



DOCUMENT DE TREBALL

XREAP2016-07

**ECONOMIC IMPACT OF CRUISE ACTIVITY:
THE PORT OF BARCELONA**

Esther Vayá (AQR-IREA, XREAP)
José Ramón García (AQR-IREA, XREAP)
Joaquim Murillo (AQR-IREA, XREAP)
Javier Romaní (AQR-IREA, XREAP)
Jordi Suriñach (AQR-IREA, XREAP)

Abstract

Tourism is a highly dynamic sector. An example of this is the boom that cruise tourism has seen in recent years, leading many countries to consider cruises a key product in their development of tourism. The Port of Barcelona has become the leading cruise port in the Mediterranean area (2.4 million cruise passengers in 2014), highlighting its role as both a port of call and a homeport. Such leadership is explained by the conjunction of several factors: its strategic geographical position, its high quality port and transportation infrastructures, and the attractiveness of the city of Barcelona itself, for both its cultural and artistic heritage and its leisure and shopping opportunities.

This article quantifies the local and regional economic impact generated by cruise activity in the Port of Barcelona. Using input-output methodology, its overall impact is computed for the year 2014 as the sum of three partial impacts: direct effect, indirect effect and induced effect. This article is pioneering at the European level, in combining different issues: estimating the impact of the Barcelona Cruise Port activity, presenting these impacts disaggregated at a sectoral level, using a rigorous methodology and carrying out extensive fieldwork. The estimated impacts demonstrate that all sectors, not just traditional tourism-related sectors, benefit from cruise tourism.

Despite the significant economic benefits that cruise activity has generated over the whole Catalan economy, it is important to note that such activity also generates negative externalities associated with congestion and environmental issues. The reduction of these negative effects is one of the major challenges in making the development of cruise tourism sustainable in a city like Barcelona.

Keywords: Cruise Tourism, Port of Barcelona, Economic Impact, Input-Output Methodology.

1. Introduction

The economic importance of tourism is widely acknowledged. Despite its maturity, the tourism sector is a highly dynamic one, as the exponential boom in cruise tourism in recent years shows. The World Tourism Organization (2008) has reported that global demand for cruises has grown over the last twenty years, at a cumulative annual rate of 8%. In turn, the International Association of Cruise Lines, CLIA (2015) points out that in the last ten years, despite the economic crisis, global demand for cruises has increased by 84%, from 13.1 million passengers in 2004, to 22.04 in 2014.

This growth and dynamism has increased the number of countries which think of cruises as a key product for tourism development. Although the Caribbean was the main destination of cruise tourism worldwide in the 1970s, the following years witnessed the rise of very successful alternative destinations, located in the Gulf of Mexico, the Atlantic, the Pacific, northern Europe and especially, in the Mediterranean basin. For example, nowadays the Mediterranean area accounts for almost 20% of the global cruise market, being the second most popular cruise destination behind the Caribbean. The cruise industry has thus become an engine of economic acceleration for many local economies in the Mediterranean (Papadopoulou and Sambracos, 2014). Western Mediterranean ports stand out for both the number of cruise passengers and number of cruise calls (67% and 57% respectively in 2012¹), and the Port of Barcelona is leading cruise port in the Mediterranean area.

Given this data about cruise passengers and the enormous dynamism of the industry, it is expected that this segment of tourism has a very significant economic impact, both globally and at regional and local levels. When we think of this impact we should not limit ourselves to considering only the direct effects derived from the expenditure of cruise passengers in the destination city, but also two additional dimensions of expenditure: spending by shipping companies (in terms of a ship's stores, mooring and pilot services, terminal services, waste management etc.) and spending by crew members when they visit the cities of destination. The direct effect thus not only affects the port, but it also extends to the entire city and its surrounding environment in terms of demand for services in general, transport, hotel and catering infrastructure, leisure, culture, retail, and so on. This impact could be extended in turn, to consider the indirect impact (derived from the demand for goods and services generated by this business) and induced impact (from the expenditure of the worker's income that has been generated by the direct and indirect effects).

Despite the importance that cruise tourism has acquired in recent years, there are still few studies that attempt to quantify its economic impact. Those few include the worldwide economic impact estimates that are conducted periodically by the International Association of Cruise Lines, who estimated the global economic contribution of the cruise industry in 2014 as 112.7 million euros, with 939,232 full-time jobs. The share of the European cruise industry would have been 40.2 million euros and 350,000 jobs (CLIA, 2015). These reports however, do not show any territorial disaggregation below country level (in the case, for example, of CLIA reports Europe). The European Commission has also tried to estimate the economic impact of cruises, although final results are aggregated for all European ports (Policy Research Corporation, 2009). At a more disaggregated level, there are the impact studies of Braun et al. (2002) for Port Canaveral in Florida; Chase and Alon (2002) for Barbados; Gibson and Bentley (2006) for

¹ MedCruise Yearbook, 2013 / 2014

England; the impact study for Mexico prepared by the Business Research and Economic Advisors (BREA, 2007); Brida and Zapata (2010a) in the case of Costa Rica; Papadopoulou and Sambracos (2014) for Greek ports or the study of CERTeT Bocconi (2015) for the port of Civitavecchia. In spite of these works, the number of studies that estimate in detail the economic impact of cruise tourism at regional or local level remains very low.

In an attempt to close the gap, this article aims to contribute to the literature about the regional economic impact of cruise tourism by quantifying that impact as generated by the cruise activity in the leading Mediterranean port, the Port of Barcelona (located in the city of Barcelona and within the European region of Catalonia). Using input-output methodology, the overall impact of cruise tourism is calculated for the year 2014 as the sum of three partial impacts: direct, indirect and induced. To estimate the direct impact we have conducted extensive fieldwork, gathering information about spending by shipping companies, cruise passengers (from a specific expenditure survey conducted among cruise passengers in the Port of Barcelona during 2014) and the ships' crews. The computation of indirect and induced impacts has been made using information from the latest regional Input-Output Table available for Catalonia (2011). This impact is quantified in terms of its effect on the gross domestic product (GDP), employment and tax revenues generated. Since the impact generated by cruise activity extends beyond the purely economic sphere, we also carry out a brief analysis of its social and environmental effects.

Note that this article is pioneering at European level, attempting to quantify the impact of cruise tourism in a port like Barcelona, for its rigorous methodology and comprehensive fieldwork (based both on direct information provided by the different agents involved and also personal interviews with different institutions, companies and organizations linked directly or indirectly to cruise activity in the Port of Barcelona, and finally a specific representative survey addressed to cruise passengers). We have gone one step beyond other studies by estimating the disaggregated impacts at a sector level, relativizing the results to the usual macromagnitudes, such as gross domestic product, total jobs and tax revenues.

The article is structured as follows. Section 2 briefly describes the dimension of cruise activity at the Port of Barcelona. Section 3 presents the methodology used for calculating the impact of cruise activity, and Section 4 describes the data sources used. In Section 5 the results of the estimation of the economic impact are shown. Section 6 briefly discusses additional effects of cruise activity. Finally, conclusions and implications are presented in Section 7.

2. The Port of Barcelona: leading Mediterranean port

Cruise activity is a catalyst for tourism and economic activity in major cities like Barcelona. The Port of Barcelona has become Europe's leading port (and the fourth worldwide) for moving cruise passengers: in 2014, a total of 2,364,292 cruise passengers were recorded, more than any other port in the Mediterranean or Northern Europe.

Compared with other European ports (Table 1), the Port of Barcelona stood just behind the port of Civitavecchia in transit passengers, with a figure of 1,141,804 passengers and just behind the ports of Venice and Southampton in boarding and disembarking, with 1,222,488 passengers. The Port of Barcelona thus has relevance not only as a port of call but also as a home port, where boarding and disembarkation account for 52% of the total movement of cruise passengers in 2014. As will be seen later the port of Barcelona as a homeport, is very significant for the

purposes of economic impact, as the revenue generated by passengers boarding/disembarking is larger than that from transit passengers.

Table 1. Leading cruise ports in Europe, 2014 (thousands of passengers)

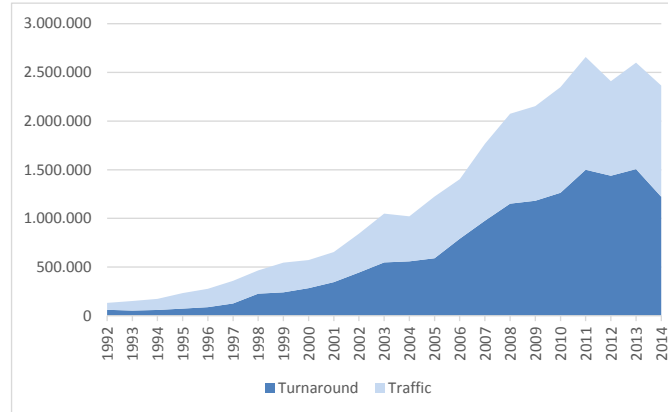
	Boarding	Disembark	Traffic	Total
<i>Mediterranean Top Ten</i>				
Barcelona	615	607	1.142	2.364
Civitavecchia	366	365	1.409	2.140
Venice	755	754	225	1.734
Palma Majorca	303	303	730	1.336
Marseille	253	253	805	1.311
Naples	50	50	1.014	1.114
Piraeus	128	128	799	1.055
Savona	334	334	350	1.019
Genoa	286	286	253	824
Dubrovnik	7	8	791	807
<i>Rest of Europe Top Ten</i>				
Southampton	768	768	38	1.573
Copenhagen	244	244	252	750
Hamburg	281	278	29	589
St Petersburg	0	0	514	514
Lisbon	21	21	459	501
Bergen	2	2	439	483
Tallinn	8	7	464	479
Stockholm	28	28	412	467
Helsinki	3	2	415	420
Cadiz	1	1	379	381

Source: CLIA Europa (2015)

Analyzing the evolution of cruise activity in the Port of Barcelona, we can see an important growth in the number of cruise passengers since the 1990s, and especially since 2001. Despite the economic crisis, the number of cruise passengers grew between 2007 and 2011 at an

average annual rate of 10.8%, from 1,765,838 cruise passengers in 2007 to 2,657,244 in 2011. Since 2011 the trend has been more stable (Figure 1).

Figure 1. Evolution of cruise activity at the Port of Barcelona



Source: Barcelona Port Authority (APB)

Authors such as Garay and Cànoves (2012) claim that the preparation of Barcelona for the 1992 Olympic Games (with subsequent investment in adaptations of the port infrastructure for tourist traffic and efforts to promote the city as a tourist destination internationally) marked a turning point, from holding a marginal position in the cruise tourism segment to the current leadership position. Many contributing factors, according to these authors, explain this leadership. The strategic geographical position of the city (very close to the main ports of the Mediterranean, important tourist resorts, the major European source markets and traditional Catalan tourist areas like the Costa Dorada and Costa Brava) and excellent port infrastructure (both within the port and short, medium and long distance transport services, as well as urban transport, high speed train and the Barcelona-El Prat Airport) can both be highlighted. The quality of logistics services in the port area, the continuous investments made to adapt the terminals and allow the berthing of very large vessels, and the security offered by the city compared to other tourist destinations in the Mediterranean should also be noted. Finally, and especially important, the city of Barcelona is attractive in terms of architectural and cultural heritage in general, and in dining and shopping and entertainment. The Barcelona brand obviously acts as a catalyst for the development of cruise tourism in the city.

