BANCA D'ITALIA

EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

The determinants of foreign tourism demand: separating elasticities for the extensive and the intensive margin

by Emanuele Breda and Giacomo Oddo

January 2019

Number 482

BANCA D'ITALIA
EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

The determinants of foreign tourism demand: separating elasticities for the extensive and the intensive margin

by Emanuele Breda and Giacomo Oddo

Number 482 – January 2019

The series Occasional Papers *presents studies and documents on issues pertaining to the institutional tasks of the Bank of Italy and the Eurosystem. The* Occasional Papers *appear alongside the* Working Papers *series which are specifically aimed at providing original contributions to economic research.*

The Occasional Papers *include studies conducted within the Bank of Italy, sometimes in cooperation with the Eurosystem or other institutions. The views expressed in the studies are those of the authors and do not involve the responsibility of the institutions to which they belong.*

The series is available online at www.bancaditalia.it .

ISSN 1972-6627 (print)
ISSN 1972-6643 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

THE DETERMINANTS OF FOREIGN TOURISM DEMAND: SEPARATING ELASTICITIES FOR THE EXTENSIVE AND THE INTENSIVE MARGIN

by Emanuele Breda* and Giacomo Oddo**

Abstract

This paper estimates the elasticities of Italy's foreign tourism demand to relative prices, nominal and real exchange rates using a dataset for tourism flows to Italy (and its macro-regions) over the period 1997-2015. By separating total tourism expenditure into the number of arrivals and per-capita expenditure, the effect of each explanatory variable can be divided into an extensive and an intensive margin. This disaggregation helps to clarify the reasons behind the mixed evidence found in the literature and offers a richer interpretation of elasticities. We find that the elasticities of tourism expenditure to relative prices and to nominal and real exchange rates are negative and range from –0.5 to –0.7, in line with previous results found in the literature. The effect on expenditure is channelled mainly via the extensive margin (i.e. the number of arrivals). Southern Italy shows higher price elasticities than the rest of the country, signalling a higher exposure to the competitive pressures from other Mediterranean destinations.

JEL Classification: F14, L83.
Keywords: International tourism, demand elasticity.

Contents

* Bank of Italy, Venice Branch, Local Economic Research and Analysis Division.

** Bank of Italy, DG for Economics, Statistics, and Research.

1. Introduction and review of the literature[1]

The international tourism industry has become one of the largest in services trade across countries: its share on world's exports of goods and services reached 7% in 2015, when total "tourism exports" amounted to US$ 1.4 trillion (World Tourism Organisation). Tourism is an activity which is beneficial for the economy as a whole in evident ways: it is a source of foreign currency, raises local consumption levels and provides incentives to investment, especially in infrastructure (e.g. airports), but also in human capital (Holzner 2011), acting as catalyst for economic growth (Eugenio-Martín *et al.* 2004).[2] If these aspects are particularly relevant for developing countries, the importance of tourism for advanced economies should not be underestimated either: tourism contributes to governments' fiscal revenues, and generates beneficial spillovers for the local economy (De Vita and Kyaw 2016); moreover, it is perceived as the "business card" of a country, a showcase for potential customers and investors worldwide. As a matter of fact, the role of tourism as a factor of promotion for international trade has been empirically assessed by Proença and Souziakis (2008) and Santana-Gallego *et al.* (2016).[3]

In 2016 Italy's share of world tourism receipts at current prices and exchange rates was 3.2%. In terms of receipts from abroad, Italy is the third international destination in the EU after Spain and France; tourism receipts account for 2.2% of its GDP, 40% of its services exports and more than 7% of its total exports.[4] According to the methodology of the Tourism Satellite Account (TSA), the Italian National Institute of Statistics (Istat) calculated that international and domestic tourism activities generated 6% of Italian value added in 2015, disregarding indirect effects.[5]

In spite of its relevance, and in particular compared to the vast literature on international trade, tourism has not attracted much attention from economists, not least because of the scarcity of comparable data across countries.[6] Theoretical models of international trade are however not easily extendable to trade in services in general, and to tourism in particular; there are conceptual difficulties that are not easy to overcome. For example, there is not a straightforward definition of production function and input factors that can be used for this purpose and that can be represented by a sufficiently low-dimensional vector; production is not attributable to a "firm", and the diffuse interactions between "suppliers" and "consumers" make a formal representation of supply and demand functions rather

---

[1] The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Italy. While retaining full responsibility for errors and omissions, the authors wish to thank Rita Cappariello, Davide Delle Monache, Silvia Fabiani, Stefano Federico, Alberto Felettigh, Claire Giordano, Roberto Tedeschi, Roberto Torrini, and the participants to a seminar at the Bank of Italy for the useful comments on previous versions of this paper. The authors acknowledge with gratitude the advice of Andrea Alivernini, who shared with them his life-long expertise on Italian tourism data. This work was made in memory of him.

[2] A recent study by Holzner (2011) looked at the risk that small open economies may suffer adverse effects from a thriving tourism sector, similarly to what in international trade literature is known as the "Dutch disease". His empirical findings however reject this hypothesis: positive effects of tourism usually prevail and are not associated with any contraction in the manufacturing sector.

[3] More recent papers started considering possible negative externalities generated by tourism on the host economy (environmental impact, housing prices surge, local public services over-crowding, crime, and other socio-cultural effects). Scarcity of data and the difficulty in identifying a measurable dependent variable still hinder a full development of this strand of literature. See for example Biagi *et al.* (2015) and Biagi and Detotto (2014).

[4] See Breda *et al.* (2018).

[5] See Istat (2017).

