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Tourism and economic growth : casuality, persistence and asymmetry

Turismo y crecimiento económico : causalidad, persistencia y asimetría

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Tourism and Economic Growth. Causality, persistence and asymmetry

Turismo y Crecimiento Económico. Causalidad, persistencia y asimetría

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A Raquel

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Preface

This PhD thesis investigates some of the main aspects of the Spanish tourist sector from an empirical point of view. The origins of this contribution can be traced back, when I finished my Master's thesis at the *Universidad de Huelva* (Msc in Local Development and Social Economy), devoted to the study of the causality relationship between tourism and economic growth in Spain. That work became the starting point of one of the essays contained in this dissertation. This initial analysis was extended by exploring other features that may help to build a bigger picture of the Spanish tourist industry such as whether shocks affecting the tourist sector in Spain may cause permanent effects on the economy in the long run, the degree of convergence amongst the number of tourist arrivals from twelve different Spain's tourism markets or the extent to which variations on the number of arrivals to Spain are due to shocks on the Spanish outcome rather than to shocks on the outputs of the source countries. After graduating, I held a research and teaching position at the Copenhagen Business School (*CBS*), where this doctoral dissertation has been finished under the inestimable supervision of Professor Emilio Congregado and Professor Antonio A. Golpe.

Several people have been influential during my PhD research. Professors Congregado and Golpe acted as supervisors during my Master thesis period. At the end of that period, they encouraged me to continue researching into Applied Economics. I am really in debt with both of them for all the guidance they have provided me with during all this process. I am also grateful to the Head of the Department of Economics at the University of Huelva, Professor María de la O Barroso and also to José María Millán, Concepción Román and Laura Saucí for their support and help.

My work also benefited from a pleasant working environment both in Huelva and at the CBS. At this point, I must thank Mirjam Van Praag for having allowed me to keep working in this project while simultaneously complying with my responsibilities at the CBS. Plus, all the colleagues and friends that I have met in both places have been really kind and helpful, I am really grateful with them.

Finally, I would like to express my special thanks to my parents and my brother for all their support and encouragement and to Raquel for her enormous effort, her unconditional love and all the faith she has put in me; I will always remember it.

Huelva, January 2015
Adrián L. Mérida Gutiérrez

Part I
Introduction

Chapter 1: Introduction and outline

1.1. Introduction

This chapter offers a general overview of this dissertation. In particular, it reviews the general framework, aims and scope of this thesis, which is organised around four empirical essays: Two of them where the relationship between tourism and economic growth is studied in both the short and longer term, and two others where the analysis of the Spanish Tourism Industry works as nexus among them.

Specifically, the first two essays extend previous literature on *tourism and economic growth* into two directions: first, distinguishing between the short and long-term effects, and second, reviewing the tourism-led growth hypothesis by using recent econometric techniques which offer a better framework for testing such a complex relationship. Both insights are interesting, not only for understanding the exact nature of this relationship but also for contributing to better management of tourism policies, which can be considered in the light of our results as a powerful counter-cyclical policy for Spanish policy makers.

Furthermore, the second part of this dissertation reports two empirical exercises oriented to provide a better understanding of the pillars of the Span-

ish Tourism Industry by means of an empirical characterization of the relationships with the evolution of some economies and a contribution to the regional distribution of this industry. These findings should be considered as key guiding principles for a better devising of the Spanish tourism policy.

As we have just mentioned, the first part addresses a central aspect of the economics of Tourism, the relationship between *tourism and economic growth (business cycles)*. Understanding this relationship is especially important in times of crisis in countries like Spain, where the evolution of tourism revenues is interpreted by some scholars like green shoots of recovery as a leading indicator of a new cyclical upswing. If this were correct, tourism promotion policies could be considered not only as a strategy for economic development but also as an alternative response to unemployment and recession, even more so at the present when traditional policies have not proven to be sufficient and effective enough.

From these premises, the two essays making up this part are devoted to providing new evidence on the relationship between tourism revenues and GDP. The first one provides new evidence and explores new hypotheses by means of econometric approaches that allow for the presence of nonlinearities in the relationships, in particular by detecting the existence of structural breaks. The second one re-examines the same relationship but from a different relationship: focusing on the long-term and addressing the aspects related to the persistence of the effects of shocks in the tourism industry on the economic development. In this way, new results should contribute to a better understanding of the relationship between tourism industry development and the evolution of the economy, not only in the short but also in the long term. We all agree that these findings should help us not only to a better understanding of the development of tourism over the cycle, but also to provide more appropriate strategic orientations to policy makers when they decide to promote tourism as a counter-cyclical policy.

Once completed this introduction, we turn now to present some stylized facts, some empirical regularities taken from the data. These regularities should be taken into account in order to understand the main hypotheses and results analysed in this work.

With almost no margin for applying the introduction of fiscal stimuli, in a context in which some of the most powerful Eurozone economies have been reluctant to potential monetary measures, the Spanish economy has relied on wage devaluation –driven by consecutive labour market reforms– and on the possibility that recoveries on exports will eventually relaunch a weak aggregated demand that does not show signs of recuperation in any of its other components.

Despite the weakness exhibited by some of the economies with which Spain possesses higher commercial intensity levels, this upturn in the exports, the rise on the Spanish general exports and, particularly, the figures derived from the provision of tourist services have been encouraging and have positively affected production and employment in which many believe will be the beginning of the cycle change prior to the anticipated recuperation.

In this scenario, the analysis of the relationship between the evolution of the tourist sector and some macroeconomic variables, such as aggregated output or employment, is the key not only to confirm the potential effects from the positive shock experienced by the Spanish tourist industry through the last years, but also to know whether those effects are just transitory or will show a certain persistence over time.

Consequently, the analysis of the effects derived from the evolution of this sector on the rest of the economy –i.e. the effects of shocks in this sector as a leading indicator of turning points in the cyclical evolution of the economy–, the role of tourism marketing as an instrument of anticyclical policy or disentangling the degree of persistence of the effects caused by those shocks make the research on this topic a *hot policy issue* at the time of presenting this thesis. The reason behind it arises from the fact that traditional demand policies have been ineffective so far, together with the impossibility to apply other measures due to the indebtedness levels accumulated by the governments of economies like Spain, which will need additional stimuli in order to accelerate the current process of adjustment.

With that in mind, we also focus on characterizing the Spanish tourist sector in terms of both its offer and its dependence on certain economies. Thus, once the impact on the economic activity of shocks in the tourist industry is proved both in the short and in the long run, the second part of this thesis will provide guidance on which an adequate intervention in the subject of tourism marketing could be based. This would complete the present contribution about the role of the Spanish tourist sector on the macroeconomic evolution of the country and on its use in the current situation, where other stimuli are conditioned on certain circumstances that prevent their application.

1.1.1. Stylised facts

To begin with the analysis, it is interesting to take a look at what the crisis has caused in this sector. According to figure 1.1, we could say that tourism has experienced a sustained growth worldwide despite the global crisis

from 2008. Interestingly, the industry shows an even smaller volatility in its evolution, after a small decline, when the crisis took place.

As is well known, the tourist activity has influence, both directly and indirectly, in the economy of those countries that are considered to be mainly tourist destinations, as is the case of Spain. Generally speaking, tourist expansion not only boosts the aggregated output, but also favours the competitiveness, employment and the reception of foreign currencies,

At present, the contribution of tourism to the global GDP is estimated to be just over 9% of the total and its participation on the global exports is around 6%. Additionally, it is expected that the number of international arrivals increases at a rate of 3.3% annually until 2030, when estimations indicate that the absolute record of 1,800 million tourists a year will be reached, the majority of them having emerging economies as the main destinations, which are currently showing a growth rate of more than 4% per year (UNWTO, 2013).

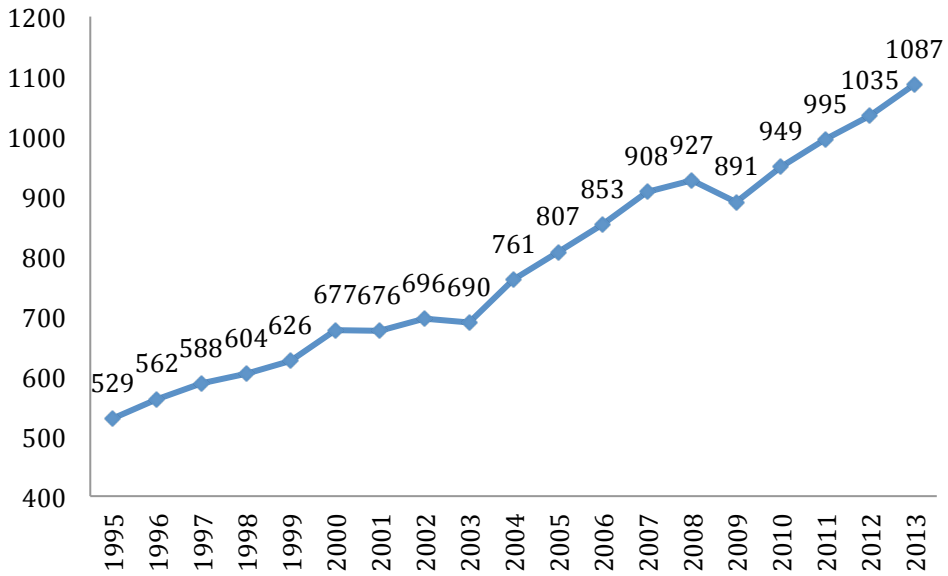

Figure 1.1. Number of international arrivals in the world (millions). Source: UNWTO.

In relation to the distribution of the sector by geographical areas, figure 1.2 contains data on international arrivals as gathered in the report by UNWTO in 2013. As can be observed, Europe is still the most visited region worldwide, having surpassed the barrier of 560 million visitants in 2013, which makes for 52% of the total. Within the old continent, the areas of Central and Eastern Europe, as well as Southern Mediterranean Europe,

were the most popular. After Europe, the region formed by Asia and the Pacific was the second most visited in 2013, with a share of 23% of the total i.e. around 248 million tourist receptions. The American continent was the third top destination after having received more than 168 million tourists during 2013, that is, a share of 15%. The remaining 10% was distributed almost equally among Africa and the Middle East, with 56 and 52 million arrivals respectively.

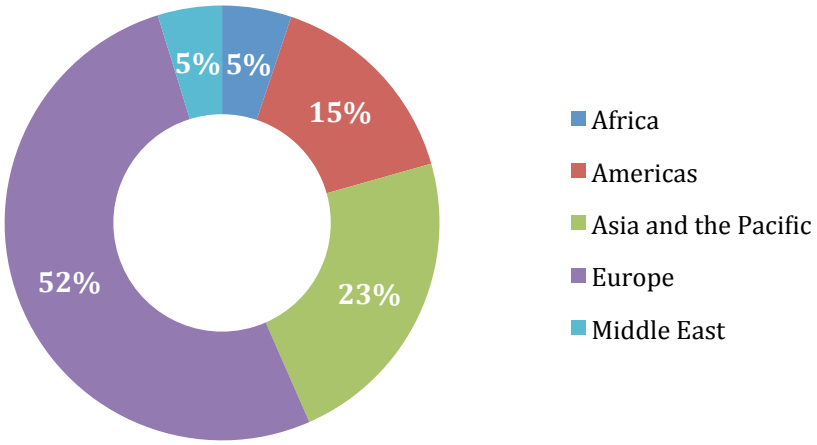

Figure 1.2. Arrivals to the different regions (% of total). Source: UNWTO.

As for the previsions for the following years, figures are certainly optimistic in relation to the volume of tourist flow, which are usually exceeded easily by the actual figures. Thereby, the expectations seem to point to a promising future. Figure 1.3 shows the estimations made by the UNWTO regarding the number of international arrivals until the year 2030. As can be noticed, forecasts indicate that a total volume of 1,400 million international tourists will be reached by 2020, with around 1,800 million tourists by 2030.

Therefore, we can observe that, in spite of the adverse shocks, the long run trend shows a sustained growth in the tourism industry, which not only demonstrates the strength of this sector, but also the smaller volatility against cyclical fluctuations during the current crisis, as opposite to how this sector had reacted to previous recessions. In the econometric terminology, we could say that this is a sector where shocks do not seem to cause persistent effects. As evidence for that last statement we could just analyse the period starting from 2008, when a slight and short drop in the number of tour-

ist arrivals happened only to precede a consistent recovery with a strong growing pace.

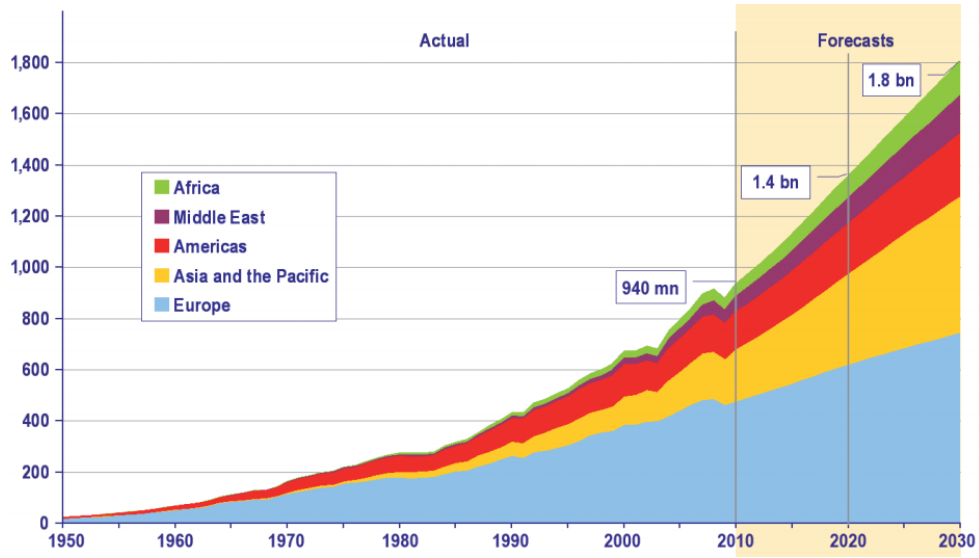

Figure 1.3. Estimations of international arrivals. Source: UNWTO.

In this way, even if it would be possible that the fast recuperation experienced by the sector, right after the crisis, could be due to the efficient application of correcting measures that may have minimized the consequences of those adverse shocks in the tourist sector, we should not discard the flexibility of the sector to adapt to a changing environment as a valid explanation.

Precisely, and as mentioned in the previous section, identifying the degree of persistence of the effects caused by external shocks in the Spanish tourist sector will be one of the lines of research to study in this thesis. In this sense, it is worth mentioning that the policy implications derived from the analysis of that persistence are of high interest, since in the case that the shocks in the tourist sector of a country were found to be permanent, then policy authorities should take into consideration that any impact, regardless of whether it is positive or negative, could origin persistent effects in the long run that may even deviate dramatically the development of the sector from its natural trend.

This last caveat admits different readings. On one hand, a high level of persistence would imply that any promotion policy for the tourist industry might positively affect the sector in a permanent way, which means the effectivity and the significance of those policies would be of high relevance. However, this scenario also has a big drawback, since any unexpected nega-

tive shock in the tourist industry might have persistent consequences over time. In that case, it would be indispensable for the policy makers to apply corrective measures in order to get the sector back to its previous levels of activity. Analogously, a weak level of persistence implies that shocks would not have permanent consequences in the long term. This also presents an inconvenience, for stimulus policies might be ineffective beyond a short run boost.

Apart from that, and so as to continue with this analysis of the empirical regularities of this sector, we shall examine now the evolution of the revenues generated by this activity. As expected, tourism receipts are closely connected to the number of tourist arrivals and also to the number of nights spent at tourist accommodations.

A singularity of this sector arises from its special sensitivity to fluctuations in currency markets. Thus, monetary policy may directly affect the results of certain tourist zones in terms of tourism receipts even if it does not originates from a change in the number of international arrivals. That way, although a favourable exchange rate might attract a larger number of foreign tourists, it is also quite likely that those tourists will consume more than before, thus elevating tourism receipts in a higher proportion than the number of tourist receptions.

Based on the purpose of visit, the UNWTO classifies tourist trips in three different categories: *leisure tourism*, *business tourism* and a third miscellaneous category which we refer to as *other type of tourism*. This last group includes trips motivated by aspects like visiting friends or family as well as health or religion trips. Figure 1.4 exhibits the weight of each of those types of tourism in the total tourist activity, leisure tourism being the most relevant.

From these premises, which are no more than considerations about the characteristics of tourism receipts, we shall carefully analyse the data regarding that indicator.

In order to continue with this particular analysis of the global tourist situation, we may now have a look at figure 1.5, which shows the number of international arrivals and the levels of tourism receipts during 2013 in the five main regions identified by the UNWTO: Europe, Americas, Asia and the Pacific, Africa, and the Middle East.

At a global level, tourism receipts increased worldwide by 5% on average to a total of 873 billion euros. Just as with the number of international arrivals, the region with the highest tourism earnings is the European continent, which generated 42% of the total revenues. In addition, Europe was also the region that experienced the highest growth in terms of tourism receipts. That way, the old continent reached an amount of 368 billion euros in 2013, 26 billions more than the year before.

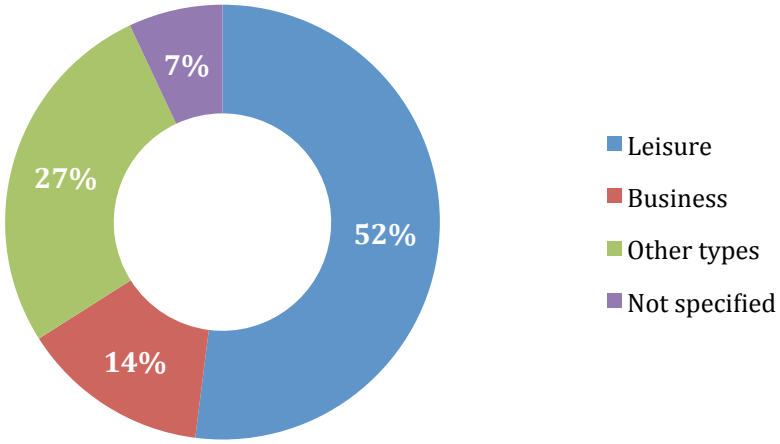

Figure 1.4. International arrivals by purpose of visit. Source: UNWTO.

Receipts generated in the region of Asia and the Pacific increased until reaching about 270 billion euros. American destinations experienced a growth of around 12 billion euros with respect to the prior season, which resulted in a total of 173 billion euros. Finally, receipts in the Middle East and in Africa topped 36 billion euros and 26 billion euros respectively (UNWTO, 2014).

In relative terms, the weight of a country in international arrivals does not necessarily have to coincide with its share on tourism receipts. In that sense, it is interesting to see the data concerning Europe, Americas and the Asia-Pacific region. Whereas the European continent accounts for 52% of the global international arrivals, it only results in 42% of total tourism receipts. On the contrary, the American region receives 20% of total tourism earnings with just 15% of total tourism receptions and Asia-Pacific earns 31% of the total tourism receipts despite receiving just 23% of total international arrivals. This seems to indicate that the average tourist that travels to Europe tends to spend less than those visiting the American or the Asian regions.

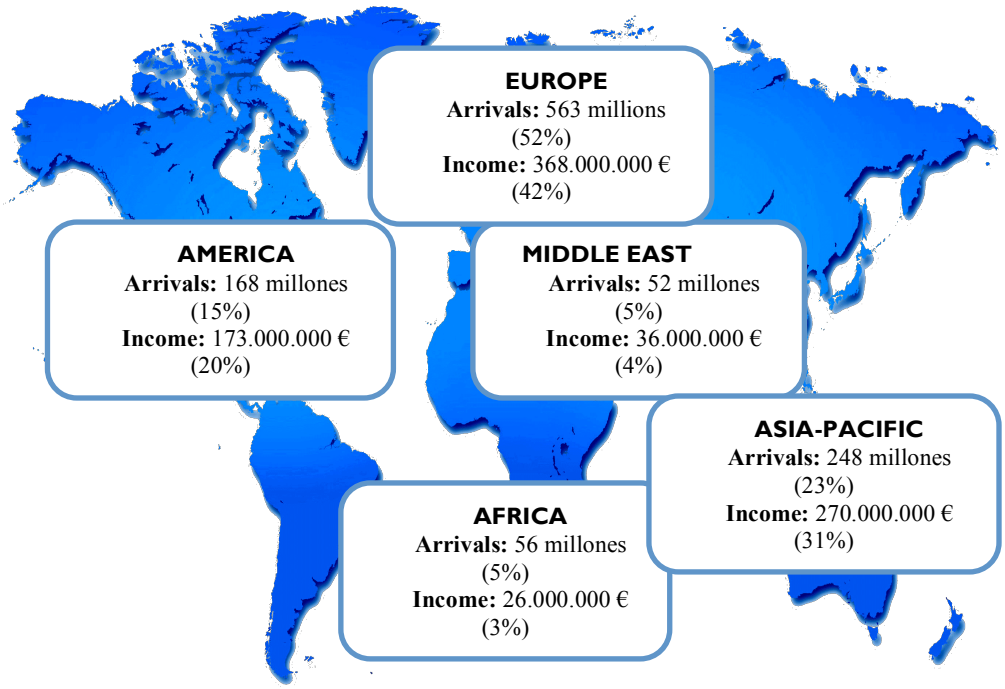

Figure 1.5. International arrivals and tourism receipts in 2013. Source: UNWTO.

With the aim of going even deeper in the tourist figures of the different regions and sub-regions of the world, we shall now examine the information contained in tables 1.1 and 1.2. These tables exhibit the number of international arrivals, and the amount of tourism receipts in the different regions and sub-regions of the world, respectively.

In concrete, table 1.1 presents the number of international arrivals to the regions and sub-regions of the world during the last 20 years as well as the average annual growth that each of those zones experienced during the period 2005-2013. Data on that table is structured in two well defined sections. In the upper section we can observe data referred to the number of international arrivals in the world, also classified in advanced and emerging economies. This classification allows us to visualize how the emerging economies are experienced a faster development during the last decades.

The annual growth rate in the case of the emerging economies has been 4.8% on average since 2005 while for the case of the advanced economies it was just 3%. The gap has been closing consistently and, despite the fact that the advanced economies received 68% of total international tourists by 1990, in 2012 the ratio is 53-47, so it is evident that a process of convergence is going on in that sense.

Table 1.1. International tourist arrivals by regions and sub-region.

	Number of international arrivals (millions)							Average annual growth rate 05-13 (%)
Region	**1990**	**1995**	**2000**	**2005**	**2010**	**2012**	**2013***	
World	**434**	**528**	**677**	**807**	**948**	**1035**	**1087**	**3.8**
Advanced economies	296	334	421	459	506	551	581	3.0
Emerging economies	139	193	256	348	442	484	506	4.8
Europe	**261.1**	**304.0**	**388.2**	**448.9**	**484.8**	**534.4**	**563.4**	**2.9**
Northern	28.2	35.8	46.6	60.4	62.7	65.1	68.9	1.6
Western	108.6	112.2	139.7	141.7	154.4	167.2	174.3	2.6
Central and Eastern	33.9	58.1	69.3	90.4	94.5	111.7	118.9	3.5
Southern and Medit.	90.3	98.0	132.6	156.4	173.3	190.4	201.4	3.2
EU 28	229.7	267.3	332.3	363.8	380.0	412.2	432.7	2.2
Asia y the Pacific	**55.8**	**82.0**	**110.1**	**153.5**	**204.9**	**233.5**	**248.1**	**6.2**
North-East Asia	26.4	41.3	58.3	85.9	111.5	122.8	127.0	5.0
South-East Asia	21.2	28.4	36.1	48.5	70.0	84.2	93.1	8.5
Oceania	5.2	8.1	9.6	10.9	11.4	11.9	12.5	1.7
South Asia	3.1	4.2	6.1	8.1	12.0	14.6	15.5	8.4
Americas	**92.8**	**109.1**	**128.2**	**133.3**	**150.6**	**162.7**	**167.9**	**2.9**
North America	71.8	80.7	91.5	89.9	99.5	106.4	110.1	2.6
Caribbean	11.4	14.0	17.1	18.8	19.5	20.7	21.2	1.5
Central America	1.9	2.6	4.3	6.3	7.9	8.9	9.2	4.9
South America	7.7	11.7	15.3	18.3	23.6	26.7	27.4	5.2
Africa	**14.7**	**18.7**	**26.2**	**34.8**	**49.9**	**52.9**	**55.8**	**6.1**
North Africa	8.4	7.3	10.2	13.9	18.8	18.5	19.6	4.4
Subsaharan Africa	6.3	11.5	16.0	20.9	31.2	34.5	36.2	7.1
Middle East	**9.6**	**13.7**	**24.1**	**26.3**	**58.0**	**51.7**	**51.6**	**4.5**

Source: UNWTO.
* Provisional data.

In the lower section of table 1.1 the data appear organized based on the classification of the different tourist regions suggested by the UNWTO. Thus, we can distinguish five main regions: Europe, Asia and the Pacific, Americas, Africa, and the Middle East. Although it seems evident that Europe is the most popular region among international tourists, we should also have a look at the growth rates of each region in order to appreciate the outstanding evolution of the tourist activity in the zone of Asia and the Pacific, with an average annual growth rate of 6.2% since 2005 and having passed from a 13% share of the total in 1990 to a 22% share in 2012. This significant gain in the market share by the Asian region clashes with a loss of weight in Europe and America with respect to the global tourist activity. Europe used to receive around 60% of the total number of arrivals by the beginning of the nineties while it is currently receiving barely 53% of the total. In that same period of time, arrivals to America have declined from 21% to 15% of the total market share.

Within the different sub-regions, we can see that the most visited zones in Europe are mainly the Western and the Mediterranean regions, which are also the ones with the highest growth rates –together with Eastern Europe–. In Asia and the Pacific, the North-East sub-region is the one receiving the largest number of tourists, even though the regions with the fastest growth rates are South Asia and South-East Asia. On the other hand, the vast majority of arrivals to the American territory had North America as the main destination, although its market share has been reduced since 1990. This is also connected to the faster growth rate in zones such as South America and Central America. Last, but not least, Subsaharan Africa is the leading destination in that continent, both in terms of market share and annual growth rate.

We shall continue with the analysis by focusing on table 1.2, which includes data regarding tourism receipts generated in those regions and subregions in 2012 and 2013. Plus, interannual variations since 2009 are also provided along with the market share of each zone in 2013. The structure is identical to the previous table, so we can observe the figures for advanced and emerging economies in the upper part of the table while the lower part contains the data disaggregated by region and sub-region following the classification suggested by the UNWTO.