3. Definition of economic impact

In order to quantify the economic impact of cruise activity, we have followed the traditional methodology used in impact studies based on the quantification of three types of effects: direct impact, indirect impact and induced impact (Murillo et al., 2008; Murillo et al., 2013).

For our purposes, the direct impact consists of the sum of initial spending by the three agents involved in cruise activity: shipping companies, cruise passengers and crew. The initial direct spending generated by shipping companies includes all goods and services needed when cruise ships dock at a port. The following expenses are included: services provided by shipping agents, services provided by the cruise terminals (luggage, safety, handling, check-in, etc.); services

provided by the Port Authority of Barcelona (including taxes and port fees); nautical pilotage and the mooring and unmooring of ships - technical services waste collection and treatment; fuel supply services; food, beverages and drinking water (among other provisions); crew trips and airport charges; medical care for both crew and passengers; and services provided by travel agencies and tour operators.

The initial direct spending by cruise passengers includes spending on trips, visits to museums and other cultural and entertainment activities; accommodation (hotels, hostels and tourist apartments); expenses (restaurants and cafes); various purchases (souvenirs, clothing and footwear, etc.); the city internal transport (including transfers from the airport/train station to the port and vice versa) and airport charges. Finally, direct spending by the crew in the city includes: expenses (restaurants and cafes); various purchases (souvenirs, clothing and footwear, etc.); and internal transport around the city.

The indirect impact is the effect on other sectors of the economy, generated as a result of the goods and services required by the companies that are receiving direct expenditure. For example, for a hotel to accommodate a cruise passenger, it also needs to purchase a set of goods (such as textiles, food products, etc.) and services (cleaning, transportation, etc.). Similarly, companies mooring, and pilot boat, require a range of goods and services to carry out their activity in port based on the cruise companies. In turn, these "second order" providers require goods and services for the development of their activity and so on. Thanks to the impact of the spending by shipping companies, cruise passengers and crew, production in all sectors is increased, thereby generating a multiplier effect throughout all economic sectors.

The induced impact is the effect derived from consumer spending of revenue generated employment (directly and indirectly) in cruise activities. People who occupy these jobs owe them directly or indirectly, to cruise activity in the Port of Barcelona. These people receive a wage income that will be allocated in part (after deducting taxes, contributions and savings) to consuming goods and services in their place of residence/work. This thus reactivates a chain of intersectoral relationships that lead to an increase in the turnover of different economic sectors.

In order to estimate the total impact of activity at the Cruise Port of Barcelona on Catalonia, each of the three types of impact (direct, indirect and induced) have been quantified separately, with subsequent aggregation.

We must also emphasize that each of these impacts has been quantified not only in terms of turnover but also in terms of gross value added (GVA) of wage income (as a component of the GVA), employment (equivalent full time jobs) and generated tax revenues (regional and state tax and tourist tax).

4. Information Sources

In order to estimate the direct impact of cruises, we performed very thorough and rigorous field-based research with the use of multiple primary and secondary sources of information.

i) Initial direct spending by shipping companies

To estimate the initial direct spending by shipping companies in 2014, we collected direct information provided by the suppliers of goods and services to these companies, along with additional information from other complementary sources. We obtained direct information provided by the Shipping Agents of Barcelona Port Terminals Cruise Port, the Port Authority of Barcelona (APB), companies for technical-nautical pilotage and the mooring of vessels, and collection and waste treatment companies. These companies answered questionnaires, providing the following information: activity data of the company (turnover, number of employees, generated GVA broken down by component, and tax revenues); expenditure data from external suppliers of the company (intermediate consumption disaggregated by the geographical location of their providers), and total amounts billed to different cruise ship companies operating in the Port of Barcelona (broken down by concept). An estimate was made of direct spending by shipping companies on services provided by the cruise terminals (luggage, safety, handling, check-in, etc.); services provided by the Port Authority of Barcelona (fees for the maritime signaling, use of port facilities for berthing ships and passenger reception); services provided by the consignees of ships; waste collection and treatment services; technical-nautical services (mooring/unmooring and pilotage of ships); crew trips and airport charges; and medical care for both crew and passengers.

Quantification was performed considering customs information about provisions for all types of vessels (both in tons and direct monetary expenditure by the cruise companies), value based on geographical origin (foreign and domestic) and the type of product, such as information provided by the Barcelona Port Authority on tons of provisions charged to cruise ships. Only supplies manufactured in Catalonia were included in our estimations.

We collected information about supply services and fuel purchases. The calculation of fuel expenditure was obtained by applying the volume of refueling by fuel types - Gasoil, Fuel and Fuel Light 3.5% - to Platts Prices Index prepared by Mc Graw Hill Financial for December 2014. We allocated to Spain and Catalonia only the proportion of the fuel refined in Spanish and Catalan facilities, with respect to the total amount of these expenses. Fuel imported from other countries has not been considered for the purposes of the study on the grounds that, as well as purchase transactions, an added value from refining activities has been generated in the countries of origin.

Finally, we estimated the services performed by the travel agents and tour operators who organize the trips and excursions for cruise passengers. We approximated the value of such services from the information provided by both CLIA-Spain (Association of Cruise Companies) and the Survey of Cruisers 2014 (discussed in detail below) for the percentage of cruise passengers in the Port of Barcelona compared to residents in Catalonia who also book the same excursions.

ii) *Initial direct spending by cruise passengers*

Both the magnitude of daily spending by cruise passengers and its structure have been identified via an analysis of the microdata from the Survey of Cruisers 2014 (Barcelona Tourism), a survey based on a representative sample of 3,130 cruise passengers who started their cruise, completed it or simply stopped in the port of Barcelona.

iii) *Initial direct expenditure made by the crew*

In order to approximate crew expenditure in the city, we contacted the Port of Barcelona, who provided us with information about the name of the cruise ships that docked at the Port of Barcelona (and stopover) in 2014, and the technical specifications of these ships (which include, among other information, the number of crew members). To estimate the initial spending of the crew, we used information from the Port Authority of Barcelona and CLIA-Spain (Association of Companies Cruise) in relation to both the percentage of crew disembarking to visit the city and their average expenditure. For the distribution of this expense among detailed items, we used the "Tourist Facilities in Ports" study by the Policy Research Corporation (2009).

5. Estimation of the economic impact of cruise activity

We present the results of the impact of activity in the Cruise Port of Barcelona, as both the total impact and as divided into direct, indirect and induced impact.

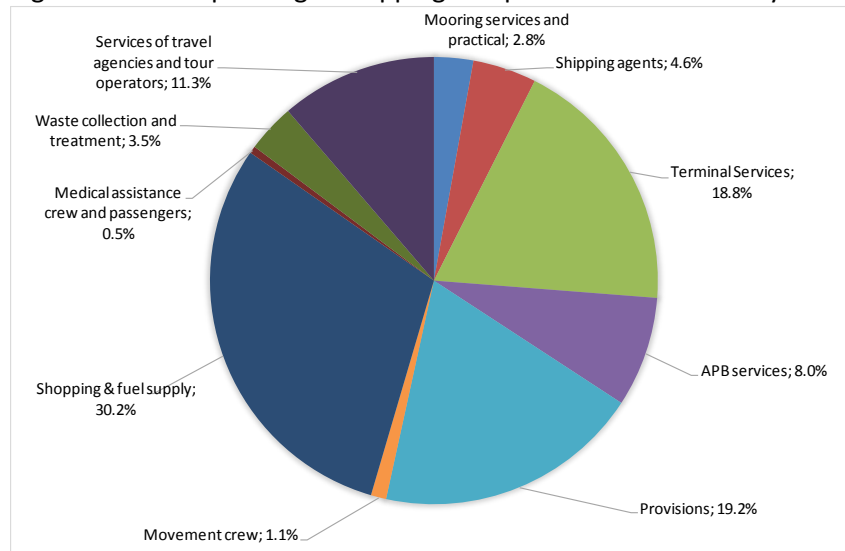
5.1 Estimated direct impact of cruise activity

Estimation of the direct impact involved analyzing the separate effect of the three generating agents identified: shipping companies, cruise passengers and crew members.

i) *Estimated direct expenditure of shipping companies*

We estimate from all the fieldwork that the direct spending of cruise shipping companies in Catalonia, in 2014 was 121.2 million € (M €). As shown in Figure 2, procurement services and fuel supply accounted for 30.2% of the direct expenditure by shipping companies. The reason for this large proportion is that cruise companies use the Port of Barcelona as one of the main ports in the Mediterranean for refueling and procuring supplies. As a main base port, Barcelona also has dedicated terminals for the reception, storage and distribution of fuel and gas. In decreasing order of importance, this includes spending on provisions (19.2%) and the services provided by the terminals (18.8%), followed by the services of travel agencies and tour operators (11.3%) and services of the Port Authority (8.0%). Other items are a lesser proportion of the total spending.

Figure 2. Direct spending of shipping companies broken down by items



Source: Own elaboration

It is important to note that this amount includes only the portion of spending that directly reverts to the Catalan economy and constitutes an "initial injection of money" in Catalonia. This amount does not include all spending by the cruise companies who docked at the Port of Barcelona in 2014. The following items should thus be added to this amount: tourist tax paid by shipping companies for cruise passengers in transit who remain in the city for more than 12 hours; payments made for provisions from the rest of Spain; payments for services rendered by travel agencies and tour operators from the rest of Spain and abroad (related to the sale of the cruise package and/or tours taken by cruise passengers who board, disembark or simply visit the Port of Barcelona); and payments for fuel from other facilities in the rest of Spain.

ii) Estimated direct expenditure of cruise passengers

We used the data about cruise passenger flows from the Port of Barcelona and the survey of cruise passengers to obtain a typology of cruise passengers. As shown in Table 2, 57.5% of cruise passengers made a visit to the city of Barcelona (with an average duration of 4.3 hours), without an overnight stay. Within this group we can distinguish transit cruise passengers (cruise passengers off the boat only for a few hours while the cruise makes a stopover, whose average duration of visit to the city was 4.2 hours) and cruise passengers for whom Barcelona is the start/end port and who paid a visit to the city before and/or after boarding or disembarking (mean duration 4.7 hours).

In contrast, almost 24% of cruise passengers were tourists in Barcelona, as they stayed at least one night in the city (average stay of 2.6 nights). 94.2% stayed in hotels (with 3.9 stars average). This percentage compares favorably with the 40% of holiday tourists who stayed in hotels (data collected from the Survey Tourists by the City of Barcelona). Finally, only 18.6% did not make any visit to the city before or after boarding or disembarking (most were Barcelona residents).