[6] The World Tourism Organisation (UNWTO) started promoting the harmonization and comparability of tourism statistics since 1995.

cumbersome (Eilat and Einav 2004). Not surprisingly then, theoretical contributions into this field are scarce, with a few exceptions, most notably the study by Morley *et al.* (2014).[7] The literature on tourism economics is therefore eminently empirical and can be divided into three main work-streams:

1. Tourism demand determinants and effects of exogenous shocks to tourism.
2. Tourism impact and spillovers on the economic activity of the exporting country.
3. Tourism management and competitiveness.

The term "tourism demand" is usually translated into "tourism expenditure" or "number of visitors", the two empirical and measureable manifestations of tourism consumption. The first line of research thus aims at identifying and measuring the determinants of tourism consumption. Works are either based on aggregate data (typically balance of payments data) or on individual survey data. The former consider macroeconomic and market variables related to the country of origin of tourism flows (e.g. average national income, relative prices with respect to the recipient country, bilateral exchange rates, and other country-specific features), which are generally analysed within a panel data approach (see Lim 1997 for a survey). Micro papers (see Brida and Scuderi 2013 for a review) focus instead on individual characteristics (personal income, occupation, educational attainment, age, gender, family status, religious creed etc.). Other studies look at the effect of specific exogenous variables on tourism: Gil-Pareja *et al.* (2007), Santana-Gallego *et al.* (2010), and De Vita (2014) assess the impact of currency unions or exchange rate regimes on international tourism flows. Fourie and Santana-Gallego (2011) are interested in the tourism acceleration capacity of large sport events (Olympic Games, World Cups etc.); Fourie *et al.* (2016) look at the relationship between religious affiliation and tourism.

In the second work-stream, which we report for the sake of completeness but which is not related to our study, the focus moves from the determinants of tourism demand to the effects of tourism on economic growth and to its potential spill-overs. Pablo-Romero and Molina (2013) offer an accurate survey of a large number of studies on the link between tourism and economic growth; more than 60% of the surveyed works claim the existence of a univocal causal relation from the former to the latter, albeit with different estimated magnitudes.[8]

Finally, the last research approach focuses on the supply side of tourism, and deals with the competitiveness of the tourism industry, in connection with the tourism management literature: this field is very rich, as it considers all non-price dimensions of competitiveness[9] (see Crouch and Ritchie 2012 for a review).

Our paper contributes to the first stream of research and, more precisely, to the challenge of estimating the elasticities of tourism demand with respect to variables such as relative prices and exchange rates. It is also indirectly related to the last group of studies insofar as it presents a demand-based measure of tourism competitiveness that is complementary to supply-based measures.

---

[7] Morley *et al.* show how a gravity equation for tourism can be derived from individual utility theory, after modeling the destination choice problem faced by the tourist.

[8] To name just a few interesting results among recent studies, Holzner (2011) analyses whether tourism can be associated with a possible deindustrialisation process in the case of small open economies and finds no evidence for that hypothesis. De Vita (2016) finds that once controlling for financial development (a variable which has a positive influence on countries' "absorptive capacity" of tourism benefits), tourism has a positive effect on growth even in advanced countries. Finally, Santana-Gallego *et al.* (2016) assess the importance of tourism for international trade within the framework of a gravity model, and find that tourism is beneficial for trade because it reduces fixed and variable trade costs.

[9] An overview on the various dimensions of tourism non-price competitiveness can be found in the Travel & Tourism Competitiveness Report, published yearly by the World Economic Forum.

Estimates of price elasticities found in the literature can be discouraging, since there is apparently no agreement about the acceptable range for the estimates, which vary dramatically both within and across papers (Eilat and Einav, 2004).[10] Apart from sample selection, a first cause of such variability is in the definition of prices. Since tourism is a composite service, ideally one should consider the prices of all the services related to the tourism sector: restaurants and hotels, recreational and cultural services, public transport, etc. Time series at this level of disaggregation are, however, available only for a few countries. With large sets of countries, researchers need to adopt wider definitions of prices, like the consumption price index, which is however harmonised only to a limited extent and might not reflect actual price dynamics as faced by a foreign tourist, especially for developing countries. Exchange rates are also used as a proxy for tourism prices. A common choice is to consider bilateral nominal exchange rates, on the grounds that tourists are aware of exchange rates but do not have direct information about prices in destination countries. A mid-way approach is the use of bilateral *real* exchange rates, i.e. nominal exchange rates adjusted for inflation in both the origin and the destination country. Many studies, however, model the effect of exchange rates on tourism demand separately from the effect of relative prices, since tourists may respond differently to the two variables. In particular, they are likely to be more quickly aware of (and perhaps more sensitive to) exchange rates when selecting a destination, than they are of prices expressed in local currency; the latter is a piece of information they will gather only when at destination (Crouch 1995, p. 114). This argument gets weaker if a growing share of tourism costs are paid in advance, as often happens with accommodations. Moreover, information about foreign prices is becoming more and more easily available thanks to the diffusion of internet platforms; against the backdrop of this trend, one may expect that the two elasticities will eventually converge toward similar values.

A second cause behind the high variability of elasticity estimates is intrinsic to the nature of elasticity. The responsiveness of the demand for international travel to movements in prices (and exchange rates) varies not only according to tourists' characteristics, but also to the features of the destination, which are not fixed over time. For instance, less substitutable destinations are likely to enjoy lower price elasticity. This is precisely the reason why a correct assessment of relative price and exchange rates elasticities is particularly important: because it can bring a useful contribution to the debate about countries' "competitiveness". With this aim in mind, we consider price elasticities as a different way to assess tourism competitiveness: if tourism exports of a country are facing a demand which is less price-elastic than the demand faced by competitors (alternative destinations), we infer that the tourism sector of that country has a high degree of "competitiveness".[11]

Our interest in relative price elasticities is also motivated by a concern for external imbalances, which brought renewed attention to the relationship between real exchange rate dynamics and current accounts, as tourism is a main component of Italy's service balance.