In relation to the percentage change in the earnings coming from tourist activities worldwide, it is remarkable to see the figures consistently increasing every year at a pace that ranges from 4% to 5%. When comparing these figures with the annual growth rates of tourism arrivals (see table 1.1), we

can notice that tourism receipts have been growing at a higher pace than international arrivals. Another relevant difference between the evolutions of both variables lies in the fact that variation rates in tourism receipts are higher for the case of advanced economies, as opposed to what happened with the number of arrivals. This seems to indicate that tourism in emerging economies is still a *low-cost* activity, since the average expenses per visit are considerably smaller in these economies than in the advanced countries.

If we now focus on the lower section of table 1.2 we should immediately notice the European situation in contrast with the situations of America and the Asia-Pacific region. Despite Europe still being the region with the highest market share in terms of tourism receipts, growth rates are noticeably smaller than in those two areas. However, perhaps the most remarkable fact derives from the average earnings per visit, which are much lower in Europe than in the two mentioned regions. In fact, tourism receipts per visit in Europe are even below the world average. Plus, the only European sub-region with receipts per visit above the world average is the Northern area, which is still below the advanced economies average.

Table 1.2. Tourism receipts by region and sub-region.

	Tourism receipts Constant prices (% change)				Market Share (%)	Tourism receipts (billion $)		
Region	**10/09**	**11/10**	**12/11**	**13*/12**	**2013**	**2012**	**2013***	**Per visit ($)**
World	**5.2**	**4.5**	**4.2**	**5.3**	**100**	**1,078**	**1,159**	**1,070**
Advanced economies	5.8	5.9	4.0	6.0	64.3	688	745	1,280
Emerging economies	4.0	2.1	4.5	4.0	35.7	390	413	820
Europe	**-0.2**	**4.9**	**1.9**	**3.8**	**42.2**	**454.0**	**489.3**	**870**
Northern	3.4	2.4	3.3	7.1	6.4	67.6	74.2	1,080
Western	1.4	3.9	2.7	1.7	14.5	157.9	167.9	960
Central and Eastern	-3.5	6.8	4.0	3.4	5.2	56.3	59.9	500
Southern and Medit.	-1.9	6.1	0.0	4.5	16.2	172.2	187.3	930
EU 28	0.9	4.0	1.7	3.4	34.8	374.2	402.9	930
Asia y the Pacific	**14.9**	**8.3**	**6.7**	**8.2**	**31.0**	**329.1**	**358.9**	**1,450**
North-East Asia	21.4	9.2	7.9	9.3	15.9	167.2	184.7	1,450
South-East Asia	15.0	12.9	10.6	9.7	9.3	96.0	107.4	1,150
Oceania	-3.0	-4.1	-1.3	1.9	3.7	43.0	42.6	3,410
South Asia	10.7	11.6	-0.6	5.3	2.1	22.9	24.3	1,570
Americas	**4.2**	**5.1**	**5.7**	**6.4**	**19.8**	**212.9**	**229.2**	**1,360**

North America	6.0	5.9	6.7	7.8	14.8	156.4	171.0	1,550
Caribbean	0.7	-1.5	1.2	2.1	2.1	24.2	24.8	1,170
Central America	0.3	9.7	7.5	3.2	0.8	8.7	9.4	1,020
South America	-2.2	5.7	3.2	3.2	2.1	23.6	23.9	870
Africa	**2.6**	**1.7**	**7.3**	**0.0**	**3.0**	**34.3**	**34.2**	**610**
North Africa	0.2	-5.5	9.1	-1.4	0.9	10.0	10.2	520
Subsaharan Africa	3.8	5.0	6.5	0.6	2.1	24.3	24.0	660
Middle East	**16.3**	**-17.2**	**2.2**	**-1.9**	**4.1**	**47.5**	**47.3**	**920**

Source: UNWTO.
* Provisional data.

Receipts per visit in Eastern and Central Europe are similar to those in North Africa. On the contrary, Oceania is the zone that earns the highest receipts per visit. In general, the Asia-Pacific region showcases the largest average among the five main regions, with a market share that keeps rising over the years, now being around 31% of the total. The territory that generates the highest revenues in that region is the North-East sub-region, which accounts for almost half of the total receipts produced in the Asia-Pacific region. In the Americas, again the most relevant sub-region is North America, which presents the highest growth rates and the largest market share in the American territory. Moreover, North America is also the American sub-region with the top level of receipts per visit, surpassing any other area in the world except for Oceania and South Asia.

All in all, it is clear that tourism is an activity of high relevance in the economic field. Europe seems to be the most popular destination, albeit America and Asia are able to make every visit more profitable. Further, expectations for the future of the industry are principally optimistic worldwide.

After this brief analysis of the global tourist situation, it seems appropriate to perform a similar task taking Spain as the subject of study. Therefore, the next chapter will be devoted to the examination of the Spanish tourist context.

1.1.2. The Spanish Tourism Sector

Even though tourism is a phenomenon that clearly affects the economic situation of a country, generating, as already described, a significant propor-

tion of the revenues in the destination countries, the degree of relevance of this industry is country-specific, i.e. it varies across countries.

In this way, there are regions whose economies do not exhibit such a strong dependence on the tourist activity due to the fact that their economies are more diversified or are specialized in sectors that are not connected to tourism. Of course, that does not imply that tourism does not play a relevant role in those countries; after all, tourism is one of the most important economic activities. However, there are countries where tourism is one of the main engines of the economic development. If we were to place Spain in one of those two categories of countries, it would most likely be in the latter.

However, the Spanish tourist sector not always was such an advanced and powerful industry as it currently is. At the beginning of the past century, tourism was an activity reserved for some few privileged persons. Thus, one could think of it as an *elite* tourism; of course, Spain was not an exception for that rule. In addition, Spain performed a relatively late incorporation to the international tourist activity even though it soon became a significantly popular destination. In that sense, table 1.3 shows how Spain has been able to establish itself among the top ten destination countries, France traditionally being the leading country. Although Spain was able to surpass the United States in 2004 in the second place of the list, it seems that its most frequent place is third. The recent explosion of the Chinese tourism appears to be a real threat for Spain –they even had virtually the same number of arrivals in 2012–, although in 2013 Spain was able to expand the gap again.

Table 1.3. Top ten destinations in international tourist arrivals (millions).

Rank in 2012	Country	1995	2000	2004	2008	2012	2013*
1	France	60.0	77.2	74.4	79.2	83.0	-
2	United States	43.5	51.2	46.1	57.9	67.0	69.8
3	Spain	34.9	46.4	52.4	57.2	57.7	60.7
4	China	20.0	31.2	41.8	53.0	57.7	55.7
5	Italy	31.1	41.2	37.1	42.7	46.4	47.7
6	Turkey	7.1	9.6	16.8	29.8	35.7	37.8
7	Germany	14.8	19.0	20.1	24.9	30.4	31.5
8	United Kingdom	21.7	23.2	25.7	30.1	29.3	31.2
9	Russia	10.3	21.2	22.1	23.7	28.2	28.4
10	Thailand	7.0	9.6	11.7	14.6	22.4	26.5

Source: World Bank; UNWTO.
* Provisional data.

With the aim of getting a qualitative vision of the trends followed by these top ten tourist destinations in terms of number of arrivals, it would be convenient to examine table 1.4, which contains the variation rates of the data contained in table 1.3. As can be observed, the variation rates have been declining over time in a generalized way. It is worth noting the extraordinary boom in the Russian tourist market, with a change of more than 100% from 1995 to 2000, albeit showing a much more moderate growth afterwards. The case of Turkey is also special. Its most successful period in this aspect was from 2000 to 2008 while, as a general rule, the period of higher growth rates for every other country in the list took place just before the beginning of the new millennium. Something similar, although in a smoother manner, happened in the United Kingdom. On the other hand, and oddly enough, the period with the highest growth rate for Thailand coincide with the toughest years of the last global crisis. In Spain, the tourist sector seemed to be showing signs of deceleration if we only look at the number of tourist arrivals until 2012. However, that trend is expected to come to an end following the figure for the change from 2012 to 2013.

Table 1.4. Variation rates of international tourism arrivals (%).

Country	1995-2000	2000-2004	2004-2008	2008-2012	2012-2013*
France	28.6	-3.6	6.4	4.8	-
United States	17.8	-10.1	25.7	15.6	4.2
Spain	32.9	13.0	9.1	0.9	5.2
China	55.9	33.7	27.0	8.8	-3.5
Italy	32.6	-10.0	15.3	8.5	2.9
Turkey	35.3	75.5	77.1	19.8	5.9
Germany	27.9	6.1	23.6	22.2	3.6
United Kingdom	6.9	10.6	17.4	-2.9	6.6
Russia	105.7	4.2	7.3	19.0	0.8
Thailand	37.8	22.5	24.3	53.3	18.5

Source: World Bank; UNWTO.
* Provisional data.

Table 1.5. Top ten destinations in international tourism receipts.

		$ (billions)		Variation rates (%)	
Rank in 2012	**Country**	**2012**	**2013***	**2011-2012**	**2012-2013***
1	United States	126.2	139.6	9.2	10.6
2	Spain	56.3	60.4	-6.3	7.4
3	France	53.6	56.1	-2.2	4.8
4	China	50.0	51.7	3.2	3.3
5	Macao (China)	43.7	51.6	13.7	18.1
6	Italy	41.2	43.9	-4.2	6.6
7	Thailand	33.8	42.1	24.4	24.4
8	Germany	38.1	41.2	-1.9	8.1
9	United Kingdom	36.2	40.6	3.3	12.1
10	Hong Kong (China)	33.1	38.9	16.2	17.7

Source: UNWTO.
* Provisional data.

1.2. Measurement: unit of analysis and data sources

In general, there are three key variables in previous literature for estimating tourism flows. Although the most commonly used are the international tourism receipts– i.e. the amount of income originating from foreign visitors– problems related to multicolinearity advise the use of alternative indicators such as the international tourist arrivals or through the number of nights spent by visitors from abroad.

Despite the most popular variable in the tourism research might be the international tourism receipts; there are two other indicators of the tourist activity which may be used in the context of empirical investigations: the number of international arrivals and the number of nights spent by visitors at tourist accommodations (Gunduz & Hatemi, 2005).

Data on the number of nights spent has been obtained from the INE[1] and is expressed in thousands of units. The GDP is expressed in millions of 2008 euros and the sources for these data are OECD and REMSDB[2].

[1] INE: *Instituto Nacional de Estadística*. National Statistics Institute.

The second exercise uses Spanish time series of the number of tourist arrivals. Plus, the real gross domestic product of Spain is used selected to obtain the cyclical component of the Spanish real output.

Finally, in the last two exercises we use the tourist arrivals to Spain from Germany, Belgium, France, Italy, Netherlands, Portugal, UK, Switzerland, the rest of European countries, USA, the rest of America and the rest of the World over a time period that ranges from January 2000 to March 2014. The data have been obtained from FRONTUR[3] survey of the Institute of Tourist Studies of Spain (IET) and have been seasonally adjusted by applying the X-12 ARIMA method.

1.3. Econometric framework: an overview

In this dissertation we use a wiade range of econometric approaches depending on the nature of our data and on the need to check the robustness of some empirical findings.

In the second chapter, we estimate the cross correlations for each pair of variables so as to cover all the possible combinations of cross-correlation by usning the methodology suggested by Burns and Mitchell (1946). We also provide an alternative measure of the co-movement between the number of tourist arrivals to Spain and the cyclical ouput following the methodology proposed by den Haan (2000). As it is well-known this approach implies the estimation ofthe correlation coefficients of forecast errors derived from unrestricted VAR models for different forecast horizons.

Finally, and in order to know the strength of the studied relationships, we explore how much of the variance in the cycles of tourism arrivals to Spain is due to business cycles of source countries and how much is explained by the Spanish business cycle. The impulse-response technique enables us to answer this question. This technique identifies the relative importance of a shock in one particular variable in explaining the predictive error variability of another variable at different time leads. If the forecast error variance of a

[2] REMSDB is the quarterly database of the Spanish economy, developed by the Spanish Government. It is available at the *Secretaría de Estado de Presupuestos y Gastos* (Spanish Government) website: http://www.sepg.pap.minhap.gob.es/

[3] The FRONTUR is a survey of tourist movements in borders developed by the Institute of Tourist Studies of Spain (IET), which collects data concerning the entry of foreign visitors to Spain. These data are available at: http://www.iet.tourspain.es/es-es/estadisticas/frontur/series/paginas/default.aspx

variable at a given horizon is explained entirely by an idiosyncratic shock, then its forecast at that horizon is not affected by the shocks on the other variable.

Concerning the chapter that addresses testing the Tourism-Led Growth hypothesis, some different econometric techniques are implemented[4]. Firstly, the comovement between the number of nights spent (by foreign visitors, domestic tourists and total nights spent) and the output (GDP) are estimated. Furthermore the potential causality between these two variables is also explored by applying a Granger causality test supported by a VAR structure model for the whole sample. Finally the potential existence of structural breaks in the cyclical relationships at different moments is alsom checked in order to test the robustness of our empirical findings.

Chapter four is devoted to the analysis of the hysteresis. In particular we want to explore the persistence in the tourist sector, that is the existence of dependence of the current tourist activity on its past. From an econometric point of view, this situation can be detected by testing for the presence of a unit root. If a time series is non-stationary, then shock effects will be persistent over time. This is why, in the literature, the existence of a unit root in a time series has often been taken as a sufficient evidence of persistence. Nonetheless, a more precise way to interpret persistence would be to consider that this phenomenon happens when a change on the cyclical component of a time series produces a permanent impact on the natural trend. Thus, considering that the existence of a unit root might be derived from past natural shocks solely -instead of being caused by shocks on the cyclical component-, then the fact that a time series is non-stationary may not be sufficient, but just necessary, to confirm the phenomenon of persistence. In order to be able to distinguish whether the changes are transitory or permanent -that is, whether the changes come from shocks on the cyclical component or from shocks on the natural rate component- we will follow the procedure developed by Jaeger and Parkinson (1990, 1994)[5]. These authors proposed an unobserved components model in which the actual values of the time series can be statistically decomposed into two different components: the cycle and the natural rate. An alternative version of this model recently suggested by Perez and Di Sanzo (2011) is also used in order to check for nonlinearity.

[4] As for the software used in this paper, we have employed E-Views for the causality tests, MATLAB for the comovement analysis and GAUSS to identify the structural breaks.

[5] Please note that, although Jaeger and Parkinson refer to the *hysteresis* phenomenon when developing their unobserved components model, in this paper we use the term *persistence* as a synonym for hysteresis. Furthermore, a formal definition of hysteresis implies the properties of persistence and they are often regarded as equal.

The last chapter explores the potential convergence of twelve different Spain's tourism source markets by using three different approaches. To start with the analysis we first check whether the series are stationary by applying the panel Lagrange multiplier test proposed by Hadri (2000). Then the procedure shall continue by considering the potential presence of structural breaks through the application of the panel stationarity test developed by Carrion-i-Silvestre et al. (2005, CBL henceforth). Finally, we will study the formation of convergence clubs following the approach proposed by Phillips and Sul (2007), which tests for the presence of convergence clubs by identifying common attributes in their convergence paths.

1.4. Chapter overview and main contributions

Leaving aside, this introduction, this thesis consists of three parts. Part II, devoted to the analysis of the relationship between tourism and business cycle, includes chapters 2 and 3. *Chapter 2* is devoted to the exploration of the effects of the international arrivals from those countries where the Spanish destination is more consolidated on the Spanish business cycle, by using different econometric strategies: cross-correlations, co-movements, an analysis by using impulse-respone functions and a VAR decomposition, in order to test the robustness of our empirical findings. The main contribution of this chapter is not only to provide new evidence based on a set of alternative approaches but also to explore how the effects of shocks on the international arrivals can lead different effects on the Spanish business cycle depending on its origin.

Chapter 3 aims to re-examine the controversial relationship between tourism activity and economic growth extending previous analyses of causality among them, considering the potential effect of nonlinearities. As it is well known, ignoring nonlinearities could be not only a source of erreoneous inference but also leads erroneous relations. In particular, we argue that in different regimes different kind of relationships –even opposite ones– can prevail. Our empirical estimates shed light on this conjecture. Our results not only confirm some of the existing results in the literature but also qualify them. In particular, our findings point to an asymmetric relationship between tourism and output gap, being a bidirectional one in the current regime.

Part III is devoted to the analysis of the demand. Chapter 4, estimates an unobserved components model to explore the dynamics of tourism sector in Spain. We ask whether nights spent exhibits *hysteresis*, defined as a situa-

tion in which tourism cyclical shocks have persistent effects on the natural rate of nights spent. We find evidence of hysteresis and discuss implications of this empirical finding for a better understanding of the scope and the effectiveness of policies of tourism promotion.

Finally, chapter 5 explores the demand from a new perspective. In particular, it provides new empirical evidence on some aspects that remain unexplored so far: the degree of convergence amongst the number of tourist arrivals from a dataset of twelve Spain's tourism markets. This information may be useful in order to identify general trends or different groups of countries –convergence clubs– with common features. These findings should be taken into account for devising a more precise and effective policy of promotion, with higher levels of differentiation. We will do so by applying three different approaches. Firstly, the potential stochastic convergence is tested by means of traditional panel unit root techniques, namely, the LM test proposed by Hadri (2000). Secondly, the potential presence of structural breaks hiding deeper results is analysed through the panel stationarity test developed by Carrion-i-Silvestre et al. (2005). Finally, the club-convergence hypothesis is assessed by way of the Phillips and Sul (2007) methodology.

The study concludes with Part IV where a final *chapter 6* contains some concluding remarks and the future research agenda. The following table summarises the general structure of the dissertation.

Contribution of this thesis

The nature of the contributions of the works contained in this dissertation with respect to previous empirical literature is threefold:

A common source of controversy in previous literature on the relationship between tourism and the business cycle is the lack of robustness of the most part of previous empirical findings given the existence of opposite theoretical arguments.

In particular one could check a high sensitivity of the relationship to the country, sampling period, or even to the econometric approach chosen. These apparently contradictory results are a potential source of controversy difficulting the understanding of the exact nature of the relationships.

Maybe the potential existence of nonlinearities or asymmetries in a relationship could be behind some of these controversies. In general, previous

contributions did not address nonlinearities. Our work is an exception in this field of research.

The rationale of our approach is that a time-varying relationship could not be ruled out, that is, one could reject a linear relationship if the relation was different in different economic conditions. In such cases, the estimation method should allow for nonlinearity. The different approaches used in the different empirical exercises of this dissertation allow take into account the potential existence of asymmetries allowing to reconsider the role of the tourism demand over the business cycle, and identifying whether the relationship between tourism demand cycles and output gaps is asymmetric depending on the phase of the busine

The second contribution of this thesis is the study of the long-term effects of cyclical shocks in this sector: the persistence. Importing some previous apporaches, recently applied, at least, in the fields of labour economics and energy economics.

Finally this thesis reports the results of applying a new approach to the study of the nature of the demand: the analysis of the convergence amongst the number of tourist arrivals for the twelve top Spain's tourism markets.

Chapter	Objectives	Scope	Data and sources	Econometric Framework
2. Tourist arrivals and business cycles	Examine the contribution of external shocks from tourism markets on Spanish business cycle.	9 countries	Tourist arrivals from 9 selected countries (2000 Q1-2014 Q3) and Real GDP taken from INE and OECD Statistics.	Cross-correlation analysis, VAR Forecast errors (Den Haan, 2000), Variance Decomposition, Impulse-Response.
3. Tourism-Led Growth revisited for Spain: causality, business cycles and structural breaks	Reconsider tourism-led growth hypothesis by considering structural breaks. Identify whether the relationship between tourism cycles and output gaps is asymmetric.	Spain	Number of nights spent obtained from INE (1980Q1-2013Q3).	Den Haan (2000), Granger causality tests, Bai-Perron (20031, 2003b).
4. Persistence in the Spanish tourism: are shocks permanent?	Identify the transitory or permanent effect of shocks. Long term effects.	Spain	Number of nights spent and Real GDP obtained from INE (1980Q1-2013Q3).	Jaeger & Parkinson (1990, 1994), Pérez y Di Sanzo (2012).
5. Exploring the regional distribution of tourism and the extent to which there is convergence	Examine the degree of convergence amongst the number of tourist arrivals from a dataset of twelve Spain's tourism markets	12 tourist markets	Tourist arrivals. Pooled data 12 countries, (2001Q1-2014Q3). Taken from INE	Panel unit root techniques, Hadri (2000); Potential presence of structural breaks –Carrion-i-Silvestre et al. (2005)–; club-convergence hypothesis – Phillips and Sul (2007) –.

1.5. Publications

Some chapters of this PhD thesis are based on papers presented in Meetings and Workshops or submitted to academic journal for evaluation. For this reason, chapters can be read independently of each other.

Chapter 3 has been published in *International Journal of Tourism Research* (2014) and is based on a work that was presented jointly with Antonio in some meetings and seminars.

The rest of chapters have been submitted for publication and are actually under review.

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Part II
Tourism and Business Cycles

Chapter 2: Tourist arrivals and business cycles in Spain

2.1. Introduction

Tourism is one of the most relevant economic activities. For a large number of countries, it represents a significant part of their income and it is the main engine of some economies.

Figures concerning this activity are notable. In 2013, tourism accounted for 9% of total GDP (direct, indirect and induced impact) in the world, as well as 6% of global exports. In terms of employment, the role of the tourist sector was remarkable too, for it created one out of eleven jobs in the world (UNWTO, 2014). What is more interesting is the fact that its performance is expected to keep increasing over the next years. In the year 2012, the number of international arrivals around the world reached a new record, exceeding the amount of one billion tourists for the first time in history. That number was even higher in 2013 and the estimates indicate an annual growth rate of around 3.3% at least until 2030, when it is expected to have surpassed 1.8 billion international arrivals (UNWTO, 2014).

Table 1 exhibits the top ten tourism destinations in terms of the number of international arrivals they receive. Having a look at the figures, it seems clear that the popularity of the tourist activity has been increasing in each of these countries at high rates. The case of China is particularly noteworthy, as it has become the fourth most attractive country with a similar performance to that from Spain and surpassing the figures of countries such as Italy or the United Kingdom in less than a decade. Turkey has performed extremely well during the last decade and has established itself on the sixth position of the table. Nonetheless, the most visited country in the world during the last two decades has always been France, and has consistently

showed a wide margin with respect to the top second destination. The performance of Spain is also remarkable, as it has maintained itself amongst the top three over the last twenty years.

Table 1. Top ten destinations in terms of million international arrivals in 2012.

Rank	Country	1995	2000	2004	2008	2012	2013*
1	France	60.0	77.2	74.4	79.2	83.0	-
2	United States	43.5	51.2	46.1	57.9	67.0	69.8
3	Spain	34.9	46.4	52.4	57.2	57.7	60.7
4	China	20.0	31.2	41.8	53.0	57.7	55.7
5	Italy	31.1	41.2	37.1	42.7	46.4	47.7
6	Turkey	7.1	9.6	16.8	29.8	35.7	37.8
7	Germany	14.8	19.0	20.1	24.9	30.4	31.5
8	United Kingdom	21.7	23.2	25.7	30.1	29.3	31.2
9	Russian Federation	10.3	21.2	22.1	23.7	28.2	28.4
10	Thailand	7.0	9.6	11.7	14.6	22.4	26.5

Source: World Bank statistic system, UNWTO (2014).
- Missing data.
* Provisional data.

This paper will focus on the case of Spain, which is a country that has suffered deep consequences derived from the recent global crisis. Its economic structure now presents high unemployment rates, an increasing public debt despite the fact that direct and indirect taxes have been raised in several occasions, as well as a continuous trade deficit, among some other worrying symptoms that have led the national government to undertake aggressive fiscal policy measures. These, nevertheless, have not been effective enough to help improve the conjunction, which is why other fields of action should be now considered. In this circumstance, commercial policy may take a stronger role and, in particular, actions concerning the tourist sector seem to be an appropriate alternative.

Despite the instabilities of the Spanish economy, tourism in the country has continued its expansion in terms of both number of arrivals and tourism receipts (see Table 2) and is currently one of the most relevant destinations. However, there may still be margin to keep improving the performance of the Spanish tourist sector, and that is where this paper points.

Table 2. Top ten destinations in terms of tourism receipts.

		$ (billion)		Variation rates (%)	
Rank in 2012	Country	2012	2013*	2011-2012	2012-2013*
1	United States	126.2	139.6	9.2	10.6
2	Spain	56.3	60.4	-6.3	7.4
3	France	53.6	56.1	-2.2	4.8

4	China	50.0	51.7	3.2	3.3
5	Macao (China)	43.7	51.6	13.7	18.1
6	Italy	41.2	43.9	-4.2	6.6
7	Thailand	33.8	42.1	24.4	24.4
8	Germany	38.1	41.2	-1.9	8.1
9	United Kingdom	36.2	40.6	3.3	12.1
10	Hong Kong (China)	33.1	38.9	16.2	17.7

Source: UNWTO (2014).
- Missing data.
* Provisional data.

In this paper, we attempt to shed light on the current level of knowledge regarding the properties and singularities of the Spanish tourist sector and the behaviour of the number of tourist arrivals to Spain. In particular, we will analyse the extent to which variations on the number of arrivals to Spain are due to shocks on the Spanish outcome and the extent to which those fluctuations depend on shocks on the outputs of the source countries. In order to do so, we shall employ data on the number of tourism arrivals to Spain from a set of nine countries as well as their corresponding GDP (including the GDP of Spain). Namely, the source countries that will be used are: Belgium, France, Germany, Italy, Netherlands, Portugal, Switzerland, United Kingdom and United States.

The econometric procedure includes unconditional cross correlations among the different combinations that arise, i.e., cross correlations between (i) the arrivals from a particular source country and the Spanish output; and (ii) the arrivals from the source country and its own output. The correlation analysis will be complemented with the study of the co-movement between variables, using the methodology proposed by Den Haan (2000) following the same set of combinations. Notwithstanding, since the main point of interest in this paper is to investigate the degree of influence of both the Spanish outcome and that from the source countries on the tourist flows to Spain, a forecast error variance decomposition will be implemented as well. With this econometric sequence we also intend to find out if the role of the source country's output and the Spanish output is significantly different for each of the nine countries that define our database.

Identifying different patterns might help to develop more diversified and customised marketing strategies to boost the number of tourist arrivals proceeding from the different source countries in the sense that, if fluctuations in the tourist arrivals from a particular country are driven by the Spanish economic performance rather than by its own output, then one might conclude that the Spanish government can influence the tourism flows from that country with the appropriate political measures while, in the opposite case, the Spanish governors might not be able to cause such

influence, and the tourism flows from that country could be viewed as an independent fact.

