Tourist profiles and atmospheric emissions in Spain

Andre Carrascal-Incera[a], Manuel Fernandez-Grela[a], and Xesus Pereira Lopez[b]

[a]: GAME-IDEGA, Universidade de Santiago de Compostela, Spain.
[b]: Quantitative Economics Department, Universidade de Santiago de Compostela, Spain.

Contact author: andre.carrascal@rai.usc.es

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Abstract

Estimating the economic impact of tourism means to estimate both benefits and costs associated with touristic activities. One of the major costs, that presents the character of a negative externality is that related to environmental pollution. The economy needs to produce a range of goods and services to support the touristic final demand vector, and the production of these goods and services is associated to the generation of pollution.

Due to the demand-driven nature of tourism activity, the specific combination of industries involved in tourism in a given destination depends on the characteristics of the tourists traveling to that destination, in particular these characteristics directly related to tourist expenditure. It is usual in the tourism literature to categorize such characteristics according to "tourist profiles" that describe the demand vectors associated with them. Public policy measures can be designed to incentive or discourage the inflow of tourists corresponding to profiles deemed as desirable or undesirable.

This paper offers an estimation of the main atmospheric emissions associated with touristic consumption disaggregated by industry in Spain, using data from the Tourism Satellite Account (TSA), the Environmental Accounts, and the 2005 Input-Output framework. We differentiate between 12 types of atmospheric emissions, some of them associated with greenhouse gases, and two different touristic profiles (inbound and domestic). This estimation is then used to give an indication of the potential impact of policy measures directed to stimulate inbound international tourism (in the context of the current economic crisis) on the objectives of emissions reduction explicitly adopted by the Spanish government, through an augmented Leontief model approach.

Keywords: Pollution; Augmented Leontief Model; Sustainable tourism.

1. Introduction

Estimating the economic impact of tourism means to estimate both benefits and costs associated with touristic activities. These costs are typically related to the environment (waste production, water consumption, greenhouse gas emissions, biodiversity damage, etc.). The tourism industry rarely acknowledges their existence, and when it does it tends to underplay them, contributing to the widely held consideration of tourism as a relatively harmless activity to the environment. Is this an accurate view of the impact of tourist activity?

One of the major environmental costs of tourism, that presents the character of a negative externality, is that related to environmental pollution. The economy needs to produce a range of goods and services to support the touristic final demand vector that jointly produce waste which reduces environmental quality. The volume of pollution thus generated is an important magnitude, but it is hard to measure.

The aim of this paper is to estimate which are the main atmospheric emissions, some of them related to greenhouse gases, associated with touristic consumption disaggregated by economic sector in Spain. We employ a top-down methodology (Becken & Patterson, 2006) based on the Augmented Leontief Model (ALM) approach. This approach consists in supplementing the input-output (IO) technical coefficient matrix with a set of pollution generation coefficients.

There is a wide literature analyzing atmospheric emissions in Spain through IO frameworks using the data provided by the Spanish National Statistical Institute (INE) in the Satellite Atmospheric Emissions Account (SAEA) included as part of the Environmental Accounts (see e.g. Butnar & Llop 2007, Roca & Serrano 2007, Tarancón & Del Río 2007, Alcántara & Padilla 2009, San Cristóbal 2010, Marin *et al*. 2012). There is also a much smaller literature focused on measuring the impact of touristic activities on atmospheric emissions by way of IO methods (Perch-Nielsen *et al.* 2010). However, we are not aware of any study focused on emissions generated by the tourism industry in Spain.

The paper is organized as follows. Section 2 will present the conceptual framework we use regarding tourism and atmospheric emissions. Section 3 will briefly describe the ALM method. Section 4 will describe the data used and their sources. Section 5 will show the results obtained with some discussion about their meaning. Finally, Section 6 will offer some final remarks.