On the background of these considerations, in this paper we estimate both relative price and exchange rate elasticities for Italy within a model of tourism demand, using an extensive micro-level dataset, collected through the monthly survey on external tourism that the Bank of Italy has been

[10] In his survey of tourism demand models, Crouch (1994) finds relative price elasticities to have a mean value of -0.63 with a standard deviation equal to ± 2.3.

[11] It is important not to mistake the meaning of "competitive" and "competitiveness" in this context: we do not refer in a direct way to market structure, but simply to the ability of a system of firms to withstand competition, which is of course connected to "market power". In other words, a tourism destination (like Italy or one of its areas) is more "competitive" than an alternative destination if the demand for a trip to Italy is less price-sensitive than the demand for a comparable trip to a competing destination. As it may appear obvious, the price elasticity is correlated, among other things, to the elasticity of substitution between the two destinations (i.e. to the shape of utility function of the consumer) and therefore it is lower the more "unique" the tourism destination is in the eyes of the buyer.

carrying out since 1996. Thanks to the high level of detail of our data, we are able to estimate a model for three different dependent variables (total expenditure, arrivals, and per-capita expenditure), thereby offering a decomposition of price and exchange rate elasticities into extensive and intensive margins, for the two main purposes of travel (leisure and business) and across Italian macro-regions (North-West, North-East, Centre, and South).

The paper is structured as follows: Section 2 presents the economic rationale behind our modelling strategy and the dataset used for the empirical estimation. Section 3 presents the model in detail, the covariates chosen, the extensive-intensive margins decomposition and discusses the estimation results. Section 4 presents a "what-if" analysis, i.e. an exercise where, using coefficients estimated in the previous section, we calculate Italy's tourism revenues under two alternative hypothetical scenarios: (i) Italy's tourism prices had the same dynamics as Germany's, and (ii) Italy's tourism prices had the same average dynamics as its main competitors. The last section offers some concluding remarks and draws some policy implications.

2. Theoretical framework and dataset

There are two fundamental metrics to quantify tourism demand: tourism expenditure and tourism arrivals. The rich micro-dataset collected by the Bank of Italy through the international tourism survey administered for balance of payments compilation purposes provides information on both dimensions with a high level of detail.[12] We consider in particular: the total expenditure by foreign tourists in Italy during time period t (E_t) and (ii) the number of foreign visitors arrived in Italy during time period t (N_t); both measures are broken down by tourists' country of residence (the importing country), by Italian region of destination, and by travel purpose (holidays or business).

We can think of total expenditure E as the product between the number of visitors (N) and their per-capita tourism expenditure (e):

$$E = N \cdot e \tag{1}$$

N can be regarded as the *extensive* margin of international tourism exports (how many consumers buy the service) and e can be regarded as the *intensive* margin (how much service is consumed by *each* visitor).

We focus on tourism expenditure and arrivals from the 20 most relevant countries in terms of Italy's foreign tourism receipts (which account for about 85% of total revenues), over the period 1997-2015.[13] With respect to domestic destinations, we group Italian regions into four "macro regions", in

[12] This survey is carried out at the relevant ports of transit in and out of Italy (airports, train stations, harbours and highway checkpoints), asking the travellers heading back home to compile a questionnaire; on average 150,000 interviews are conducted each year (see Alivernini *et al.*, 2014). Survey micro-data allow for disaggregation for geographical breakdown (tourist's country of residence, Italian region visited), means of transportation, travel purpose, other personal characteristics of the respondent. Data can be downloaded from the Bank of Italy official website at the following web address: www.bancaditalia.it/statistiche/tematiche/rapporti-estero/turismo-internazionale/.

[13] Some clarifications are needed here: in our dataset there are two different definitions of tourism arrivals: arrivals "at the border" and arrivals "at destination". The former number quantifies the number of visitors pouring into Italy, each of them being counted only once. The latter number quantifies number of visitors to a given destination (e.g. Tuscany). Since a single visitor may be visiting different Italian regions, the total number of tourists at destination may exceed the total number of tourists at the border. Hence we need to refer to the appropriate definition of arrivals: "at the border" when considering Italy as a whole; "at destination" when considering Italian regions.

adherence to the definitions given by Istat.[14] If on one side this aggregation implies a reduction in the number of observations, on the other side it is a way to minimise the risk of sampling errors connected with small geographical aggregates and to achieve a better balance in the relative weights of macro-regions within Italy, without giving up on geographical heterogeneity.[15] These choices lead to two panel datasets (one for leisure and one for business tourism) consisting of tourism expenditure and number of arrivals from 20 countries over 76 quarters, for a total of 1,520 observations in each dataset. Finally, we focus on leisure tourism only and expand our observations to 6,080 by considering four Italian macro-regions (see Table 1).