Tourism in Spain is still a hot a topic in the economic literature. The first works were developed with the aim of analysing the international tourism demand in Spain (e.g. González and Moral, 1995; García-Ferrer and Queralt, 1997; Young and Pedregal, 1997; Garín-Muñoz and Pérez-Amaral, 2000). Other authors approached the issue of demand modelling under the assumption that not every Spanish region necessarily presents the same patterns and relevance in terms of their tourist activity, thus formulating unique models for different regions of Spain (e.g. Garín-Muñoz, 2004, 2006, 2007; Garín-Muñoz and Montero-Marín, 2007; Gil-Alana et al., 2008; Rodríguez and Rivadulla, 2012).

Another line of investigation focused on the causality relationship between tourism and economic growth. In fact, the Tourism-Led Growth hypothesis that has been followed by many authors to inquiry on the aforementioned causality relationship for many different countries[1] was developed in a paper devoted to the analysis of the Spanish tourism, namely in Balaguer and Cantavella-Jordá (2002). This hypothesis aims to test whether tourism is a determinant factor of the economic growth of a particular region in the long-run. In this seminal paper, the proposed methodology included Granger's causality tests along with cointegration analysis to determine the long-run causality relationship of the tourist and economic variables as well as the direction of the causality. The Tourism-Led Growth hypothesis was later reinterpreted for the case of Spain in order to test the robustness of the results found by Balaguer and Cantavella-Jordá (2002), who had confirmed such hypothesis. For instance, Nowak et al. (2007) added a variable representative of capital-goods imports to the Tourism-Led Growth model and corroborated the unidirectional causality from tourism to economic growth in Spain. However, other applications of this methodology in the context of Spanish tourism have provided evidence of bidirectional causality in the relationship (Cortés-Jiménez, 2010; Cortés-Jiménez and Pulina, 2010).

Although this paper is indeed devoted to investigate some particular features of the Spanish tourist sector, we feel that it is difficult to relate our work with the existing literature concerning tourism research in Spain since we will use business cycles in our analysis, which, to the best of our knowledge, has never been employed in the field of tourism research for Spain. In fact, business cycles and tourism research have a rather scarce relation. Guizzardi and Mazzocchi (2010) already pointed the difficultness of identifying tourism cycles due to different irregularities and structural

[1] See (Pablo-Romero and Molina, 2013; Brida et al., 2013; Brida et al., 2014a) for exhaustive literature reviews concerning investigations on Tourism-Led Growth

changes in aspects like working hours, technological advances or infrastructures and also due to the uncertainty of the impact caused by business cycles in the tourist activity, e.g., recessions in a destination country may become a price advantage when compared to its main competitors. In spite of it, some authors have used business cycles in tourism research with satisfactory results (see for instance Eeckels et al. 2012).

Nonetheless, the topic that we will address -whether fluctuations in tourist arrivals to Spain are more dependent on shocks in the source countries' outputs or in the Spanish output- might have some connections with some of the cited works. For instance, González and Moral (1995) included an income index in their model for international tourism demand in Spain in order to take into consideration the influence derived from the economic performance of the source countries in the arrivals to Spain.

Moreover, Garín-Muñoz and Pérez-Amaral (2000) found that the level of income in the countries of origin was the most relevant variable in the tourism demand model they proposed. The Tourism-Led Growth hypothesis is somewhat related to our topic, for it essentially measures a relationship between tourism and economic growth. However, one should notice that our work focuses on analysing the contribution of shocks in both the origin countries' output and the Spanish output on the variations of the tourism flows into Spain rather than a long-run causality relationship between them. In sum, we hope to provide a richer picture of the inherent characteristics of the Spanish tourism by addressing a line of research that remains unexplored for the case of Spain at the time of writing, and that might be followed in subsequent works.

The rest of the paper is structured as follows. Section 2 contains the description of the employed data. Section 3 gives a more detailed presentation of the methodology joint to the results derived from its application. Finally, section 4 concludes this work.

2.2. Data

In this paper, we will employ both tourism data and economic time series. The tourism data used will be the number of tourist arrivals to Spain from nine different source countries: Belgium, France, Germany, Italy, Netherlands, Portugal, Switzerland, United Kingdom and United States. The economic data consists of real GDP time series for each of those countries plus Spain. All data have quarterly periodicity.

The source of the number of tourist arrivals to Spain is the FRONTUR2 survey of the Institute of Tourist Studies of Spain (IET) and the data have been seasonally adjusted by applying the X-12 ARIMA method. The data corresponding to the GDP of the nine source countries and Spain have been obtained from the OECD statistics database and were already seasonally adjusted when gathered. The data commences in 2000(I) and ends in 2014(III). We have transformed all the data by taking logs and have isolated the cycles by means of the Hodrick-Prescott filter (1980, 1997; HP hereafter).

After this brief overview of the selected data we shall now proceed to an explanation of the methodology that will be followed in this paper.

2.3. Methodology and results

2.3.1. Co-movement analysis

To begin with our econometric analysis, we shall take a brief look at the co-movement analysis between the studied variables. We shall do so by applying two different techniques in order to check the robustness of the results.

In first place, we will estimate the cross correlations for each pair of variables so as to cover all the possible combinations, i.e., we will present the cross correlations between (i) the arrivals from a particular source country and the Spanish output; and (ii) the arrivals from the source country and its own output. We will follow the methodology suggested by Burns and Mitchell (1946). Thus, we will estimate contemporaneous correlation coefficients, $corr(0)$, to measure the contemporaneous co-movement. We will also estimate the cross correlation coefficients, $corr(k)$, which provide information on the lagging and leading co-movements. Thus, a high correlation at $t+k$ (or $t-k$) indicates that a series lags (or leads) with a difference of k time periods.

Table 3: Cross-correlations

x_t	y_{t+i}	-4	-3	-2	-1	0	1	2	3	4
BE (A)	**SP (Y)**	-0.338	-0.284	-0.158	-0.016	0.194	0.330	**0.400**	0.381	0.292
BE (Y)	**SP (Y)**	-0.045	0.184	0.440	0.670	0.827	**0.850**	0.751	0.565	0.355
BE (Y)	**BE (A)**	0.179	0.293	0.419	**0.475**	0.351	0.121	-0.019	-0.161	-0.235
FR (A)	**SP (Y)**	-0.070	-0.026	0.073	0.131	0.221	0.297	0.328	**0.347**	0.322
FR (Y)	**SP (Y)**	-0.038	0.218	0.482	0.710	0.859	**0.892**	0.807	0.648	0.453
FR (Y)	**FR (A)**	0.163	0.223	0.279	**0.285**	0.266	0.220	0.226	0.173	0.131
GE (A)	**SP (Y)**	0.217	0.324	0.464	0.521	**0.601**	0.581	0.512	0.423	0.327
GE (Y)	**SP (Y)**	0.015	0.270	0.529	0.737	**0.846**	0.820	0.686	0.479	0.263

[2] The FRONTUR is a survey of tourist movements in borders developed by the Institute of Tourist Studies of Spain (IET), which collects data concerning the entry of foreign visitors to Spain. These data are available at: http://www.iet.tourspain.es/es-es/estadisticas/frontur/series/paginas/default.aspx

GE (Y)	**GE (A)**	0.092	0.197	0.308	0.381	**0.465**	0.417	0.388	0.286	0.166
IT (A)	**SP (Y)**	-0.203	-0.045	0.132	0.316	0.447	0.541	**0.554**	0.471	0.404
IT (Y)	**SP (Y)**	-0.115	0.151	0.435	0.681	0.846	**0.868**	0.785	0.618	0.415
IT (Y)	**IT (A)**	0.267	0.440	0.577	**0.647**	0.640	0.543	0.377	0.147	-0.073
NL (A)	**SP (Y)**	-0.086	0.107	0.312	0.424	**0.481**	0.443	0.358	0.255	0.104
NL (Y)	**SP (Y)**	0.256	0.475	0.688	0.847	**0.904**	0.834	0.657	0.657	0.165
NL (Y)	**NL (A)**	-0.026	0.137	0.238	0.338	0.434	**0.493**	0.377	0.177	-0.051
PT (A)	**SP (Y)**	0.243	0.378	0.460	0.553	**0.556**	0.553	0.543	0.456	0.365
PT (Y)	**SP (Y)**	-0.029	0.121	0.311	0.479	**0.601**	0.600	0.492	0.307	0.115
PT (Y)	**PT (A)**	0.027	0.297	0.297	0.348	**0.354**	0.330	0.265	0.095	-0.050
SW (A)	**SP (Y)**	0.137	0.302	0.466	0.553	0.623	**0.625**	0.594	0.526	0.412
SW (Y)	**SP (Y)**	0.189	0.391	0.599	0.774	**0.873**	0.861	0.734	0.535	0.311
SW (Y)	**SW (A)**	0.311	0.402	0.502	**0.554**	0.551	0.548	0.547	0.445	0.231
UK (A)	**SP (Y)**	0.166	0.305	0.440	0.522	**0.589**	0.556	0.464	0.319	0.183
UK (Y)	**SP (Y)**	0.005	0.230	0.460	0.667	0.838	**0.874**	0.814	0.663	0.457
UK (Y)	**UK (A)**	0.111	0.270	0.427	0.564	**0.722**	0.705	0.629	0.521	0.367
US (A)	**SP (Y)**	0.172	0.177	0.207	0.219	**0.221**	0.214	0.137	0.016	-0.051
US (Y)	**SP (Y)**	-0.151	0.052	0.275	0.482	0.667	**0.762**	**0.762**	0.695	0.595
US (Y)	**US (A)**	**-0.231**	-0.137	-0.025	0.041	0.137	0.121	0.149	0.121	0.156

Note: The numbers in the table represent $corr(x_t, y_{t+i})$ where $i=[-4,-3,-2,-1,0,1,2,3,4]$, x_t is the variable listed first and y_t is the variable listed second. The first line of each panel computes correlations between tourist arrivals in the source country (A) and the output (Y) of the destination country, in this paper, Spain. The second line computes correlations between the output (Y) of the source country and the Spanish output (Y), and the third line, computes correlations between the output (Y) and the tourist arrivals (A), both of the source country. Country codes: BE is Belgium; FR is France; GE is Germany; IT is Italy; NL is Netherlands; PT is Portugal; SW is Sweden; UK is United Kingdom; US is United States and, finally, SP is Spain. All the variables in cycles.

Table 3 reports correlations between the tourist arrivals of each country and both the Spanish and the source countries' business cycles at different lags and leads. Basically, tourist arrivals move contemporaneously (in any case, with one lag or lead) with business cycles (Spanish and source country). We don´t find a dominant pattern regarding which cycle has more degree of comovement with tourist arrivals. Thus, in three countries -Germany, Portugal and Sweden- the correlation between tourist arrivals and the Spanish business cycle is stronger than in relation to their own business cycles while in two countries -Italy and UK- the correlations are stronger with their own business cycles. Finally, in the rest of the countries -Belgium, France, Netherlands and US- we observe a similar degree of correlation of tourist arrivals with both cycles. Plus, it is worth noting the low degree of correlation between the tourist arrivals from US with both cycles.

In second place, we give another measure of the co-movement between the number of tourist arrivals to Spain and the outputs of both Spain and the source countries by following the methodology developed by den Haan (2000). This implies estimating the correlation coefficients of forecast errors derived from unrestricted VAR models for different forecast horizons.

Despite the fact that there are simpler alternatives to measure the co-movement between variables, the procedure proposed by den Haan (2010) has been chosen because it possesses several advantages over other possible methods. First, no modelling assumptions -e.g. VAR ordering or structural assumptions- are required in the process. Second, although the application

of different detrending filters in the series provides different business cycles (Canova, 1998), the results are not sensitive to the filter used to isolate the cycles or to the orders of integration that the variables present. Third, this methodology allows both short-run and long-run correlations to be assessed, which definitely provides a richer picture of dynamic co-movement.

On the other hand, this approach does not need to identify which of the possible structural shocks is -or are- originating fluctuations in the data of the model. In this way, the researcher can simply consider that there is a number of structural shocks affecting the model variables and also playing a role in the shapes of the co-movements that are being analysed, not needing to identify which of those structural shocks are responsible for those fluctuations.

The process starts from a VAR model like this one:

$$X_t = \alpha + \beta t + \gamma t^2 + \sum_{t=1}^{L} A_l X_{t-l} + \varepsilon_t \qquad (1)$$

where X_t is a $2x1$ vector including the tourist arrivals, and the business cycle (Spanish or own country); α, β and γ are N-vectors of constants, A_l is an $N \times N$ matrix of regression coefficients and ε_t is an N-dimensional white noise process -i.e., $E(\varepsilon_t) = 0$, $E(\varepsilon_t \varepsilon_t) = \sigma$ and $E(\varepsilon_s \varepsilon_t) = 0 \; \forall s \neq t$-. Lastly, L is the total number of lags included.

In our case, $N = 9$, since we have nine tourist arrivals source countries in our quarterly dataset. Moreover, we set $L = 4$ so that we have an entire year in terms of lags in the VAR.

Building on the previous VAR model, the K-period forecast errors of each variable X_{t-l} can be determined.

$$e_{t+K}^{X} = X_{t+k} - E_t X_{t+K} \qquad (2)$$

where $E_t X_{t+K}$ can be considered as the trend component of X_t while X_{t+K} can be viewed as its cyclical component determined for a particular horizon of K. It should be pointed that forecast errors associated with short-term horizons are more likely to be influenced by the high-frequency components of the data while those associated with long-term horizons will tend to be more influenced by the low-frequency components, for they essentially rebuild the time series without the deterministic trend.

Next, the correlation coefficients between these K-period ahead forecast errors, Corr(K), are estimated at different horizons to examine the co-movements between the cyclical components of each pair of variables

Table 4: Co-movement between arrivals from source countries to Spain and Spanish output.

Forecast Horizon	BE	FR	GE	IT	NL	PT	SW	UK	US
1	0.445	0.028	0.303	0.117	0.221	0.336	0.347	0.216	0.051
2	0.440	0.223	0.363	0.376	0.197	0.609	0.408	0.451	0.054
3	0.452	0.315	0.516	0.488	0.415	0.517	0.379	0.610	0.098
4	0.236	0.353	0.568	0.530	0.554	0.478	0.498	0.541	0.152
5	0.296	0.359	0.584	0.533	0.645	0.555	0.549	0.561	0.189
6	0.274	0.346	0.618	0.514	0.669	0.559	0.573	0.584	0.214
7	0.213	0.327	0.598	0.488	0.646	0.593	0.574	0.586	0.229
8	0.198	0.311	0.618	0.465	0.645	0.606	0.564	0.594	0.235
12	0.213	0.328	0.613	0.473	0.675	0.623	0.529	0.620	0.236
16	0.217	0.340	0.613	0.483	0.700	0.645	0.592	0.668	0.243
20	0.208	0.336	0.709	0.479	0.661	0.642	0.594	0.668	0.244

Note: The first column denotes the forecast horizon in quarters. The numbers in the rest of the columns represents the correlation coefficients at different forecast horizon between the tourist arrivals y the Spanish business cycle. Country codes: BE is Belgium; FR is France; GE is Germany; IT is Italy; NL is Netherlands; PT is Portugal; SW is Sweden; UK is United Kingdom; US is United States and, finally, SP is Spain. All the variables in cycles.

Table 5: Co-movement between arrivals from source countries to Spain and their respective outputs.

Forecast Horizon	BE	FR	GE	IT	NL	PT	SW	UK	US
1	0.546	0.127	0.289	0.344	-0.003	0.028	0.295	0.380	0.189
2	0.365	0.181	0.346	0.534	0.259	0.180	0.187	0.511	0.117
3	0.360	0.237	0.409	0.620	0.435	0.270	0.220	0.635	0.113
4	0.345	0.274	0.451	0.656	0.570	0.304	0.311	0.713	0.132
5	0.317	0.300	0.476	0.669	0.603	0.314	0.313	0.756	0.144
6	0.304	0.316	0.488	0.673	0.591	0.317	0.340	0.775	0.151
7	0.307	0.325	0.492	0.673	0.574	0.318	0.309	0.779	0.154
8	0.316	0.329	0.493	0.674	0.571	0.319	0.345	0.776	0.156
12	0.319	0.333	0.490	0.676	0.607	0.320	0.305	0.767	0.157
16	0.319	0.333	0.490	0.676	0.600	0.320	0.384	0.768	0.157
20	0.319	0.333	0.490	0.676	0.583	0.320	0.407	0.768	0.157

Note: The first column denotes the forecast horizon in quarters. The numbers in the rest of the columns represents the correlation coefficients at different forecast horizon between the tourist arrivals y the Spanish business cycle. Country codes: BE is Belgium; FR is France; GE is Germany; IT is Italy; NL is Netherlands; PT is Portugal; SW is Sweden; UK is United Kingdom; US is United States and, finally, SP is Spain. All the variables in cycles.

The correlation coefficients at different forecast horizons (in quarters), are showed in table 4 (tourist arrivals and Spanish business cycle) and table 5 (tourist arrivals and its own business cycle). The results confirm those from previous studies using traditional statistics. On one hand, as we can see from both tables (4 and 5), in tourist arrivals from France, and specially Germany, Portugal and Sweden, the coefficients are significantly positive at all horizons and larger in relation to the Spanish business cycle against its own country. On the other hand, Italy and UK show the opposite pattern. Again, like the cross correlation analysis, in UK, the correlation coefficients between the tourist arrivals from UK and the Spanish business cycle is very high. The rest of the countries display a similar pattern in terms of coefficient values, being almost equal in both tables. Finally, tourist arrivals from US show low correlation coefficients with both the Spanish and its own cycles.

2.3.2. Variance decompositions

The results obtained in the previous section have clarified the existence and significance of the relationship between tourism arrivals cycles and the business cycles in both Spain and the source countries, but it has not established the strength of these relationships. Thus, we are interested in answering how much of the variance in the cycles of tourism arrivals to Spain is due to business cycles of source countries and how much is explained by the Spanish business cycle.

A method known as the impulse-response technique enables us to answer this question. This technique identifies the relative importance of a shock in one particular variable in explaining the predictive error variability of another variable at different time leads. If the forecast error variance of a variable at a given horizon is explained entirely by an idiosyncratic shock, then its forecast at that horizon is not affected by the shocks on the other variable.

Therefore, we use this technique to decompose the forecast error variance of Tourism arrivals of each country into three different proportions: one attributed to the Spanish business cycle, another one attributed to the own country's business cycle and a last one attributed to shocks on the cycle of tourist arrivals itself. For this purpose, we use a trivariate VAR that can be expressed as follows:

$$A(L)\begin{pmatrix} T_t - T_t^* \\ Y_t^S - Y_t^{S,*} \\ Y_t^i - Y_t^{i,*} \end{pmatrix} = \begin{pmatrix} \varepsilon_t^T \\ \varepsilon_t^{Y^S} \\ \varepsilon_t^{Y^i} \end{pmatrix}$$

where $A(L)$ is a k_{th}-order matrix polynomial in the lag operator L, $T_t - T_t^*$ is the tourism arrival cycle, $Y_t^S - Y_t^{S,*}$ is the Spanish business cycle, $Y_t^i - Y_t^{i,*}$ is the business cycle of the country i (I being Belgium, France, Germany, Italy, Netherlands, Portugal, Switzerland, United Kingdom or United States)[3] .

Results are summarized in table 6. The first column denotes the horizon in quarters and the two rows of each country decompose the forecast error variance of the tourism arrival cycle into one proportion attributable to

[3] The lag length for the VAR was chosen based on the Modified Akaike information criterion.

shocks on the Spanish business cycle and another one attributable to shocks on the business cycle of each source country[4].

Table 6: Percent contribution to the variability of tourist arrivals cycle from shocks to the output gap (Spanish and source country)

Code	Shock to	Forecast Horizon (in quarters)						
		1	**2**	**4**	**8**	**12**	**16**	**20**
BE	BE output	18.063	18.063	20.066	22.477	22.583	22.623	22.612
	SP output	0.005	6.097	7.411	9.130	11.412	11.462	11.500
FR	FR output	1.750	2.610	4.390	6.835	7.018	8.042	8.147
	SP output	2.267	3.411	3.934	8.637	13.033	13.991	14.034
GE	GE output	1.517	3.354	7.415	8.288	8.534	8.601	8.633
	SP output	8.898	13.733	21.176	26.083	25.859	25.880	25.896
IT	IT output	6.438	14.719	27.563	29.051	30.497	30.672	30.713
	SP output	0.132	0.577	1.210	2.781	8.383	9.355	9.413
NL	NL output	2.228	7.026	11.049	11.429	11.621	12.010	12.140
	SP output	6.524	13.442	25.960	29.753	31.323	31.426	31.414
PT	PT output	0.138	0.563	2.098	3.104	5.141	5.226	5.253
	SP output	1.414	5.308	20.385	26.494	26.058	26.036	26.052
SW	SW output	2.253	2.029	13.693	19.792	19.537	19.317	19.298
	SP output	10.423	17.083	16.249	16.879	17.350	18.251	18.281
UK	UK output	14.975	24.681	48.353	57.955	58.936	58.960	58.990
	SP output	4.016	5.662	4.021	3.441	5.624	6.199	6.218
US	US output	3.016	3.038	3.357	5.064	6.108	6.229	6.264
	SP output	0.000	0431	0.957	1.060	1.199	1.399	1.456

Note: The first column denotes each country. The two rows in each panel denote the forecast horizon in quarters. The numbers of each pairs of the rows represents the cumulative impact (in percentage) of business cycles to the variation in the error variance of tourist arrivals from each country business cycle and Spanish business cycle respectively. Country codes: BE is Belgium; FR is France; GE is Germany; IT is Italy; NL is Netherlands; PT is Portugal; SW is Sweden; UK is United Kingdom; US is United States and, finally, SP is Spain. All the variables in cycles.

Table 7: Percent contribution of shocks on the tourist arrivals to the variability of the Spanish output gap

Country	Forecast Horizon (in quarters)						
	1	**2**	**4**	**8**	**12**	**16**	**20**
Belgium	0.003	0.625	2.060	3.078	3.197	3.203	3.208
France	0.000	3.397	7.275	12.795	12.861	13.155	13.461
Germany	10.181	13.474	19.071	28.463	29.310	29.200	29.162
Italy	0.081	0.766	3.135	5.606	5.700	5.724	5.759
Netherlands	6.438	9.624	11.633	19.595	21.979	21.992	21.998
Portugal	1.291	0.390	5.525	10.824	10.389	10.463	10.458
Sweden	9.679	13.641	24.728	37.834	37.572	37.515	37.561
UK	2.941	2.930	2.265	1.482	1.752	1.681	1.719
US	0.302	0.138	0.869	1.809	1.790	1.802	1.839

Note: The first column denotes each country. The two rows in each panel denote the forecast horizon in quarters. The numbers of each pairs of the rows represents the cumulative impact (in percentage) of the variation in the error variance of tourist arrivals from each country business cycle and Spanish business cycle respectively.

According to the figures exhibited in Table 6, there are four main facts to be pointed. Firstly, in the short run (a year), the cumulative impacts of both

[4] The percentage of variance rise to the series (tourism arrivals) itself is not included because it is not relevant for our study. Of course , this percentage is not more than the rest up to 100% minus the percentage of the two business cycle

business cycles reach the convergence (no relevant changes beyond this time) for all countries. Secondly, we can emphasize that in Belgium, Italy, Switzerland, United Kingdom and US the effect from shocks on their own business cycle is stronger than those from shocks on the Spanish business cycle. Thirdly, shocks on the Spanish business cycles explain more than 25 percent of the forecast error for the cases of Germany and Portugal. These two countries seem to be the most sensitive to the Spanish business cycle. Finally, tourist arrivals from UK and Italy show very high sensitivity with their own business cycles.

Table 7 reports the contribution of tourist arrivals from each country to the variability of the Spanish output gap. As we can see, in four countries -Belgium, Italy, UK and US- the contribution is very low at any horizon. Conversely, the Spanish output gap seems to be strongly influenced by the tourist arrivals from Germany, Netherlands and Sweden.

2.3.3. Impulse-response functions

By means of the VAR approach used in the previous section, we can also obtain impulse-response functions to analyse the short-run dynamic reactions to shocks. The impulse-response functions in this paper are based on the generalized approach of Pesaran and Shin (1998), which does not require orthogonalizaton of shocks and is invariant to the ordering of the variables in the VAR.

Figure 1 plots responses of the Spanish output gap to shocks on tourist arrivals from each source country. Similarly, Figures 2 and 3 display the responses of the tourist arrivals to shocks -of one (and two) standard deviation(s) from the mean- on the Spanish output gap and on that one of the source countries, respectively. In each graph, the continuous line in represents the cumulated mean responses to the corresponding shock and the dotted lines show the -positive and negative- one standard deviations from the mean.

As we can observe in Figure 1, the Spanish output gap responds positively to a shock on tourist arrivals from all the countries except for the case of US. These responses are statistically significant in every country, which indicates that a positive (negative in the case of US) shock on the tourist arrivals will have persistent influences on the Spanish output gap over five years (twenty quarters). Specifically, in terms of magnitude of the response, the highest responses of the Spanish output gap are those for Belgium, Germany, Netherlands, and Switzerland; while for France, Italy and Portugal the level of response is medium (in relation to the rest of the countries) and rather small -close to zero- in the case of UK and US. These results are very similar to those found in table 7.

From Figure 2 we can conclude that responses of the tourist arrival cycles are generally positive (and significant) except for the case of France and Italy, where, in the medium term -two years later (three in Italy)- the responses switch from positive to negative. In terms of magnitude, Germany, Portugal and Switzerland show the highest responses to a shock on the Spanish output gap. In these three countries, the responses tend to increase over eight quarters (two years) and stabilize later.

Finally, Figure 3 plots the responses of tourist arrivals from each country to its own output gap. In this case, the magnitudes, compared to the other two figures, are clearly higher. In the short term, all the countries show a positive and significant response to the shock, reaching their peaks in a medium term (eight quarters). Switzerland and UK are the countries with the highest responses, while Belgium and Portugal show a low level of response to the shock (in the case of Portugal, it is even negative).