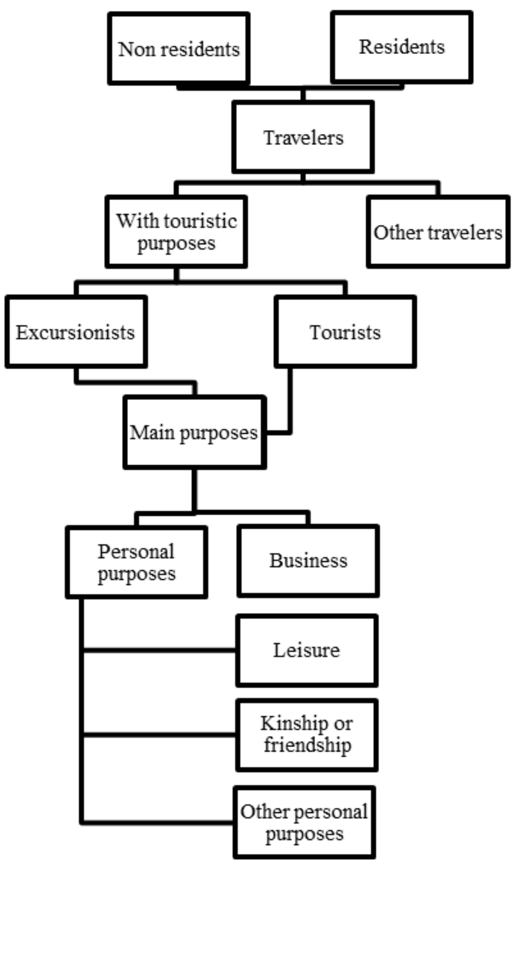
2. Preliminary notions: Tourism and gas emissions

2.1. Tourism, visitors and tourists

Tourism is widely recognized as a strategic activity for the Spanish economy, due to its economic impact on incomes, employment, and public revenues. Besides, tourism is a heterogeneous activity that feeds on a diverse number of industries to fulfil its demand. In fact, the tourism sector is consumer-defined. It consumes the products of various industries that are identified as tourism output exclusively by the nature of the consumers. That is the reason why the determination of who is a tourist is of paramount importance for the analysis of tourism.

A commonly used definition of tourist is that provided by the United Nations World Tourism Organization (UNWTO): “a person travelling to and staying in places outside his/her usual environment for not more than one consecutive year for leisure, business, and other purposes” (UNWTO, 1995). This definition is usually extended, from the viewpoint of the destination, to a classification of travellers. Defining a *traveller* as a person that travels within or outside his/her usual environment, for any reason, and using any transportation means, travellers can be divided into visitors and other travellers. A *visitor* is a person that travels to a place outside his/her usual environment for not more than one consecutive year with the main purpose of not pursuing a paid activity in the place visited. Visitors can be divided into tourists and excursionists. A *tourist* is a temporary visitant that stays in the destination for at least 24 hours for personal or business reasons. An *excursionist* is a temporary visitant that stays in the destination less than 24 hours for personal or business reasons (see Figure 1).

Figure 1: Classification of travellers.



From another point of view, we can obtain a classification of tourist flows following the perspective of residence and destination of the travel (Table 1). *Domestic tourism* refers to the flows of residents of the country travelling as visitors within their own country. The denomination of *inbound tourism* applies to the flows of non-residents visiting a particular country different from their own. Finally, *outbound tourism* is the label identifying the flows of residents of the country visiting other countries. All these flows can be combined in different ways to get three new categories: *interior tourism*, which includes domestic tourism and inbound tourism (all flows of visitors *to* the country, irrespective of their origin), *national tourism*, including domestic tourism and outbound tourism (all flow of visitors *from* the country, irrespective of their destination), and finally, *international tourism* which is the sum of all (inbound tourism plus outbound tourism) flows of visitors that cross national boundaries.

Table 1: Classification of tourist flows

		Destination territory		
		Inside the same economic territory	Outside the economic territory	TOTAL
Residential territory	Residents	**DOMESTIC TOURISM**	**OUTBOUND TOURISM**	*NATIONAL TOURISM*
	Non residents	**INBOUND TOURISM**		
	TOTAL	*INTERIOR TOURISM*		

2.2. Atmospheric emissions and greenhouse gases.

In each production process we obtain two types of outputs, one capable of being used as an input or being consumed as a final output (raw materials or manufactured products), and another which we can call waste or emission, necessarily obtained but which do not represent the main aim of the production process. Atmospheric emissions are a particular kind of this second type of outputs that can be defined as "*the expulsion of certain substances into the atmosphere*".