Table 1. Structure of the datasets with different aggregations

	Aggregation A	Aggregation B	Aggregation C
Time dimension	19 years; 4 quarters.	19 years; 4 quarters.	19 years; 4 quarters
Country of origin	20 countries	20 countries	20 countries
Travel purpose	collapsed	a) leisure b) business	leisure
Regional detail	collapsed	collapsed	4 Italian macro-regions
Number of observations	1,520	2 × 1,520	6,080

As our aim is the estimation of elasticity of foreign tourism demand to changes in relative prices and exchange rates, a key control variable is competitors' prices, which influence the substitution between holidays in Italy and holidays elsewhere. Because of data constraints and theoretical considerations that will be clarified later on, we make the implicit assumption that potential tourists make their holiday choice only between Italy and a limited set of euro-area Mediterranean countries. Albeit restrictive, this assumption can be motivated by the fact that only very close countries (geographically and culturally) are likely to be perceived as "substitutes" of Italy.[16] Our dataset was therefore complemented with the following variables that, according to the literature reviewed in the previous section, are among the main determinants of tourism expenditure:

- Relative price index ($prel_{i\text{-}t}$) is a quarterly index (1999 = 100), defined as the ratio between the consumer price index in Italy and the corresponding index in the importing country *i*; an increase signals a loss in price competitiveness for Italy. Ideally, the index should be referred to the prices of all services making up the tourism sector (accommodation and catering services, local public transports, cultural and recreational activities), but sector-specific data are not available for many

[14] Istat adopts a division of Italy into four macro-regions: North-West (Valle d'Aosta, Piedmont, Lombardy, and Liguria), North-East (Veneto, Trentino-Alto Adige, Friuli-Venezia Giulia, Emilia-Romagna), Centre (Tuscany, Umbria, Marche, and Lazio), and South (Abruzzo, Campania, Puglia, Basilicata, Calabria, Sicily, and Sardinia).

[15] The tourism panel dataset is inevitably unbalanced if considered at the highest possible level of detail, since micro-data report only non-zero observations; Country-region pairs representing a non-recorded phenomenon are not in the dataset: for example, there are no observations referring to Danish tourism in Basilicata in 2008. This issue has been overcome by regional aggregation into macro-regions. When using data at regional level, an alternative to ignoring missing observations is to replace them with zeroes (thereby obtaining a perfectly balanced dataset) and use zero-inflated Poisson regression models.

[16] See Patsouratis *et al.* (2005); in their paper the authors use a similar criterion to identify the three main competitors of Greece: Italy, Portugal, and Spain.

countries in the dataset, forcing us to use the consumption price index, as in many empirical works (Lim, 1997). The elasticity associated to this variable is expected to be negative; moreover, as argued in the literature, it should be lower for travellers coming from more distant countries, the intuition being that when overall costs are higher (i.e. when there is a self-selection of wealthy tourists due to high entry costs), prices at destination matter less.

- Nominal bilateral exchange rate (ner_{i-t}) is a quarterly index (1999 = 100), defined so that an increase signals an appreciation of the euro vis-a-vis the currency of the tourist's country of origin *i* (importing country). Its elasticity is henceforth expected to be negative. There are good reasons to keep relative prices and nominal (bilateral) exchange rates in an empirical tourism demand model separated, as we explain later.[17]
- Real bilateral exchange rate (rer_{i-t}), is a quarterly index (1999 = 100) given by the product of the nominal bilateral exchange rate and the relative price index. Accordingly, an increase signals a loss in competitiveness for Italy. When using *rer* instead of *ner* and *prel*, we also add a dummy variable for euro-area countries, in order to account for the fact that tourists share the same currency as Italy.
- Competitors' relative price index ($pcomp_{-t}$), is a quarterly index (1999 = 100), defined as the ratio of Italy's price index for accommodation and catering services to the weighted geometric average of the corresponding indices of the four closest competitors (France, Spain, Greece, and Portugal).[18] As in Patsouratis *et al.* (2005), the four countries were chosen on the basis of both geo-economic considerations (with respect to Italy they all have the same currency, they are at a comparable stage of economic development, they share similar climate, they are in a close geographical position, they offer a comparable blend of world heritage sites, iconic landmarks, and other touristic attractions and environmental amenities) and of data availability. The sign of its estimated coefficient is expected to be negative.
- Population (pop_{i-t}) is the number of people living in the tourist's country of residence *i* in each year. Adding this variable is very common in the literature (Crouch 1994), however there is no consensus on whether including it among the regressors or as the denominator of the dependent variable (Garin-Munoz and Amaral 2000). The latter case is tantamount to assuming a unit elasticity of tourism demand to the population of the importing country. Since in our dataset we have expenditure and also the number of visitors entering Italy in each unit of time, we prefer to add this variable as a regressor. In a standard gravity model, this variable usually complements distance: more populated countries will send more visitors, other things being equal. We expect this variable to have a positive coefficient.
- Per-capita GDP ratio ($ygap_{ijt}$) is the ratio between nominal per-capita income in the importing country *i* and per-capita income in Italy or in the Italian macro-region *j*, both expressed in the same currency, providing information on the average spending power of tourists in Italy. In the literature, per-capita income has been found to have a strong explanatory power. The income elasticity of tourism demand qualifies tourism as a normal or a luxury good, depending on whether it falls below or above unit. About 70% of empirical findings support the view of tourism as a luxury good

[17] Eilat and Einav (2004) find that exchange rates matter especially for tourism in advanced countries, while they are less relevant when the destination is a developing country. The meta-analysis carried out by Crouch (1994) finds that, on average, exchange rate elasticities are higher than estimated relative price elasticities.

[18] Each country weight in the index is given by the ratio of the country's international tourism credits (as reported in the corresponding national balance of payments statistics) to the sum of tourism credits of the four countries all together, all quantities taken as average over the period 2010-2016. Calculated weights are: Spain 0.430; France 0.376; Greece 0.108; Portugal 0.086.