Table 2. Type and number of cruise passengers, and the average length of their visit to Barcelona

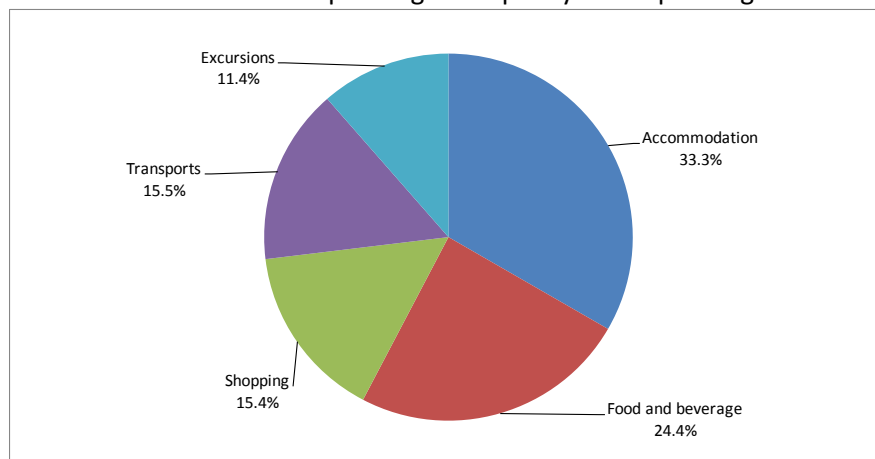
Categories of cruise passengers according to their relationship with the city	Average length of visit to the city	Cruisers
“Day visitor” cruise passengers (not staying overnight)	4.3 hours	1,360,271 (57.5%)
Tours of cruise passengers in transit (stop over)	4.2 hours	1,141,805 (48.3%)
Tours of cruise passengers boarding or disembarking	4.7 hours	218,466 (9.2%)
“Tourists” cruise passengers (stay at least one night in the city)	2.6 nights	565,400 (23.9%)
“Not visitors” (cruise passengers traveling to or from the port without visiting the city)	No visit and not overnight	438,621 (18.6%)
Total cruise passengers		2,364,292 (100%)

Source: Own elaboration from Turisme de Barcelona (2015)

Cruise passengers who also stayed overnight made a daily expenditure per person of 200 € (holiday tourists averaged 156.4 € daily, according to the Tourists Barcelona survey). On the other hand, the average daily expenditure of a “day visitor” cruise passenger (visited the city without spending the night) was 53.3 €. This difference in spending demonstrates the importance of Barcelona as a home port rather than a port of call. This is because cruise passengers boarding and/or disembarking have additional expenditure (with respect to cruise passengers in transit) in terms of the use of air links, rail or road transport to get to their destination, as well as increased spending during the pre- and post-cruise: accommodation, catering and consumption of complementary offers.

Once we know the average daily spending for all categories of cruise passengers, their average stay in the city, and the quantification of the flow of cruise passengers in the city, we can proceed to the calculation of the direct impact generated by cruise passengers in the city. It has thus been estimated that their total direct expenditure amounted to 315.8 M €. This amount includes expenditure incurred by both passengers who just visited the city and passengers boarding and/or disembarking at the start or end of their cruise at the Port of Barcelona. In terms of distribution by concepts (see Figure 3), expenditure on accommodation and catering (food and beverages) accounted for almost 58% of all spending by cruise passengers, followed at a greater distance by expenses in various shopping categories (15.4%), transport (15.5%) and excursions (11.4%).

Figure 3. Initial distribution of spending concepts by cruise passengers in Catalonia



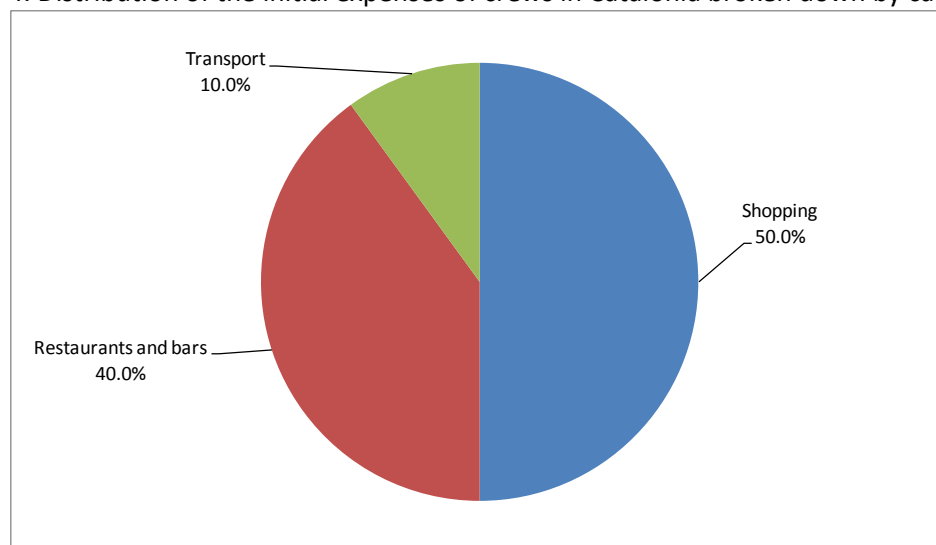
Source: Own elaboration

iii) Estimated direct expenditure by crew members

Using all the information consulted (described in Section 3), we estimate that 660,863 cruise ship crew members docked at the port: 428,462 belonged to ships that used Barcelona as a port of call, while the remaining 232,401 worked on ships that had Barcelona as their homeport (beginning and end of the line). The distinction between a port of call and homeport is relevant because, as directed by CLIA-Spain, we have assumed that the proportion of crewmembers that visited the city was 40% of the crew when the Port of Barcelona was a port of call and 25% when it was a homeport.

It has also been estimated that the crewmembers visiting the city made an average expenditure of 25 €, distributed as follows: 50% shopping, 40% restaurants and bars, and 10% internal transports (Figure 4). We have thus finally estimated that the initial spending by crew reached 5.5 M €, directly generating a GVA of 3.3 M € (1.7 M € of wage income) and 76 jobs.

Figure 4. Distribution of the initial expenses of crews in Catalonia broken down by categories

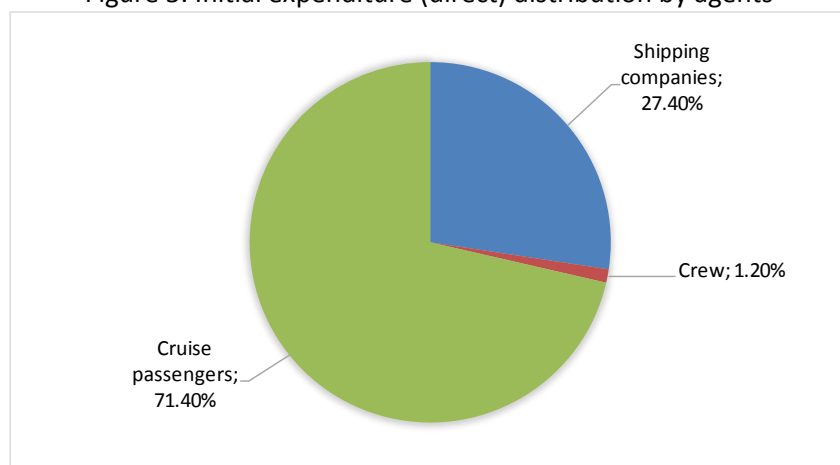


Source: Own elaboration

iv) Estimated total direct cost

We finally estimate that the initial direct spending in Catalonia by the three agents involved totaled 442.5 M €. Spending by cruise passengers accounted for 71.4% of the total initial spending, and the spending of shipping companies accounted for 27.4% and of crew, 1.2% (Figure 5).

Figure 5. Initial expenditure (direct) distribution by agents

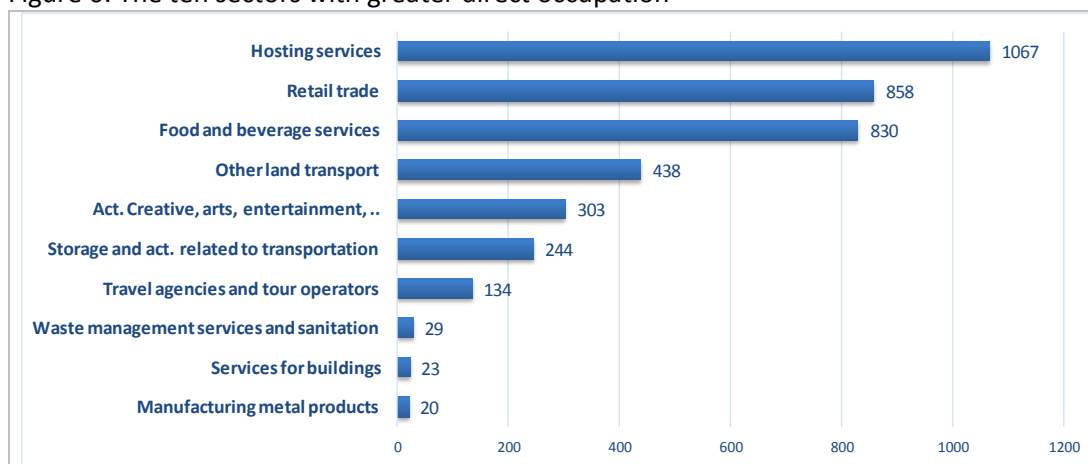


Source: Own elaboration

From these results, and using information from the Regional Accounts of Catalonia and the Input-Output Table of Catalonia (2011), it has been estimated that the initial expenditure of 442.5M € meant a GVA of 225.9 M € (direct contribution to GDP of Catalonia) for the Catalan economy, of which 116.7 M € were wages and related costs (52%). Finally, it has been estimated that cruise activity in the Port of Barcelona generated 4,026 direct full-time equivalent jobs.

The sectoral distribution of direct impact is characterized by a remarkable concentration in a few sectors. In terms, for example, of occupation (Figure 6), 87% of all direct jobs generated by cruise activity is concentrated in five of the eighty-two sectors considered: hosting services, retail, services catering, ground transportation and leisure activities (sectors traditionally related to tourism).

Figure 6. The ten sectors with greater direct occupation*



Note: *full-time equivalent jobs. Source: Own elaboration

5.2 Estimation of the indirect and induced impacts of cruise activity

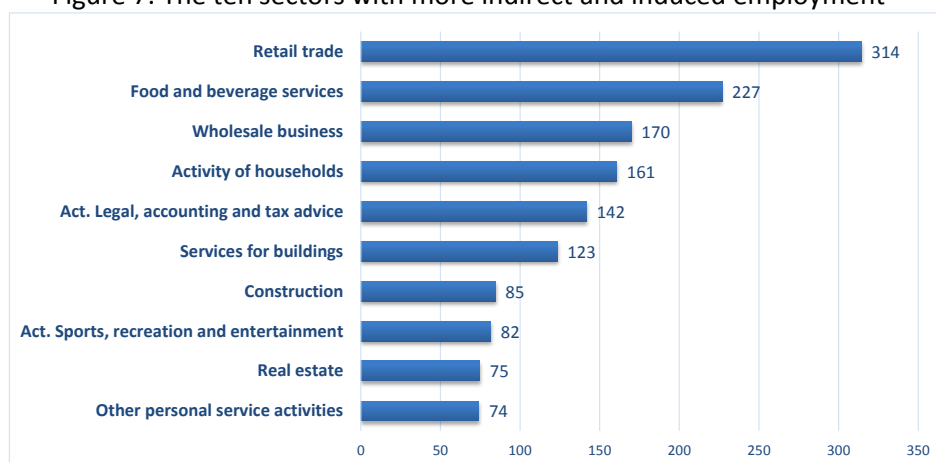
As discussed in Section 3, the economic impact of cruise activity in the Port of Barcelona is not limited to the initial expenditure estimate. From that initial impact a number of complex intersectoral relationships, once the intermediate consumption needs of the beneficiary companies in the first instance by the cruise activity are triggered. A multiplier effect on the entire system, an indirect impact in terms of turnover, GVA (and wage income) and employment is thus generated. We must also consider the induced impact, of the consumption expenditure made by those workers whose jobs have been generated directly or indirectly due to cruise activity. The induced impact is also reflected in terms of turnover, GVA and occupation.