The interest in atmospheric emissions has been boosted because of the link found between the so-called greenhouse gases (GHG) and climate change. The scientific consensus is that mitigation of climate change requires large reductions in GHG emissions. The aim of achieving such reductions has been pursued through multinational agreements with the aspiration of reaching a global scope. One of the first and more relevant is the Kyoto Protocol (KP), developed under the 1992 UN Framework Convention on Climate Change.

The Protocol set reduction targets for the emissions of six GHG[1] that are causing global warming: carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O), plus three fluorinated industrial gases: hydro fluorocarbons (HFCs), per fluorocarbons (PFCs) and sulfur hexafluoride (SF6).

3. Methodology: the augmented Leontief Model

To account properly for the impact of atmospheric emissions linked to tourism activity it is important to distinguish direct from indirect impacts. Direct impacts are those that result directly from tourist activities, while indirect impacts are associated with intermediate inputs required in order to provide tourism services for the final demand. The IO model and its environmental variants provide a framework for analysis specially designed to make that distinction.

IO is defined as an accounting framework that presents the interdependence in the production structure and allows us to implement simulation and prediction models. The essential premise is to consider that an economy can be divided into homogeneous industries with mutual and stable relations over time, expressed through "technical coefficients".

Thus, the main advantage of this type of model (over partial equilibrium models) is that it takes into account economic interdependence, i.e. the mutual dependence of two or more industries in the production process. This interdependence of the flows of the industries means that changes in final demand in some specific products of one industry will affect other associated sectors of the economy and, sequentially, also those industries associated with them.

The basic Leontief model (Leontief, 1936, 1941) can be used to examine how the production changes in response to a change in final demand. In matrix notation:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{f} \qquad (1)$$

where **x** is the column vector of gross outputs by industry, **I** the identity matrix, **A** the technical coefficients matrix, and **f** the column vector of final demands by industry. The matrix $(\mathbf{I}-\mathbf{A})^{-1}$ is usually referred to as the "Leontief inverse" matrix, and we will denote it henceforth as **L**.

The input-output framework may be easily extended to account for pollution generation. From the several alternative approaches available to build such extension, in this paper we will choose the one called the augmented Leontief Model (ALM). This is an

[1] The primary GHG in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. The others (SF6, HFC and PFC) are obtained because of the production process of certain industries when replace mainly hydrogen atoms by fluorine atoms and/or chlorine atoms.

approach to the measuring of pollution that "augments" the **A** matrix with a set of pollution generation and elimination coefficients.[2]

We can compute pollution generation coefficients by dividing the quantities of each gas emitted to the atmosphere as a result of the activity of each particular industry by total industry output. These emission coefficients, interpreted as measures of by-products of productive processes, can then be included as additional rows of "inputs", preceded by a negative sign. Under the usual IO assumption of coefficient stability, this will result in an "augmented" coefficient matrix, that we will note as $\mathbf{A}_p$.[3] Vectors **x** and **f** can be augmented in a similar fashion (the first, with the total quantities emitted of each pollutant, the second with zeroes).

This process of "augmentation" makes possible to compute total levels of pollution jointly with industry outputs for any given values of final demand as:

$$\mathbf{x}_p = (\mathbf{I} - \mathbf{A}_p)^{-1}\mathbf{f}_p \quad (2)$$

While total levels of pollution can be measured using other, simpler, methods, this approach leads naturally to the imputation of pollution levels to final users through final demand. In fact, the elements in the "augmented" rows of the $(\mathbf{I}\text{-}\mathbf{A}_p)^{-1}$ matrix can be interpreted as "pollution multipliers", expressing the volume of each pollutant generated by each monetary unit of final demand of the product of each industry. These multipliers are particularly relevant for our purposes of linking atmospheric emissions to particular profiles of touristic demand.

4. Data

4.1. Atmospheric Emissions

It is possible to obtain emission ratios to incorporate into the model as pollution generation coefficients from the INE Environmental Accounts. As a part of them, the SAEA disaggregate atmospheric emissions into 12 different types and present a disaggregation of 29 industries.[4] The SAEA follow the NAMEA (National Accounting Matrix including Environmental Accounts) system, organised in accordance with the HSUT (Hybrid Supply and Use Tables) structure. There are currently two versions of the SAEA, with different base years (2000 and 2010). The one we use is that with base year 2010.

