this specialization. For the case of Calp, this mechanism explains a possible causal relationship between real estate development and tourism growth.

Likewise, it is well-known that the new residents of these nationalities, through word-of-mouth, and in their attempt to optimize the investment made in the purchase of the property, have constituted a driving force to attract new tourists to the destination. This mechanism would explain a possible causal relationship between tourism growth and new real estate developments in a mutually reinforcing mechanism.

The existence of these mechanisms, together with the availability of data for a long period of time, make Calp an ideal case study to examine the relationship between tourism and real estate development.

4. Methodology

As previously stated, this paper uses time series analysis to explore the relationship between real estate and tourism. Specifically, the hypotheses to be tested in this article are: 1) Is there a long-term bilateral or unilateral relationship between tourism and real estate development? and 2) Is this relationship symmetrical or asymmetrical?

As in most of the literature on TLGH, the empirical approach in this article is based on the methodology of the Granger non-causality test. Specifically, the Granger non-causality testing procedure advocated by Hacker and Hatemi (2010), Hatemi (2012) and Hatemi (2021) is used.

The Hacker and Hatemi (2010) methodology is based on the Toda and Yamamoto (1995) procedure which is carried out on an augmented vector autoregression (VAR) model in the levels of the data. The Toda and Yamamoto's (1995) procedure can be summarized in the following steps: 1) first, the maximum order of integration of the series using a unit root or stationarity test is established *(d)*; 2) the optimal lags length of the VAR *(p)* are then determined based on a criterion such as AIC, BIC etc,; 3) the VAR is estimated adding the *d* extra lags in each of the equations; 4) an inference asymptotic analysis is conducted by performing a standard Wald test on the first *p* lags (not the extra lags). The Wald test

statistics exhibit an asymptotic chi-square distribution with p degrees of freedom under the null hypothesis. Therefore, rejecting the null hypothesis implies rejecting the concept of Granger non-causality.

The advanced version of Hacker and Hatemi (2010) improves the size and power of the test by endogenously determining the optimal VAR lag length and carrying out a bootstrap procedure to determine the critical values of the Wald test.

Furthermore, the Hatemi (2012) Granger causality test is an improved version of the previous test that takes into account the possibility of asymmetric effects. As explained by the author, assuming a lack of differentiation between the effects of positive and negative shocks could be overly constraining, especially when considering situations involving the impact of asymmetric information. Thus, following an idea of Granger and Yoon (2002), the new test is adapted by transforming the data into both cumulative positive and negative changes. As in the symmetric version of the test, in this asymmetric version a bootstrap procedure is carried out to determine the critical values of the Wald test.

Finally, the dynamic asymmetric test developed by Hatemi (2021) is used to explore the dynamic symmetric or asymmetric causality relationship between the two variables.

As mentioned earlier and as highlighted by Brida et al. (2016), the Granger non-causality methodology has been widely utilized in TLGH literature. As well as being used in the original study by Balaguer and Cantavella-Jordá (2002), it has been employed by Perles et al. (2017) to examine TLGH in the case of Spain following the economic crisis of 2007-2013. Furthermore, Gunduz and Hatemi (2005) use Hatemi's version of the tests to assess TLGH in Turkey; Hatemi et. al (2016) use Hatemi's methodology to analyze an asymmetric version of the TLGH for a panel of G7 countries. Finally, more recently in Hatemi and Maneschiöld (2021) it has been applied in the case of Sweden.

5.Data and results

Three data series are used to establish the relationship between tourism and real estate in Calp. As a proxy for the evolution of the local tourism sector, the series of traffic at Alicante airport provided by AENA (lpassengers), the closest airport to the destination, is used. On the other hand, the evolution of the real estate sector is proxied by the series of building licenses granted by the City Council of Calp (lhousing). Although data are available up to 2021, to avoid possible distortions caused by the COVID-19 pandemic, only data from the period 1967-2019 are used. To minimize the variance of the series and interpret the coefficients as elasticities, all the series are transformed by taking the natural logarithm.