Using input-output methodology and the latest available Input-Output Table for Catalonia (for 2011) we estimated the indirect and induced contribution of cruise activities in the Port of Barcelona to the Catalan economy. We find that in 2014, cruise activity generated an additional turnover in Catalonia (indirect and induced) of 353.5M € a GVA of 187.3 M € (of which 80.9 M € were wage income) and 2,733 full-time equivalent jobs.

If we compare the results of the direct impact with the indirect and induced impact it can be concluded that for every 100 € of direct spending from cruise activity at the Port of Barcelona, 80 € in extra billing were generated in an indirect and induced way (multiplier coefficient 1.8). In turn, for every 100 € of GVA generated directly, an additional 83 € were generated in an indirect and induced manner (multiplier of 1.83), while for every 100 direct jobs, 68 were additionally generated in an indirect and induced way (multiplier of 1.68). These figures show the importance of the multiplier effects of cruise activity in the Port of Barcelona.

It should be noted that sectors with higher indirect and induced impact were not only tourism sectors (as with direct expenditure) but also include other sectors such as real estate, wholesale trade, construction, legal activities and the manufacture of food products (Figure 7). The importance of cruise activity is therefore noted as a new source of economic activity in areas that are not strictly "tourist" sectors. In other words, there is a diversification of the business impact of cruise passengers in a wide range of economic sectors not directly related to tourism.

Figure 7. The ten sectors with more indirect and induced employment *



Note: * Posts full-time equivalent work. Source: Own elaboration

In this sense, it is very important to note that the diversification of the productive structure of the Catalan economy (with a wide range of production of both agricultural products such as industrial and service) means that the size of the multiplier effects that remain in Catalonia become very relevant, as the estimated figures show.

5.3 Estimated total impact of cruise activity

If we consider jointly the direct, indirect and induced impact (Table 3), we can conclude that cruise activity in the Port of Barcelona generated a total turnover of 796 M € (over 2.2 M € daily) in 2014, a GVA of 413.2 M € (of which € 197.6M were income wages) and a total of 6,759 full-time equivalent jobs in Catalonia.

Table 3. Detail of the total impact (and its breakdown by components) derived from cruise activity at the Port of Barcelona

	Turnover	GVA	Income Wage	Occupation*
Direct Impact	442.5 M€	225.9 M€	116.7M€	4,026
Indirect and Induced Impact	353.5 M€	187.3 M€	80.9 M€	2,733
TOTAL IMPACT	796.0 M€	413.2 M€	197.6 M€	6,759

Note: * Posts full-time equivalent work. Source: Own elaboration

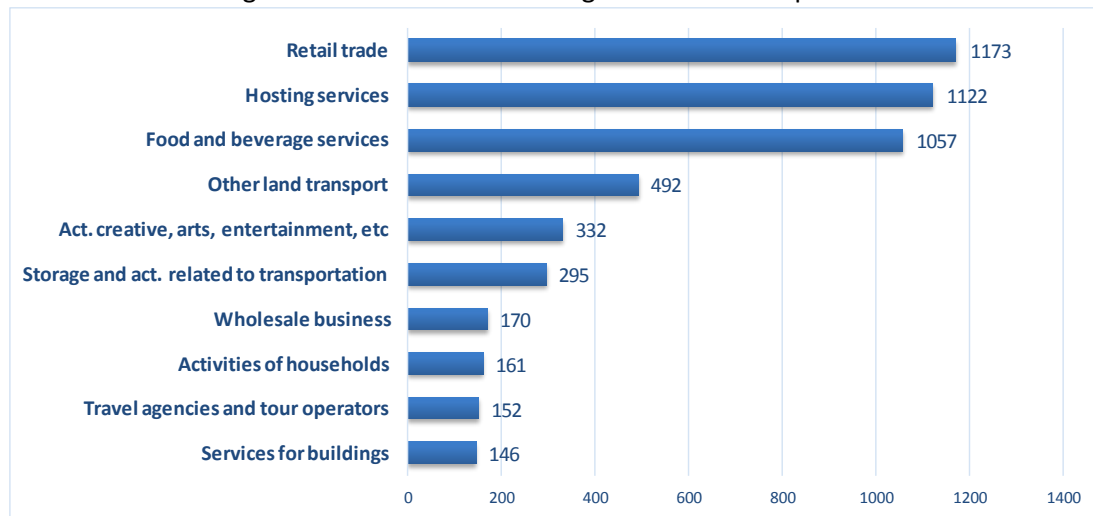
We can see that, every 100 € of initial expenditure from cruise activity in the Port of Barcelona ended up generating, in total, 93 € of GVA (of which 45 € are income wages) in Catalonia. Moreover, for every million euros of initial expenditure, 15 jobs were created.

If the above figures are relativized by the number of cruise ships docked at the port, we can conclude that each cruise ship that stopped at the Port of Barcelona in 2014 generated, on average, in Catalonia, a 1 million € turnover, contributed in more than half a million € to GDP, and it was also responsible for 9 full-time jobs and 0.2 million € of tax revenue.

The above results suggest, as mentioned, the impact that cruise activity has on the Catalan economy; however, we should also consider which part of the total impact remains in Barcelona city. While the full impact of territorialization is a very complex operation, it has been estimated that Barcelona would ultimately concentrate 75% of the total impact. Thanks to the activity at the Cruise Port of Barcelona, almost 600M € (1.7 M € a day) was generated, 313.4M € GVA, and 5,039 jobs were maintained in the municipality of Barcelona. By comparison, we can see how, unlike the effect in other ports such as Civitavecchia, where one of the main attractions is visiting the city of Rome, a very significant part of the total regional impact remains in the city of Barcelona itself.

Finally, Figure 8 shows the ten sectors with the greatest overall impact in terms of employment. It must be said that these ten sectors account for 75% of total jobs generated by cruise activity. This figure is much lower when compared with the sectoral concentration detected in the case of direct impact, where 98% of the direct jobs generated by cruise activity were concentrated in ten of the eighty-five sectors analyzed.

Figure 8. The ten sectors with greater total occupation*



Note: * Full-time equivalent jobs. Source: Own elaboration

Considering the sectoral breakdown, it is very important to emphasize again, and now with figures of global impact, that the benefits of activity at the Cruise Port of Barcelona not only affect the sectors commonly considered tourist-related, but extend throughout the economy. Taking, as an example, the results in terms of employment, seen as the 6,759 full-time jobs generated by cruise activity, 3,995 were in the five tourist branches by excellence (hotels, restaurants, retail, land transport and travel agencies and tour operators), that is 59% of the total, compared to the balance of 87% in the case of directly generated employment. By contrast, 2,764 jobs (41% of the total) were in other sectors, most notably the areas of storage and related activities for transportation, food manufacturing, metallurgy, chemical industry, services, waste management and sanitation, or medical services. The impact on non-tourism sectors is even more important in terms of turnover. While tourism sectors ultimately received, in total, 339 M € (42.6% of total turnover generated), this amount totaled 457 M € in other non-tourist sectors (57.4% of the total turnover generated).

5.4. Tax revenues generated by cruise activity

Once the total impact was obtained, we quantified the tax revenues generated in terms of regional and state taxes. It was estimated that cruise activity in the Port of Barcelona generated a total revenue of 150.8 M €: 79.7 M € corresponded to value added tax (VAT), 30.1 M € in the concept of the collection of personal income tax (income tax) and 41 M € as corporate tax. Cruise activity generated additional income tax due to the collection of the tourist tax. The estimated amount of this tax was 844,643 € (3.2% of the total collection of tourist tax in the province of Barcelona in 2014). This amount includes both the rate from cruise passengers in transit who stayed more than 12 hours in the city (estimated at 265,830 € and paid by shipping companies themselves), and the rate from those cruise passengers who spent the night in a tourist establishment (quantified as 578,813 € and paid by cruise passengers themselves to the establishment where they spent the night).

6. Other effects associated with cruise tourism

While the main objective of this article is to quantify the economic impact of cruise activity on the Catalan economy (derived from the spending by shipping companies, cruise passengers and crew of ships), it is important to briefly mention other effects, both positive and negative, that the literature identifies as derivatives of cruise tourism. Several studies have detected a variety of effects from cruise tourism, both quantitative and qualitative, on the cities where ports are located and their surrounding environment.

First of all, we should mention the improvement of the external image of the city: satisfied visitors describe positive experiences to their relatives, friends and acquaintances, and recommend it as a tourist destination. In the case of cruise passengers calling at the city, since the duration of their visit is limited (a few hours) if the visit was enjoyable, they are likely to decide to make a longer visit in the future (Penco and Di Vaio, 2014; Satta, et al. 2015). In the case of Barcelona, the surveys conducted among cruise passengers by Turisme de Barcelona indicate that 90% say that they "certainly" or "probably" will revisit the city in the coming years, and 93.3% will "certainly" recommend the city to relatives, friends and acquaintances. Cruise tourism thus acts as a seed for future tourists and visitors.