[2] Leontief (1970) was the first in proposing this procedure. Further development of the approach can be found in Luptacik & Böhm (1999).

[3] This matrix will also incluye additional columns for pollutants, filled with zero values, except for the element corresponding to the row where the particular pollutant is represented, whose value is 1.

[4] Tables A.1 and A.2 in the Annex list the polluting substances and industries considered in this paper.

Table 2 shows the pollution generation coefficients by industry and pollutant for the year 2005.[5]

Table 2 – Pollution generation coefficients *(Tons per every million euros)*.

	SOx:	NOx:	COVNM:	CH4:	CO:	CO2:	N2O:	NH3:	SF6:	HFC:	PFC:	PM10:
R01	0,41	4,68	27,38	22,46	7,97	262,73	1,22	8,30	0,00	0,00	0,00	1,17
R02	17,44	3,11	0,22	41,54	0,29	1225,82	0,03	0,00	0,00	0,00	0,00	1,58
R03	0,00	1,03	0,10	0,33	0,29	100,33	0,00	0,00	0,00	0,00	0,00	0,02
R04	0,06	0,27	0,53	0,10	0,16	70,37	0,00	0,00	0,00	0,00	0,00	0,01
R05	0,10	0,51	0,34	0,11	0,29	124,20	0,00	0,00	0,00	0,00	0,00	0,02
R06	0,03	0,19	1,31	0,03	0,09	42,11	0,00	0,00	0,00	0,00	0,00	0,01
R07	0,04	0,47	0,12	0,04	0,20	74,85	0,00	0,00	0,00	0,00	0,00	0,01
R08	0,13	0,53	1,35	0,33	0,30	138,74	0,00	0,00	0,00	0,00	0,00	0,03
R09	3,74	1,50	0,55	0,22	0,65	659,13	0,01	0,01	0,00	0,00	0,00	0,22
R10	0,33	0,62	1,23	0,46	0,43	231,65	0,13	0,36	0,00	0,00	0,00	0,06
R11	0,03	0,14	3,45	0,04	0,08	38,29	0,00	0,00	0,00	0,00	0,00	0,01
R12	1,70	3,59	0,33	0,23	2,49	1662,08	0,03	0,00	0,00	0,00	0,00	0,17
R13	0,44	0,50	0,73	0,11	7,70	226,96	0,00	0,00	0,00	0,00	0,00	0,15
R14	0,02	0,09	0,21	0,02	0,06	26,59	0,00	0,00	0,00	0,00	0,00	0,00
R15	0,01	0,04	0,41	0,01	0,02	12,25	0,00	0,00	0,00	0,00	0,00	0,00
R16	0,03	0,09	0,71	0,03	0,07	32,73	0,00	0,00	0,00	0,00	0,00	0,00
R17	0,01	0,14	1,59	0,05	0,06	29,29	0,00	0,00	0,00	0,00	0,00	0,00
R18	20,92	7,38	0,27	0,51	0,49	2469,25	0,04	0,00	0,00	0,00	0,00	0,49
R19	0,00	0,24	0,38	0,00	0,07	19,43	0,00	0,00	0,00	0,00	0,00	0,00
R20	0,02	0,26	0,23	0,01	0,08	40,15	0,00	0,00	0,00	0,00	0,00	0,01
R21	0,00	0,03	0,00	0,00	0,01	4,99	0,00	0,00	0,00	0,00	0,00	0,00
R22	0,42	2,08	0,37	0,18	0,56	270,44	0,01	0,00	0,00	0,00	0,00	0,09
R23	0,01	0,01	0,00	0,00	0,01	7,50	0,00	0,00	0,00	0,00	0,00	0,00
R24	0,00	0,00	0,00	0,00	0,00	1,46	0,00	0,00	0,00	0,00	0,00	0,00
R25	0,01	0,01	0,00	0,00	0,01	10,42	0,00	0,00	0,00	0,00	0,00	0,00
R26	0,00	0,00	0,00	0,00	0,00	0,95	0,00	0,00	0,00	0,00	0,00	0,00
R27	0,01	0,09	0,01	0,00	0,03	15,93	0,02	0,00	0,00	0,00	0,00	0,00
R28	0,05	0,08	0,39	9,82	0,09	48,35	0,07	0,12	0,00	0,00	0,00	0,01
R29	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source: Environmental Accounts and National Accounts, INE.