Figure 3 reflects the variables and data used for the analysis and Tables 1 and 2 reflect the unit root and stationarity analysis carried out. Figure 3 is a semilogarithmic chart representing the percentage change of variables over time. It aligns well with the evolution discussed in the third section for the case-study. Initially, the left part of the graph clearly portrays a significant surge in tourism within the municipality, peaking in around 1972. However, after 1972, the growth rate of tourism noticeably decelerated. The graph shows this decline, illustrating the impact of the oil crises of 1974-1975 and 1979-1981. The latter half of the 1980s witnessed a renewed period of growth, which abruptly ended in 1988 and persisted until 1991. Between 1992 and 2008, there was consistent growth in passenger traffic, except for a dip in 2001 as a result of the 11S episode. Subsequently, the growth rate slowed down again between 2008 and 2012 due to the Global Financial and Economic Crisis. However, from 2013 to 2019, a much more accelerated growth can be observed.

Table 1 shows that the ADF rejects the null hypothesis of unit root for the variable of passengers, using both a constant and a deterministic trend or only a constant. This result suggests that the passengers are stationary. Conversely, the building licenses series are integrated of order one, because the null hypothesis of unit root is not rejected in levels for any specification but is rejected for the first difference of the variable.
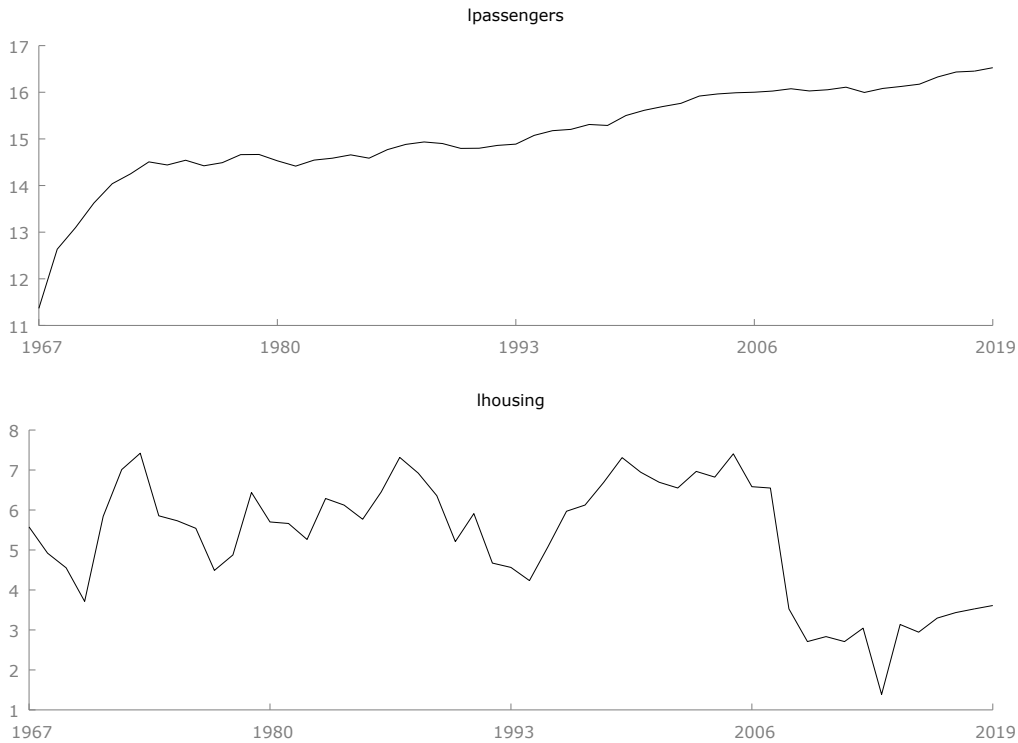
Figure 3 *Passengers and building permits. Authors own elaboration.*

Note: lpassengers natural of logs of passengers; lhousing natural logs of building permits(homes). Y-axis natural log of the variables.

On the other hand, the KPSS test also indicates that the passengers series is stationary, not rejecting the null hypothesis of stationarity when a constant and a deterministic trend are included in the estimations. Also, the I(1) nature of the building licenses is confirmed by this test.