(Crouch 1995).[19] There is however a wide degree of variation in the estimates, due to the different set of countries considered in the analysis. More recent studies have found lower values for this elasticity. While on one hand this can suggest the idea that after the turn of the century tourism has become a normal good, on the other hand, as argued by Crouch *et al* (2007), individual survey data deliver remarkably different result than aggregate data and should be preferred to draw conclusions on the responsiveness of tourism consumption to variations in disposable income.[20]

- Travel cost ($travel_{i,t}$) is the average transport cost in euros of a one-way, one-passenger trip from country *i* to Italy, recorded in year *t*. This variable is based on the answers collected, within the Banca d'Italia survey on international tourism, at Italian border entry points.[21] In many empirical studies, distance is used as a control variable within the theoretical framework of a gravity model; it is often used as a proxy for transportation and/or travel costs since it is readily available. In our view, sheer distance does not fully account for travel costs, the relation between the two being non-linear and evolving over time. In a panel setting where time-invariant information is wiped away by country-level fixed effects, the time-varying information on travel costs allows to better assess the role that such costs have on tourism consumption decisions.

Since the supply of tourism services is reasonably assumed to be price inelastic (at least in the short and medium term),[22] we estimate a standard aggregate demand function:

$$x_{ijt} = f(prel_{i,t};\ ner_{i,t};\ pop_{i,t};\ ygap_{ijt};\ travel_{i,t};\ w_{ij};\ z_t) \qquad (2)$$

Italy's tourism exports *x* to country *i* (from macro-region *j*) are a function of the bilateral relative price, of the nominal bilateral exchange rate, of the population of country *i*, of the income differential between country *i* and macro-region *j*, of the average travel cost from country *i* to Italy, and of a set of control variables and "demand shifters" (time, region, and country-level fixed effects).

3. Estimation and results

We estimate a log-linear version of model stated in Eq. 2, defining the generic dependent variable *x* both as total expenditure *E* and as the product of arrivals by average per-capita expenditure $N \cdot e$ (see Eq. 1). When reformulating in logarithmic terms we get:

$$\ln E_{ijt} = \ln N_{ijt} + \ln e_{ijt} \qquad (3)$$

Stacking all observations in matrices yields a compact form for the baseline specification of our model:

[19] Elasticity above unit means that an increase in income induces a more than proportional consumption of tourism; a good (or service) that enters utility function in this way is called "luxury good".

[20] From the empirical point of view, aggregate income data may over-estimate income elasticity of tourism because they do not account for income distribution, an issue that can be properly solved only when working on individual survey data, containing both income (and wealth) data and decisions on tourism consumption.

[21] The answers given by tourists arriving to Italy via third countries were excluded from this calculation: we considered only direct trips to Italy to have a more accurate estimate of travel cost. Tourists from overseas countries typically arrive by plane. However, considering closer European countries, there is also a considerable share of visitor reaching Italy on the road (i.e. by car or the like). In the latter case, we calculated the average transportation cost as a weighted average of the cost of traveling by airplane and the cost of traveling by motor-vehicle, where the weights are based on the number of travellers choosing each mean of transportation.

[22] We nevertheless introduce time fixed effects also with the purpose of controlling for supply shifts over the period of analysis.

$$\begin{aligned} \ln E &= \boldsymbol{X}\beta + \boldsymbol{W}\theta + \varepsilon \\ \ln N &= \boldsymbol{X}\beta^N + \boldsymbol{W}\theta^N + \varepsilon \\ \ln e &= \boldsymbol{X}\beta^e + \boldsymbol{W}\theta^e + \varepsilon \end{aligned} \tag{4}$$

Where $\boldsymbol{X}$ is the matrix containing the vectors of relative prices and exchange rates, and $\boldsymbol{W}$ contains the other control variables and demand shifters. If we estimate model (4) for the three dependent variables *E*, *N* and *e* (with three separate regressions), the estimated coefficients remain linked by the algebraic identity stated in Eq. (3) and we have that:

$$\hat{\beta} = \hat{\beta}^N + \hat{\beta}^e \text{ and } \hat{\theta} = \hat{\theta}^N + \hat{\theta}^e \tag{5}$$

In this way estimation coefficients of the expenditure equation can be decomposed between the extensive and the intensive margins.

Since our panel dataset has a long temporal dimension, we run a Levin-Li-Chu test for unit root on the dependent variables; the null hypothesis was rejected in all cases, suggesting that the variables are stationary. A formal Hausman test indicated a strong preference for a fixed-effect specification relative to a random-effect specification, reasonably due to the high level of unobserved cross-country heterogeneity in the panel that is not fully accounted for by our control variables. A fixed-effect "within" estimation approach was therefore applied to model (4), which we regard as our benchmark specification. In addition to country fixed effects, which were always included, we also introduced temporal fixed effects, in order to control for possible shocks that may affect travellers' decisions and that are common to all countries (albeit to a different extent), and also to get rid of the well-known seasonality of tourism data.[23] However, time fixed-effects wipe away the significance of every other variable that is purely time-varying, as it is the case for *pcomp*.[24] Estimations were first performed on the whole sample, considering both types of travel collapsed together (i.e. no distinction between leisure and business travels[25]). Results are reported in Table 2: in columns (1) to (3) the dependent variable is the log of total expenditure, in column (4) is the log of arrivals, and in column (5) is the log of per-capita expenditure. In the first two regressions only quarter fixed effects are included, in order to keep *pcomp* in the regression. When time fixed effects were introduced in columns (3-5), the *pcomp* variable had to be omitted because of collinearity. According to what is stated in Equation 5, coefficients in columns (4) and (5) sum up to the coefficients in column (3).