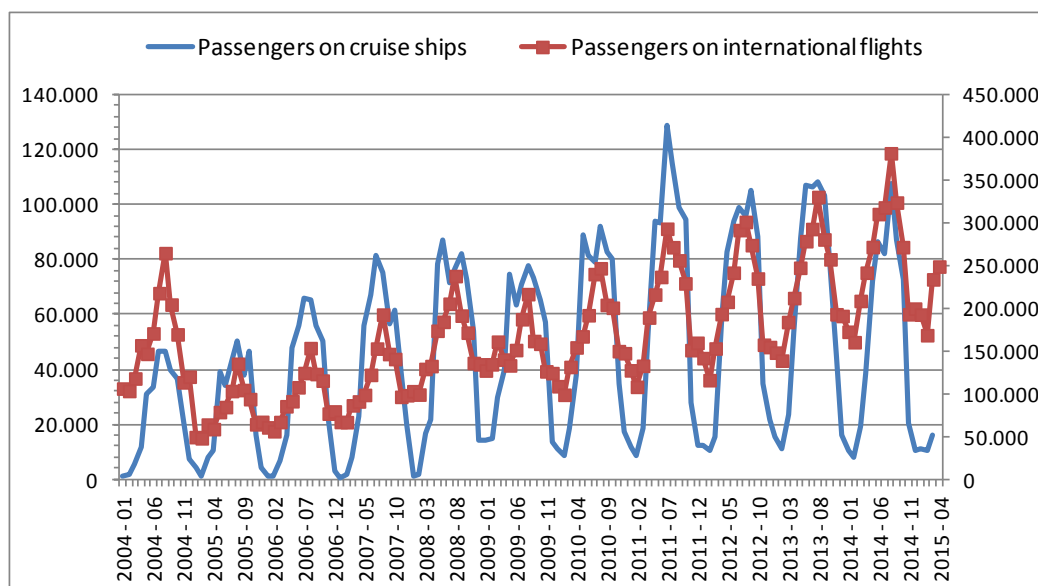
Various authors note that cruise activity acts as a clear catalyst that contributes to increasing investment in port infrastructure, revitalizing existing businesses and creating new activities (Bel and Fageda, 2008; Lindsay, 2011; Bond, 2015). In this sense, the Port of Barcelona is a clear example of the above effects. The significant growth of the cruise segment has led, since 2000, to the implementation of significant investments in port infrastructure, both in adapting the existing terminals and creating new ones dedicated exclusively to cruise ships. Such investment, mostly private (and partly from foreign firms) have not yet been completed, as a new cruise terminal (which will be operational by 2018) is currently being built. There are also business (e.g. rental bicycles, musical performances and dance, etc.) that are offered during the stays of cruise passengers in the city. Moreover, it can be said that the relevance of the Port of Barcelona as a base port (not only as a port of call) has generated a clear pull factor that has led to various shipping companies (and other companies in the sector) locating their headquarters in the city (e.g. Carnival and Royal Caribbean).

The literature also suggests the catalytic activity of cruises in the development of other means of transport, especially air traffic (Bel and Fageda, 2008; Lindsay, 2011). This is particularly evident in the case of the Port of Barcelona. Its importance as a base cruise port and the fact that 78% of cruise passengers boarding or disembarking at the port use aircraft as a means of transportation to or from the port have been crucial to the creation and maintenance of international routes that have their origin or destination in the Barcelona-El Prat Airport. Cruise traffic has therefore become a catalyst, especially for intercontinental routes from Barcelona Airport. There are several examples of airlines with a market-focused cruise vision, including, among others, Air Canada, American Airlines and Delta Air Lines for the North American market, and Emirates, Qatar Airways and Singapore Airlines for connections to Asia and Australia.

As evidence of this link between passengers on international flights and cruise passengers, Figure 9 shows the monthly series of cruise passengers who embarked in the Port of Barcelona and international passenger Barcelona-El Prat Airport since 2004. This seems to show the clear

existence of a relationship between two variables (the correlation between the two variables is 75%).

Figure 9. International passengers (Barcelona-El Prat Airport) and cruise ship passengers (Port of Barcelona), 2004-2015



Source: Own elaboration from data supplied by APB and AENA

This has been corroborated by applying cointegration techniques to these series, which has led to the conclusion that there really is a long-term relationship between the series of cruise passengers at the Port of Barcelona and passengers on international flights. It is noteworthy that these routes (whose origin is the transportation of cruise passengers embarking or disembarking at the Port of Barcelona) are subsequently also used by other types of passengers (especially, business travelers), a fact that increases the attraction of the city even further for foreign companies who decide to locate headquarters or offices in the city.

The literature also points to the existence of negative externalities resulting from the development of cruise tourism, however, especially related to the effects of agglomeration in the destination cities and the environment.

Brida and Zapata (2010b), Perez (2013) and Bonilla-Priego et al. (2014) highlight the "agglomeration effect" of cruise passengers when arriving simultaneously and in large numbers at certain points of the destination city and concentrating their visit in a few hours. This congestion is annoying for both other tourists and residents, and can even have a crowding-out effect on residents living in the historic centers of cities (Motta, 2014). In Barcelona, this concentration is also more evident since the cruise visits focus on certain parts of the city, including the old city, emblematic monuments and main shopping streets. The relevance of the Port of Barcelona as homeport allows visitors to be distributed around the all city and more hours and days, partly reducing the harmful effects of congestion in the city.

Many authors have warned of the effects of pollutant emissions from cruises (Dwyer and Forsyth, 1998; Butt, 2007; Howitt et al., 2010; Tzannatos, 2010, Bonilla-Priego et al., 2014). In recent years, however, there has also been efforts to relativize the environmentally harmful

effects of cruise ships, showing how these emissions are lower than those produced by road traffic, industry and other economic sectors (Barcelona Regional, 2015, in the case of the Port of Barcelona).

7. Conclusions

There are many factors that explain the international leadership of the Port of Barcelona in the cruise segment and its tremendous growth in recent years. Of these, we can emphasize its strategic geographical position, its port infrastructure, its short, medium and long distance transport infrastructure, and the attractiveness of the city of Barcelona itself. This leadership has led to the fact that in 2014, almost 2.4 million cruise passengers used the Port of Barcelona as a port of transit or as the origin or destination of their trip.

Given the leading role of the Port of Barcelona, the objective of this study was to assess the economic impact of cruise activity in the Port of Barcelona in 2014. We have shown that cruise activity has a very remarkable multiplier impact on the regional economy. From an initial direct expenditure of 442.5M €, cruise activity in Port of Barcelona ultimately generated a total turnover of 796 M € (over 2.2 M € a day and a multiplier of 1.8) in Catalonia, a contribution to the GDP of 413.2 M € (of which € 197.6M were income wages), a total of 6,759 full-time equivalent jobs and 152 M € of tax revenue. In this sense, the high proportion of cruise passengers who use Barcelona as the base port for their cruise and its profile as a quality tourist port (after finding the highest relative expenditure of cruise visitors compared to holidaying tourists in the city of Barcelona) are shown as relevant factors when explaining the magnitude of the effect.

We have also found that all sectors, not just the traditional tourism-related sectors, profit from cruise activity. Proof of this is that, of the 6,759 jobs created in total, more than 40% (2,764) were concentrated in non-tourism sectors.

Cruise activity has also had a significant catalytic effect, providing connective flights to Barcelona airport and economic stability to other parts of the city, and creating new business opportunities. It also has an impact to the extent that there is a high probability of cruise visitors returning as tourists in the short to medium term.

Despite the significant economic benefits that cruise tourism in the Port of Barcelona generates over all the Catalan economy (as quantified in this article), it is also important to mention the negative externalities arising from cruise activity, especially as concentrated in the city of Barcelona. These externalities include the excessive congestion generated at certain points of tourist attraction in the city (especially by visits from cruise passengers in transit) and the environmental effects of emissions generated by cruise ships (some of them being very large ships).

The reduction of negative effects associated with the cruise activity is a major challenge to making the development of the cruise tourism sector a sustainable activity in the city of Barcelona. In this sense, the new legislative regulations adopted at European level, and improvements in the design and construction of ships and the increased use of cleaner fuels will contribute to this goal by reducing pollution. In turn, knowledge in advance about the stopover

of cruise ships at the Port of Barcelona should enable city managers to develop good overall planning that minimizes the effects of congestion on the host city.

References

Ayuntamiento de Barcelona (2015), *Encuesta a turistas* (2014).

Barcelona Regional (2015), *Anàlisi de la contribució en emissions i immissions del Port de Barcelona l'any 2013*.

Bel, G. and Fageda, X. (2008), "Getting There Fast: Globalization, Intercontinental Flights and Location of Headquarters". *Journal of Economic Geography*, vol. 8, nº 4, pp. 471-495.

Bond, M. (2015), "Global Conectivity". *Seatrade Cruise Review*, Jun. 2015, p.47.

Bonilla-Priego, M.J.; Font, X. and Pacheco-Olivares, M.R. (2014), "Corporate sustainability reporting index and baseline data for the cruise industry". *Tourism Management*, vol. 44, pp. 149-160.

BREA (2007), "Aportación económica del turismo de cruceros en México ", Vol.I, Análisis de Impacto.

Brida, J.C. and Zapata, S. (2010a), "Economic Impacts of Cruise Tourism: The Case of Costa Rica", *Anatolia: An International Journal of Tourism and Hospitality Research*, Vol.21, Nº 2, pp.322-338.

Brida, J.C. and Zapata, S. (2010b), "Cruise tourism: economic, socio-cultural and environmental impacts ". *Int. J. Leisure and Tourism Marketing*, Vol. 1, Nº. 3, pp. 205-215.

Butt, N. (2007), "The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton". *Marine Policy*, vol. 31, pp. 591–598.

CERTeT Bocconi (2015), *Analisi dell'impatto socio-economico delle attività crocieristiche del porto di Civitavecchia*, PORTI di ROMA e del LAZIO, Università Commerciale Luigi Bocconi.

Chase, G. and Alon I. (2002), "Evaluating the economic impact of cruise tourism: a case study of Barbados", *Anatolia: An International Journal of Tourism and Hospitality Research*, Vol. 13, No. 1.

CLIA Europe (2015): *The cruise industry. Contribution of Cruises Tourism to the Economies of Europe*, 2015 Edition.

Dwyer, L. and Forsyth, P. (1998), "Economic significance of cruise tourism". *Annals of Tourism Research*, Vol. 25, Nº. 2, pp. 393-415.

Garay, L.A. and Cànoves, G. (2012): "Turismo de cruceros en Barcelona. De la marginalidad al liderazgo internacional", *Boletín de la Asociación de Geógrafos Españoles* N.º 60 , pp 253-271

Gibson, P. and Bentley, M. (2006) "A study of impacts – cruise tourism and the south west of England", *Journal of Travel & Tourism Marketing*, Vol. 20, Nos. ¾.

Howitt, O.J.A.; Revol, V.G.N.; Smith, I.J. and Rodger, C.I. (2010), "Carbon emissions from international cruise ship passengers' travel to and from New Zealand". *Energy Policy*, vol. 38, pp. 2552–2560.

Lindsay, G. (2011), "Cities of the Sky". The Wall Street Journal, 26 de Febrero.

MedCruise Yearbook 2013/2014. Disponible en: <http://www.medcruise.com/>

Motta, P. (2014), "Cruises -the uncultural tourism endangering heritage worldwide". VIII Conferência anual do turismo Sustainability of Touristic Destiny Cities. Madeira - 4 April 2014.

Murillo, J., Romaní, J., and Suriñach, J. (2008), "The Impact of Heritage Tourism on an Urban Economy: The Case of Granada and the Alhambra". *Tourism Economics* 14(2), 361-376.

Murillo, J., Vayà, E., Romaní, J., and Suriñach, J (2013), "How important to a city are tourists and daytrippers? The economic impact of tourism on the city of Barcelona". *Tourism Economics*, 19(4), 897-917.

Organización Mundial del Turismo (2008), *Turismo de cruceros-situación actual y tendencias*.

Papadopoulou, G. and Sambracos, E. (2014), "Recent Evolution of Cruise Activities in European Ports of Embarkation: a Quantitative and Economic Approach". *Archives of Economic History* , Vol. 1, No. XXVI, pp. 7-26.