Table 1 *ADF unit root testing.*

Variable	ADF specification	Lag length (based on SIC) max 10	t-statistic (p-value)	Conclusion
lpassengers	constant+trend	0	-11.92 (0.00)	I(0)
lpassengers	constant	0	-6.30 (0.00)	
lhousing	constant+trend	0	-2.37 (0.39)	I(1)
lhousing	constant	0	-1.99 (0.28)	
dlhousing	constant+trend	8	-3.26 (0.07)	
dlhousing	constant	8	-2.91 (0.04)	

Notes: l_variable (levels) dl_variable (first difference)

Table 2 *KPSS stationarity testing.*

Variable	KPSS specification	Bandwidth (Newey-West using Bartlett kernel)	t-statistic (critical values 5% level)	Conclusion
lpassengers	constant+trend	3	0.10 (0.14)	I(0)
lpassengers	constant	3	1.32 (<0.01)	
dlpassengers	constant	3	0.39 (0.07)	
lhousing	constant+trend	3	0.17 (0.03)	I(1)
lhousing	constant	3	0.42 (0.06)	
dlhousing	constant+trend	3	0.04 (>0.10)	
dlhousing	constant	3	0.06 (>0.10)	

Notes: lvariable (levels) dlvariable (first difference)

5.1. Static analysis

Table 3 reflects the Hacker and Hatemi (2010) Granger non-causality testing. The optimal VAR lag length has been endogenously determined as 2 and the suggested extra lag is 1, which coincides with the unit root testing carried out. The results reveal that the non-Granger causality null hypothesis is rejected in the case where tourism causes real estate development, but the reverse is not true. Thus, it confirms that, at least for the case of Calp, tourism growth would be the driving force behind the urban and real estate development and not vice versa.

Table 3 *Granger non-causality testing Hacker and Hatemi (2010).*

VAR	Optimal VAR lag length	Extra lag	Granger non-causality test
l_passengers l_housing	2 lags based on Hatemi-J Criterion (HJC)	1	lhousing→passengers W=2.250 (c.v 5% 6.480) lpassengers→lhousing W=9.431 (c.v. 5% 6.833)

Bootstrap critical values (c.v.) based on 1000 replications.

Table 4 reflects the result of the Hatemi (2012) asymmetric Granger non-causality testing. The optimal VAR lag length has been endogenously determined as 1 and the suggested extra lag is also 1. The results of the test indicate that the non-Granger causality null hypothesis is rejected in the case where tourism causes real estate development, in the case of positive shocks. But the reverse is not true, neither in the case of negative shocks.

Table 4 *Asymmetric Granger non-causality testing Hatemi (2012).*

VAR	Optimal VAR lag length	Extra lag	Granger non-causality test
l_passengers l_housing	1 lags based on Hatemi-J Criterion (HJC)	1	lhousing$^+$→lpassengers$^+$ W=1.012 (c.v 5% 4.206) lhousing$^-$→lpassengers$^-$ W=0.105 (c.v 5% 5.027) lpassengers$^+$→lhousing$^+$ W=19.879 (c.v. 5% 3.754) lpassengers$^-$→lhousing$^-$ W=0.706 (c.v. 5% 3.990)

Bootstrap critical values (c.v.) based on 1000 replications.

In summary, the relationship between tourism growth and real estate development in Calp, from a long-term perspective, goes in a one-way direction, from tourism to real estate development. Moreover, the relationship is asymmetrical, limited to periods of tourism expansion.

5.2. Dynamic analysis
Table 5 shows the results of the dynamic Granger non-causality test performed for the different directions and the symmetric and asymmetric cases and a recursive approach from a first test taking the period 1967-1980.

The results suggest a bidirectional causality between tourism and real estate development in the early stages of the development process, as reflected in the rejected null hypothesis for all the cases in the several tests that finish in the years 1980 and 1981. Conversely, the results suggest only a one-way causality from tourism to real estate development from 1986 onwards in the case of positive shocks.

Overall, the analysis suggests that the initial stages of tourism growth saw the strongest interaction with real estate development. However, once a certain level of development had been achieved, it was the tourism industry that drove and promoted real estate growth, rather than the other way around.

6.Discussion
The findings for Calp partially confirm and refine the results of Gopy-Ramdhany (2021) and Feridouni and Al-Mulali (2014), who identify a bidirectional link between tourism development and real estate growth. However, in Calp, this bidirectional relationship is only evident during the initial phase of tourist expansion. Once a certain level of development had been attained, the relationship became unidirectional, with tourism driving real estate growth. The latter result is in line with the findings of Gascón and Milano (2018) or Quian et al. (2012).

The results of this study suggest that the link between tourism and real estate development is primarily observed during periods of tourism expansion, aligning with the economic logic of the real estate market. During these times, the anticipation of heightened demand stimulates real estate development. However, once the expansion phase concludes or during economic downturns, the existing real estate supply may adequately meet the demand, rendering new developments unnecessary.
In contrast, the results of this article appear to contradict the findings of Tang et al. (2007) and Selvanathan et al. (2009), which suggest a causal relationship from direct investment to tourism. However, it is important to note that these studies examine global foreign direct investment (FDI) across countries, while this analysis focuses exclusively on a variable that represents the real estate development of the specific destination. As such, a direct comparison of results may not be entirely valid.