2.4. Conclusion

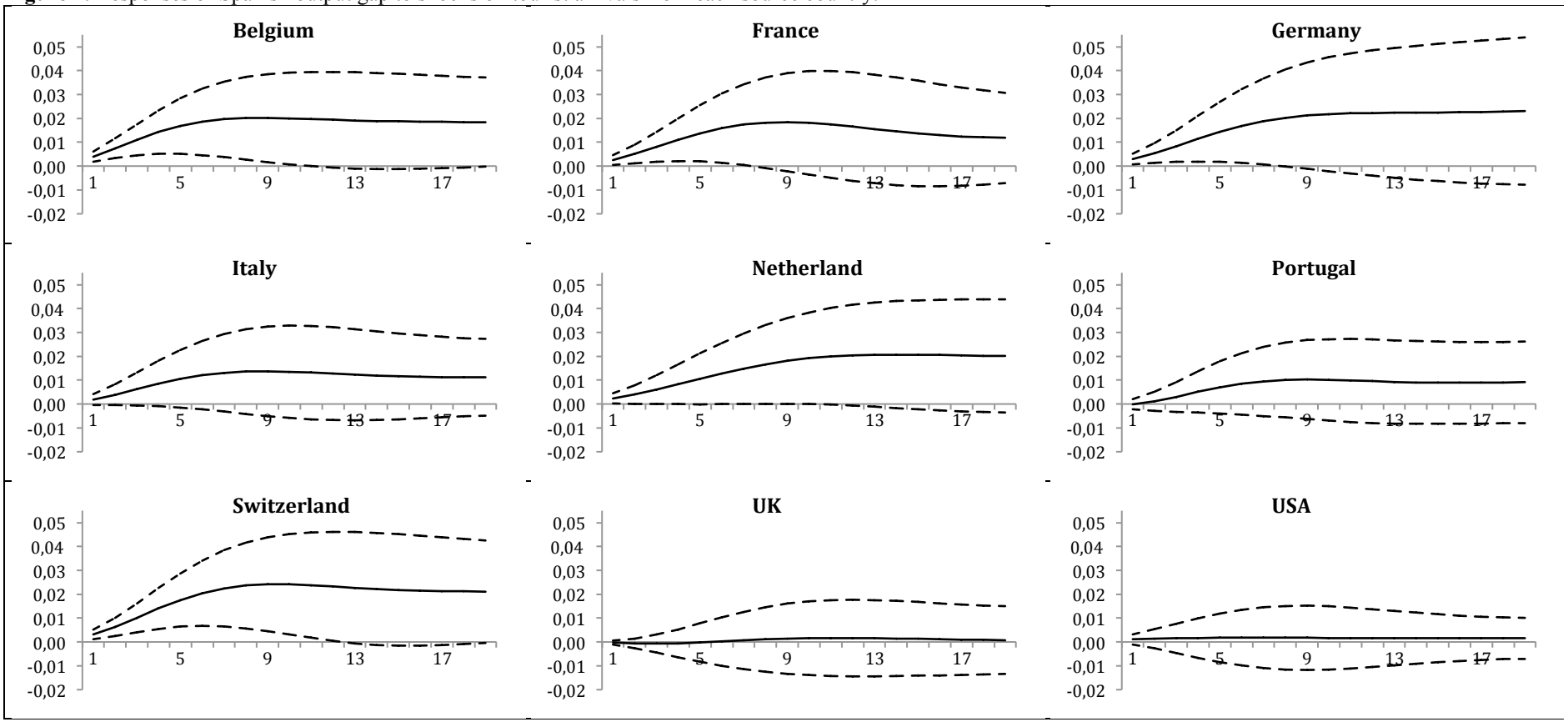
This paper contributes to our ability to understand the relationship between the tourist arrivals to Spain -from nine developed countries- and the business cycles of both the source countries and Spain. By means of different econometric techniques, we have been able to assess (i) whether those variables move contemporaneously through time, (ii) the degree of impact on the fluctuations of tourist arrivals caused by shocks on the source countries' business cycles and shocks on the Spanish business cycle and (iii) how each variable responds to shocks on any of the other variables.

Our results from the comovement analysis reveal different patterns for each country. Arrivals from France, Germany, Portugal and Sweden seem to be more correlated with the evolution of the Spanish business cycle than with their own economic situation while in other countries -such as Italy or the United Kingdom- both aspects seem to equally correlated with the tourist outflows to Spain, although for both of them the evolution of their own inner economies seem to be more relevant.

With the purpose of disentangling how much of the variance in they cycles of tourism arrivals to Spain is due to the economic evolution in the source countries and how much is due to the Spanish business cycle we perform variance error decompositions. We find that fluctuations of tourist arrivals from Belgium, Italy, Switzerland, UK and US are more affected by shocks on their own business cycles -particularly in the case of UK and Italy- while those from Germany and Portugal are mostly due to the Spanish business cycle. Moreover, the Spanish output gap seems to be particularly influenced by the arrivals from Germany, Netherlands and Sweden, and it responds positively to shocks on tourist arrivals from any of these countries except for the US.

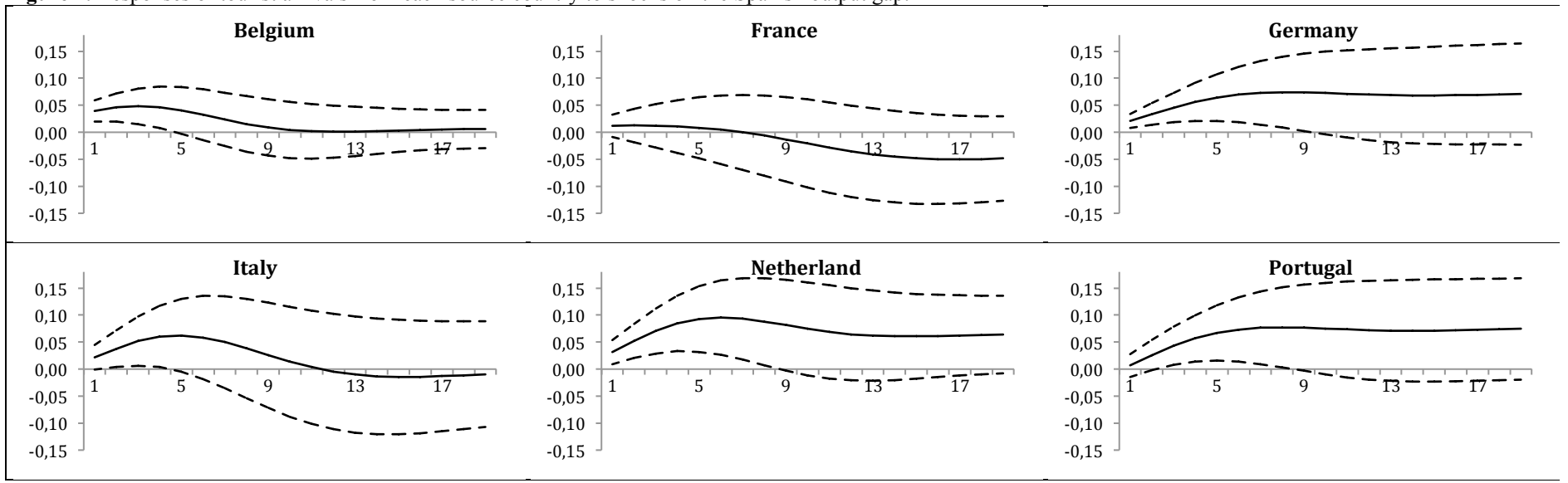
All in all, these results may be helpful for a deeper understanding of the tourism industry in Spain. Tourism is one of the most important activities in Spain; therefore, it is appropriate to keep increasing the popularity that this country has among tourists from all over the world. One could argue that for those countries whose tourist outflows to Spain are more dependent on their own business cycles, there is little to do in order to increase the number of visitors. However, for those other countries showing enough sensitivity to shocks on the Spanish economy, then one could expect that policy makers might have the chance to boost the reception of visitors by applying measures that affect the economic activity in Spain even if it is only in the short run, as our results seem to indicate. Of course, more visitors will cause the Spanish business cycle to improve, thus attracting more and more visitors. This process, which might be regarded as an *endogenous loop*, can be initiated by applying appropriate measures.

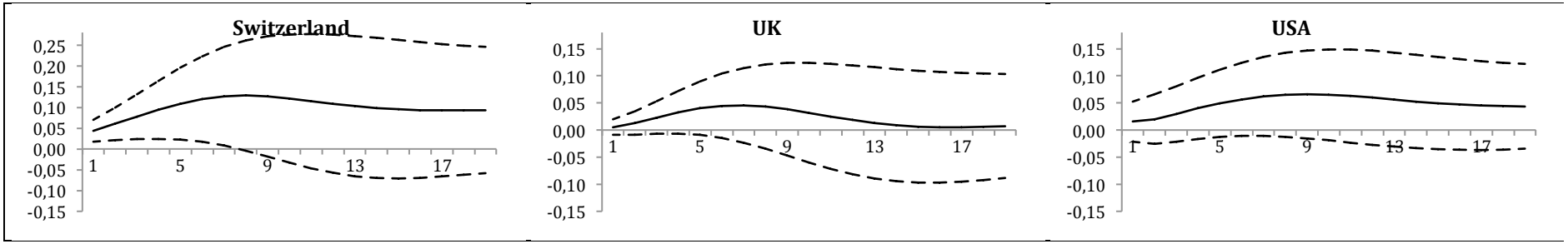
Figure 1. Responses of Spanish output gap to shocks on tourist arrivals from each source country.



Note: Solid line represents the cumulated mean impact, and the dotted lines represent one standard deviation impacts from the mean.

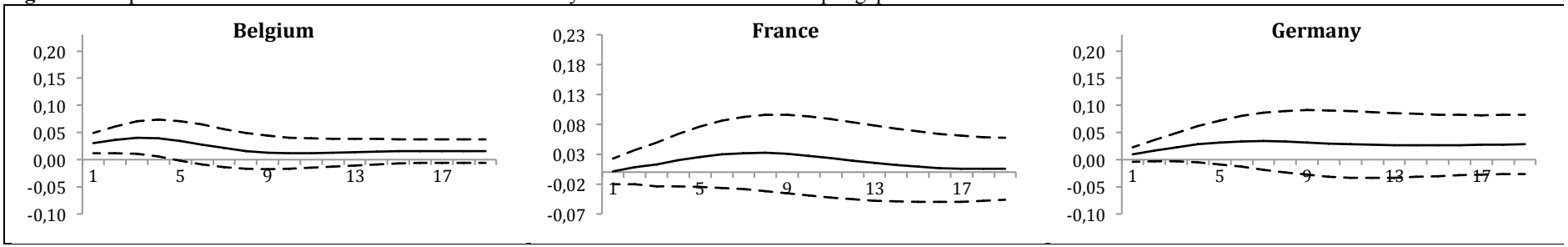
Figure 2. Responses of tourist arrivals from each source country to shocks on the Spanish output gap.

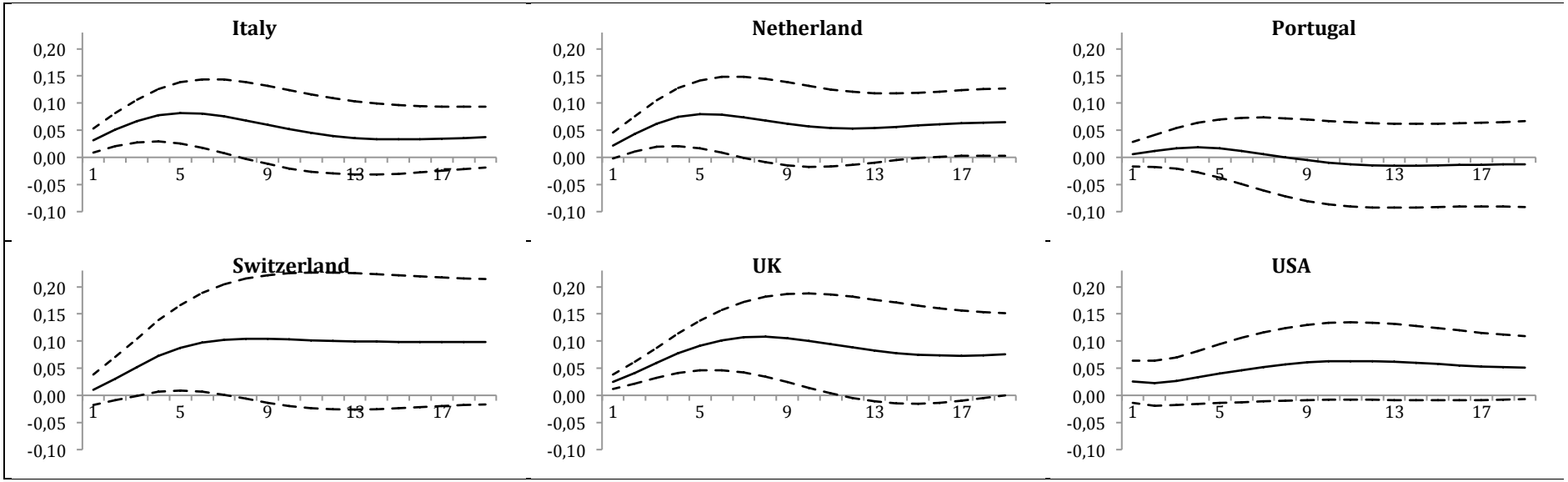




Note: Solid line represents the cumulated mean impact, and the dotted lines represent one standard deviation impacts from the mean.

Figure 3. Responses of tourist arrivals from each source country to shocks on their own output gap.





Note: Solid line represents the cumulated mean impact, and the dotted lines represent one standard deviation impacts from the mean.

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Chapter 3: Tourism-Led Growth revisited for Spain: causality, business cycles and structural breaks

This chapter is devoted to reconsider the Tourism-Led Growth hypothesis for Spain. An increasing number of investigations studying the relationship between tourism and economic growth have arisen over the last years for many different countries. This paper is aimed to test the causality relationship between the cycles of tourism and economic development for the case of Spain using quarterly time series data on gross domestic product, the number of nights spent in Spanish tourist accommodations and real exchange rates from 1980 to 2013. A distinction between nights spent by foreign tourists and nights spent by national tourists is also made. Although no evidence of causality is found on preliminary results, structural breaks affecting the relationships between the variables are detected. Causality from economic growth towards tourist activity is found until 1985. Results also confirm bidirectional causality from 2000 onwards. Interestingly, despite the existence of a structural break in 2008, no alterations are detected in the causalities, implying the financial crisis does not seem to have affected this relationship.

3.1. Introduction

Tourism has proven to be an important source of revenue for numerous countries around the world, with 9% of total GDP (direct, indirect and induced impact) and 6% of the world's exports. Its influence on employment has been significant as well, since one out of eleven jobs in the world are related to this economic activity (UNWTO, 2014).

Likewise, this sector seems to keep growing at a constant pace globally, the increasing number of emerging tourist destinations being a good proof of it, which also involves higher levels of competitiveness between countries in order to attract international tourists. The amount of international arrivals is also expected to rise by 3.3% a year until 2030, with a pace of 4.4% for those emerging destinations (UNWTO, 2014).

In spite of those and many other facts, tourism has not been specially studied within the economic research at an empirical or quantitative level until hardly more than a decade ago. It is currently accepted that tourism expansion in a region is positive for its economic development both directly

and indirectly due to the fact that it involves income increases for the country, boosts currency receptions and enhances competitiveness and employment within companies from the tourist sector and from other related sectors, among other positive effects.

In general, the objective of the researchers that have shown interest in this economic activity has been to verify the Tourism-Led Growth (TLG) hypothesis[1] in different countries, either individually, by means of time series analysis, or by using panel data for a selection of countries.

The Tourism-Led Growth hypothesis, which is inspired by the Export-Led Growth hypothesis, was first introduced by Balaguer and Cantavella-Jordá (2002). This theory is aimed to test whether tourism can be a determinant factor of economic growth in the long-run and is thus based on the analysis of the potential relationship between tourism and economic development with the aim of finding potential causality and its direction between both variables. The basic method is to formulate a VAR model in order to apply Granger's causality test after analysing cointegration of the variables. This combination of econometric techniques should allow for researchers to identify whether tourism is a driving force of the economic growth or if it is the economic development which pushes tourism expansion in the region.

Since that particular research work, many authors have tried to attest this hypothesis for different countries from every continent, which has led to a wide range of results that have been contradictory in many occasions, thus demonstrating the volatility of the findings depending on the analysed period of time, the selected variables and even the methodology used.

Several research papers for African destinations have proven the TLG hypothesis for Jordan (Kreishan, 2010) South Africa (Akinboade & Braimoh, 2010) and Kenya (Obadiah et al., 2012). Although Belloumi (2010) found evidence of Tourism-Led Growth in Tunisia, Cortés-Jimenez et al. (2011) rejected it while validating the TKIG[2] hypothesis in the short run. More recently, Bouzahzah & El Menyari (2013) discovered causality from international tourism to economic growth in the short-term for Tunisia and Morocco while the reverse causality was found in the long-term for both countries.

Tourism-Led Growth has also been confirmed for several American countries like Chile (Gardella & Aguayo, 2002), Uruguay (Brida et al., 2008a), Mexico (Brida et al. 2008b), Colombia (Brida et al., 2009) and

[1] See (Pablo-Romero & Molina, 2013; Brida et al., 2013; Brida et al., 2014a) for exhaustive literature reviews concerning investigations on Tourism-Led Growth

[2] The TKIG (Tourism - capital import - growth) hypothesis was first introduced by Nowak, Cortés-Jiménez & Sahli (2007) for the case of Spain. This hypothesis is used to corroborate an indirect tourism-led growth by means of capital imports financed by tourism receipts.

Jamaica (Amaghionyeodiwe, 2012). Causality from tourism towards the output has been found for the MERCOSUR countries, with Argentina and Uruguay also showing bidirectional causality (Brida et al., 2014). This theory has been discarded for USA by Tang & Jan (2009), who found signs of causality from economic development towards tourism.

Within the Asia-Pacific region, TLG has been approved for India (Mishra et al., 2010), Pakistan (Malik et al., 2010; Hye & Khan, 2013), Singapore (Katircioglu, 2011), Sri Lanka (Srinivasan et al., 2012; Jayathilake, 2013), Lebanon (Tang & Abosedra, 2013), among others. There are some countries for which the TLG hypothesis has been declined, like Fiji (Narayan, 2004) and Korea (Oh, 2005). However, results from the work by Cheng & Chiou-Wei (2009) suggest bidirectional causality between tourism and economic growth in Korea. These same authors also found indications of Tourism-Led Growth for the case of Taiwan in that same research paper despite the fact that Kim et al. (2006) and Lee & Chien (2008) had previously detected causality between tourism and economy in both directions.

In the context of Asian countries, Malaysia has been one of the most analysed destinations and the results have been heterogeneous. Lean & Tang (2010) came to the conclusion that TLG hypothesis could be confirmed for that country. The research made by Kadir & Jusoff (2010) suggested that tourism in Malaysia is caused by diverse variables such as exportations, importations and total trade. On the other hand, Tang (2011) carried out an investigation in which he attempted to test the TLG hypothesis in Malaysia based on a database of twelve tourism markets from which Malaysia receives tourists. Even though the results showed cointegration between international arrivals and economic development for all twelve countries, only five of them were proved to contribute to the economic growth in the long run and just six of them did it in the short run according to the Granger causality tests. This demonstrated that not all tourism markets enrich economic development with the same intensity. This same author took up the topic of TLG hypothesis in Malaysia again by applying the Granger causality tests in the context of ARDL framework and the results indicated bidirectional causality between international tourism receipts and real income but only in the long-term (Tang, 2013).

3.2. A selective review of the previous literature

3.2.1. Tourism-Led Growth in Europe

Due to the fact that the present document is aimed to test the TLG hypothesis in Spain, it is more interesting to review what has been written about the European countries within this specific literature, since those countries are more likely to have certain common aspects with Spain.

One of the most investigated countries up to date with regard to the Tourism-Led Growth conjecture and whose characteristics are similar to

those from Spain is Turkey. The results derived from the research papers have been discordant in general. There has been found evidence of causality from tourism towards economic development (Gunduz & Hatemi-J, 2005; Kaplan & Çelik, 2008; Zortuk, 2009; Husein & Kara, 2011; Arslanturk & Atan, 2012; Ertugrul & Mangir, 2014), of bidirectional causality (Demiröz & Ongan, 2005) and of absence of causality as well (Katircioglu, 2009a). In that sense, Ozturk & Acaravci (2009) tested the TLG hypothesis for Turkey by using two different methods: the Vector Error Correction Model (VECM) and the Autoregressive Distributed Lag model (ARDL), and the results led the authors to indicated that the TLG hypothesis cannot be inferred for the Turkish economy in the long term due to a lack of cointegration between international tourism and the real GDP.
There is also a lack of consensus in relation to the results obtained for the case of Greece, which is also a similar country to Spain. On one hand, Dristakis (2004) found long run bidirectional causality between tourist expansion and economic growth. On the other hand, Eeckels et al. (2012) validated the unidirectional causality from tourism to economic development in the short run. This disparity in the results might be due to the fact that the latter authors analysed the cycles of those variables instead of their long term trends.

Something quite similar has happened among the research made for Cyprus. Causality from economic development towards tourism expansion has been encountered for this country (Katircioglu, 2009b). However, Louca (2006) detected indications of bidirectional causality between tourism and a number of variables related to the supply-side expenditure. The author used international tourism receipts and international arrivals as indicators of the tourist activity and the results showed two-way causality with marketing expenditure and with expenditures in hotels and restaurants.

Even more interesting is the case of Italy, due to its proximity to Spain and the similarities that these two countries share. In fact, Cortés-Jiménez (2010) and Cortés-Jiménez & Pulina (2010) scrutinized both countries together.

On one hand, Cortés-Jiménez (2010) attempted to assess TLG hypotheses within different regions; namely, coastal, internal and Mediterranean regions. In order to accomplish that task, the author made use not only of international arrivals, but also of domestic tourism data. The outcome corroborated causality from international tourism towards economic development in coastal and Mediterranean regions while domestic tourism was proved to be influential in every region.

On the other hand, Cortés-Jiménez & Pulina (2010) evaluated the TLG hypotheses for Italy and Spain, leading to the conclusion that there exist bidirectional relationships between economic growth and tourism expansion

in Spain while in the case of Italy the relationship was unidirectional from tourism to economic growth.

Bidirectional causality between tourism and economic development in Italy was later found by Massidda & Mattana (2013) when applying the hypothesis within the context of a trade, tourism and growth triangle of relationships.

3.2.2. The case of Spain

Spain is considered to be the paradigm of economic development supported by a strong tourism expansion by many authors. Following UNWTO (2014) data, Spain is fourth in the international arrivals ranking and is the second most popular destination just below the USA. Thus, tourism in Spain has been studied in multiple occasions.

Analyses of the international tourism demand were developed long time ago by many authors and with different objectives. Perhaps the most common aim back then was to identify the trend of the tourism demand in Spain and to develop reliable predictions for the number of tourist arrivals or the amount of international receipts. In that regard, González & Moral (1995) employed data concerning international tourism receipts and two price indexes, one related to client countries and the other one related to competitor countries. By means of Structural Time Series Models, Transfer Function, Error Correction Model and ARIMA forecasting methods, high elasticity between international tourism demand and relative prices was found. However, the utility and the appropriateness of the variables and methodologies used within that research was later questioned (García-Ferrer & Queralt, 1997; Young & Pedregal, 1997).

Nevertheless, it was not until the formulation of the Tourism-Led Growth hypothesis when investigations in the field of tourism reached a breaking point. Balaguer & Cantavella-Jordá (2002) developed the Tourism-Led Growth hypothesis when examining the relationship between tourism and economic development in Spain for a time period from the first quarter of 1975 to the first quarter of 1997. In order to do so, they made use of data concerning the Spanish GDP, international tourism receipts and effective exchange rate as a proxy of external competitiveness. By means of Johansen's cointegration test and Granger's causality test, the results confirmed that tourism caused a positive impact in the economic development in the long run. In that article, the authors ensure that, unlike the traditional ELG (Export-Led Growth) hypothesis, the TLG hypothesis is not exclusive for developing countries. Besides the aforementioned research works for countries all over the world, there exist a number of investigations aimed to apply this theory in Spain.

Nowak et al. (2007) made a contribution to the understanding of the interactions between tourism and economy in Spain with the addition of

capital-goods imports as a new variable for the analysis, which allowed testing not only the Tourism-Led Growth hypothesis, but also the possibility that tourism income might finance capital-goods imports (i.e. the TKIG hypothesis), which in the end turns in an enhancement of the Spanish economy. In their model, the authors employed annual data for the period from 1960 to 2003 of the GDP, real tourism exports and real manufactured-items imports. By means of a multivariate Granger test based on a Vector Error Correction Model, the results confirmed both theories.

While those two works identified causality from tourism towards economic growth, a bidirectional relationship between these variables has also been detected after another application of the methodology proposed for testing the TLG hypothesis (Cortés-Jimenez & Pulina, 2010) and also when testing TLG together with ELG (Cortés-Jiménez et al, 2010). The aim of this paper is to make a contribution with respect to the Tourism-Led Growth issue for the case of Spain by adding another econometric technique to identify potential structural breaks[3] within the selected time series, which should help to test TLG consistence within smaller sub-periods.

3.2.3. Tourism and Business Cycles

Although awareness of the presence of cyclical movements in tourism demand has long existed, not many authors have tried to analyse them properly in order to identify potential break points or trend changes leading to causality shifts between tourism and other variables like economic growth.

It is understandable why there is a lack of literature investigating that particular element of the tourism conjuncture, for it is complicated to identify tourism cycles due to two major aspects. Firstly, the existence of different irregularities and structural changes, such as modifications in working hours, technological advances, infrastructure enhancements or even significant events that might cause tourism flow to change dramatically within a certain period of time. Secondly, business cycles can make impacts on the destination chosen by tourists in either direction, meaning that economic recessions can provide price advantages for certain destination countries over their competitors (Guizzardi & Mazzocchi, 2010).

In spite of those difficulties, some authors have used the cyclical component of tourism income as the basis for short-run forecasting, mainly with the aim of predicting the tourism demand for a country. To the best of our knowledge, short-run tourism demand predictions for Spain were first made by González and Moral (1996) and García-Ferrer and Queralt (1997). Nonetheless, the Tourism-Led Growth hypothesis has not been tested for Spain using the cyclical components to detect short-run causalities. In fact,

[3] To the best of our knowledge, Lee & Chien (2008) were the first authors to consider structural breaks in the relationship between tourism and economic growth. Instability in the causalities between those variables motivated by structural breaks was found for the case of Taiwan.

the use of cyclical components when testing the TLG hypothesis is quite unusual; hence the lack of research studies focusing on the causality between tourism and economic growth in the short-run despite the fact that this hypothesis has been tested multiple times for several countries.

Perhaps the prime example of the use of cyclical components when testing the TLG hypothesis is the investigation developed by Eeckels et al. (2012) for the case of Greece. The authors explain that they decided to use cyclical components in order to identify the short-run relationship between the economic output and the tourist activity.

The cyclical component of a time series provide evidence of periodic fluctuations around the long-run trend, which means they can be used to detect short-run stages that may be hiding additional information which cannot be appreciated if only the trend is studied. Since the aim of this paper is to add a different point of view to the TLG testing by making use of structural breaks along the selected time series, it is necessary to isolate their cyclical components.