The coefficient of relative prices (*lprel*) has the expected negative sign with respect to total expenditure: a loss of 1% in price competitiveness is associated with a 0.63% drop in total expenditure. As expected, the effect of relative prices is much stronger on the extensive margin (col. 4), while it has a positive smaller impact on the intensive margin (col. 5): a 1% relative price appreciation translates into 0.8% fewer arrivals and a 0.2% increase in per-capita expenditure. When Italy becomes more expensive with respect to visitors' home country, fewer travellers can afford to visit, since higher costs drive the choice towards alternative destinations and/or exclude those with smaller budgets; however, travellers actually arriving in Italy spend (slightly) more, because of higher prices and of the resulting self-selection of travellers with a higher spending capacity. These two dynamics combined translate into an overall negative elasticity of about −0.6, which is broadly in line with average values reported in the survey of empirical works by Crouch (1994).

---

[23] Foreign tourism demand in Italy typically peaks in the third quarter (summer holidays effect), both in terms of arrivals and in terms of expenditure.

[24] Since *pcomp* was defined as the ratio between Italy's price index for accommodation and catering services and the average of the corresponding indices of the four closest competitors, this ratio is changing over time but is constant across the panel dimension (i.e. across importing countries).

[25] Cross-border workers' travels are always excluded from our sample.

Table 2. Panel estimation of tourism determinants

	(1)	(2)	(3)	(4)	(5)
	lnE	lnE	lnE	lnN	lne
lprel	-0.493***	-0.564***	-0.628***	-0.826***	0.197**
	(0.135)	(0.137)	(0.142)	(0.130)	(0.0730)
lner	-0.485***	-0.545***	-0.610***	-0.460***	-0.150**
	(0.0922)	(0.0948)	(0.0987)	(0.0907)	(0.0508)
lpop	2.983***	2.428***	2.312***	2.666***	-0.354
	(0.277)	(0.348)	(0.382)	(0.350)	(0.196)
lygap	0.602***	0.541***	0.529***	0.519***	0.0108
	(0.0617)	(0.0658)	(0.0710)	(0.0652)	(0.0365)
ltravel	0.0477	0.0387	-0.0661	-0.196***	0.130***
	(0.0555)	(0.0554)	(0.0626)	(0.0574)	(0.0322)
lpcomp		-1.548**	*dropped*	*dropped*	*dropped*
		(0.008)	(.)	(.)	(.)
time FE	no	no	yes	yes	yes
quarter FE	yes	yes	no	no	no
country FE	yes	yes	yes	yes	yes
N	1520	1520	1520	1520	1520
R^2	0.896	0.896	0.896	0.948	0.917

Note: Country and time fixed effects are included as specified. Coefficients of the constant and of fixed effects are not reported for brevity. Reported R^2 include variance explained by dummy variables. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The estimated elasticity of expenditure to the bilateral exchange rate (*lner*) has the expected negative sign and equals to –0.6: a 1% appreciation of the euro vis-à-vis, for example, the Japanese yen leads to a 0.6% drop in tourism revenues from Japan. While this value is comparatively low if benchmarked against the survey of Crouch (1994), it is not far from the value found by Garín-Muñoz and Pérez-Amaral (2000) for Spain,[26] possibly the closest country to Italy in terms of culture, climate, landscape, touristic attractions and geographical position. The effect of exchange rate variations on expenditure is channelled mainly through the extensive margin (a 1% relative appreciation of the Italian currency leads to a 0.46% contraction in arrivals); unlike what was observed for relative prices, however, the effect is negative on the intensive margin too: a 1% appreciation does not translate into higher per-capita expenditure but rather makes it drop by 0.15%. This difference in the impact of relative prices and exchange rates on the intensive margin can be interpreted under the hypothesis that tourists are more aware (and therefore more sensitive to) exchange rates *before* their decision to visit Italy, while they find out the actual price level of Italian services only *after* their arrival at destination; the former information may therefore influence the decision on where to go and *how long* to remain there (intensive margin).[27]

As expected, the size of the population of the visitors' country of origin (*lpop*) has a positive correlation with total expenditure: a 1% increase in population size is associated with a 2.3% increase in Italy's tourism credits. This elasticity estimate is very high, but it drops down to around unity once

[26] They find an exchange rate elasticity of Spanish tourism demand of about 0.5. The positive sign is due to the reverse definition of exchange rate.

[27] The volatility of nominal exchange rate was tested as a possible covariate, but it turned out to be never significant and was not included in the results presented in this paper.

China and Brazil are removed from the sample.[28] The positive effect is entirely concentrated in the extensive margin: larger countries send more tourists other things being equal, but not necessarily richer (or poorer) tourists.