Our findings coincide with those of Rodriguez and Bustillo (2010) in confirming the positive impact of tourism on real estate development in Spain. This study extends this confirmation over a longer time period, although the results appear to contradict those of Sokhanvar (2019). Nevertheless, it is important to recognize that a direct comparison of results may not be entirely appropriate, as factors such as methodology and considered variables differ.

Table 5: *Dynamic Granger non-causality test.*

	Ho:Real Estate =/=>Tourism			Ho: Tourism=/=>Real Estate		
SSP	TVpCV symmetric	TVpCV asymmetric negative	TVpCV asymmetric positive	TVpCV symmetric	TVpCV asymmetric negative	TVpCV asymmetric positive
1980	**68.855**	**0.186**	**1.990**	**18505.322**	**68.763**	**147.681**
1981	**3.226**	**4.102**	**4.721**	**93.063**	**6.457**	**316.619**
1982	0.053	0.002	.	0.447	0.167	.
1983	0.077	0.004	0.032	0.735	0.195	0.874
1984	0.054	0.003	0.038	0.788	0.195	0.992
1985	0.067	0.004	0.036	0.857	0.189	0.873
1986	0.080	0.006	0.037	0.737	0.201	**1.212**
1987	0.019	0.009	0.039	0.776	0.211	**1.027**
1988	0.027	0.017	0.051	0.901	0.131	**1.111**
1989	0.032	0.075	0.073	0.896	0.088	**1.214**
1990	0.027	0.035	0.080	**1.046**	0.095	**1.129**
1991	0.045	0.034	0.096	**1.015**	0.013	**1.303**
1992	0.025	0.003	0.093	0.971	0.013	**1.401**
1993	0.077	0.008	0.074	0.504	0.023	**1.447**
1994	0.228	0.023	0.029	0.244	0.051	**1.692**
1995	0.370	0.020	0.040	0.188	0.079	**2.206**
1996	0.431	0.016	0.084	0.215	0.097	**2.305**
1997	0.359	0.018	0.078	0.200	0.104	**2.616**
1998	0.337	0.015	0.099	0.347	0.129	**2.462**
1999	0.163	0.016	0.136	0.465	0.117	**1.664**
2000	0.122	0.026	0.597	0.420	0.103	**5.590**
2001	0.138	0.029	0.528	0.513	0.110	**4.226**
2002	0.188	0.036	0.260	0.550	0.104	**4.149**
2003	0.569	0.033	0.262	0.866	0.116	**3.710**
2004	0.623	0.043	0.203	0.969	0.138	**4.464**
2005	0.648	0.045	0.193	**1.020**	0.083	**4.172**
2006	0.599	0.063	0.184	0.911	0.079	**4.086**
2007	0.679	0.056	0.178	**1.032**	0.008	**3.727**
2008	0.330	0.024	0.167	0.159	0.003	**3.549**
2009	0.094	0.020	0.148	0.038	0.015	**3.627**
2010	0.098	0.029	0.117	0.015	0.009	**3.826**
2011	0.095	0.007	0.119	0.002	0.007	**4.136**
2012	0.043	0.023	0.137	0.001	0.063	**4.218**
2013	0.044	0.005	0.106	0.004	0.093	**4.864**
2014	0.038	0.010	0.223	0.026	0.113	**4.793**
2015	0.044	0.011	0.228	0.021	0.129	**4.684**
2016	0.057	0.017	0.243	0.019	0.153	**5.187**
2017	0.317	0.022	0.236	**1.247**	0.142	**4.821**
2018	0.348	0.024	0.240	**1.412**	0.163	**4.687**
2019	0.335			**1.322**		

Note: TVpCV>1 indicates rejection of the null hypothesis. 5% significance level for Recursive Approach

7.Conclusion

The scientific literature theoretically and empirically explores the relationship between tourism growth and real estate development. However, the results remain inconclusive and vary depending on different factors such as the type of destination, its territorial scale of analysis, its tourism specialization, etc.