3.3. Data

According to Gunduz & Hatemi (2005), there are three main variables which may be used to estimate tourism flows. Perhaps the most commonly used are the international tourism receipts, which represent the amount of income originating from foreign visitors. Although this indicator has been used by many authors within the field of the TLG application, some multicolinearity problems caused by this variable have been reported, namely in Turkey (Gunduz & Hatemi, 2005; Katircioglu, 2009a). The volume of tourism can also be estimated through international tourist arrivals or through the number of nights spent by visitors from abroad. These two have the advantage of not being monetary measures, thus helping to avoid any casual multicolinearity issue.

In this paper, the selected variable to use as proxy for the tourism activity in Spain is the number of nights spent at Spanish touristic accommodation because of two main reasons. First, the time series of number of nights spent considers the length of the stay (Garín-Muñoz & Pérez-Amaral, 2000). The second reason refers to length availability problems concerning international tourism receipts and international tourist arrivals. Moreover, the utilization of the number of nights spent allows to distinguish nights spent by foreign visitors and nights spent by domestic tourists, which may be an interesting aspect for the analysis, since major differences might exist between foreign and domestic tourism concerning the contribution to the economic growth.

Due to the fact that the Tourism-Led Growth hypothesis is supposed to provide relationships between tourism and economic development, real gross domestic product will be used as an indicator for the economic growth.

Finally, as suggested by Oh (2005), Gunduz & Hatemi (2005) and Balaguer & Cantavella-Jordá (2002) among others, real effective exchange rates are used as a proxy variable of external competitiveness.

The number of nights spent is expressed in thousands of units and have been obtained from the INE[4]. The sources of the GDP data are OECD and REMSDB[5], the variable being expressed in millions of 2008 euros. As for the real effective exchange rates, the data have been collected from the OECD. All the time series have quarterly periodicity and are available from 1980QI to 2013QIII.

To ease interpretations and to standardize measures, the time series selected have been transformed taking logarithms and have also been seasonally adjusted[6]. Finally, the Hodrick-Prescott filter (1980, 1997; HP hereafter) was used to detrend the time series, thus isolating the cyclical components from the long-run trends. Original series (in logs) and their corresponding cycles can be observed in Figure 2 (see Appendix).

3.4. Methodology and Results

Although the common methodology for testing the Tourism-Led Growth hypothesis consists of integration analysis, cointegration tests and causality detection; in this paper some different econometric techniques are implemented7.

Firstly, the comovement between the number of nights spent (by foreign visitors, domestic tourists and total nights spent) and the output (GDP) are estimated.

The process will then continue by analysing the potential causality between those variables by means of the Granger causality test supported by a VAR structure model for the whole sample. Thirdly, the potential existence of structural breaks in the cyclical relationships at different moments is tested to check the consistency of the results.

3.4.1. Comovement analysis

To start with the econometric analysis, the comovements of the total nights spent, the nights spent by foreign tourists and the nights spent by

[4] INE: *Instituto Nacional de Estadística*. National Statistics Institute.
[5] REMSDB is the quarterly database of the Spanish economy, developed by the Spanish Government. It is available at the *Secretaría de Estado de Presupuestos y Gastos* (Spanish Government) website: http://www.sepg.pap.minhap.gob.es/
[6] X-12 ARIMA method was used for this process. GDP data were already deseasonalized when gathered.
[7] As for the software used in this paper, we have employed E-Views for the causality tests, MATLAB for the comovement analysis and GAUSS to identify the structural breaks.

domestic tourists with the output will be estimated. To that end, the methodology proposed by den Haan (2000) will be followed, which means the correlation coefficients of forecast errors derived from unrestricted VAR models will be estimated for different forecast horizons.

Although there are simpler methods to measure the comovement between two variables, the procedure developed by den Haan has been selected due to the fact that the results are not sensitive to the filter used to isolate the cycles or to the orders of integration that the variables present. Plus, it allows both short-run and long-run correlations to be assessed.

The process starts from a VAR model like this one:

$$X_t = \alpha + \beta t + \gamma t^2 + \sum_{t=1}^{l} A_l X_t + \varepsilon_t \quad (1)$$

where X_t is a 2×1 vector including the output and each of the three tourism variables expressed in logarithms; α, β and γ are $N\times1$ vectors of constants, A_l is an $N\times N$ matrix of regression coefficients and ε_t is an N-dimensional white noise process, i.e., $E(\varepsilon_t) = 0$, $E(\varepsilon_t \varepsilon_t) = \sigma$ and $E(\varepsilon_s \varepsilon_t) = 0 \; \forall s \neq t$. Lastly, l is the total number of lags included.

Then, the K-period forecast errors of each variable X_t shall be determined:

$$e^X_{t+K} = X_{t+k} - E_t X_{t+K} \quad (2)$$

where $E_t X_{t+K}$ can be considered as the trend component of X_t while X_{t+K} can be viewed as its cyclical component determined for a particular horizon of K. Next, the correlation coefficients between these K-period ahead forecast errors, Corr(K), are estimated at different horizons to examine the comovements between the cyclical components of each pair of variables. Figure 1 shows the correlation coefficients between each of the tourism variables and the output at different K horizons.

It can be observed that the correlation coefficients for all the variables with respect to the GDP are significantly positive at all horizons, the ones for the nights spent by domestic tourists being especially high. Plus, considering that the nights spent by foreign visitors represents 60% of the total number of nights spent as average, it is logical that the coefficients for the total number of nights spent are closer to those for the foreign tourists. The correlation coefficients for all the variables seem to stabilize from around the eight quarter, that is, at the horizon of two years.

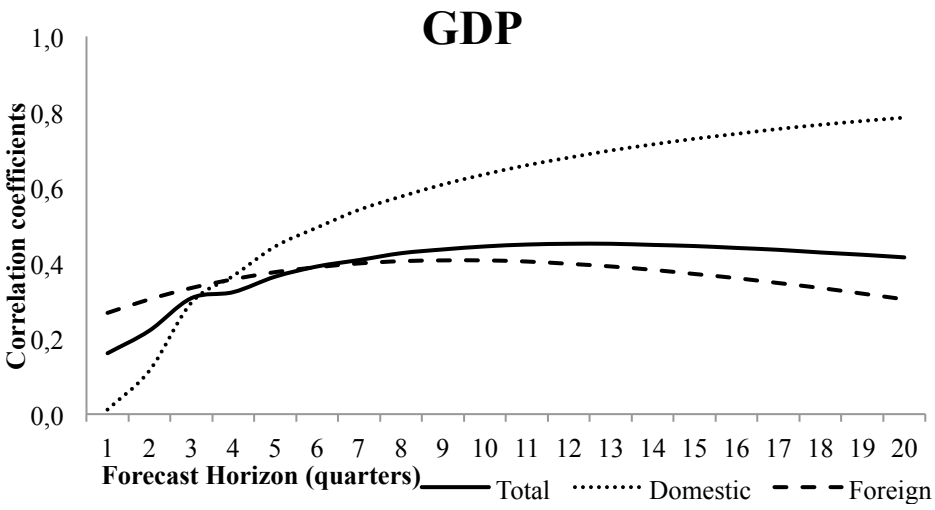


Figure 1. Correlation coefficients of VAR forecast errors. All estimations are significant at the 1% level.

3.4.2. Granger Causality Tests

As in the majority of the research papers dedicated to test the Tourism-Led Growth hypothesis, the potential causality between tourism and economic growth will be tested by means of the causality test proposed by Granger (1969).

Due to the distinction made between total nights spent, nights spent by foreign visitors and nights spent by domestic visitors, three different Granger causality tests will be run by means of VAR models[8], which can be expressed as follows:

$$\begin{pmatrix} Y_t - Y_t^* \\ T_t^T - T_t^{T*} \\ r_t - r_t^* \end{pmatrix} = \sum_{i=1}^{p} \phi_i \begin{pmatrix} Y_{t-i} - Y_{t-i}^* \\ T_{t-i}^T - T_{t-i}^{T*} \\ r_{t-i} - r_{t-i}^* \end{pmatrix} + \varepsilon_i \tag{3}$$

$$\begin{pmatrix} Y_t - Y_t^* \\ T_t^F - T_t^{F*} \\ r_t - r_t^* \end{pmatrix} = \sum_{i=1}^{p} \varphi_i \begin{pmatrix} Y_{t-i} - Y_{t-i}^* \\ T_{t-i}^F - T_{t-i}^{F*} \\ r_{t-i} - r_{t-i}^* \end{pmatrix} + \upsilon_i \tag{4}$$

[8] Since the time series need to be stationary in order to run a VAR model, unit root tests have been applied to all the analysed variables. As shown in Table 3 (see Appendix), the null hypothesis of presence of a unit root in the cycles of the variables was rejected for all cases, thus leading to the conclusion that the cycles used are stationary.

$$\begin{pmatrix} Y_t - Y_t^* \\ T_t^D - T_t^{D*} \\ r_t - r_t^* \end{pmatrix} = \sum_{i=1}^{p} \psi_i \begin{pmatrix} Y_{t-i} - Y_{t-i}^* \\ T_{t-i}^D - T_{t-i}^{D*} \\ r_{t-i} - r_{t-i}^* \end{pmatrix} + \omega_i \qquad (5)$$

The difference $Y_t - Y_t^*$ represents the Hodrick-Prescott filtered cycle of the output. $T_t^T - T_t^{T*}$denotes the same but for the total nights spent, $T_t^F - T_t^{F*}$ for the nights spent by foreign visitors and $T_t^D - T_t^{D*}$ for the nights spent by domestic tourists. Plus, $r_t - r_t^*$ is the Hodrick-Prescott filtered cycle of the real exchange rates. Finally, ϕ_i, φ_i and ψ_i are matrices of coefficients while ε_i, υ_i and ω_i represent the errors caused by irregular components and omitted variables.

With regard to the optimal lag length criteria, the Schwarz information criterion has been followed for all three systems above. Table 5 (see Appendix) shows the results indicating that the optimal lag length of the VAR is one for all of them.

The results of these preliminary Granger causality tests can be observed in Table 1. In Granger causality test, the null hypothesis is based on the absence of causality between a pair of variables. *P-values* under 0.10, 0.05 or 0.01 are considered to indicate that the null hypothesis can be rejected. As can be seen on Table 1, the only causality relationship that cannot be rejected at conventional levels of significance is the one happening from nights spent by domestic tourists towards economic growth.

The fact that no causality is detected from nights spent by foreign visitors and total nights spent towards the output does not seem to concur with previous works dedicated to test the TLG hypothesis in Spain, where either unidirectional causality from tourism to economic growth (Balaguer & Cantavella-Jordá, 2002; Nowak et al., 2007) or bidirectional relationship between them (Cortés-Jiménez & Pulina, 2010; Cortés-Jiménez et al., 2010) was found. While this incident might be caused by manifold factors such as the employment of different variables, the potential existence of structural changes could be concealing deeper findings that may be totally different from what these results show. Moreover, it is pertinent to highlight the fact that cyclical components have been used in this paper instead of long term trends of the data, which may also be causing these results to be different from previous works.

Table 1. Granger causality tests between tourism cycle and nights spent by total number of tourists, foreign tourists and domestic tourists.

Null hypothesis	***p*-value**
$Y_t - Y_t^* \not\rightarrow T_t^T - T_t^{T*}$	0.341
$T_t^T - T_t^{T*} \not\rightarrow Y_t - Y_t^*$	0.665
$Y_t - Y_t^* \not\rightarrow T_t^F - T_t^{F*}$	0.335
$T_t^F - T_t^{F*} \not\rightarrow Y_t - Y_t^*$	0.923
$Y_t - Y_t^* \not\rightarrow T_t^D - T_t^{D*}$	0.168
$T_t^D - T_t^{D*} \not\rightarrow Y_t - Y_t^*$	**0.004**

Note: Significant *p*-values for F-test are in boldface. Similar results obtained for Wald tests.

3.5. Causality considering structural breaks

Due to the aforementioned incongruous results and taking into account that the analysed period of time is quite long, it seems appropriate to identify potential structural breaks to test the consistency of the previous results and to detect possible causality changes between the studied variables.

In the case that no structural breaks were found, then there would be no reason to consider the outcomes above to be wrong, despite the discrepancy with results from previous investigations. Nonetheless, if one or more structural breaks existed, then causalities would need to be recalculated in order to overcome possible bias caused by their existence.

The procedure used for checking for potential structural breaks in this paper is based on the methodology developed by Bai and Perron (1998. 2003a, 2003b)[9].

Tables 4a, 4b and 4c (see Appendix) show the exact number of structural breaks that exist in the three relationships that are being studied and the precise break points where those breaks happen. In the case of the relationship between the total number of nights spent and the output cycle, the execution of the Bai-Perron methodology has led to identify three structural breaks taking place at the first quarter of 1985, at the second quarter of 1995 and at the second quarter of 2005. Three breaks were also detected for the relationship with the number of nights spent by foreign

[9] See Appendix for further details on the Bai and Perron (1998, 2003a, 2003b) econometric procedure.

tourists, meaning four sub-periods can be distinguished. The first breakpoint is exactly the same as in the case of the total number of nights spent, which seems logical if we consider the fact that the number of nights spent by foreign visitors represents 60% of the total as an average. The second structural break happens at the fourth quarter of 1999 while the last one appears at the third quarter of 2008, probably motivated by the financial crisis that started by that year. Lastly, only two structural breaks were discovered for the relationship between the output cycle and the nights spent by domestic tourist happening at the last quarter of 1986 and at the third quarter of 1995.

Tables 2a, 2b and 2c show the different sub-periods for each relationship as well as the *p-values* of every Granger causality test run. The three previous systems have been recalculated for the new sub-periods and the results can be seen on those three tables.

Taking a look at Table 2a it is possible to observe the four new sub-periods for the total nights spent and output relationship and the *p-values* for the respective Granger causality test. The first row exhibits the existence of causality from the economic growth cycle towards the cycle of the number of total nights spent at Spanish accommodations in the first sub-period and in the last two. The second row shows results for the reverse causality between these variables, indicating causality running from total nights spent to the output since 1995Q3. Therefore, these results confirm the existence of bidirectional causality between the variables since 1995, thus aligning with the findings from Cortés-Jiménez & Pulina (2010) and Cortés-Jiménez et al (2010).

Although results in Table 2a can be accepted as a contribution to the TLG testing within Spain, the aim of this research paper is to go a step further by differentiating the influence of domestic tourism and international tourism since it might help to better understand the influence that the tourist activity causes on the Spanish economy. In consequence, it is interesting to examine what Table 2b and Table 2c exhibit.

Table 2b provides the Granger causality tests between the foreign tourism cycle and the output cycle within the four new sub-periods for this relationship. Observing the *p-values* it is easy to see that the results imply causality from economic growth to the entrance of foreign visitors for the whole sample except for the second sub-period -1985Q2 to 1999Q4-. On the other hand, evidence of causality from international tourism towards

economic growth is detected since beginning of 2000, but not earlier. This implies bidirectional causality since that year. Interestingly, despite the existence of a structural break in the last quarter of 2008, the results indicate that the financial crisis has not altered the causality relationship between the output and the number of foreign visitors.

Finally, Table 2c contains the causality tests run for the relationship between domestic tourism cycles and output cycles for the sub-periods that were detected previously. The results show causality running from the economic output into the domestic tourism until 1986 and bidirectional causality between these two variables since the third quarter of 1996.

Table 2a. Granger causality tests between the cycles of the output and the total number of nights spent in different sub-periods.

Null hypothesis	**Sub-period 1 1980(I)-1985(I)**	**Sub-period 2 1985(II)-1995(II)**	**Sub-period 3 1995(III)-2005(II)**	**Sub-period 4 2005(III)-2013(III)**
	p-value	*p*-value	*p*-value	*p*-value
$Y_t - Y_t^* \not\rightarrow T_t^T - T_t^{T*}$	**0.073**	0.691	**0.003**	**0.000**
$T_t^T - T_t^{T*} \not\rightarrow Y_t - Y_t^*$	0.853	0.236	**0.005**	**0.016**

Note: Significant *p*-values in bold.

Table 2b. Granger causality tests between the cycles of the output and the number of nights spent by foreign tourists in different sub-periods.

Null hypothesis	**Sub-period 1 1980(I)-1985(I)**	**Sub-period 2 1985(II)-1999(IV)**	**Sub-period 3 2000(I)-2008(III)**	**Sub-period 4 2008(IV)-2013(III)**
	p-value	*p*-value	*p*-value	*p*-value
$Y_t - Y_t^* \not\rightarrow T_t^F - T_t^{F*}$	**0.000**	0.563	**0.054**	**0.001**
$T_t^F - T_t^{F*} \not\rightarrow Y_t - Y_t^*$	0.638	0.879	**0.072**	**0.068**

Note: Significant *p*-values in bold.

Table 2c. Granger causality tests between the cycles of the output and the number of nights spent by domestic tourists in different sub-periods.

Null hypothesis	**Sub-period 1 1980(I)-1986(IV)**	**Sub-period 2 1987(I)-1995(III)**	**Sub-period 3 1995(IV)-2013(III)**
	p-value	*p*-value	*p*-value

$Y_t - Y_t^* \not\rightarrow T_t^D - T_t^{D*}$	**0.021**	0.134	**0.100**
$T_t^D - T_t^{D*} \not\rightarrow Y_t - Y_t^*$	0.496	0.971	**0.014**

Note: Significant *p*-values in bold.

3.6. Conclusions

In general terms, the results obtained in this paper indicate three different stages in the relationship between the economic growth and the tourist activity in Spain from the first quarter of 1980 to the third quarter of 2013. The main breaks seem to take place at the beginning of 1985 and during the second half of the *'90s*. First, results show that Spanish inner economic development was a crucial factor for foreign tourists to visit the country, which can be understood as a tourism specialization stage. The results suggest that the relationship between these two variables can be likened to a sowing and reaping process in which Spain collected the benefits of having invested in tourism specialization during many years -before the first structural break-. From 2000 onwards there exists causality on both directions meaning the influence between the economic growth and the tourism development is reciprocal.

As for the domestic tourism, the evolution of the causality may well respond to bigger purchase power after the inner development of the country during the '80s and the '90s as well as to a slow but progressive mentality change in the society after the end of the dictatorship, which led people to consider tourism as a relevant option to spend their holidays and their leisure time, thus contributing to the economic expansion at the same time.

The case of the international tourists is more interesting since it perfectly matches the evolution of the relationship between the output and the total tourist activity. Interestingly, the existence of a last structural break coinciding with the inception of the global financial crisis does not seem to result in changes on the causality relationship.

After a brief look at the results, two main questions arise: Why does the causality change in the relationship and how does it become bidirectional since 2000? A retrospective view of the Spanish economic situation and its tourist conjuncture within that period of time might shed light on this topic.

Back in the late '70s, Spain observed how the number of foreign tourists visiting the country decreased dramatically probably due to a combination

of both external factors like the oil crisis in 1973 or the energy crisis in 1979 and internal factors such as the end of the dictatorship, the birth of an emerging democracy, a new constitution, a military coup and some other inner instabilities that were likely to turn Spain into a less appealing destination. The '80s decade was full of political measures in matters of tourism protection and promotion as well as the integration of Spain in the European Union –in 1986-. Plus, relevant support to the tourist development took place during that decade, for example through foreign direct investment and through grants and subsidies for reformation and expansion of tourist establishments from the government. It was, then, a modernization and expansion stage of the tourist activity within the country. Moreover, there were two major events which took place during the '90s: the Expo in Seville and the Olympic Games in Barcelona. Moreover, another important event took place by that decade in Galicia: the *Xacobeo*[10]. Besides, the famous construction boom also motivated a fast economic growth in the country, which also had an impact on the construction of infrastructures like airports, roads and motorways, among others. Last but not least, there were additional political measures on the subject of tourism targeting competitiveness improvements, the prime example being the first policy framework plan for Spanish tourism competitiveness (1992-95), which settled down the bases for the modernization of the tourist supply in Spain, and which was later continued with a second framework plan in 1996.

It seems feasible to think that all the aforementioned facts helped to position Spain as one of the most attractive tourism destination by the end of the last century, which in the end resulted in increasing numbers of foreign visitors –also thanks to the free movement of persons and capital within the EU country members-, who now were determined to spend more money due to the better quality and conditions within the country –many of them even decided to buy houses for their holidays, thus contributing to the construction boom that was happening in Spain by that time-. Therefore, the tourist sector became highly relevant for the Spanish economy, helping to create countless jobs, which in the end resulted in higher purchase power for local inhabitants as well, thus contributing to the inner development of the country.

[10] The year of *Xacobeo* is the holy year of St. James. It takes place the year when the 25th of July (day of St. James) is a Sunday. This only happens within a fixed period of 6-5-6-11 years, which implies there are only fourteen *Xacobeos* every century. In this religious event, believers can obtain a plenary indulgence, leaving them completely absolved of all their sins if they visit the tomb of the Apostle in the cathedral of Santiago. The ceremony involves praying for the intentions of the Pope and receiving the sacraments of confession and communion. This event attracts a considerable number of visitors and is a millionaire contribution to the Spanish GDP.

After a brief breather, the Spanish government developed a new integral plan of Spanish tourism quality. The aim was then to increase the quality standards within the country in terms of infrastructure and global service. This might have resulted in higher influence from economic development towards tourist inflows, which in combination with the relevance of the tourist activity for the economic growth in Spain explains the bidirectional causality during this last stage.

Despite the hard research process, some limitations need to be pointed. Firstly, a similar investigation using longer data would have been of interest in order to identify previous structural breaks in earlier decades. Moreover, it would be appropriate to follow the same procedure that has been applied through the present document incorporating new variables such as tourism income or tourism arrivals to test the consistency of the results. In that regard, the structural break happening in 2008 should be re-examined with those other variables to test whether the financial crisis made an impact on the causality relationship between economic growth and tourism in Spain, since it is possible that the number of nights spent does not help to detect further effects.

All in all, this paper makes a contribution to the field of tourism research from two different perspectives. On one hand, the methodology proposed by den Haan (2000) to analyse the comovements between the series of tourism and economic growth in Spain has been employed. To the best of our knowledge, this may well be the first application of that particular econometric technique in the field of the relationship between tourism and economic growth. On the other hand, the causality relationship between the tourist activity and the economic performance in Spain has been studied by using the cyclical components of the series and considering the existence of structural breaks, which makes our results deeper and more precise. In sum, this article provides evidence of different changes in the causality relationship between tourism and economy in Spain during the last three decades. The econometric approach employed might be replicated for the case of other countries in order to explore causality relationships while considering the presence of structural breaks hiding further conclusions.

Appendix

The Bai and Perron methodology for identifying structural breaks

Bai and Perron (1998. 2003a, 2003b) considered a theoretical framework of a lineal model with *m* multiple structural changes, thus generating *m+1* regimes:

$$y_t = x_t'\beta + z_t'\delta_1 + u_t \qquad t = 1, \dots, T_1 \tag{6}$$

$$y_t = x_t'\beta + z_t'\delta_2 + u_t \qquad t = T_1, \dots, T_2 \tag{7}$$

$$y_t = x_t'\beta + z_t'\delta_{m+1} + u_t \qquad t = T_{m+1}, \dots, T \tag{8}$$

where y_t is the studied dependent variable at time *t*; $x_t(p\times1)$ and $z_t(q\times1)$ are vectors of covariates and their corresponding vectors of coefficients are represented by β and $\delta_j(j = 1, \dots, m+1)$, u_t being the error at time *t*. $T_1, \dots, T_m$ are the break points to be estimated together with the regression coefficients. Moreover, in our case $p = 0$, that is, our model is a pure structural change model where all coefficients are subject to change.

The procedure is based on a chain of tests which provides not only the number of breaks existing in the data, but also the exact time and the confidence intervals of the breaks and the parameters associated. In order to identify the break points, Bai and Perron (1998. 2003a, 2003b) suggest using four statistics to test for multiple breaks. The first test of the sequence tests the absence of structural breaks (*m*=0) against the existence of at least one break (*m*=*k*). This is the sup $F_T(k; q)$ test. When the null hypothesis is rejected, the next step is to find out how many breaks exist. In order to accomplish such task a double maximum test is run where the null hypothesis of no breaks (*m*=0) is matched up with the presence of an unknown number of breaks given some upper bound M, with $(1 \leq m \leq M)$.

The first test (*U D max* test) is an equal weighted version while in the second one (*W D max* test) the weights depend on the number of regressors (q) and the significance level of the test (α).

Finally, the sup $F_T(1 + 1/l)$ sequential test is run to assess the existence of l breaks against the existence of $l+1$ breaks until the null hypothesis cannot be rejected anymore, thus leading to identify both the number of breaks and the exact points where they happen.

Table 3: Ng-Perron and Phillips-Perron unit root tests for the number of nights spent.

	Parameter	$Y_t - Y_t^*$	$T_t^T - T_t^{T*}$	$T_t^F - T_t^{F*}$	$T_t^D - T_t^{D*}$	$r_t - r_t^*$
Ng-Perron	$\overline{MZ}_\alpha^{GLS}$	-15.929	-34.542	-31.740	-25.353	-8.867
	$\overline{MZ}_t^{GLS}$	-2.798	-4.151	-3.982	-3.551	-2.096
	$\overline{MSB}^{GLS}$	0.176	0.120	0.125	0.140	0.236
	$\overline{MPT}^{GLS}$	1.629	0.723	0.778	0.998	2.800
ADF	PP statistic	-4.555	-5.033	-5.333	-4.594	-4.411
	Prob.	0.000	0.000	0.000	0.00	0.000

Critical Values	**Ng-Perron**				**ADF**
	$\overline{MZ}_\alpha^{GLS}$	$\overline{MZ}_t^{GLS}$	$\overline{MSB}^{GLS}$	$\overline{MPT}^{GLS}$	τ_α
1%	-13.800	-2.580	0.174	1.780	-3.480
5%	-8.100	-1.980	0.233	3.170	-2.883
10%	-5.700	-1.620	0.275	4.450	-2.578

Notes: The critical values for the Ng-Perron test are tabulated in Ng & Perron (2001). The *MAIC* information criteria is used to select the autoregressive truncation lag, *k*, as proposed in Perron and Ng (1996)

*** Rejects null hypothesis at 1% significance level.

** Rejects null hypothesis at 5% significance level.

* Rejects null hypothesis at 10% significance level.

Table 4a. Bai-Perron tests of multiple structural changes in the relationship between the total number of nights spent and the output cycle.

Statistics						
UDmax	*WDmax*	$SupF_t(1)$	$SupF_t(2)$	$SupF_t(3)$	$SupF_t(4)$	$SupF_t(5)$
61.187***	83.949***	48.142***	52.161***	61.187***	49.073***	36.159***
$SupF_t(2/1)$	$SupF_t(3/2)$	$SupF_t(4/3)$	$SupF_t(5/4)$			
35.225***	17.165***	2.450	0.000			

Break dates estimates		
T_1	1985:1	[1981:1-1985:2]
T_2	1995:2	[1995:1-1996:2]
T_3	2005:2	[2004:1-2005:3]

Notes: *,**,and *** denote significance at the 10%, 5% and 1% levels, respectively. The critical values are taken from Bai and Perron (1998), Tables 1 and 2; and from Bai and Perron (2003b), Tables 1 and 2. The number of breaks has been determined according to the sequential procedure of Bai and Perron (1998), at the 1% size for the sequential test. 90% confidence intervals for T_1 in square brackets.