The elasticity of tourism expenditure to the per-capita income differential is positive and highly significant: if the importing country becomes 1% "richer" than Italy (more precisely, if its per-capita income become 1% higher than the Italian one), then Italy's tourism revenue from that country increases by 0.54%. The positive effect is concentrated in the extensive margin: as countries get richer, more tourists visit Italy but, on average, they do not spend more money while at destination. The interpretation of why there is apparently no effect on the intensive margin (col. 5) is more articulate: when a country reaches a higher average per-capita income, more residents can afford to travel to Italy. On one hand, those who already used to travel to Italy can now afford to stay longer and/or spend more per day; this effect is going to be reflected into a higher per-capita expenditure; but incumbent tourists can also decide to travel more frequently (more arrivals, i.e. expenditure rises via the extensive margin); since more frequent trips are typically associated with shorter stays, in this case their behaviour would translate into a reduction in per-capita expenditure. Moreover, the new "marginal" tourists, whose income went just beyond the "holidays threshold", are now able to afford a trip to Italy, but the marginal tourist has a per-capita income that is lower than the per-capita income of accustomed travellers, so new tourists contribute in reducing per capita expenditure. The non-significant coefficient of the intensive margin suggests that these potentially off-setting behaviours compensate each other to a large extent. Our result can also suggest the idea that tourism demand in Italy has a preference for frequency over length-of-stay. It is worth recalling that, at least since the beginning of the past decade, an international trend of reduction in the length of stay in favour of more frequent and shorter trips was observed across all main industrial countries, especially in Europe. This phenomenon is also linked with the development of low-cost air carriers, which led to a reduction in transportation fees, thereby lowering "entry costs" and favouring access of tourists with lower per-capita income and at the same time allowing shorter and more frequent trips of more wealthy travellers.[29]

The travel cost variable (*ltravel*) does not have a significant impact on total expenditure. This apparently null elasticity is however the result of highly significant, off-setting effects on the two margins: negative on arrivals and positive on per capita expenditure. A simple interpretation of this result is that travel tickets are a sort of "entry cost" for prospective travellers to Italy: the higher they are the lower the number of tourists choosing to travel to Italy (negative elasticity on the extensive margin). However, once the decision to visit Italy is made, there is a natural positive correlation between per-capita expenditure and travel cost for at least two reasons: first, wealthier travellers self-select into "high-end destinations" (self-selection effect); second, travellers tend to stay longer and/or to spend more when their holidays destination is more distant (more costly to reach), because they know that they will not be able to afford to return as soon as they may like (sunk-cost effect; positive elasticity on the intensive margin). In the case of Italy, a traveller from a distant country (e.g. Canada or China) is less likely to return with the same frequency than a traveller from Switzerland or France; long-haul travellers are expected to "invest" more resources in terms of money and/or time of stay.

[28] During the time span under scrutiny both countries recorded a strong increase in their populations and in their travels to Italy.

[29] See, for Italy, Breda *et al.* (2018). It should be noted that international transportation costs are excluded from the balance of payments definition of international travel expenses (IMF, 1993 and 2009), which we consider in this paper; accordingly, the variable expenditure *E* does not include travel costs, which are incorporated in the specific variable *travel*, which we add to our model.

Among the various forces and shocks captured by time fixed-effects, there is also the favourable competitiveness trend due to Italy's tourism prices growing at slower pace than those of other competitors. Although it is hard to disentangle this effect from other unobservable temporal factors, we nevertheless can get an idea of its possible size by explicitly introducing into the model the competitors' relative prices index (*lpcomp*). To accommodate this variable, which is time-varying only, we dropped time fixed-effects, but retained a set of quarter-level fixed effects to control for the well-known seasonality of tourism data. As reported in table 2, a 1% increase in Italian hotels-and-restaurants prices vis-à-vis the average price level of hotels-and-restaurants in France, Spain, Greece, and Portugal, would be associated with a 1.5% drop in foreign tourists' expenditure in Italy. As it is the case of bilateral relative prices, the effect is concentrated on the extensive margin, while the effect on average per-capita expenditure is positive, although smaller in magnitude.[30] We are not going to use the *lpcomp* variable in the continuation of our analysis because, as already said, its informative content is already captured by temporal fixed effects, which are also controlling for several other variables and forces that are at play in the time span under scrutiny (e.g. rise of low cost air carriers, development of new infrastructure, diffusion of digital travel services). Only in the last section, when evaluating scenarios with different Italian prices dynamics, we will include again competitors' prices in our model.

Instead of using nominal exchange rates and relative prices separately, an alternative approach is to use relative real exchange rates (*lrer*), i.e. nominal bilateral exchange rates adjusted for inflation, in both the origin and the destination country. The estimated coefficient for *lrer* is highly significant and equal to –0.6 (see table A2 in the Appendix). Unlike what was found for the nominal exchange rate, its effect is, as expected, more evenly distributed between the extensive and the intensive margin, with the latter being slightly higher. Since the overall effect of real exchange rate can be regarded as a weighted average of the effects of nominal exchange rates and relative prices, we choose to keep them separated.

Table 3. Panel estimation of tourism determinants pre- and post-crisis

	ln(E)		ln(N)		ln(e)	
	pre-2009	post-2009	pre-2009	post-2009	pre-2009	post-2009
lprel	-0.245	-0.790***	-0.298	-0.898***	0.0525	0.108
	(0.176)	(0.146)	(0.163)	(0.134)	(0.0924)	(0.0762)
difference:	-0.544***	significant	-0.600***	significant	-	-
lner	-0.714***	-0.641***	-0.330**	-0.481***	-0.383***	-0.160**
	(0.127)	(0.107)	(0.117)	(0.0988)	(0.0664)	(0.0560)
difference:	0.0727	non-signif.	-0.151*	significant	0.223***	significant
lpop	1.696***	1.582***	2.134***	2.021***	-0.437*	-0.439*
	(0.412)	(0.416)	(0.380)	(0.384)	(0.216)	(0.218)
difference:	-0.114***	significant	-0.113***	significant	-0.0011	non-signif.
lygap	0.431***	0.324**	0.520***	0.443***	-0.0890*	-0.119*
	(0.0862)	(0.114)	(0.0796)	(0.104)	(0.0451)	(0.0599)
difference:	-0.107*	significant	-0.077	non-signif.	-0.0296	non-signif.
ltravel	-0.0626	-0.00814	-0.198***	-0.141*	0.136***	0.133***
	(0.0623)	(0.0618)	(0.0575)	(0.0571)	(0.0326)	(0.0324)
difference:	-	-	0.0573**	significant	-0.00283	non-signif.