[5] Table A.3 in the Appendix contains the values of emissions in Tons. by industry and pollutant.

4.2. Tourism Final Demand

The next step in our approach is to build the final demand vector. In order to do that, we are going to use the information of the Tourism Satellite Account (TSA) of Spain elaborated by the INE for the year 2005. This source gives us the information of the total touristic consumption made by residents and non-residents disaggregated by industry, as shown in Table 3.

Table 3 - Touristic final demand vector for Spain in 2005.

Industry Code	**Inbound Tourism Consumption**	**Domestic Tourism Consumption**	**Domestic Household Consumption (excluding Tourism)**
AB:	0	0	6.207.900
CA:	0	0	34.200
CB:	0	0	55.400
DF:	0	0	34.395.100
E:	0	0	1.580.900
DA:	0	0	2.186.100
DB:	0	0	152.400
DC:	0	0	2.895.600
DD:	0	0	7.546.400
DE:	0	0	3.265.000
DG:	0	0	182.100
DH:	0	0	56.500
DI:	0	0	194.500
DJ:	0	0	1.656.600
DK:	0	0	138.580
DL:	0	0	467.400
DM:	0	0	2.371.400
DN:	0	0	9.689.400
F:	0	0	4.359.700
G:	0	0	81.836.300
H:	22.038.900	26.141.600	46.939.900
I:	8.686.800	8.244.600	11.234.000
J:	0	0	21.487.000
K:	522.000	240.400	68.730.600
L:	0	0	0
M:	0	0	9.349.800
N:	0	0	16.576.400
O:	1.024.500	1.190.900	24.340.000
P95:	0	0	7.085.000
Total	**32.272.200**	**35.817.500**	**365.014.180**

Source: Tourism Satellite Account, INE.

As we can see the main expenditures of the visitors are made in *hospitality services*, in *transport*, in *other services* like recreational and sports activities and in *real estate activities*.

5. Results

In this paper we are going to use the Spanish Input-Output framework of 2005. The main results obtained are shown in Table 4.

Table 4 - Main results for Spain.

Table 4A: Atmospheric emissions (in Tons) imputable to final demand users.

	Inbound Tourism Consumption	Domestic Tourism Consumption	Non Tourism Consumption
SOx:	28.584	30.599	592.146
NOx:	45.543	47.473	467.101
COVNM:	53.956	62.336	760.783
CH4:	53.267	61.762	861.813
CO:	26.751	29.646	324.054
CO2:	7.866.584	8.264.033	106.836.434
N2O:	2.120	2.478	31.701
NH3:	12.714	15.003	186.230
SF6:	0	0	0
HFC:	1	1	16
PFC:	0	0	3
PM10:	3.770	4.143	48.830

Table 4B: Atmospheric emissions (in %) imputable to final demand users.

	Inbound Tourism Consumption	Domestic Tourism Consumption	Non Tourism Consumption
SOx:	2,287%	2,448%	47,375%
NOx:	3,789%	3,949%	38,857%
COVNM:	3,133%	3,619%	44,173%
CH4:	3,232%	3,747%	52,287%
CO:	2,350%	2,605%	28,470%
CO2:	2,726%	2,864%	37,028%
N2O:	3,266%	3,816%	48,832%
NH3:	3,534%	4,170%	51,758%
SF6:	0,056%	0,059%	1,693%
HFC:	0,993%	1,137%	19,003%
PFC:	0,846%	0,945%	12,726%
PM10:	3,336%	3,666%	43,206%