Penco, L.; Di Vaio, A. (2014), "Monetary and non-monetary value creation in cruise port destinations: an empirical assessment". *Maritime Policy & Management*, vol. 41, nº5, pp. 501-513.

Perez, L. (2013), *Assessing and managing cruise ship tourism in historic port cities: case study Charleston, South Carolina*. Tesis doctoral. Graduate School of Architecture, Planning and Preservation. Columbia University.

Policy Research Corporation (2009), *Tourist facilities in ports. The economic factor*, European Commission, Directorate-General for Maritime Affairs and Fisheries.

Satta, G.; Parola, F.; Penco, L. and Persico, L. (2015) "Word of mouth and satisfaction in cruise port destinations". *Tourism Geographies*, vol. 17, nº1, pp. 54-75.

Suriñach, J.; García, J.R.; Murillo, J.; Romaní, J.; and Vayà, E. (2014), *Impacto económico, cultural y social de la defensa*. Ministerio de Defensa, Madrid.

Tabla Input-Output de Cataluña (2011), Idescat www.idescat.es

Turisme de Barcelona (2015). Encuesta de Cruceristas 2014.

Tzannatos, E. (2010), "Ship emissions and their externalities for the port of Piraeus". *Atmospheric Environment*, vol. 44, pp. 400-407.

World Tourism Organization (2008), *"Turismo de Cruceros. Situación Actual y Tendencias"*. Published and printed by Organización Mundial del Turismo, Madrid. ISBN 978-92-844-1240-2.



2006

CREAP2006-01

Matas, A. (GEAP); **Raymond, J.Ll.** (GEAP)

"Economic development and changes in car ownership patterns"
(Juny 2006)

CREAP2006-02

Trillas, F. (IEB); **Montolio, D.** (IEB); **Duch, N.** (IEB)

"Productive efficiency and regulatory reform: The case of Vehicle Inspection Services"
(Setembre 2006)

CREAP2006-03

Bel, G. (PPRE-IREA); **Fageda, X.** (PPRE-IREA)

"Factors explaining local privatization: A meta-regression analysis"
(Octubre 2006)

CREAP2006-04

Fernàndez-Villadangos, L. (PPRE-IREA)

"Are two-part tariffs efficient when consumers plan ahead?: An empirical study"
(Octubre 2006)

CREAP2006-05

Artís, M. (AQR-IREA); **Ramos, R.** (AQR-IREA); **Suriñach, J.** (AQR-IREA)

"Job losses, outsourcing and relocation: Empirical evidence using microdata"
(Octubre 2006)

CREAP2006-06

Alcañiz, M. (RISC-IREA); **Costa, A.**; **Guillén, M.** (RISC-IREA); **Luna, C.**; **Rovira, C.**

"Calculation of the variance in surveys of the economic climate"
(Novembre 2006)

CREAP2006-07

Albalade, D. (PPRE-IREA)

"Lowering blood alcohol content levels to save lives: The European Experience"
(Desembre 2006)

CREAP2006-08

Garrido, A. (IEB); **Arqué, P.** (IEB)

"The choice of banking firm: Are the interest rate a significant criteria?"
(Desembre 2006)

CREAP2006-09

Segarra, A. (GRIT); **Teruel-Carrizosa, M.** (GRIT)

"Productivity growth and competition in spanish manufacturing firms:
What has happened in recent years?"
(Desembre 2006)

CREAP2006-10

Andonova, V.; **Díaz-Serrano, Luis.** (CREB)

"Political institutions and the development of telecommunications"
(Desembre 2006)

CREAP2006-11

Raymond, J.L. (GEAP); **Roig, J.L.** (GEAP)

"Capital humano: un análisis comparativo Catalunya-España"
(Desembre 2006)

CREAP2006-12

Rodríguez, M. (CREB); **Stoyanova, A.** (CREB)

"Changes in the demand for private medical insurance following a shift in tax incentives"
(Desembre 2006)

CREAP2006-13

Royuela, V. (AQR-IREA); **Lambiri, D.**; **Biagi, B.**

"Economía urbana y calidad de vida. Una revisión del estado del conocimiento en España"
(Desembre 2006)



CREAP2006-14

Camarero, M.; Carrion-i-Silvestre, J.LL. (AQR-IREA); Tamarit, C.

"New evidence of the real interest rate parity for OECD countries using panel unit root tests with breaks"
(Desembre 2006)

CREAP2006-15

Karanassou, M.; Sala, H. (GEAP); Snower, D. J.

"The macroeconomics of the labor market: Three fundamental views"
(Desembre 2006)

2007

XREAP2007-01

Castany, L. (AQR-IREA); López-Bazo, E. (AQR-IREA); Moreno, R. (AQR-IREA)

"Decomposing differences in total factor productivity across firm size"
(Març 2007)

XREAP2007-02

Raymond, J. Ll. (GEAP); Roig, J. Ll. (GEAP)

"Una propuesta de evaluación de las externalidades de capital humano en la empresa"
(Abril 2007)

XREAP2007-03

Durán, J. M. (IEB); Esteller, A. (IEB)

"An empirical analysis of wealth taxation: Equity vs. Tax compliance"
(Juny 2007)

XREAP2007-04

Matas, A. (GEAP); Raymond, J. Ll. (GEAP)

"Cross-section data, disequilibrium situations and estimated coefficients: evidence from car ownership demand"
(Juny 2007)

XREAP2007-05

Jofre-Montseny, J. (IEB); Solé-Ollé, A. (IEB)

"Tax differentials and agglomeration economies in intraregional firm location"
(Juny 2007)

XREAP2007-06

Álvarez-Albelo, C. (CREB); Hernández-Martín, R.

"Explaining high economic growth in small tourism countries with a dynamic general equilibrium model"
(Juliol 2007)

XREAP2007-07

Duch, N. (IEB); Montolio, D. (IEB); Mediavilla, M.

"Evaluating the impact of public subsidies on a firm's performance: a quasi-experimental approach"
(Juliol 2007)

XREAP2007-08

Segarra-Blasco, A. (GRIT)

"Innovation sources and productivity: a quantile regression analysis"
(Octubre 2007)

XREAP2007-09

Albalade, D. (PPRE-IREA)

"Shifting death to their Alternatives: The case of Toll Motorways"
(Octubre 2007)

XREAP2007-10

Segarra-Blasco, A. (GRIT); Garcia-Quevedo, J. (IEB); Teruel-Carrizosa, M. (GRIT)

"Barriers to innovation and public policy in catalonia"
(Novembre 2007)

XREAP2007-11

Bel, G. (PPRE-IREA); Foote, J.

"Comparison of recent toll road concession transactions in the United States and France"
(Novembre 2007)



XREAP2007-12

Segarra-Blasco, A. (GRIT);

“Innovation, R&D spillovers and productivity: the role of knowledge-intensive services”
(Novembre 2007)

XREAP2007-13

Bermúdez Morata, Ll. (RFA-IREA); **Guillén Estany, M.** (RFA-IREA), **Solé Auró, A.** (RFA-IREA)

“Impacto de la inmigración sobre la esperanza de vida en salud y en discapacidad de la población española”
(Novembre 2007)

XREAP2007-14

Calaeys, P. (AQR-IREA); **Ramos, R.** (AQR-IREA), **Suriñach, J.** (AQR-IREA)

“Fiscal sustainability across government tiers”
(Desembre 2007)

XREAP2007-15

Sánchez Hugalbe, A. (IEB)

“Influencia de la inmigración en la elección escolar”
(Desembre 2007)

2008

XREAP2008-01

Durán Weitkamp, C. (GRIT); **Martín Bofarull, M.** (GRIT) ; **Pablo Martí, F.**

“Economic effects of road accessibility in the Pyrenees: User perspective”
(Gener 2008)

XREAP2008-02

Díaz-Serrano, L.; **Stoyanova, A. P.** (CREB)

“The Causal Relationship between Individual’s Choice Behavior and Self-Reported Satisfaction: the Case of Residential Mobility in the EU”
(Març 2008)

XREAP2008-03

Matas, A. (GEAP); **Raymond, J. L.** (GEAP); **Roig, J. L.** (GEAP)

“Car ownership and access to jobs in Spain”
(Abril 2008)

XREAP2008-04

Bel, G. (PPRE-IREA) ; **Fageda, X.** (PPRE-IREA)

“Privatization and competition in the delivery of local services: An empirical examination of the dual market hypothesis”
(Abril 2008)

XREAP2008-05

Matas, A. (GEAP); **Raymond, J. L.** (GEAP); **Roig, J. L.** (GEAP)

“Job accessibility and employment probability”
(Maig 2008)

XREAP2008-06

Basher, S. A.; **Carrión, J. Ll.** (AQR-IREA)

Deconstructing Shocks and Persistence in OECD Real Exchange Rates
(Juny 2008)

XREAP2008-07

Sanromá, E. (IEB); **Ramos, R.** (AQR-IREA); **Simón, H.**

Portabilidad del capital humano y asimilación de los inmigrantes. Evidencia para España
(Juliol 2008)

XREAP2008-08

Basher, S. A.; **Carrión, J. Ll.** (AQR-IREA)

Price level convergence, purchasing power parity and multiple structural breaks: An application to US cities
(Juliol 2008)

XREAP2008-09

Bermúdez, Ll. (RFA-IREA)

A priori ratemaking using bivariate poisson regression models
(Juliol 2008)



XREAP2008-10

Solé-Ollé, A. (IEB), Hortas Rico, M. (IEB)

Does urban sprawl increase the costs of providing local public services? Evidence from Spanish municipalities
(Novembre 2008)

XREAP2008-11

Teruel-Carrizosa, M. (GRIT), Segarra-Blasco, A. (GRIT)

Immigration and Firm Growth: Evidence from Spanish cities
(Novembre 2008)

XREAP2008-12

Duch-Brown, N. (IEB), García-Quevedo, J. (IEB), Montolio, D. (IEB)

Assessing the assignation of public subsidies: Do the experts choose the most efficient R&D projects?
(Novembre 2008)

XREAP2008-13

Bilotkach, V., Fageda, X. (PPRE-IREA), Flores-Fillol, R.

Scheduled service versus personal transportation: the role of distance
(Desembre 2008)

XREAP2008-14

Albalade, D. (PPRE-IREA), Gel, G. (PPRE-IREA)

Tourism and urban transport: Holding demand pressure under supply constraints
(Desembre 2008)

2009

XREAP2009-01

Calonge, S. (CREB); Tejada, O.

“A theoretical and practical study on linear reforms of dual taxes”
(Febrer 2009)

XREAP2009-02

Albalade, D. (PPRE-IREA); Fernández-Villadangos, L. (PPRE-IREA)

“Exploring Determinants of Urban Motorcycle Accident Severity: The Case of Barcelona”
(Març 2009)

XREAP2009-03

Borrell, J. R. (PPRE-IREA); Fernández-Villadangos, L. (PPRE-IREA)

“Assessing excess profits from different entry regulations”
(Abril 2009)

XREAP2009-04

Sanromá, E. (IEB); Ramos, R. (AQR-IREA), Simon, H.