This article has a dual objective. First, it seeks to formalize the relationship between two variables (real estate and tourism growth) through the Real Estate Growth Hypothesis, which explains the primary mechanisms and interactions that affect these variables, from a theoretical perspective. Second, the paper explores this relationship empirically in a well-established destination of the Spanish Mediterranean coastline using non-linear time series analysis techniques. This analysis enables us to examine the relationship and its potential asymmetries from a long-term perspective. By achieving both of these objectives, this article contributes to the theoretical understanding and empirical assessment of the relationship between real estate and growth.

7.1. Theoretical and academic contribution

The results reveal that, at least for this case study, and despite the theoretical bilateral nature of the relationship, from a long-term perspective this relationship goes in only one direction, whereby tourism growth promotes real estate development.

The findings also suggest that a bilateral relationship between the two variables only seems to be limited to the initial stages of the destinations' tourism take-off. Moreover, this relationship seems to be asymmetrical, in the sense that it would be limited to expansion periods of tourism demand. In other words, it would be favorable at times in the tourism cycle that drive real estate growth in the destination. These results coincide with those of Rodriguez and Bustillo (2010) who found for the case of Spain and the period 1995-2007 that tourism has a positive influence on real estate development. In contrast, the results differ from those obtained by Shokhanvar (2019) for the period 1995-2014.

7.2 Management or practical implications

The results have important practical implications for the management of tourist destinations and align with residential destinations that focus on providing extra-hotel accommodation such as bungalows, chalets, villas, and apartments. Consequently, the insights gained from this article may be more applicable to destinations of this nature. Conversely, destinations heavily reliant on hotel accommodation may be less influenced by the dynamics described here. Through effective hotel capacity management and deseasonalization strategies, these destinations can potentially meet higher demand volumes without the need to expand supply.

In residential destinations, the real estate growth strategy can synergistically support the initial stages or take-off of tourism development. However, once a certain growth threshold has been surpassed, the influence of real estate expansion on tourism growth diminishes, and in some cases, it may even pose a threat to the future sustainability of the destination itself. Therefore, achieving balanced development may be the most relevant practical recommendation of this article.

7.3. Limitations and future work

As already noted, the findings differ from previous work on the subject such as Shokhanvar (2019). These differences highlight the importance of the variables used by the different researchers. In the same vein, the importance of the variables used for the analysis also explains the discrepancies found between the results of this study and those of Tang et al. (2007) and Selvanathan et al. (2009) for the cases of China and India, respectively.

However, it cannot be ruled out that these discrepancies may be due to the limitations of this article. The main limitation is that, in principle, by using the passengers in Alicante airport as a proxy for tourism growth, only the international tourism side of the demand of the destination is considered. However, the available data show that the vast majority of Spanish tourists who come to Calp arrive in their own car.

Moreover, the available data suggest that international tourists come to the destination mostly during the low season. However, during the summer season, the percentage of tourists in Calp is balanced between international and Spanish tourists. Furthermore, it can be observed that many properties in the destination are owned by foreigners, but a considerable number are owned by Spaniards who were once tourists.

The effect of this limitation on the results could be considered as slight if it is assumed that domestic and international tourism have experienced parallel evolutions over time. This would be the case when economic crises are symmetrical in different countries, affecting Spain and the rest of the origin markets of the tourists.

However, this limitation could further distort the results in the case of asymmetric crises if Spanish tourists play a substitute role for international demand in the destination. To overcome this limitation, it would be necessary to obtain a series of data that considers all tourists (domestic and international) visiting the destination. Unfortunately, these data do not currently exist for local Spanish destinations such as the one considered in this study. In any case, the failure to consider domestic tourism in the analysis of the relationship between tourism and real estate development is a limitation common to all the literature reviewed in this article.

 A future recommended line of research is an in-depth analysis of the asymmetric nature of the relationship detected, exploring by means of dynamic causality tests the specific periods for which the possible relationship between the two activities is confirmed. Similarly, it would be interesting to explore the relationship for a broader set of Spanish local and regional destinations, using panel data analysis techniques, similarly to the works of Shokhanvar (2019) and Shokhanvar and Jenking (2022).

In any case, the exercise carried out, by considering the theoretical insights, the long-term perspective and the non-linear nature of the possible, represents an advance with respect the existing literature on the subject and could be applied to other similar destinations that share certain characteristics or face comparable challenges: coastal mature destinations facing urban planning challenges, such as balancing tourism infrastructure development with the preservation of natural and cultural heritage. However, it is crucial to consider the specificities of each destination when assessing the transferability of the findings.

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