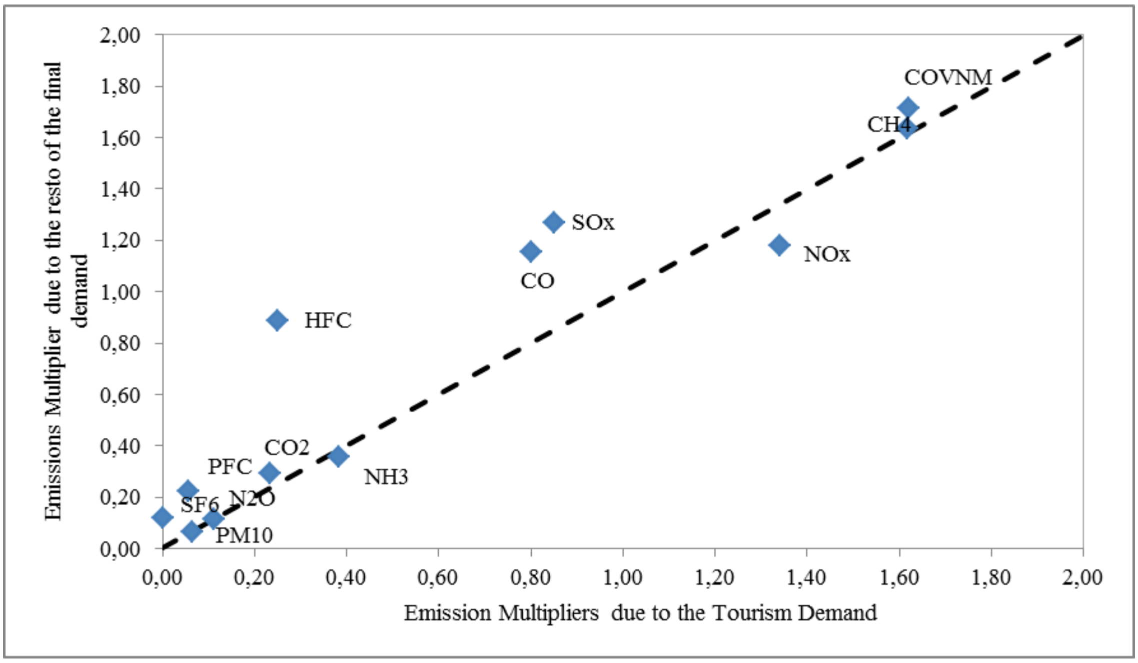
Table 4C: Pollution multipliers (Atmospheric emissions in Tons per million € of final demand).

	Inbound Tourism Consumption	Domestic Tourism Consumption	Non Tourism Consumption
SOx:	0,88571	0,85431	1,62225
NOx:	1,41120	1,32542	1,27968
COVNM:	1,67191	1,74036	2,08426
CH4:	1,65056	1,72435	2,36104
CO:	0,82892	0,82769	0,88778
CO2:	243,75728	230,72614	292,69119
N2O:	0,06570	0,06917	0,08685
NH3:	0,39397	0,41886	0,51020
SF6:	0,00000	0,00000	0,00000
HFC:	0,00003	0,00003	0,00004
PFC:	0,00001	0,00001	0,00001
PM10:	0,11681	0,11566	0,13377
Total	**250,78**	**237,80**	**301,66**

We can see that inbound touristic demand represents 3,22% of the total output in 2005 while domestic tourism represents 3,58%.

In Figure 2 we show the comparison between the whole touristic demand versus the rest of the final demand. In this way, we could see that per every million euros Tourism demand produces more NOx and NH3 than the rest of the final demand. [6].