“Los salarios de los inmigrantes en el mercado de trabajo español. ¿Importa el origen del capital humano?”
(Abril 2009)

XREAP2009-05

Jiménez, J. L.; Perdiguero, J. (PPRE-IREA)

“(No)competition in the Spanish retailing gasoline market: a variance filter approach”
(Maig 2009)

XREAP2009-06

Álvarez-Albelo, C. D. (CREB), Manresa, A. (CREB), Pigem-Vigo, M. (CREB)

“International trade as the sole engine of growth for an economy”
(Juny 2009)

XREAP2009-07

Callejón, M. (PPRE-IREA), Ortún V, M.

“The Black Box of Business Dynamics”
(Setembre 2009)

XREAP2009-08

Lucena, A. (CREB)

“The antecedents and innovation consequences of organizational search: empirical evidence for Spain”
(Octubre 2009)



XREAP2009-09

Domènech Campmajó, L. (PPRE-IREA)

“Competition between TV Platforms”
(Octubre 2009)

XREAP2009-10

Solé-Auró, A. (RFA-IREA), **Guillén, M.** (RFA-IREA), **Crimmins, E. M.**

“Health care utilization among immigrants and native-born populations in 11 European countries. Results from the Survey of Health, Ageing and Retirement in Europe”
(Octubre 2009)

XREAP2009-11

Segarra, A. (GRIT), **Teruel, M.** (GRIT)

“Small firms, growth and financial constraints”
(Octubre 2009)

XREAP2009-12

Matas, A. (GEAP), **Raymond, J.Ll.** (GEAP), **Ruiz, A.** (GEAP)

“Traffic forecasts under uncertainty and capacity constraints”
(Novembre 2009)

XREAP2009-13

Sole-Ollé, A. (IEB)

“Inter-regional redistribution through infrastructure investment: tactical or programmatic?”
(Novembre 2009)

XREAP2009-14

Del Barrio-Castro, T., **García-Quevedo, J.** (IEB)

“The determinants of university patenting: Do incentives matter?”
(Novembre 2009)

XREAP2009-15

Ramos, R. (AQR-IREA), **Suriñach, J.** (AQR-IREA), **Artís, M.** (AQR-IREA)

“Human capital spillovers, productivity and regional convergence in Spain”
(Novembre 2009)

XREAP2009-16

Álvarez-Albelo, C. D. (CREB), **Hernández-Martín, R.**

“The commons and anti-commons problems in the tourism economy”
(Desembre 2009)

2010

XREAP2010-01

García-López, M. A. (GEAP)

“The Accessibility City. When Transport Infrastructure Matters in Urban Spatial Structure”
(Febrer 2010)

XREAP2010-02

García-Quevedo, J. (IEB), **Mas-Verdú, F.** (IEB), **Polo-Otero, J.** (IEB)

“Which firms want PhDs? The effect of the university-industry relationship on the PhD labour market”
(Març 2010)

XREAP2010-03

Pitt, D., **Guillén, M.** (RFA-IREA)

“An introduction to parametric and non-parametric models for bivariate positive insurance claim severity distributions”
(Març 2010)

XREAP2010-04

Bermúdez, Ll. (RFA-IREA), **Karlis, D.**

“Modelling dependence in a ratemaking procedure with multivariate Poisson regression models”
(Abril 2010)

XREAP2010-05

Di Paolo, A. (IEB)

“Parental education and family characteristics: educational opportunities across cohorts in Italy and Spain”
(Maig 2010)



XREAP2010-06

Simón, H. (IEB), **Ramos, R.** (AQR-IREA), **Sanromá, E.** (IEB)

“Movilidad ocupacional de los inmigrantes en una economía de bajas cualificaciones. El caso de España”
(Juny 2010)

XREAP2010-07

Di Paolo, A. (GEAP & IEB), **Raymond, J. Ll.** (GEAP & IEB)

“Language knowledge and earnings in Catalonia”
(Juliol 2010)

XREAP2010-08

Bolancé, C. (RFA-IREA), **Alemaný, R.** (RFA-IREA), **Guillén, M.** (RFA-IREA)

“Prediction of the economic cost of individual long-term care in the Spanish population”
(Setembre 2010)

XREAP2010-09

Di Paolo, A. (GEAP & IEB)

“Knowledge of catalan, public/private sector choice and earnings: Evidence from a double sample selection model”
(Setembre 2010)

XREAP2010-10

Coad, A., Segarra, A. (GRIT), **Teruel, M.** (GRIT)

“Like milk or wine: Does firm performance improve with age?”
(Setembre 2010)

XREAP2010-11

Di Paolo, A. (GEAP & IEB), **Raymond, J. Ll.** (GEAP & IEB), **Calero, J.** (IEB)

“Exploring educational mobility in Europe”
(Octubre 2010)

XREAP2010-12

Borrell, A. (GiM-IREA), **Fernández-Villadangos, L.** (GiM-IREA)

“Clustering or scattering: the underlying reason for regulating distance among retail outlets”
(Desembre 2010)

XREAP2010-13

Di Paolo, A. (GEAP & IEB)

“School composition effects in Spain”
(Desembre 2010)

XREAP2010-14

Fageda, X. (GiM-IREA), **Flores-Fillol, R.**

“Technology, Business Models and Network Structure in the Airline Industry”
(Desembre 2010)

XREAP2010-15

Albalade, D. (GiM-IREA), **Bel, G.** (GiM-IREA), **Fageda, X.** (GiM-IREA)

“Is it Redistribution or Centralization? On the Determinants of Government Investment in Infrastructure”
(Desembre 2010)

XREAP2010-16

Oppedisano, V., Turati, G.

“What are the causes of educational inequalities and of their evolution over time in Europe? Evidence from PISA”
(Desembre 2010)

XREAP2010-17

Canova, L., Vaglio, A.

“Why do educated mothers matter? A model of parental help”
(Desembre 2010)

2011

XREAP2011-01

Fageda, X. (GiM-IREA), **Perdiguero, J.** (GiM-IREA)

“An empirical analysis of a merger between a network and low-cost airlines”
(Maig 2011)



XREAP2011-02

Moreno-Torres, I. (ACCO, CRES & GiM-IREA)

“What if there was a stronger pharmaceutical price competition in Spain? When regulation has a similar effect to collusion”
(Maig 2011)

XREAP2011-03

Miguélez, E. (AQR-IREA); **Gómez-Miguélez, I.**

“Singling out individual inventors from patent data”
(Maig 2011)

XREAP2011-04

Moreno-Torres, I. (ACCO, CRES & GiM-IREA)

“Generic drugs in Spain: price competition vs. moral hazard”
(Maig 2011)

XREAP2011-05

Nieto, S. (AQR-IREA), **Ramos, R.** (AQR-IREA)

“¿Afecta la sobreeducación de los padres al rendimiento académico de sus hijos?”
(Maig 2011)

XREAP2011-06

Pitt, D., Guillén, M. (RFA-IREA), **Bolancé, C.** (RFA-IREA)

“Estimation of Parametric and Nonparametric Models for Univariate Claim Severity Distributions - an approach using R”
(Juny 2011)

XREAP2011-07

Guillén, M. (RFA-IREA), **Comas-Herrera, A.**

“How much risk is mitigated by LTC Insurance? A case study of the public system in Spain”
(Juny 2011)

XREAP2011-08

Ayuso, M. (RFA-IREA), **Guillén, M.** (RFA-IREA), **Bolancé, C.** (RFA-IREA)

“Loss risk through fraud in car insurance”
(Juny 2011)

XREAP2011-09

Duch-Brown, N. (IEB), **García-Quevedo, J.** (IEB), **Montolio, D.** (IEB)

“The link between public support and private R&D effort: What is the optimal subsidy?”
(Juny 2011)

XREAP2011-10

Bermúdez, Ll. (RFA-IREA), **Karlis, D.**

“Mixture of bivariate Poisson regression models with an application to insurance”
(Juliol 2011)

XREAP2011-11

Varela-Irimia, X-L. (GRIT)

“Age effects, unobserved characteristics and hedonic price indexes: The Spanish car market in the 1990s”
(Agost 2011)

XREAP2011-12

Bermúdez, Ll. (RFA-IREA), **Ferri, A.** (RFA-IREA), **Guillén, M.** (RFA-IREA)

“A correlation sensitivity analysis of non-life underwriting risk in solvency capital requirement estimation”
(Setembre 2011)

XREAP2011-13

Guillén, M. (RFA-IREA), **Pérez-Marín, A.** (RFA-IREA), **Alcañiz, M.** (RFA-IREA)

“A logistic regression approach to estimating customer profit loss due to lapses in insurance”
(Octubre 2011)

XREAP2011-14

Jiménez, J. L., **Perdiguero, J.** (GiM-IREA), **García, C.**

“Evaluation of subsidies programs to sell green cars: Impact on prices, quantities and efficiency”
(Octubre 2011)



XREAP2011-15

Arespa, M. (CREB)

“A New Open Economy Macroeconomic Model with Endogenous Portfolio Diversification and Firms Entry”
(Octubre 2011)

XREAP2011-16

Matas, A. (GEAP), **Raymond, J. L.** (GEAP), **Roig, J.L.** (GEAP)

“The impact of agglomeration effects and accessibility on wages”
(Novembre 2011)

XREAP2011-17

Segarra, A. (GRIT)

“R&D cooperation between Spanish firms and scientific partners: what is the role of tertiary education?”
(Novembre 2011)

XREAP2011-18

García-Pérez, J. I.; **Hidalgo-Hidalgo, M.**; **Robles-Zurita, J. A.**

“Does grade retention affect achievement? Some evidence from PISA”
(Novembre 2011)

XREAP2011-19

Arespa, M. (CREB)

“Macroeconomics of extensive margins: a simple model”
(Novembre 2011)

XREAP2011-20

García-Quevedo, J. (IEB), **Pellegrino, G.** (IEB), **Vivarelli, M.**

“The determinants of YICs’ R&D activity”
(Desembre 2011)

XREAP2011-21

González-Val, R. (IEB), **Olmo, J.**

“Growth in a Cross-Section of Cities: Location, Increasing Returns or Random Growth?”
(Desembre 2011)

XREAP2011-22

Gombau, V. (GRIT), **Segarra, A.** (GRIT)

“The Innovation and Imitation Dichotomy in Spanish firms: do absorptive capacity and the technological frontier matter?”
(Desembre 2011)

2012

XREAP2012-01

Borrell, J. R. (GiM-IREA), **Jiménez, J. L.**, **García, C.**

“Evaluating Antitrust Leniency Programs”
(Gener 2012)

XREAP2012-02

Ferri, A. (RFA-IREA), **Guillén, M.** (RFA-IREA), **Bermúdez, Ll.** (RFA-IREA)

“Solvency capital estimation and risk measures”
(Gener 2012)

XREAP2012-03

Ferri, A. (RFA-IREA), **Bermúdez, Ll.** (RFA-IREA), **Guillén, M.** (RFA-IREA)

“How to use the standard model with own data”
(Febrer 2012)

XREAP2012-04

Perdiguero, J. (GiM-IREA), **Borrell, J.R.** (GiM-IREA)

“Driving competition in local gasoline markets”
(Març 2012)

XREAP2012-05

D’Amico, G., **Guillen, M.** (RFA-IREA), Manca, R.