Table 4b. Bai-Perron tests of multiple structural changes in the relationship between the output cycle and the number of nights spent by foreign tourists.

Statistics						
UDmax	*WDmax*	$SupF_t(1)$	$SupF_t(2)$	$SupF_t(3)$	$SupF_t(4)$	$SupF_t(5)$
81.243***	92.341***	76.897***	81.243***	68.020***	58.472***	49.447***

$SupF_t(2/1)$	$SupF_t(3/2)$	$SupF_t(4/3)$	$SupF_t(5/4)$
31.005***	14.113**	13.297	0.212
Break dates estimates			
T_1	1985:1	[1982:1-1985:2]	
T_2	1999:4	[1999:2-2000:4]	
T_3	2008:3	[2007:1-2011:4]	

Notes: As in table 4a.

Table 4c. Bai-Perron tests of multiple structural changes in the relationship between the output cycle and the number of nights spent by domestic tourists.

Statistics						
UDmax	*WDmax*	$SupF_t(1)$	$SupF_t(2)$	$SupF_t(3)$	$SupF_t(4)$	$SupF_t(5)$
30.962***	46.657***	22.536***	26.538***	28.983***	30.962***	22.767***
$SupF_t(2/1)$	$SupF_t(3/2)$	$SupF_t(4/3)$	$SupF_t(5/4)$			
11.645*	7.396	0.000	0.000			
Break dates estimates						
T_1	1986:4	[1985:1-1989:3]				
T_2	1995:3	[1993:4-1997:1]				

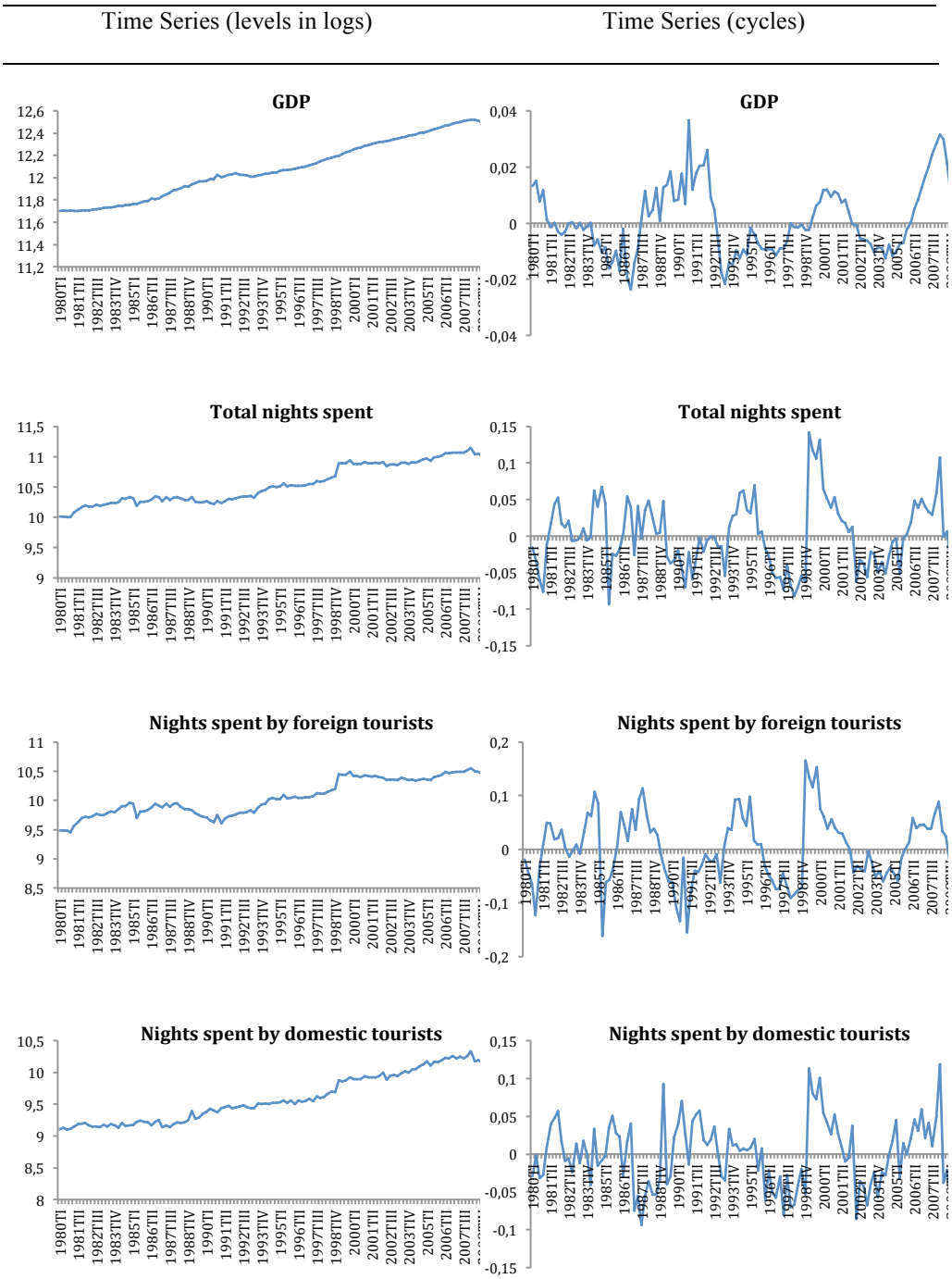
Notes: as in table 4a.

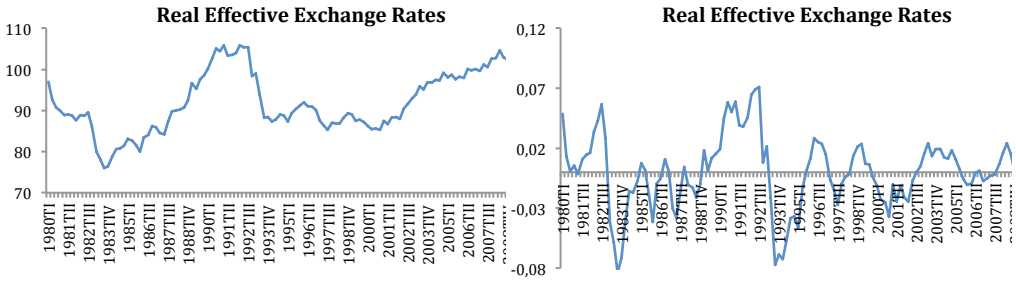
Table 5. VAR lag length criteria.

Lag order	**VAR Equation**		
	(3)	**(4)**	**(5)**
1	-16.388*	-15.943*	-16.180*
2	-16.211	-15.769	-15.997
3	-16.063	-15.613	-15.850
4	-15.965	-15.570	-15.677
5	-15.694	-15.313	-15.415
6	-15.519	-15.138	-15.253
7	-15.244	-14.892	-15.012
8	-15.062	-14.675	-14.752

*Indicates lag order selected by the criterion.

Figure 2. Graphs representing the time series data used in levels and their HP-filtered cycles.





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Part III
Analysis of the demand

Chapter 4: Persistence in the Spanish tourism: are shocks permanent?

This chapter is aimed to explore whether there is persistence in the Spanish tourist sector. In order to do so, time series data on the number of nights spent at Spanish accommodations are analysed by applying the unobserved components model proposed by Jaeger and Parkinson (1990, 1994) after testing the presence of a unit root in the series. Although the results provided by that method indicate absence of persistence in the series, a potential asymmetric behaviour is considered by implementing a nonlinear version of the unobserved components model that was developed by Pérez and Di Sanzo (2011). The outcome derived from this technique suggests the presence of persistence in the data with two different regimes, the first one showing higher levels of persistence than the second one. Therefore, shocks affecting the tourist sector in Spain may cause permanent effects in the long run. The Tourism-Led Growth hypothesis is also confirmed with the nonlinear version of the model.

4.1. Introduction

Tourism is one of the most important wealth sources in the global economy. In the literature, it is accepted that tourism expansion affects positively a region in a direct, indirect and induced way; for example by increasing the levels of income of the country, by creating a considerable amount of employment or by boosting currency receptions from abroad.

This is why there is an increasing number of research works concerning many aspects of that sector in order to detect potential singularities in its relationship with the economic development of the countries, which may be used to provide a solid basis for policy making. Several scholars have made considerable contributions especially in terms of tourism demand modelling

and forecasting[1] and with regard to the causality relationship with the economic growth[2].

This paper aims to take a further step by analysing the potential persistence in the Spanish tourism. Spain is a top destination for foreign visitors, being the second most popular country in the world and fourth in terms of international arrivals (UNWTO, 2014). Thus, this first epigraph shall be focused on developing a brief literature review regarding the research made about tourism in Spain.

Tourism demand modelling has been approached in different occasions throughout the literature for the case of Spain. For the purpose of illustration we shall revisit some of the research papers focusing on this filed. González and Moral (1995) used international tourism receipts data as a proxy of the tourist activity in Spain as well as two different price indexes to take into consideration both client and competitor countries to address the tourism demand modelling and forecasting for this country by means of ARIMA forecasting methods. The price elasticity of the international tourism demand was found to be rather high. Another tourism demand model specification was later developed by Garín-Muñoz and Pérez-Amaral (2000), who employed an unbalanced panel data set comprised of annual data from 17 tourism routes over a period of 11 years. The authors studied the international tourism demand elasticity with respect to the real per capita income, the exchange rates and the real prices.

While those research works considered the tourism demand from all the countries of origin presented the same patterns, Garín-Muñoz (2007) made a special distinction by developing a tourism demand model exclusively for the German visitors. The results evidenced that tourism demand for the Germans is highly dependent on the relative prices and the travel costs.

Similarly, Rodríguez and Rivadulla (2012) assumed that the relevance of tourism in Spain is not equal for every region within the territory. Therefore, five models of tourism demand were formulated, one for the whole Spanish territory and four for groups of regions which were grouped according to their touristic profiles. The authors concluded that tourism is not considered to be a luxury good by foreign tourists and only the economic situation of the origin countries may affect significantly the number of inbound visitors from abroad while the transport costs did not seem to be such relevant.

Research works specifying tourism demand models for very concrete regions of Spain like Madrid (Garín-Muñoz, 2004), the Canary Islands

[1] See (Song & Li, 2008; Lim, 1997; Witt & Witt, 1995) for exhaustive literature reviews on tourism demand modelling and forecasting.
[2] See (Pablo-Romero & Molina, 2013; Brida et al., 2013; Brida et al., 2014a) for exhaustive literature reviews concerning investigations on the Tourism-Led Growth hypothesis.

(Garín-Muñoz, 2006; Gil-Alana et al. 2008) or the Balearic Islands can also be found (Garín-Muñoz & Montero-Marín, 2007).

On the other hand, the causality relationship between tourism and economic growth represents a more recent line of research. Balaguer and Cantavella-Jordá (2002) proposed a methodology based on cointegration analyses and Granger causality tests to assess the so called Tourism-Led Growth hypothesis, which was later followed and further developed by several authors. The results clearly evidenced causality from the tourist conjuncture towards the economic growth in Spain. However, additional investigations arose with diverse results, some of them confirming the unidirectional causality from tourism to economic development (e.g. Nowak et al. 2007) while others showed evidence of bidirectional causality (e.g. Cortés Jiménez et al, 2010; Cortés Jiménez & Pulina, 2010).

With all the above, the objective of this paper is to address another aspect of the Spanish tourist activity, namely the degree of persistence in the tourist data, which has been scarcely studied so far for this country. Furthermore, and to the best of our knowledge the approach adopted in this paper for studying the hysteresis in the field of tourism is novel. The next section contains a review of some of the investigations connected to this scope.

4.2. Tourism and persistence

While there is no doubt that it is necessary to understand all those aspects of the tourist activity, it cannot be denied that there may exist other attributes whose comprehension could help to increase the level of effectiveness of the measures adopted by the policy makers.

In that regard, the phenomenon of persistence is worth studying. Persistence can be defined as the extent to which effects caused by an external or unexpected shock on the current market can give rise to permanent changes in the future. The policy implications derived from the understanding of the volatility in the tourist market are relevant since it should allow managers to maximize potential profits arisen from positive shocks or, on the contrary, to minimize the impact from negative changes in the current situation.

The typical method to detect whether a time series exhibits persistence is to test for the random walk hypothesis. That is, testing for the existence of a unit root in the variable, implying it would be a non-stationary process and thus the effects caused by an external shock would be permanent. The policy makers should then undertake solid measures to prevent negative impacts from generating prolonged damage in the sector while, at the same

time, they would be willing to implement strategies that might encourage the health of the market in the long term.

Despite the importance of identifying the phenomenon of persistence in the tourism sector, not too many authors have approached this topic so far. Maloney and Montes-Rojas (2005) found high levels of persistence after testing for unit root in the tourist arrivals to 29 different Caribbean destinations. A similar research effort was accomplished by Bhattacharya and Narayan (2005) for the case of India, although in this case the random walk hypothesis was rejected, which means the external shocks only cause temporary impacts on the tourist market. Temporary effects were also evidenced in Fiji with regard to the tourism expenditure, implying the military coup that happened in 1987 had a limited impact on the tourism sector (Narayan, 2005). Aly and Strazicich (2004) proved that the external shocks in the tourism market of Israel and Egypt caused temporary effects as well. Another similar study was developed by Saleh et al. (2011) for the tourist arrivals in the territory of Thailand coming from ten different source markets. The results suggested that shocks to visitor arrivals from six of the origin countries only caused temporary effects on Thailand tourism while shocks on any of the other four countries provoked permanent changes.

The papers above employed techniques in which no fractional integration is allowed. That is, the integration order of the analysed time series was forced to be either 1 or 0. Since it may be possible that the series present integration orders ranging within the continuous space between 0 and 1, some other papers have focused on dealing with fractional integration in tourism data (see e.g. Gil-Alana, 2005; Cuñado et al. 2008; Cuñado et al. 2011; Assaf et al. 2012; Gil-Alana et al, 2011; Gil-Alana et al. 2014).

As for Spain, the literature concerning the persistence in its tourist activity is relatively scarce, to the best of our knowledge, despite the fact that Spain is a major tourism market in the world.

Alvarez et al. (2007a) conducted a research paper focused on testing the volatility and the persistence hypothesis in the tourist arrivals to five major Spanish destinations, namely Andalusia, the Balearic Islands, the Canary Islands, Catalonia and the Community of Madrid. The authors employed monthly data from January 1994 to February 2006 and made use of the multivariate CCC model of Bollerslev (1990) along with a variation of the Autoregressive Conditional Heteroskedasticity (ARCH) model for each of the five destinations. Long-run persistence was only detected for Andalusia

and Catalonia while, at the same time, each destination was found to be weakly related to the shocks happening in any of the other four communities. Similarly, the same authors detected long-run persistence on the effects caused by shocks to tourist arrivals from France, Germany and USA while only short-run persistence of about one month was found for the case of UK (Alvarez et al. 2007b).

On the other hand, Cuñado et al. (2011) made use of fractional integration to analyse the persistence in the total number of international arrivals to Spain. Their results initially confirmed that the analysed time series was highly persistent and mean reverting. However, when allowing for structural breaks, the findings suggested that the international arrivals to Spain were highly persistent but not mean-reverting.

Within the exposed scenario, this paper aims to make a contribution on the topic of persistence in the Spanish tourism by means of different econometric techniques that will also allow testing for the Tourism-Led Growth hypothesis implicitly. The remainder of this article is structured in three sections: data and methodology, empirical results and conclusions.

4.3. Data and methodology

4.3.1. Data

Despite the most popular variable in the tourism research might be the international tourism receipts; there are two other indicators of the tourist activity which may be used in the context of empirical investigations: the number of international arrivals and the number of nights spent by visitors at tourist accommodations (Gunduz & Hatemi, 2005). Due to the non-monetary nature of the last two, the potential existence of causal multicolinearity problems that have been reported in some research works (Gunduz & Hatemi, 2005; Katircioglu, 2009a) can be avoided. Plus, due to the fact that the number of nights spent consider the length of the stay (Garín-Muñoz & Pérez-Amaral, 2000) and also to some data availability issues with the number of tourist arrivals, this paper will employ the first variable as an indicator of the tourist activity in Spain. Plus, the real gross domestic product of Spain has been selected to represent the Spanish economic output.

Data on the number of nights spent has been obtained from the INE[3] and is expressed in thousands of units. The GDP is expressed in millions of 2008 euros and the sources for these data are OECD and REMSDB[4]. The studied time period ranges from the first quarter of 1980 to the third quarter of 2013. Both variables have, therefore, quarterly periodicity. Finally, data on the number of nights spent have been seasonally adjusted by applying the X-12 ARIMA method whereas the GDP data had already been deseasonalized when gathered.

4.3.2. Methodology

As has been stated previously, persistence can be described as the degree to which the conditions of the market may change in the future due to unexpected shocks in its current status. In other words, persistence in the tourist sector indicates that there is a considerable level of dependence of the current tourist activity on its past. From an econometric point of view, this situation can be detected by testing for the presence of a unit root. If a time series is non-stationary, then shock effects will be persistent over time. This is why, in the literature, the existence of a unit root in a time series has often been taken as a sufficient evidence of persistence.

Nonetheless, a more precise way to interpret persistence would be to consider that this phenomenon happens when a change on the cyclical component of a time series produces a permanent impact on the natural trend. Thus, considering that the existence of a unit root might be derived from past natural shocks solely -instead of being caused by shocks on the cyclical component-, then the fact that a time series is non-stationary may not be sufficient, but just necessary, to confirm the phenomenon of persistence.

In order to be able to distinguish whether the changes are transitory or permanent -that is, whether the changes come from shocks on the cyclical component or from shocks on the natural rate component- we will follow the procedure developed by Jaeger and Parkinson (1990, 1994)[5]. These authors proposed an unobserved components model in which the actual

[3] INE: *Instituto Nacional de Estadística*. National Statistics Institute.

[4] REMSDB is the quarterly database of the Spanish economy, developed by the Spanish Government. It is available at the *Secretaría de Estado de Presupuestos y Gastos* (Spanish Government) website: http://www.sepg.pap.minhap.gob.es/

[5] Please note that, although Jaeger and Parkinson refer to the *hysteresis* phenomenon when developing their unobserved components model, in this paper we use the term *persistence* as a synonym for hysteresis. Furthermore, a formal definition of hysteresis implies the properties of persistence and they are often regarded as equal.

values of the time series can be statistically decomposed into two different components: the cycle and the natural rate.

The number of nights spent at Spanish accommodations (T_t) can be decomposed into the sum of its natural rate component T_t^N and its cyclical component T_t^C:

$$T_t = T_t^N + T_t^C \tag{1}$$

In a similar way, the natural component can be defined as the sum of a random walk, itself on the previous moment and the cyclical component on the previous moment:

$$T_t^N = T_{t-1}^N + \beta T_{t-1}^C + \varepsilon_t^N \tag{2}$$

where β is a coefficient whose purpose is to measure the percentage change in the natural rate caused by a 1 percent increase in the cyclical component. Therefore, persistence from shocks on the cyclical components exist when β>0. It may happen that there is a unit root in the analyses time series - T_t in this case- while β=0 at the same time (Røed, 1997), thus rejecting the hypothesis of persistence. That is why the existence of a unit root is a necessary but not sufficient evidence of persistence.

On the other hand, the cyclical component can be expressed as a stationary AR(2) [6]:

$$T_t^C = \varphi_1 T_{t-1}^C + \varphi_2 T_{t-2}^C + \varepsilon_t^C \tag{3}$$

φ_1 and φ_2 being indicators of the periodicity of the cyclical component.

The identification of the model is completed by adding yet another equation relating the studied variables, that is, the number of nights spent and the output growth (D_t):

$$D_t = \alpha D_{t-1} + \delta T_t^C + \varepsilon_t^D \tag{4}$$

where D_t is the growth rate of the output at the moment *t*.

[6] It is possible to express the cyclical component as another type of process, such as an autoregressive moving-average process rather than a pure auto regressive model. However, the AR(2) seems to be more suitable for the data employed in this paper according to AIC comparisons. Further results on this topic are available upon request.

It is also relevant to point out that equation (4) can also provide evidence of Tourism-Led Growth if the parameter δ is significantly different from zero, since it measures how much the output changes when there are variations on the tourist sector.

On the other hand, the random shocks $\varepsilon_t^N, \varepsilon_t^C$ and ε_t^D are assumed to follow a normal distribution with variance-covariance matrix Ω. Thus, the state-space form of the unobserved components model is the following:

$$T_t = \begin{pmatrix} 1 & 1 & 0 \\ 0 & \delta & 0 \end{pmatrix} \begin{pmatrix} T_t^N \\ T_t^C \\ T_{t-1}^C \end{pmatrix} + \begin{pmatrix} 0 \\ \alpha \end{pmatrix} D_{t-1} + \begin{pmatrix} 0 \\ \varepsilon_t^D \end{pmatrix} \tag{5}$$

$$\begin{pmatrix} T_t^N \\ T_t^C \\ T_{t-1}^C \end{pmatrix} = \begin{pmatrix} 1 & \beta & 0 \\ 0 & \varphi_1 & \varphi_2 \\ 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} T_{t-1}^N \\ T_{t-1}^C \\ T_{t-2}^C \end{pmatrix} + \begin{pmatrix} \varepsilon_t^N \\ \varepsilon_t^C \\ 0 \end{pmatrix} \tag{6}$$

$$\Omega = \begin{pmatrix} \sigma_N^2 & 0 & 0 \\ 0 & \sigma_C^2 & 0 \\ 0 & 0 & 0 \end{pmatrix} \tag{7}$$

As has already been stated, the existence of persistence can be confirmed when the parameter β is significant. Plus, the equations (4) to (7) are estimated by maximum likelihood by means of a Kalman filter.

Additionally, asymmetry in the behaviour of the number of nights spent facing positive or negative shocks should be considered. Therefore, the nonlinear specification of the unobserved components model developed by Pérez and Di Sanzo (2011) will be followed. This asymmetric approach includes a Threshold Auto-Regressive specification at the stage (6) instead of the state-space used before.

$$\begin{pmatrix} T_t^N \\ T_t^C \\ T_{t-1}^C \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \varphi_1 & \varphi_2 \\ 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} T_{t-1}^N \\ T_{t-1}^C \\ T_{t-2}^C \end{pmatrix} + \begin{pmatrix} \beta^+ \\ 0 \\ 0 \end{pmatrix} I_t^+ T_{t-1}^C + \begin{pmatrix} \beta^- \\ 0 \\ 0 \end{pmatrix} I_t^- T_{t-1}^C + \begin{pmatrix} \varepsilon_t^N \\ \varepsilon_t^C \\ 0 \end{pmatrix} \tag{8}$$

I_t^+ and I_t^- being the Heaviside indicator functions such that:

$$I_t^+ = \begin{cases} 1 \; if \; T_{t-1}^C \geq \tau \\ 0 \; if \; T_{t-1}^C < \tau \end{cases}$$

$$I_t^- = \begin{cases} 1 \; if \; T_{t-1}^C < \tau \\ 0 \; if \; T_{t-1}^C \geq \tau \end{cases}$$

As for the previous model, the estimations will be carried out via maximum likelihood and Kalman filter. The parameter τ needs to be estimated together with the rest of parameters of the model, i.e. β^+ and β^-. From the perspective of this specification, we can analysis the potential asymmetry by testing for linearity, the null hypothesis being $H_0 : \beta^+ = \beta^-$ and the alternative being $H_0 : \beta^+ \neq \beta^-$, that is, the existence of a single regime against the presence of two different regimes.

Rejecting the null hypothesis implies that there is evidence of nonlinear persistence in the number of nights spent by tourists at Spanish accommodations, which means the cyclical shocks cause asymmetric changes in the natural rate component of the time series. As advised by Pérez and Di Sanzo (2011), it is necessary to resort to bootstrap methods to provide reliable approximations for the sampling distribution of the test statistic, since the characteristics of our model make the conventional χ^2 distribution to be inappropriate[7].

To the best of our knowledge, the application of the unobserved components model proposed by Jaeger and Parkinson (1990, 1994) together with the nonlinear version of Pérez and Di Sanzo (2011) has not yet been implemented in the field of tourism research, which is one of the main points of interest of this article.

4.4. Empirical results

The results obtained in this paper can be divided in three main sections. Firstly, the necessary condition for persistence is assessed by means of unit root tests. The second part of the results derives from the application of the unobserved components model proposed by Jaeger and Parkinson (1990, 1994). Lastly the potential asymmetry is tested through the nonlinear version of the aforementioned model as has been explained.

[7] See e.g. Hansen (1999) and Lo and Zivot (2001).

4.4.1. Unit root tests

To begin with the empirical procedure we shall start by testing for the existence of a unit root in the tourism series as a necessary condition for the presence of persistence. In order to conduct this task we make use of the approaches developed by Phillips and Perron (1988) and Ng and Perron (2001)[8].

Table 1 contains the results obtained from both the Phillips-Perron (PP) test and the Ng-Perron test, which consists of four different test statistics based on the GLS detrended data and a modified Akaike Information Criteria to select the lag length for the regression. Just like in the PP test, the null hypothesis of a unit root in the series is tested against the alternative of stationarity. As can be observed, both approaches suggest that the null hypothesis of non-stationarity cannot be rejected, which leads to consider the presence of a unit root in the series of the number of nights spent by tourists at Spanish accommodations.

Table 1: Ng-Perron and Phillips-Perron unit root tests for the number of nights spent.

	Parameter	I(2) vs. I(1)	I(1) vs. I(0)
Ng-Perron test	$\overline{MZ}_{\alpha}^{GLS}$	-21.965***	-7.959
	$\overline{MZ}_{t}^{GLS}$	-3.306***	-1.955
	$\overline{MSB}^{GLS}$	0.151***	0.246
	$\overline{MPT}^{GLS}$	1.144***	11.567
PP test	PP statistic	-13.701***	-2.174
	Prob.	0.000	0.499

Critical values	I(2) vs. I(1)				
	Ng-Perron test				PP test
	$\overline{MZ}^{GLS}$	$\overline{MZ}_{t}^{GLS}$	$\overline{MSB}^{GLS}$	$\overline{MPT}^{GLS}$	$\overline{t}_{\alpha}$
1%	-13.800	-2.580	0.174	1.780	-3.480
5%	-8.100	-1.980	0.233	3.170	-2.883
10%	-5.700	-1.620	0.275	4.450	-2.578

I(1) vs. I(0)

Ng-Perron test				PP test
$\overline{MZ}^{GLS}$	$\overline{MZ}_{t}^{GLS}$	$\overline{MSB}^{GLS}$	$\overline{MPT}^{GLS}$	$\overline{t}_{\alpha}$

[8] The Ng-Perron test is worth using in the case of highly persistent processes, for it solves the problems from which traditional unit roots tests -such as ADF or PP- tend to suffer. Thus, the Ng-Perron test overcomes the difficulties shown by classic unit root tests when it comes to distinguishing stationary from non-stationary processes when the integration order is close to but below 1. Moreover, it is considered to show excellent size and local asymptotic power due to the use of the GLS detrended data, which resolves size distortion problems that may arise when using traditional unit root tests. Further details may be found on Ng and Perron (2001).