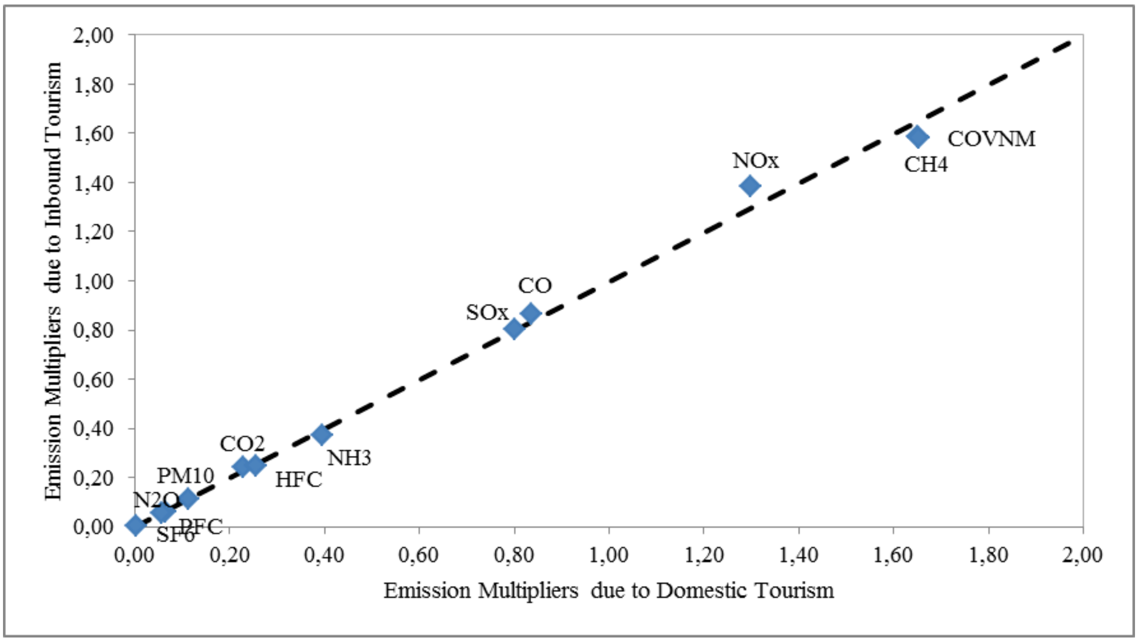
Figure 4 - Emissions multipliers due to Tourism Demand vs due to the rest of the demand in 2005.



In Figure 3, we compare the emission multipliers of the inbound and the domestic tourism. As we could see there are not too much differences and the majority of the multipliers are situated very close to the diagonal which represents an equal multiplier.

[6] Here in order to could represent these results in a single graph, we re-escalate some of the multipliers. The CO2 emission multiplier is in thousands of tons per every million euros and the SF6, PFC and HFC multipliers are measured in hectograms per every million euros.

Figure 3 - Differences between multipliers of domestic and inbound tourism in 2005.



6. Final remarks

In this paper we have estimated the main atmospheric emissions associated with touristic consumption disaggregated by economic sector in Spain. We have found that, as expected, tourism is a relatively low-emission activity, but the disaggregated nature of our analysis, both regarding types of emissions and industries, gives a more nuanced vision of the impacts these emissions have.

Thus, we have shown that the relative low values of emissions linked to tourism come out from the low-intensity of tourism activities in CO2 emissions, by far the largest of all atmospheric emissions. But tourism presents relatively high intensity in the emissions of gases like NOx and NH3 (the first one mainly linked to inbound tourism, while the second one presents more intense emissions linked to domestic tourism).

Moreover, if we take a look to the results measured in terms of emission multipliers, we could see that per every million euros, Tourism demand produces more NOx and NH3 than the rest of the final demand. It is remarkable that in the other side it is situated the SOx, the CO, and more important the CO2.

Comparing the emission multipliers of the inbound and the domestic tourism, they are situated very close to the diagonal, which represents an equal multiplier.

Finally, one of the major conclusions we could draw is that none of the main emissions related with tourism demand are those that are considered in the Kyoto protocol. Therefore, we could infer from this work that any policy which tries to attract more arrivals of visitors at a national level would not cause a damage to achieve the goals or fulfil the imposed emissions constraints.

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Annex

Table A.1 - Atmospheric emissions considered in the model.

Formulation	Chemical
SOx: (tons)	Sulfur Oxide
NOx: (tons)	Nitrogen Oxide
COVNM: (tons)	Volatile Organic Compounds, excluding CH4
CH4: (tons)	Methane
CO: (tons)	Carbon Monoxide
CO2: (thousands of tons)	Carbon Dioxide
N2O: (tons)	Nitrous Oxide
NH3: (tons)	Ammonia
SF6: (kg)	Sulfur Hexafluoride
HFC: (kg)	Hydrofluorocarbons Compounds
PFC: (kg)	Perfluorocarbons Compounds
PM10: (tons)	Suspended particles, with a diameter until 10 micrometers

Source: Environmental Accounts, INE.

Table A.2 - Industries considered in the model and its code.