“Discrete time Non-homogeneous Semi-Markov Processes applied to Models for Disability Insurance”
(Març 2012)



XREAP2012-06

Bové-Sans, M. A. (GRIT), Laguado-Ramírez, R.

“Quantitative analysis of image factors in a cultural heritage tourist destination”
(Abril 2012)

XREAP2012-07

Tello, C. (AQR-IREA), **Ramos, R.** (AQR-IREA), **Artís, M.** (AQR-IREA)

“Changes in wage structure in Mexico going beyond the mean: An analysis of differences in distribution, 1987-2008”
(Maig 2012)

XREAP2012-08

Jofre-Monseny, J. (IEB), **Marín-López, R.** (IEB), **Viladecans-Marsal, E.** (IEB)

“What underlies localization and urbanization economies? Evidence from the location of new firms”
(Maig 2012)

XREAP2012-09

Muñoz, I. (GEAP), **Calatayud, D.**, **Dobaño, R.**

“Los límites de la compacidad urbana como instrumento a favor de la sostenibilidad. La hipótesis de la compensación en Barcelona medida a través de la huella ecológica de la movilidad y la vivienda”
(Maig 2012)

XREAP2012-10

Arqué-Castells, P. (GEAP), **Mohnen, P.**

“Sunk costs, extensive R&D subsidies and permanent inducement effects”
(Maig 2012)

XREAP2012-11

Boj, E. (CREB), **Delicado, P.**, **Fortiana, J.**, **Esteve, A.**, **Caballé, A.**

“Local Distance-Based Generalized Linear Models using the dbstats package for R”
(Maig 2012)

XREAP2012-12

Royuela, V. (AQR-IREA)

“What about people in European Regional Science?”
(Maig 2012)

XREAP2012-13

Osorio A. M. (RFA-IREA), **Bolancé, C.** (RFA-IREA), **Madise, N.**

“Intermediary and structural determinants of early childhood health in Colombia: exploring the role of communities”
(Juny 2012)

XREAP2012-14

Miguelé, E. (AQR-IREA), **Moreno, R.** (AQR-IREA)

“Do labour mobility and networks foster geographical knowledge diffusion? The case of European regions”
(Juliol 2012)

XREAP2012-15

Teixidó-Figueras, J. (GRIT), **Duró, J. A.** (GRIT)

“Ecological Footprint Inequality: A methodological review and some results”
(Setembre 2012)

XREAP2012-16

Varela-Irimia, X-L. (GRIT)

“Profitability, uncertainty and multi-product firm product proliferation: The Spanish car industry”
(Setembre 2012)

XREAP2012-17

Duró, J. A. (GRIT), **Teixidó-Figueras, J.** (GRIT)

“Ecological Footprint Inequality across countries: the role of environment intensity, income and interaction effects”
(Octubre 2012)

XREAP2012-18

Manresa, A. (CREB), **Sancho, F.**

“Leontief versus Ghosh: two faces of the same coin”
(Octubre 2012)



XREAP2012-19

Alemaný, R. (RFA-IREA), **Bolancé, C.** (RFA-IREA), **Guillén, M.** (RFA-IREA)

“Nonparametric estimation of Value-at-Risk”
(Octubre 2012)

XREAP2012-20

Herrera-Idárraga, P. (AQR-IREA), **López-Bazo, E.** (AQR-IREA), **Motellón, E.** (AQR-IREA)

“Informality and overeducation in the labor market of a developing country”
(Novembre 2012)

XREAP2012-21

Di Paolo, A. (AQR-IREA)

“(Endogenous) occupational choices and job satisfaction among recent PhD recipients: evidence from Catalonia”
(Desembre 2012)

2013

XREAP2013-01

Segarra, A. (GRIT), **García-Quevedo, J.** (IEB), **Teruel, M.** (GRIT)

“Financial constraints and the failure of innovation projects”
(Març 2013)

XREAP2013-02

Osorio, A. M. (RFA-IREA), **Bolancé, C.** (RFA-IREA), **Madise, N.**, **Rathmann, K.**

“Social Determinants of Child Health in Colombia: Can Community Education Moderate the Effect of Family Characteristics?”
(Març 2013)

XREAP2013-03

Teixidó-Figueras, J. (GRIT), **Duró, J. A.** (GRIT)

“The building blocks of international ecological footprint inequality: a regression-based decomposition”
(Abril 2013)

XREAP2013-04

Salcedo-Sanz, S., **Carro-Calvo, L.**, **Claramunt, M.** (CREB), **Castañer, A.** (CREB), **Marmol, M.** (CREB)

“An Analysis of Black-box Optimization Problems in Reinsurance: Evolutionary-based Approaches”
(Maig 2013)

XREAP2013-05

Alcañiz, M. (RFA), **Guillén, M.** (RFA), **Sánchez-Moscona, D.** (RFA), **Santolino, M.** (RFA), **Llatje, O.**, **Ramon, Ll.**

“Prevalence of alcohol-impaired drivers based on random breath tests in a roadside survey”
(Juliol 2013)

XREAP2013-06

Matas, A. (GEAP & IEB), **Raymond, J. Ll.** (GEAP & IEB), **Roig, J. L.** (GEAP)

“How market access shapes human capital investment in a peripheral country”
(Octubre 2013)

XREAP2013-07

Di Paolo, A. (AQR-IREA), **Tansel, A.**

“Returns to Foreign Language Skills in a Developing Country: The Case of Turkey”
(Novembre 2013)

XREAP2013-08

Fernández Gual, V. (GRIT), **Segarra, A.** (GRIT)

“The Impact of Cooperation on R&D, Innovation and Productivity: an Analysis of Spanish Manufacturing and Services Firms”
(Novembre 2013)

XREAP2013-09

Bahraoui, Z. (RFA), **Bolancé, C.** (RFA), **Pérez-Marín, A. M.** (RFA)

“Testing extreme value copulas to estimate the quantile”
(Novembre 2013)

2014

XREAP2014-01

Solé-Auró, A. (RFA), **Alcañiz, M.** (RFA)

“Are we living longer but less healthy? Trends in mortality and morbidity in Catalonia (Spain), 1994-2011”
(Gener 2014)



XREAP2014-02

Teixidó-Figueres, J. (GRIT), **Duro, J. A.** (GRIT)

“Spatial Polarization of the Ecological Footprint distribution”

(Febrer 2014)

XREAP2014-03

Cristobal-Cebolla, A.; Gil Lafuente, A. M. (RFA), **Merigó Lindhal, J. M.** (RFA)

“La importancia del control de los costes de la no-calidad en la empresa”

(Febrer 2014)

XREAP2014-04

Castañer, A. (CREB); **Claramunt, M.M.** (CREB)

“Optimal stop-loss reinsurance: a dependence analysis”

(Abril 2014)

XREAP2014-05

Di Paolo, A. (AQR-IREA); **Matas, A.** (GEAP); **Raymond, J. Ll.** (GEAP)

“Job accessibility, employment and job-education mismatch in the metropolitan area of Barcelona”

(Maig 2014)

XREAP2014-06

Di Paolo, A. (AQR-IREA); **Mañé, F.**

“Are we wasting our talent? Overqualification and overskilling among PhD graduates”

(Juny 2014)

XREAP2014-07

Segarra, A. (GRIT); **Teruel, M.** (GRIT); **Bové, M. A.** (GRIT)

“A territorial approach to R&D subsidies: Empirical evidence for Catalan firms”

(Setembre 2014)

XREAP2014-08

Ramos, R. (AQR-IREA); **Sanromá, E.** (IEB); **Simón, H.**

“Public-private sector wage differentials by type of contract: evidence from Spain”

(Octubre 2014)

XREAP2014-09

Bel, G. (GiM-IREA); **Bolancé, C.** (Riskcenter-IREA); **Guillén, M.** (Riskcenter-IREA); **Rosell, J.** (GiM-IREA)

“The environmental effects of changing speed limits: a quantile regression approach”

(Desembre 2014)

2015

XREAP2015-01

Bolance, C. (Riskcenter-IREA); **Bahraoui, Z.** (Riskcenter-IREA), **Aleman, R.** (Riskcenter-IREA)

“Estimating extreme value cumulative distribution functions using bias-corrected kernel approaches”

(Gener 2015)

XREAP2015-02

Ramos, R. (AQR-IREA); **Sanromá, E.** (IEB), **Simón, H.**

“An analysis of wage differentials between full- and part-time workers in Spain”

(Agost 2015)

XREAP2015-03

Cappellari, L.; Di Paolo, A. (AQR-IREA)

“Bilingual Schooling and Earnings: Evidence from a Language-in-Education Reform”

(Setembre 2015)

XREAP2015-04

Álvarez-Albelo, C. D., Manresa, A. (CREB), **Pigem-Vigo, M.** (CREB)

“Growing through trade: The role of foreign growth and domestic tariffs”

(Novembre 2015)

XREAP2015-05

Caminal, R., Di Paolo, A. (AQR-IREA)

Your language or mine?

(Novembre 2015)



XREAP2015-06

Choi, H. (AQR-IREA), **Choi, A.** (IEB)

When one door closes: the impact of the hagwon curfew on the consumption of private tutoring in the Republic of Korea
(Novembre 2015)

2016

XREAP2016-01

Castañer, A. (CREB, XREAP); **Claramunt, M M.** (CREB, XREAP), **Tadeo, A., Varea, J.** (CREB, XREAP)

Modelización de la dependencia del número de siniestros. Aplicación a Solvencia II
(Setembre 2016)

XREAP2016-02

García-Quevedo, J. (IEB, XREAP); **Segarra-Blasco, A.** (GRIT, XREAP), **Teruel, M.** (GRIT, XREAP)

Financial constraints and the failure of innovation projects
(Setembre 2016)

XREAP2016-03

Jové-Llopis, E. (GRIT, XREAP); **Segarra-Blasco, A.** (GRIT, XREAP)

What is the role of innovation strategies? Evidence from Spanish firms
(Setembre 2016)

XREAP2016-04

Albalade, D. (GiM-IREA, XREAP); **Rosell, J.** (GiM-IREA, XREAP)

Persistent and transient efficiency on the stochastic production and cost frontiers – an application to the motorway sector
(Octubre 2016)

XREAP2016-05

Jofre-Monseny, J. (IEB, XREAP), **Silva, J. I., Vázquez-Grenno, J.** (IEB, XREAP)

Local labor market effects of public employment
(Novembre 2016)

XREAP2016-06

García-López, M. A. (IEB, XREAP), **Hemet, C., Viladecans-Marsal, E.** (IEB, XREAP)

Next train to the polycentric city: The effect of railroads on subcenter formation
(Novembre 2016)

XREAP2016-07

Vayá, E. (AQR-IREA, XREAP), **García, J. R.** (AQR-IREA, XREAP), **Murillo, J.** (AQR-IREA, XREAP), **Romaní, J.** (AQR-IREA, XREAP), **Suriñach, J.** (AQR-IREA, XREAP),

Economic impact of cruise activity: the port of Barcelona
(Desembre 2016)



xarxa.xreap@gmail.com