-23.800	-3.420	0.143	4.030	-4.028
-17.300	-2.910	0.168	5.480	-3.444
-14.200	-2.620	0.185	6.670	-3.147

Notes: The critical values for the Ng-Perron test are tabulated in Ng & Perron (2001). The *MAIC* information criteria is used to select the autoregressive truncation lag, *k*, as proposed in Perron and Ng (1996)

*** Rejects null hypothesis at 1% significance level.

** Rejects null hypothesis at 5% significance level.

* Rejects null hypothesis at 10% significance level.

4.4.2. Linear unobserved component model

The results from the application of the Jaeger and Parkinson (1990, 1994) procedure are reflected on Table 2. The lack of significance of the parameter β indicates that the hypothesis of persistence cannot be confirmed -in a linear way-. Plus, the parameter δ, which can be interpreted as an indicator of Tourism-Led Growth, is also non-significant.

Table 2: Estimates of the linear and the nonlinear unobserved component models.

	Linear model	**Nonlinear model**	
Natural rate equation			
		Regime 1	Regime 2
β	0.181	0.418**	0.222*
	(0.176)	(0.250)	(0.148)
σ_N	0.036***	0.048***	
	(0.006)	(0.008)	
Cyclical rate equation			
ϕ_1	0.919***	0.811***	
	(0.093)	(0.045)	
ϕ_2	0.038	0.117***	
	(0.094)	(0.043)	
σ_C	0.012*	0.021***	
	(0.009)	(0.008)	
Identification equation			
α	-0.438***	-0.285**	
	(0.169)	(0.143)	
δ	2.289	19.319**	
	(2.017)	(10.702)	
σ_D	0.041***	0.486***	
	(0.007)	(0.090)	
Threshold	-	0.028	
Delay Lag	-	3	
% obs.	-	Regime 1	Regime 2
		37.12	62.88
Range	1980:1-2013:3	1980:1-2013:3	

Notes: Standard errors in parentheses.

*** Rejects null hypothesis at 1% significance level.

** Rejects null hypothesis at 5% significance level.

* Rejects null hypothesis at 10% significance level.

Hence, it seems appropriate to check the nonlinear version of this model in order to assess the potential existence of persistence in the number of nights spent -and also to evaluate the Tourism-Led Growth hypothesis- under an asymmetric behaviour.

4.4.3. Nonlinear version

Since the application of the linear unobserved components model has not provided satisfactory results, we shall proceed to assess the hypothesis of persistence while relaxing the symmetric assumption of the model above. The process of identifying whether there is an asymmetric behaviour in the number of nights spent can be approached by finding a potential threshold such that $H_0 : \beta^+ \neq \beta^-$; i.e. there exist two different regimes separated by that threshold. The bootstrap technique explained in Pérez and Di Sanzo (2011) has been applied to obtain the *p-value* for that contrast. Since *p-value*$= 0.000$, the null hypothesis can be rejected at a 1% level, thus implying the existence of two different regimes in the behaviour of the variable.

Table 2 shows the results obtained from the nonlinear estimation. The threshold parameter is $\tau = 0.028$. Thus, the regression is split in two regimes, one where the variable is above the threshold parameter -i.e. $T_{t-1} - T_{t-3} > 0.028$ - and another one where the variable is below it -i.e. $T_{t-1} - T_{t-3} \leq 0.028$ -. The persistence parameter is significant at the 5% level for the first regime and at the 10% level for the second one, the former being higher than the latter. This implies that the hypothesis of persistence cannot be rejected when considering an asymmetric behaviour on the number of nights spent by tourists at Spanish accommodations, which leads to the conclusion that policy makers should take into account the fact that effects from shocks on the tourist activity shall affect the future of the sector in a permanent way.

Furthermore, the parameter used to assess the Tourism-Led Growth hypothesis, δ, is significant at the 5% level. This indicates that tourism cycles have influence in the economic growth, thus validating the TLG hypothesis. This result is similar to those from previous research papers, like the ones by Balaguer and Cantavella-Jordá (2002), Nowak et al. (2007), Cortés-Jimenez and Pulina (2010) or Cortés-Jiménez et al. (2010).

4.5. Conclusions and policy implications

In this chapter we have examined the degree of persistence existing in Spanish tourist sector within a time period that ranges from the first quarter of 1980 to the third quarter of 2013. The econometric procedure that has been followed consists of three techniques. Firstly, we have tested for the existence of a unit root in the series, since it is considered to be a necessary condition for confirming the presence of persistence in the data.

However, as has been discussed previously, rejecting the hypothesis of stationarity is not a sufficient evidence of persistence, which is why we have employed the unobserved components model proposed by Jaeger and Parkinson (1990, 1994).

Nonetheless, the linear application of this model did not generate convincing results, for it indicated absence of persistence and a lack of causality running from tourism towards the output -which does not coincide with results from previous research works in the field of Tourism-Led Growth-. Therefore, possible asymmetries in the behaviour of the analysed time series are verified by means of a nonlinear version of the unobserved components model which was designed by Pérez and Di Sanzo (2011). Two different regimes are found to be separated by a threshold and the results suggest there is persistence in both regimes, the first one showing a higher degree of persistence than the second one. Moreover, the parameter indicating that the tourist activity is relevant for the output growth turns to be significant, thus confirming the Tourism-Led Growth hypothesis as well.

The results from this paper have meaningful policy implications. In the first place, tourism in Spain has been proven not to be mean-reverting, which means shocks affecting the Spanish tourist sector will cause permanent effects in the long run. This conclusion is of interest for the policy makers, as it implies that any measures -both short-run oriented and long-run oriented- adopted to modify the situation of this sector will have long-lasting effects and will remain active in the future. Plus, as the tourist sector in Spain is performing adequately, the fact that there is persistence in its behaviour can be regarded as a sign of stability and of absence of volatility in the market. Nevertheless, while that may seem a positive indicator, it is necessary to warn that strong corrective policies will unavoidably be required to recover the original levels of performance in case of negative shocks affecting the tourist sector.

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Chapter 5: Exploring the regional distribution of tourism and the extent to which there is convergence

5.1. Introduction

The global crisis that arose in 2008 caused a deep impact in some European countries, especially in Spain. In particular, unemployment reached dramatic levels, wages and salaries have been reduced drastically, public debt has almost hit 100% of the economic output and trade deficit keeps increasing. This has led the Spanish government to take aggressive measures such as public expense reductions and tax rises. However, despite the strong efforts, the situation is far from being solved. Fiscal policy has proven ineffective and the government cannot perform suitable monetary policies to enhance the impact of the adopted fiscal measures, as the former type of policy depends on the European Central Bank. This scenario makes trade policy or positive external shocks two of the scarce options to start the take off and for achieving the desired recovery. From this perspective tourism policies seem to be an appropriate start point among the different fields of action that the government can undertake.

In this sense, tourism is one of the most relevant activities in the Spanish economy, and the promotion of this sector could become one of the scarce possibilities of applying active countercyclical policies, given the constraints imposed by the stability framework.

As it is well-known, Spain is one of the most visited destinations in the world. Namely, Spain is fourth in the international arrivals ranking and is

the second most popular destination just below the USA (UNWTO, 2014). Then, the design and implementation of adequate strategies of international promotion of this sector, should be considered not only as a way to promote economic growth and employment but also as one of the scarce alternatives of combating recession and unemployment in the current cyclical phase.

With the aim of providing new guidelines for the devising of this promotion, we try to provide new empirical evidence on some aspects that remain unexplored so far, in this paper we examine the degree of convergence amongst the number of tourist arrivals from a dataset of twelve Spain's tourism markets. This information may be useful in order to identify general trends or different groups of countries –convergence clubs– with common features. These findings should be taken into account for devising a more precise and effective policy of promotion, with higher levels of differentiation.

We will do so by applying three different approaches. Firstly, the potential stochastic convergence is tested by means of traditional panel unit root techniques, namely, the LM test proposed by Hadri (2000). Secondly, the potential presence of structural breaks hiding deeper results is analysed through the panel stationarity test developed by Carrion-i-Silvestre et al. (2005). Finally, the club-convergence hypothesis is assessed by way of the Phillips and Sul (2007) methodology.

Therefore, and to the best of our knowledge, this paper may have three novel contributions to the tourism research literature. In first place and to the best of the authors' knowledge, the potential convergence of Spain's tourism markets has not been explored yet; secondly, this might be the first application of the CBL panel within the area of tourism research and; thirdly, the use of the Phillips and Sul (2007) methodology to identify the potential existence of club-convergence is novel in this field of investigation. Nonetheless, the most important contribution of our work resides in the policy implications derived from the presence -or absence- of convergence between tourist markets.

In particular, identifying whether or not there is evidence of convergence may be highly useful for policy makers in terms of redirecting efforts based on a customisation strategy rather than a vague, general marketing that treats all tourist sources as equal. Furthermore, there are at least four other relevant reasons to study the phenomenon of convergence in the context of

tourism1. Firstly, testing for convergence is useful in terms of where to direct marketing and policy efforts. That is, if a particular source market shows signs of convergence, then one could argue that its contribution to the total tourist activity is increasing, which means that the policy makers should focus on promoting the tourist inflow from that country in order to boost the overall performance of the sector. Secondly, convergence can be interpreted as a measure of diversification, in the sense that when all -or most- source markets converge, it indicates that the overall industry does not depend on a few source markets. In third place, the analysis of convergence adds important conclusions that cannot be found with traditional demand modelling due to the fact that convergence analysis usually involves more advanced techniques that may unveil further results. Finally, testing for convergence can help to calibrate the degree of success or appropriateness of the marketing efforts developed in the different source markets.

5.2. Literature review

An increasing body of literature concerning different aspects of the tourist activity has arisen in recent years motivated by the considerable importance of this sector for the economy in terms of revenue generation, employment, and competitiveness. Studies in this field have provided policy makers with some key findings that should help to enhance the effectiveness of the measured adopted to promote tourism. Demand modelling and forecasting as well as the causality relationship between tourism and economic growth are arguably the most analysed aspects of this sector. However, there are some other aspects, which have not been explored in depth so far, such as the potential convergence in the tourist markets. This is indeed a recent and hot topic at the moment of writing.

To the best of our knowledge, the body of literature devoted to the analysis of the convergence hypothesis in the tourist markets started with the pioneer work of Narayan (2006). This first research work approximated the convergence study by analysing whether the difference between the total number of visitors to a country and the number of visitors from a particular country of origin was stationary. Under that criterion, the potential convergence of thirteen major tourist source markets to Australia was investigated by means of both, univariate and panel Lagrange multiplier tests for unit roots. Strong evidence of convergence between all thirteen

[1] See Narayan (2007).

source markets was found when allowing for two structural breaks in the model.

This approach is extended in Narayan (2007), where the same author adds another econometric technique in order to check the robustness of his previous work. Specifically, the possible cointegration between the total visitor arrivals and the visitor arrivals from a particular source market was included in the analysis besides testing the hypothesis of stationarity in the series in order to study whether the source markets are converging. This methodology led to confirm the existence of convergence for the case of Fiji's tourism markets. By following very similar approaches, the hypothesis of convergence in the tourism markets was later tested for the case of some other countries.

For instance, Lean and Smyth (2008) followed the same strategy used by Narayan (2006), i.e. univariate and panel LM tests for unit roots considering one and two structural breaks, and found solid evidence of convergence in Malaysia's ten main tourism markets. Nevertheless, Tang (2011) came to the conclusion that only five source markets of Malaysia showed evidence of convergence after following the m-breaks unit root test developed by Kapetanios (2005).

In the context of Singapore's tourism markets, Lee (2009) tested for convergence from two different points of view: convergence in the long-run and convergence as a catching-up process. The results indicated that international visitor arrivals to Singapore from Africa and Europe were catching up with those from Asia while the arrivals from the Americas and Oceania were converging in the long-run. Later, Tan and Tan (2013) found evidence of convergence in Singapore's 15 top source markets when allowing for structural breaks in the framework of univariate and panel LM unit root tests.

There is a lack of consensus in the results for the case of Turkey. Thus, Abbott et al. (2012) followed a pairwise approach to test for convergence in Turkey's 20 top tourism markets while identifying cluster-based clubs at the same time. The authors concluded that neither overall convergence nor club-convergence could be supported. However, Yilanci and Eris (2012) detected firm evidence of convergence in 10 out of 14 Turkey's source markets in the framework of the Fourier stationary test.

Convergence has also been studied in South Africa's markets. Solarin (2014) applied the Lee and Strazicich (2003, 2004) test for unit roots, which allows for structural breaks in an endogenous framework. Plus, the author also assesses the club-convergence hypothesis by clustering the different source markets in two different clubs: African markets and overseas markets. The results confirmed both widespread convergence and club-convergence among all tourism markets with the exception of Lesotho. Moreover, the autoregressive distributed lag (ARDL) developed by Pesaran et al. (2001) was used to test for cointegration in the series and the findings are robust with the rest of the estimates.

Additionally, the convergence hypothesis has been rejected in 22 Caribbean's tourism markets by Lorde & Moore (2008) while confirmed for the case of Seychelles' tourism markets by Solarin and Lean (2014) following a nonlinear approach.

In this paper we address the analysis of stochastic convergence in a panel of twelve Spain's tourism markets over the period 2000-2014 through three different approaches that will be detailed in the corresponding epigraph. The rest of this paper is structured in three parts. Section number two contains all the information concerning the data used in this research and the followed methodology. In the third epigraph, results are exhibited and discussed. The last part includes an argumentation about the policy implications of our results.

5.3. Data and methodology

5.3.1. Data

A set of 12 Spain's tourism markets will be employed to assess the hypothesis of club-convergence. Specifically, we analyse the tourist arrivals to Spain from Germany, Belgium, France, Italy, Netherlands, Portugal, UK, Switzerland, the rest of European countries, USA, the rest of America and the rest of the World over a time period that ranges from January 2000 to March 2014. The data have been obtained from FRONTUR[2] survey of the Institute of Tourist Studies of Spain (IET) and have been seasonally adjusted by applying the X-12 ARIMA method.

[2] The FRONTUR is a survey of tourist movements in borders developed by the Institute of Tourist Studies of Spain (IET), which collects data concerning the entry of foreign visitors to Spain. These data are available at: http://www.iet.tourspain.es/es-es/estadisticas/frontur/series/paginas/default.aspx

With the purpose of providing a richer picture of the data employed, we may take a look at Figure 1, which shows the evolution of the participation rates of the different source markets in the Spanish tourism markets in terms of number of tourist arrivals. UK can be easily identified as the major market for Spain, with a relative participation that oscillates around 25%, although the trend seems to be decreasing. The second top market source has traditionally been Germany, which has maintained a relative weight of around 20%. However, its decreasing trend has led that country to be surpassed by the rest of Europe and almost caught by France. The rest of the countries keep their rates of participation under 5%, with Italy surpassing that limit occasionally.

After this brief overview of the selected data we shall now proceed to an explanation of the methodology that will be followed in this paper.

5.3.2. Methodology

As stated, we shall explore the potential convergence of twelve different Spain's tourism source markets by means of three different approaches. To start with the analysis we first check whether the series are stationary by applying the panel Lagrange multiplier test proposed by Hadri (2000). Then the procedure shall continue by considering the potential presence of structural breaks through the application of the panel stationarity test developed by Carrion-i-Silvestre et al. (2005, CBL henceforth). Finally, we will study the formation of convergence clubs in a different manner from what has been applied in other papers in the field of tourism research (e.g. Abbott et al, 2012; Solarin, 2014). Namely, we follow the approach proposed by Phillips and Sul (2007), which tests for the presence of convergence clubs by identifying common attributes in their convergence paths.

Panel unit root test without structural breaks

The first step of out procedure will be based on a LM panel unit root test without any structural breaks as proposed in Hadri (2000). This test is built on the stationarity test formulated by Kwiatkowski et al. (1992) and it checks the null hypothesis of stationary in the series against the alternative of a unit root in the panel, which is contrary to most other panel unit root tests where the null hypothesis usually refers to the non-stationarity condition. While this difference might seem insignificant, we should take into account that when the null hypothesis is the existence of a unit root, i.e. non-stationarity, rejecting the null does not imply that all individuals

converge, but only that at least one of them converge. Thus, with stationarity as the null hypothesis we can ensure that all the countries converge in case that it cannot be rejected. Plus, this test exhibits desirable size properties and is robust to non-normality.

It is worth pointing that we will focus on the analysis of convergence in a stochastic sense exclusively, although the study of stochastic convergence is often complemented by examining the potential existence of deterministic convergence, which is a stricter notion of convergence. In this sense, while the presence of stochastic convergence only implies that the series are not diverging, deterministic convergence indicates that the series are indeed converging. That is, deterministic convergence implies stochastic convergence, but not vice versa. Notwithstanding, it is not reasonable to think that tourist arrivals from all the different source markets will show a deterministic -absolute- convergence, since it seems highly improbable that countries with low participation shares in the Spanish tourism will catch-up the levels of those countries with the highest participation shares, as the characteristics of the different tourist source markets are too different in terms of their population, their national income, their power as tourism sources, their proximity to Spain and their historic tourism relationships with Spain, among other features. This is why we will only focus in testing the existence of convergence in a stochastic sense.

In our case, stochastic convergence would imply that shocks in the number of tourist arrivals relative to the average of the panel are temporary, which means the series would revert to their respective equilibrium level. In sum, if the series are proven to be stationary -that is, if the null hypothesis cannot be rejected-, then we could argue that there is a process of convergence -or, more precisely, a non-divergence process-, while if a unit root was found in the panel; then the conclusion would be that the tourism markets are diverging.

In order to explore this issue, we first need to generate a variable that enables the correct study of convergence in the number of tourist arrivals to Spain from the different countries. Whereas Narayan (2006) and several subsequent papers employ the difference between the aggregate of the tourist arrivals from all the source markets and each individual series, in this paper we will generate a series relative to the average of the panel rather than in relation to the aggregate. In this way, we can distinguish country-specific movements from the common trend.

More specifically, the variable that will be used for unit root testing is relative tourism and it can be expressed as $RY_{i,t} = \ln\left(Y_{i,t}/\overline{Y}_t\right)$ where Y_{it} is the number of tourist arrivals to Spain from country *i* at the moment *t*, with $i = 1, \dots, N$ and $t = 1, \dots, T$; and where $(\overline{Y}_t = \sum_{i=1}^{N} Y_{i,t}/N)$ is the monthly sample average of the panel at each moment of time *t*. In our case, $i = 12$ and $t = 171$, which makes a balanced panel of 2052 observations.

In a broad sense, the test proposed by Hadri (2000) decomposes the analysed variable into the sum of a deterministic trend, a random walk and a stationary stochastic process. In our case, $RY_{i,t}$ can then be described as:

$$RY_{i,t} = \alpha_{i,t} + \beta_i t + \varepsilon_{i,t} \tag{1}$$

$$\alpha_{i,t} = \alpha_{i,t-1} + \upsilon_{i,t} \tag{2}$$

where $\varepsilon_{i,t}$ and $\upsilon_{i,t}$ are mutually independent, with $\varepsilon_{i,t} \sim \text{iid}\ (0, \sigma^2_{\varepsilon,i})$ and $\upsilon_{i,t} \sim \text{iid}\ \left(0, \sigma^2_{\upsilon,i}\right)$; with $i = \{1, \dots, N\}$ individuals and $t = \{1, \dots, T\}$ time periods.

The null hypothesis of stationarity is equivalent to a scenario where the variance of the perturbation of the random walk equals zero, i.e. H_0: $\sigma^2_{\upsilon,i} = 0$, which happens when $\alpha_{i,t} = \alpha_{i,0}$. The null can be obtained by substituting (2) in (1) as follows:

$$RY_{i,t} = \alpha_{i,0} + \beta_i t + e_{i,t} \tag{3}$$

where $e_{i,t} = \sum_{i=1}^{T}(\varepsilon_{i,t} + \upsilon_{i,t})$, $\beta_i t$ is the country-specific linear trend and $\alpha_{i,0}$ is the country-specific time-invariant compensating differentials.

The test statistic can be computed as the average of univariate KPSS tests, its expression being as follows:

$$\eta(\hat{\lambda}) = N^{-1} \sum_{i=1}^{N} (\eta_i(\hat{\lambda}_i)) \tag{4}$$

where $\eta_i(\hat{\lambda}_i) = \hat{\omega}_i^{-2} T^{-2} \sum_{t=1}^{T} \hat{S}_{i,t}^2$ is the univariate KPSS test for individual *i*, with $\hat{S}_{i,t}^2 = \sum_{j=1}^{t} \hat{e}_{i.j}$ being the partial sum of the estimated OLS residuals from Eq. (3).

Panel unit root test with multiple structural breaks

The second step of our process leads us to consider the potential existence of structural breaks that may be hiding further conclusions on whether there is convergence. Thus, we apply the panel stationarity test developed by Carrion-i-Silvestre *et al*. (2005, CBL henceforth). This method differs from other panel unit root tests in three ways. Firstly, it

allows for endogeneity in the behaviour of the individuals that form the panel, enabling multiple shifts not only in the levels of the different time series of the panel -as some other panel unit root tests already do-, but also in their respective slopes. Secondly, the test proposed by CBL allows for multiple structural breaks in the sample, unlike other unit root tests for panels, such as the LM test used in Narayan (2006) and in other similar works. Thirdly, as in the panel stationarity test of Hadri (2000), the null hypothesis is the absence of a unit root instead of the non-stationarity condition, which is a relevant aspect as has already been argued in the previous epigraph. To our knowledge, this may be the first application of this panel unit root test in the field of tourism.

The test proposed by CBL is a generalization of the test developed by Hadri (2000) for the case of multiple changes in both the intercept and the trend. The variable employed to test for stationarity is again the relative tourism $RY_{i,t}$. Let $RY_{i,t}$ be our set of stochastic processes given by:

$$RY_{i,t} = \alpha_{i,t} + \beta_i t + \varepsilon_{i,t} \tag{5}$$

$$\alpha_{i,t} = \sum_{k=1}^{m_i} \theta_{i,k} D(T_{b,k}^i)_t + \sum_{k=1}^{m_i} \gamma_{i,k} DU_{i,k,t} + \alpha_{i,t-1} + \upsilon_{i,t} \tag{6}$$

where $\alpha_{i,0} = \alpha_i$ is a constant, $\upsilon_{i,t} \sim iid\left(0, \sigma_{\upsilon,i}^2\right)$ and $\varepsilon_{i,t} \sim iid\ (0, \sigma_{\varepsilon,i}^2)$; with $i = \{1, \dots, N\}$ individuals and $t = \{1, \dots, T\}$ time periods. $DU_{i,k,t}$ and $D(T_{b,k}^i)_t$ are dummy variables that account for changes in slope and level and are defined as $DU_{i,k,t} = 1$ for $t > T_{b,k}^i$ and 0 otherwise; and $D(T_{b,k}^i)_t = 1$ for $T_{b,k}^i + 1$ and 0 otherwise; with $T_{b,k}^i$ denoting the *k*-th date of the break for the *i*-th individual, $k = \{1, \dots, m_i\},\ m_i \geq 1$.

Thus, just as in the test proposed by Hadri (2000), $RY_{i,t}$ has been decomposed in the sum of a random walk, $\alpha_{i,t}$, a stochastic process that is supposed to be stationary, $\varepsilon_{i,t}$, and a term describing country-specific linear time trends, $\beta_i t$.

The null hypothesis of stationarity occurs when $\sigma_{v,i}^2 = 0, \forall i = \{1, \dots, N\}$, that is, when $\alpha_{i,t} = \alpha_{i,0}$. Its expression can be obtained by substituting (6) in (5), thus rewriting our set of stochastic processes as follows:

$$RY_{i,t} = \alpha_{i,0} + \sum_{k=1}^{m_i} \theta_{i,k} DU_{i,k,t} + \beta_i t + \sum_{k=1}^{m_i} \gamma_{i,k} DT_{i,k,t}^* + e_{i,t} \tag{7}$$

with $DT^{*}_{i,k,t} = t - T^{i}_{b,k}$, for $t > T^{i}_{b,k}$ and 0 otherwise, $k = \{1, \dots, m_i\}$, $m_i \geq 1$. The expression formulated in (7) captures individual effects, *individual structural break effects* -shifts in the mean caused by the structural breaks-, temporal effects -when $\beta_i \neq 0$- and *temporal structural break effects* -when $\gamma_{i,k} \neq 0$, that is, when there are shifts in the individual time trend. Therefore, it is general enough to enable different effects on each individual time series from the structural breaks, which may also take place at different dates and in different occasions for each individual. To enable a set of scenarios where the structural breaks can (i) cause different effects on each individual time series, (ii) appear at different dates for each individual time series and (iii) appear in a different number of occasions for each individual time series.

Under the utilisation of this model, the rejection of the null hypothesis implies that at least one of the individuals forming the panel is not converging while, otherwise, the conclusion would be that tourist arrivals from all countries of the sample are converging in a stochastic sense. The process of computation of the statistic of the test follows the same structure as in Hadri's test, which has already been described.

Club-convergence analysis

The third -and most relevant- methodology that will be followed in this paper is the one proposed by Phillips and Sul (2007; PS henceforth), which will help us study the hypothesis of club-convergence of those Spain's source markets. To the best of our knowledge, this is also a novel technique within the area of tourism research.

The PS procedure exhibits several relevant advantages compared to other approaches to the analysis of convergence. First, it identifies groups of individuals in the panel that share similar patterns in their convergence paths, even when there is no full convergence in the panel. The process may reveal the existence of manifold convergence-clubs while at the same time allowing some individuals to diverge. What is more, the group clustering is based on the characteristics of the data rather than to *a priori* assumptions, thus avoiding any potential bias caused by the intervention of the researcher in the process. Second, it allows for both heterogeneity and transitional divergence within the context of a nonlinear time-varying factor model. This represents a decisive difference with respect to approaches in which a simple panel unit root is executed, since they are not adequate for analysing convergence when there is heterogeneity in the panel. Third, the PS

methodology may also be used to test for asymptotic cointegration in a precise way, regardless of the size of the sample.