Industry Code	Industry name
AB:	Primary sector
CA:	Coal and lignite; peat
CB:	Other mining and quarrying products
DA:	Food products and beverages
DB:	Textiles
DC:	Wearing apparel; furs and leather
DD:	Wood and products of wood and cork
DE:	Pulp, paper and paper products
DF:	Coke, refined petroleum products and nuclear fuels
DG:	Chemicals
DH:	Rubber and plastic products
DI:	Other non-metallic mineral products
DJ:	Metallurgy and other basic metals
DK:	Machinery and equipment
DL:	Medical, precision and optical instruments
DM:	Motor vehicles, and other transport equipment
DN:	Other manufactured goods
E:	Electrical energy, gas, steam and hot water
F:	Construction work
G:	Trade and repair services
H:	Hotel and restaurant services
I:	Transport and communicating services
J:	Financial intermediation services
K:	Real estate services
L:	Public administration and defence services
M:	Education services
N:	Health and social work services
O:	Other services
P95:	Private households with employed persons

Table A.3 – Spanish Emissions Table for 2005 (Tons).

	SOx:	NOx:	COVNM:	CH4:	CO:	CO2:	N2O:	NH3:	SF6:	HFC:	PFC:	PM10:
AB:	16.726	191.003	1.117.811	916.980	325.474	10.725.000	49.655	338.641	0	0	0	47.785
CA:	19.208	3.423	246	45.745	321	1.350.000	35	0	0	0	0	1.735
CB:	12	4.648	433	1.509	1.303	454.000	9	2	0	0	0	90
DA:	4.922	23.838	47.083	8.510	14.115	6.254.000	161	2	0	0	0	1.000
DB:	1.604	8.541	5.818	1.780	4.834	2.096.000	54	1	0	0	0	332
DC:	149	1.061	7.316	156	505	235.000	6	0	0	0	0	44
DD:	450	4.704	1.245	402	2.066	755.000	19	1	0	0	0	105
DE:	3.735	15.343	38.946	9.541	8.564	3.994.000	103	1	0	0	0	736
DF:	113.149	45.311	16.597	6.753	19.547	19.952.000	453	400	0	0	0	6.606
DG:	12.754	23.927	47.983	17.690	16.532	9.004.000	4.872	13.808	0	85	0	2.167
DH:	537	2.461	61.925	738	1.475	688.000	17	0	0	0	0	118
DI:	52.438	110.722	10.143	7.016	76.838	51.284.000	909	3	0	0	0	5.098
DJ:	29.703	33.675	49.260	7.710	520.161	15.341.000	301	2	0	0	21	10.294
DK:	567	2.529	5.671	562	1.540	735.000	18	0	0	0	0	122
DL:	210	944	9.958	271	573	298.000	7	0	11	0	0	46
DM:	1.693	6.068	45.758	1.712	4.223	2.119.000	52	0	0	0	0	322
DN:	271	2.825	32.827	1.058	1.176	605.000	12	1	0	0	0	93
E:	928.512	327.605	11.844	22.800	21.850	109.570.000	1.876	1	0	0	0	21.900
F:	148	65.042	102.683	291	19.964	5.316.000	118	15	0	0	0	488
G:	2.518	41.435	36.404	833	13.143	6.452.000	108	18	0	0	0	1.339
H:	241	2.919	204	73	978	506.000	8	1	0	0	0	104
I:	54.895	271.918	48.672	24.209	73.321	35.402.000	761	89	0	0	0	11.771
J:	544	415	55	124	636	444.000	7	0	0	0	0	53
K:	425	324	43	97	497	347.000	5	0	0	0	0	41
L:	787	601	79	180	920	643.000	10	0	0	0	0	76
M:	52	40	5	12	61	43.000	1	0	0	0	0	5
N:	566	6.133	432	168	2.112	1.107.000	1.264	3	0	0	0	222
O:	3.102	4.662	22.835	571.315	5.514	2.812.000	4.078	6.820	0	0	0	325
P95:	0	0	0	0	0	0	0	0	0	0	0	0
Total	1.249.917	1.202.118	1.722.277	1.648.236	1.138.240	288.531.000	64.919	359.811	11	85	21	113.015

Source: Environmental Accounts, INE.