Plus, the process provides a picture of how the different individuals evolve through time in respect of the other individuals and the panel average. Furthermore, the PS test is robust when the series are trend stationary and also under the presence of stochastic nonstationarity.

To introduce the econometric methodology proposed in Phillips and Sul (2007), let us suppose that the variable contained in our panel data, i.e. the number of tourist arrivals to Spain, is Y_{it}, with $i = 1, \dots, N$ and t= $1, \dots, T$. Y_{it} can be decomposed as:

$$Y_{it} = a_{it} + x_{it} \tag{8}$$

where a_{it} and x_{it} represent the systematic and the transitory components, respectively. Moreover, Phillips and Sul (2007) further develop the previous expression into:

$$Y_{it} = \left(\frac{a_{it} + x_{it}}{\mu_t}\right)\mu_t = \delta_{it}\,\mu_t, \qquad \forall\, i, t \tag{9}$$

where δ_{it} stands for the idiosyncratic component and μ_t embodies the common trend component, both of them being time-varying. In other words, δ_{it} provides information on the transition path of each individual towards the common steady state path, which is represented by μ_t.

In order to eliminate the common component, thus isolating the idiosyncratic component, and to test whether δ_{it} converges to a constant, δ, Phillips and Sul (2007) suggest taking ratios to define a relative transition parameter, h_{it}:

$$h_{it} = \frac{Y_{it}}{N^{-1}\sum_{i=1}^{N} Y_{it}} = \frac{\delta_{it}}{N^{-1}\sum_{i=1}^{N} \delta_{it}} \tag{10}$$

$\mathrm{h_{it}}$ measures how the variable of interest for individual i evolves in relation to the panel average. It can be noticed that, in case that there is ultimate convergence between the individuals, $\mathrm{h_{it}} \to 1$ and $\mathrm{H_{it}} \to 0$ as $\mathrm{t} \to \infty$, where $\mathrm{H_{it}} = \mathrm{N^{-1}}\sum_{\mathrm{i=1}}^{\mathrm{N}}(\mathrm{h_{it}} - 1)^2$ stands for the cross-sectional variation of the relative transition growth path.

The null hypothesis of the PS test can be formulated through a semiparametric model for δ_{it}:

$$\delta_{it} = \delta_i + \frac{\sigma_i \xi_{it}}{L(t)t^{\alpha}}, \;\; t \geq 1, \;\; \sigma_i \geq 0 \;\; \forall\, i \tag{11}$$

where ξ_{it} is assumed to be normally distributed across i, $L(t)$ is slowly varying, increasing and divergent at infinity, and α is a decay rate such as δ_{it} converges to δ_i when $\alpha \geq 0$. In sum, the null and alternative hypotheses of this test are:

$$H_0: \delta_i = \delta \quad and \quad \alpha \geq 0$$
$$H_1: \delta_i \neq \delta \;\; \forall i, \;\; or \;\; \alpha < 0$$

The null hypothesis of convergence is tested by running the following regression:

$$\log(H_1/H_t) - 2\log L(t) = \hat{c} + \hat{b}\log t + u_t \tag{12}$$

with $L(t) = \log(t)$ and $\hat{b} = 2\hat{\alpha}$, where $\hat{\alpha}$ is the OLS estimate of α. The expression in (12) is often called the *log(t)* regression and it starts at a certain moment $t = [rT]$, where $[rT]$ is the integer part of rT and with $r > 0$. This implies removing a fraction r of the sample[3]. Full panel convergence shall exist when $\hat{b} \geq 0$, otherwise there will be divergence in the panel. Hence, higher values of $\hat{b}$ will imply faster rates of convergence[4]. Nevertheless, rejecting the null hypothesis only indicates that there is not full convergence in the panel, but there might be different subgroups showing diverse convergent patterns. Thanks to an empirical clustering algorithm, the PS methodology enables the option of identifying the potential convergence-clubs in the dataset.

The algorithm begins by ordering individuals in the panel according to their last observation. Then, the *log(t)* regression is run for the k highest individuals within the group -with $N > k \geq 2$- to form the subgroup G_k and to calculate its convergence *t*-statistic, t_k -with $t_k > -1.65$ -.

The next step consists in adding one member at a time to the subgroup G_k and executing the *log(t)* regression again to calculate its respective *t*-statistic. The subgroup G_k will eventually become the first convergence club if the *t*-statistic is over zero. Finally, the authors suggest running another

[3] Phillips and Sul (2007) suggest choosing a value of $r = 0.3$ for adequate performance in terms of both size and power.

[4] A standard one-sided *t*-test for the coefficient $\hat{b}$ is used to test the null. The *t*-test is constructed under the utilisation of heteroskedasticity and autocorrelation consistent standard errors. The null hypothesis of convergence may be rejected at the 5% significance level when $t_{\hat{b}} < -1.65$.

log(t) regression for the remaining individuals to see if they all converge, which would mean they form the second -and last one, therefore- club. Otherwise, the previous steps should be carried out again for these individuals to check whether they can be clustered in two or more convergence clubs. It is also possible that no clubs can be formed at all, which would indicate that these individuals diverge.

5.4. Empirical results

In this section we shall present the results derived from the application of the three different techniques that have been previously presented. In first place, we discuss the output obtained from the panel stationarity test of Hadri (2000) and then we do so with the output from the general case proposed by CBL, which allows us to consider the potential existence of structural breaks in the panel. Additionally, we provide results for individual stationarity tests in both cases -without and with structural breaks-. Plus, in order to avoid potential distortions caused by cross-sectional dependence we make use of bootstrap methods to approximate the empirical distribution of the panel stationarity tests. The last part of this section showcases the results obtained after having applied the methodology proposed by Phillips and Sul (2007) for club convergence.

Panel unit root test without structural breaks

Table 1 is divided in two main sections and exhibits the results from the application of the KPSS tests without considering structural breaks. As reported in the section A of Table 1, the results of univariate KPSS tests for each country of the sample indicate that the null hypothesis of stationarity can be rejected for all cases -except for the rest of Europe-, which points to divergence in the number of tourist arrivals to Spain.

Section B in Table 1 shows the outcome from the application of the panel stationarity test proposed by Hadri (2000) in the context of cross-sectional independence and asymptotic normality as well as the bootstrap critical values that allows for general forms of cross-sectional dependence.

Moreover, the panel KPSS statistics have been calculated for the case of both heterogeneity and homogeneity in the panel so as to check the robustness of the outcome. The null hypothesis of joint-stationarity can be rejected at the 1% level for both the homogeneous and the heterogeneous cases, even under the assumption of cross-sectional correlation. This also

points to absence of joint convergence in the number of tourist arrivals to Spain.

Panel unit root test with multiple structural breaks

As expected, joint convergence in the sample has been rejected by applying the panel unit root test without considering structural breaks. However, the potential presence of structural breaks in the sample might be distorting our results, perhaps leading us to reject joint stationarity erroneously. Therefore and as previously explained, we shall follow the panel stationarity test proposed by CBL, which allows for multiple structural breaks in the data. Table 2 contains the results from the employment of that test in our panel of twelve source markets. As in the case of Table 1, there are two different sections in Table 2. Again, section A reports the results from the univariate stationarity tests while allowing for a maximum of 3 structural breaks. The majority of the countries only exhibit one structural break, while America and the rest of the World showcase two breaks and only the UK presents three. In contrast with the previous findings, we are able to reject the null of stationarity for only seven tourism markets. Nonetheless, this still points to divergence in the panel.

Results from the application of the panel stationarity test proposed by CBL can be found in section B of Table 2. Again, the null hypothesis of joint-stationarity can be rejected at the 1% level both in the context of homogeneity and heterogeneity regardless of whether there is cross-sectional correlation or not. Therefore, absence of convergence in the number of tourist arrivals to Spain is corroborated with the application of the CBL panel stationarity test, which suggests robustness in the results thus far.

Club-convergence test

The results of the *log(t)* regression for convergence clustering of the number of tourist arrivals to Spain during the studied period, i.e. January 2000 to March 2014, can be found in Table 3. By following the algorithm proposed by Phillips and Sul (2007), we have been able to identify three different convergence clubs among the different tourism markets in terms of tourist arrivals to Spain. The first one is compounded by USA, the rest of America and the rest of the World; the second one is formed by France, Switzerland and the rest of Europe and the last one includes UK, Germany, Italy, Netherlands, Portugal and Belgium.

In order to further analyse the behaviour of the different clubs, let us give a brief description of the data. Figure 2 exhibits the evolution of the three clubs in terms of participation in the total number of tourist arrivals to Spain. Regarding the first year of the analysed time period, i.e. the year 2000; the first club -formed by USA, America and the World- accounted for only 8.14% of total visitor arrivals to Spain on average while the second group -France, Switzerland and the rest of Europe- represented 27.11% and the third group 64.75%, Germany and UK alone accounting for 49.41% of total visitor arrivals. The situation in 2013 was similar but already reflects relevant changes. Thus, the first group slightly increased its importance as a source market, reaching 8.91% of total visitor arrivals. A more significant change occurs in relation to the second group, which now accounts for 35.70% of the total while the third group diminishes its weight to 55.39%. This decrease in the third club is mostly due to a reduction of the dependence on German and British tourists, which now represent just 39.79% of the total number of visitors.

5.5. Conclusions and policy implications

In this paper we have examined the hypothesis of full convergence and club convergence amongst twelve different Spain's tourist source markets following a strategy consisting on three different econometric approaches.

As expected, the hypothesis of full convergence amongst the different Spain's source markets could not be accepted regardless of the econometric approach applied. The application of the panel stationarity test developed in Hadri (2000) in the context of both cross-sectional independence and cross-sectional correlation led us to reject the idea of full convergence in the panel. These results were proven robust when considering the potential existence of structural breaks by means of the utilisation of the panel stationarity test by CBL. In sum, lack of full stochastic convergence has been found and the results seem to be robust enough for us to consider whether there might be another type of convergence between those tourism markets. That is why our next step pointed to the analysis of club-convergence through the application of the Phillips and Sul (2007) methodology.

That being said, we have been able to identify three different convergence clubs. One group comprises Germany, UK, Portugal, Italy, Netherlands and Belgium. Another group is formed by France, Switzerland and the rest of Europe. The last one contains USA, the rest of America and the rest of the World.

At first glance, the first group is formed by the two main current source markets of the Spanish tourist activity, that is, Germany and UK, as well as other four European countries with similar characteristics in terms of proximity, economic development and lifestyle -especially Italy and Portugal- which are converging with Germany and UK despite being too far from them in terms of participation in the total share of tourist arrivals. The transition path of this first club seems to be below the panel average during the time period, which may indicate that the weight of these countries in the total number of tourist arrivals has been reduced over the last years.

Moreover, the other two clubs have been evolving at a higher rate than the first club, particularly the club formed by USA and the rest of America. This is a positive sign, since it indicates a lower dependence on the classic source markets -particularly Germany and UK-, that is, there has been a diversification process in the Spanish tourist sector. However, this diversification is still slow and is mostly due to a higher degree of participation of tourists from France and other European countries rather than an increase on the relative weight of the American tourists. We can then conclude that the marketing actions and policy measures performed do not seem to be as effective as one might expect, perhaps derived from an undifferentiated approach.

Policy makers may utilise our findings concerning the identification of different convergence clubs to detect common features in the countries of each cluster in order to redirect their efforts in a more precise manner, with higher levels of differentiation. For instance, USA and the rest of America seem to evidence an untapped potential. USA is one of the most populated countries in the world and has a huge capacity as a tourism market. However, its importance in the total share of visitor arrivals to Spain is fairly limited, which implies a different strategy should be accomplished to make this destination more attractive for the North-American tourists. The case of the rest of America is equally improvable if we consider that Spanish is the common language in most American countries. Definitely, there is work to be done in relation to the American market and the first step would be to develop a customised strategy for American tourists.

Therefore, the Spanish tourist sector is in need of more precise and customised policies in order to (i) reach a higher level of diversification, which should help to reduce the -still high- dependence on German and British tourists, (ii) boost the American share in the total number of tourist

arrivals and (iii) keep the high pace of increase in the total market share of the tourist proceeding from French and other European sources.

To conclude, we would like to highlight some limitations concerning our research.

First, due to a lack of differentiation in the data concerning different source markets of America, we have not been able to detect further convergence-clubs amongst American countries. Further research should be developed in order to solve this issue, since it is not reasonable to develop a similar strategy for such a diverse and large group of countries.

Second, as this is the first time that the issue of convergence amongst Spain's tourism markets has been addressed, we cannot carry out any comparisons with previous findings in the literature, which makes later investigations necessary to test the robustness of our results. Nonetheless, our contribution should help to pave the way for future works about convergence in Spain and also enables replication studies for the case of other countries' tourism markets.

Appendix

Table 1. KPSS tests without structural breaks.

A: Univariate tests.

Country	KPSS test
America	0.271***
Belgium	0.381***
Europe	0.058
France	0.143*
Germany	0.264***
Italy	0.201**
Netherlands	0.142*
Portugal	0.314***
Switzerland	0.210**
UK	0.266**
USA	0.316***
World	0.319***

B: Panel KPSS test

			Bootstraps critical values			
	Test	p value	90%	95%	97.5 %	99%
$Z(\hat{\lambda})$ (homogeneous)	15.708	0.000	2.056	2.746	3.422	4.423
$Z(\hat{\lambda})$ (heterogeneous)	14.405	0.000	1.678	2.326	2.992	3.733

Notes: The 1%, 5% and 10% finite sample critical values for the KPSS test for the specification with trends are 0.213, 0.149, 0.121, respectively, for T=50 (see Sephton, 1995). $Z(\hat{\lambda})$ homogeneous and $Z(\hat{\lambda})$ heterogeneous denote the panel KPSS test by Hadri (2000) for the case of homogeneity and heterogeneity in the estimation of the long-run variance, respectively. ***, ** and * imply rejection of the null hypothesis at 1%, 5% and 10%, respectively.

Table 2: KPSS tests with multiple structural breaks.

A: Univariate tests.

Country	Test	m_i	$\hat{T}^1_{b,1}$	$\hat{T}^1_{b,2}$	$\hat{T}^1_{b,3}$	10%	5%	1%
America	0.043	2	2004:7	2009:2		0.055	0.080	0.096
Belgium	0.068	1	2009:3			0.159	0.254	0.319
Europe	0.047	1	2002:1			0.092	0.135	0.166
France	0.154***	1	2002:3			0.043	0.056	0.064
Germany	0.063*	1	2002:3			0.056	0.079	0.096
Italy	0.086***	1	2010:9			0.034	0.045	0.051
Netherlands	0.086***	1	2003:7			0.042	0.058	0.069
Portugal	0.063***	1	2006:10			0.034	0.044	0.050
Switzerland	0.099***	1	2005:9			0.040	0.054	0.065
UK	0.022	3	2002:3	2004:4	2009:6	0.032	0.041	0.047
USA	0.124*	1	2006:5			0.084	0.131	0.162
World	0.029	2	2004:10	2009:8		0.057	0.085	0.103

B: Panel KPSS test

	Cross-sectional independence		Bootstraps critical values *cross-sectional dependence*			
	Test	p value	90	95	97.5	99%

			%	%	%	
$Z(\hat{\lambda})$ (homogeneous)	7.110	0.000	-0.636	-0.362	-0.058	0.282
$Z(\hat{\lambda})$ (heterogeneous)	6.354	0.000	-0.441	-0.139	0.127	0.529

Notes: The specification contains country-specific intercepts and linear trends. $Z(\hat{\lambda})$ (homogeneous) and $Z(\hat{\lambda})$ (heterogeneous) denote the panel stationary test with multiple breaks developed by Carrion-i-Silvestre et al. (2005) for the case of homogeneity and heterogeneity, respectively, in the estimation of the long-run variance. The bootstrap distribution for $Z(\hat{\lambda})$ is based on 20.000 replications. The number of break points has been estimated using the LWZ information criteria allowing for a maximum of $m_i = 3$ structural breaks. ***, ** and * imply rejection of the null hypothesis at 1%, 5% and 10%, respectively.

Table 3. Convergence club classification

Tourist arrivals					
Club 1		Club 2		Club 3	
[AMERICA, USA, WORLD]		[EUROPE, FRANCE, SWITZERLAND]		[BELGIUM, GERMANY, ITALY, NETHERLANDS, PORTUGAL, UK]	
Log t	*t-stat*	*Log t*	*t-stat*	*Log t*	*t-stat*
0.110	*1.564*	*0.071*	*4.265*	*0.074*	*3.584*

Note: The clubs have been obtained by applying the algorithm proposed by Phillips and Sul (2007), which aims to find groups of MSA with similar convergence speeds to the average. The term log t stands for a parameter which is twice the speed of convergence of this club towards the average; moreover, t-stat is the convergence test statistic, which is distributed as a simple one-sided t-test with a critical value of -1.65 (see Phillips and Sul, 2007 for further details)

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Part IV
Conclusions

Chapter 6: Conclusions and Future Lines of Research

This dissertation provided new empirical evidence on the relationship between tourism and economic growth extending previous literature thanks to the use of recent and alternative econometric approaches including the use of structural breaks and nonlinear models in both the short and longer term.

Furthermore, this work provided two empirical characterizations of the demand and supply of the Spanish Tourism Industry in order to contribute to a better knowledge about the supply and the regional distribution of this industry.

Based on these analyses the results of the first work point to the existence of three different stages in the last four decades. The main breaks seem to take place at the beginning of 1985 and during the second half of the *'90s*. The results suggest that the relationship between these two variables can be likened to a sowing and reaping process in which Spain collected the benefits of having invested in tourism specialization during many years -before the first structural break-. From 2000 onwards there exists causality on both directions meaning the influence between the economic growth and the tourism development is reciprocal.

Turning our attention to the exploration of the long term, this thesis also provided evidence of two different regimes separated by a threshold suggesting the existence of persistence in both regimes.

Moreover, the parameter indicating that the tourist activity is relevant for the output growth turns to be significant, thus confirming the Tourism-Led Growth hypothesis again.

These set of results have powerful policy implications. In the first place, shocks affecting the Spanish tourist sector will cause not only temporary effects but also permanent effects in the long run, implying that any measures adopted to modify the situation of this sector will have long-lasting effects and will remain active in the future. Plus, the fact that there is persistence in

its behaviour can be regarded as a sign of stability and of absence of volatility in the market.

Furthermore, as I mentioned above, the second part of this dissertation tried to characterize the Spanish tourist sector by means of statistical tools. First, we examined the hypothesis of full convergence and club convergence amongst twelve different Spain's tourist source markets.

As expected, the hypothesis of full convergence amongst the different Spain's source markets was not accepted. However, we were able to identify three different convergence clubs. One group comprises Germany, UK, Portugal, Italy, Netherlands and Belgium. Another group is formed by France, Switzerland and the rest of Europe. The last one contains USA, the rest of America and the rest of the World. The first group is formed by the two main current source markets of the Spanish tourist activity, that is, Germany and UK, as well as other four European countries with similar characteristics in terms of proximity, economic development and lifestyle -especially Italy and Portugal- which are converging with Germany and UK despite being too far from them in terms of participation in the total share of tourist arrivals. The transition path of this first club seems to be below the panel average during the time period, which may indicate that the weight of these countries in the total number of tourist arrivals has been reduced over the last years. Moreover, the other two clubs have been evolving at a higher rate than the first club, particularly the club formed by USA and the rest of America.

One could interpret this last result as a positive sign, since it indicates a lower dependence on the classic source markets -particularly Germany and UK-, that is, there has been a diversification process in the Spanish tourist sector.

However, this diversification is still slow and is mostly due to a higher degree of participation of tourists from France and other European countries rather than an increase on the relative weight of the American tourists. We can then conclude that the marketing actions and policy measures performed do not seem to be as effective as one might expect, perhaps derived from an undifferentiated approach. Policy makers may this convergence clubs identified to detect common features in the countries of each cluster in order to redirect their efforts in a more precise manner, with higher levels of differentiation.

The last chapter helped to have a better understanding about the relationship of interdependence between arrivals, and the business cycle in both in Spain and in the country of origin. By using a forecast error variance decomposition technique the work identified the relative importance of one

variable´s shock in explaining the predictive error variability of another at different time leads.

To conclude, we would like to highlight some limitations concerning our research. First, the use of longer data set or even panel data sets would have been of interest in order to identify previous structural breaks in earlier decades or nonlinear models for panel data. Moreover, it would be appropriate to follow the same procedure that has been applied through the present document incorporating new variables such as tourism income or tourism arrivals to test the consistency of the results. In that regard, the structural break happening in 2008 should be re-examined with those other variables to test whether the financial crisis made an impact on the causality relationship between economic growth and tourism in Spain, since it is possible that the number of nights spent does not help to detect further effects.

Second, due to a lack of differentiation in the data concerning different source markets of America, we have not been able to detect further convergence-clubs amongst American countries. Further research should be developed in order to solve this issue, since it is not reasonable to develop a similar strategy for such a diverse and large group of countries.

Third, as this is the first time that the issue of convergence amongst Spain's tourism markets has been addressed, we cannot carry out any comparisons with previous findings in the literature, which makes later investigations necessary to test the robustness of our results. Nonetheless, our contribution should help to pave the way for future works about convergence in Spain and also enables replication studies for the case of other countries' tourism markets.

Resumen en castellano

Resumen en castellano

Esta tesis es un compendio de cuatro ensayos sobre el sector turístico español, en los que se a través del uso de técnicas econométricas avanzadas, se proporciona nueva evidencia empírica acerca del rol de este sector en la evolución cíclica de la economía española y acerca del carácter de la promoción turística como política anticíclica.

El primero versa la relación existente entre la llegada de turistas a España, desde sus principales mercados en términos de penetración, y los efectos de éstos sobre el ciclo económico español. Se trata pues de una revisión empírica de los efectos macroeconómicos de los shocks sufridos por este sector. Esta cuestión es un hot policy issue en este momento, en el que autoridades, agentes y ciudadanos en general, tienen un alto interés en todos aquellos elementos que potencialmente pueden propiciar el despegue hacia una nueva fase de recuperación.

El segundo de ellos reexamina una de las hipótesis mas intensamente exploradas en la literatura acerca de los efectos macroeconómicos del sector turístico: la hipótesis *tourism-led growth*, es decir, acerca del carácter adelantado o no del sector turístico respecto al ciclo de la actividad económica general. La relación entre la evolución del sector turístico y otras variables macroeconómicas tales como el PIB, permiten a priori, aportar argumentos teóricos que nos ayuden a explicar tanto el efecto del PIB en la actividad del sector turístico, como el de éste sobre la fase del ciclo económico. Desde esta perspectiva, la evidencia empírica derivada del análisis de la causalidad entre las dos variables, se configura como la forma natural de resolver una controversia de estas características. La literatura

previa ha tratado de resolver esta cuestión a través de análisis de causalidad, con diferentes aproximaciones que arrojan en su conjunto la ausencia de unos resultados lo suficientemente robustos y concluyentes como para apostar por la validez de una de las dos hipótesis teóricas en competencia. Una de las razones de esta aparente falta de robustez de los resultados empíricos previos puede encontrarse en la suposición de comportamientos lineales. Como bien es sabido, suponer relaciones lineales cuando éstas no lo son no solo conllevan mala inferencia sino posiblemente una fuente de error en las relaciones encontradas. Por ello, y frente a la literatura anterior, este capítulo reconsidera la literatura previa proporcionando nueva evidencia empírica en la que las relaciones de causalidad entre las variables pueden ser diferentes dependiendo de los diferentes regímenes en los que dividimos el período de análisis cuando obtenemos evidencia de cambio estructural en las relaciones. En efecto, observamos como las diferentes fases definidas, muestran diferentes tipos de relación. En particular, la última arroja evidencia en favor de una relación de causalidad bidireccional entre ambas variables.

El segundo de los trabajos trata de evidenciar cuál es la contribución del sector turístico español a la salida de la crisis, aportando nueva evidencia acerca de la dependencia del PIB español de la evolución de las llegadas desde los países que se configuran como su principales clientes. Para ello, se explora, de manera inicial a través de un análisis simple de correlaciones cruzadas, que se complementa con un análisis de comovimiento a través de un enfoque de vectores autorregressivos del error de predicción propuesto por den Haan, que se complementa a través de un análisis de descomposición de la varianza. El principal hallazgo es que las llegadas de turistas procedentes de Portugal, Alemania y Reino Unido, proporcionan un impulso decisivo a nuestra exportaciones y por tanto al PIB, de forma que la evolución de estas economías o el grado de penetración de nuestro sector turístico en los mismos ha de considerarse elemento clave de la política anticíclica española.

El tercero de los ensayos de la tesis, aborda una temática parecida pero cambiando la perspectiva desde el corto a el largo plazo. En particular, se trata de comprobar si los shocks operados en el sector turístico tienen carácter transitorio o permanente, es decir si estos cambios muestran cierta persistencia o histéresis. La cuestión es importante dado que la valoración de los efectos de cualquier cambio o política no sólo deberían evaluar sus impactos a corto sino también a largo.

Importando técnicas y enfoques aplicados inicialmente en el ámbito de la economía laboral, este trabajo hace uso del modelo de componentes inobservables de Jaeger y Parkinson (1990) para capturar la persistencia, cuyos parámetros son estimados a través un filtro de Kalman. Al igual que en el caso anterior, los resultados de la modelización lineal se completan con una estimación no lineal, inspirada en el trabajo de Pérez y Di Sanso, que permite testar la robustez de los hallazgos empíricos a la consideración explícita de comportamientos no lineales.

El último de los trabajos con el que se cierra esta tesis, profundiza en el conocimiento y caracterización del sector turístico español, y más concretamente de la detección de grupos homogéneos en lo que se refiere a los países de procedencia de sus clientes, con el objetivo de mejorar la efectividad de las políticas de promoción turística orientada a lograra tasas de penetración mayores en determinado mercados.

Para ello, examinamos primero la hipótesis de convergencia, para después detectar la posible existencia de clubs de convergencia entre los diferentes mercados de origen de los que se nutre la industria turística española. Como era de esperar, la hipótesis de convergencia no se cumple, aunque si se identifican tres clubs de convergencia: el primero comprende a Alemania, Reino Unido, Portugal, Italia, Holanda y Bélgica. El segundo se encuentra conformado por Francia, Suiza y el resto de Europa. El último contiene a los Estados Unidos, el resto de América y el resto del mundo. Los resultados también indican que existe una menor dependencia de los mercados de origen clásicos –Alemania y el Reino Unido– lo que apunta hacia una mayor diversificación de mercado turístico español. Sin embargo, esta diversificación es todavía lenta y debida, en gran medida a la creciente participación de Francia y otros países europeos.

Los agentes responsables de la toma de decisiones políticas deberían tener en cuenta la existencia de estos clubs de convergencia con el objetivo de detectar características comunes de cada grupo para reorientar los esfuerzos de promoción de cara a lograr una mayor diversificación.