Country and time fixed effects are *always* included. Difference between non-significant coefficients is not reported. Robust standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

[30] See table A1 in the appendix, where results of column (2) in table 2 are expanded in the extensive and intensive margins.

A further issue we address is whether there is evidence of a structural break after the deep recession of 2009. We estimated the model on the two sub-periods and performed a Wald test of the null hypothesis that coefficients are the same before and after 2009, finding that the null has to be rejected. We tested the significance of changes on a variable-by-variable basis; results are reported in Table 3.

Estimation results indicate that the most relevant difference between the two periods concerns the relative price indicator: its elasticity became remarkably higher after 2009 in the extensive margin. The crisis had apparently no overall effect on the nominal exchange rate elasticity, and produced only minor variations on the other coefficients. However, albeit non apparent when considering total expenditure, a significant difference between the two periods can be found also for the "cost of travel" variable when looking at extensive and intensive margins separately. The lower elasticity of arrivals to travel costs could be interpreted as indirect evidence that after 2009 there were shorter and/or cheaper trips to Italy by a higher number of visitors; in other words, it could be due to a deepening in the trend we mentioned in the introduction (substitution of length-of-stay with frequency of trips), whose long-run causes are discussed in Breda *et al.* (2018).

The estimates presented so far are based on aggregate data and constitute a "benchmark" we can compare other results against.[31] We re-estimated the same model splitting the sample into two: leisure and business tourism.[32] The number of observations in each of the two sub-samples is unchanged, because every observation in the previous dataset was actually obtained by summing leisure and business records.

Table 4 reports the results: the overall significance of estimated models is magnified (especially on the leisure side), since observations now belong to a dataset that has been generated by a more homogeneous economic process.

Table 4. Panel estimation of *leisure* and *business* tourism determinants.

	Leisure tourism			Business tourism		
	ln(E)	ln(N)	ln(e)	ln(E)	ln(N)	ln(e)
lprel	-0.355*	-0.602***	0.247**	-0.388*	-0.845***	0.458***
	(0.167)	(0.154)	(0.0832)	(0.166)	(0.153)	(0.0990)
lner	-0.453***	-0.303**	-0.150**	-0.484***	-0.553***	0.0688
	(0.116)	(0.107)	(0.0578)	(0.115)	(0.106)	(0.0688)
lpop	2.543***	3.380***	-0.837***	-0.0941	-1.188**	1.094***
	(0.448)	(0.413)	(0.223)	(0.446)	(0.410)	(0.266)
lygap	0.812***	0.719***	0.0932*	0.408***	0.314***	0.0940
	(0.0833)	(0.0769)	(0.0416)	(0.0830)	(0.0764)	(0.0495)
ltravel	-0.308***	-0.413***	0.105**	0.265***	0.165*	0.0998*
	(0.0734)	(0.0677)	(0.0366)	(0.0731)	(0.0673)	(0.0436)
N	1520	1520	1520	1520	1520	1520
R^2	0.887	0.935	0.886	0.821	0.925	0.893
"Panel" R^2	0.634	0.637	0.179	0.140	0.248	0.330

Country and time fixed effects are *always* included, but coefficients are not reported for brevity. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Reported R^2 includes variance explained by fixed effects., while "panel" R^2 does not.

[31] Moreover, since this is the kind of non-detailed data that many studies are based upon (indeed a disaggregation between holidays and business is not available for many countries), it was reasonable to use a breakdown that allowed for cross-country comparisons.

[32] With the term "leisure" tourism we mean a wider definition of holidays tourism: it includes honeymoons, shopping trips, and visits to friends and relatives. Religious pilgrimages, health-related travels, and study visits are excluded from "leisure tourism", since these travels depend on a totally different set of variables.

However, it can also be noticed that the explanatory power of our model is lower when applied to business tourism, and some variables lose significance or show a completely different coefficient. This finding is not unexpected since business tourism demand is influenced by a different (and larger) set of determinants, including variables like the location of economic activity and firms' clusters, the presence of large multinational groups, and the intensity of trade linkages.[33] If we wanted to model business tourism demand properly, we would need to include additional regressors, in order to avoid the risk of incurring in omitted variable bias. Still, we take our results as an indication of how large the differences with respect to leisure tourism can be, and hence how distorted results can be when considering leisure and business tourism collapsed together is, as in many empirical studies in the literature.

With this caveat in mind, we can nevertheless learn something by the juxtaposition of results on the two kinds of tourism. The effect of sheer population size has the expected positive sign only for leisure tourism, while it has a negative sign in the extensive margin for business travel: the latter result is probably due to the fact that business trips are disproportionately concentrated in neighbouring industrial countries (Germany, France, and United Kingdom) whereas other large but distant countries (Japan, Russia, China, and Brazil) are less important for business tourism, with the notable exception of the United States.

The estimated coefficient of per-capita GDP is much higher for leisure tourism than for business travel. In the former case average disposable income (or a proxy of it, like per capita GDP) has indeed a natural direct link with consumption capacity, while in the latter case it is only an indirect indicator of economic activity, informatively inferior with respect to a wide set of other possible - more appropriate - measures that should be taken into account (e.g. firms' distribution, trade intensity, global value chains diffusion, and productivity differentials).

Travel costs have the expected sign only for leisure travellers: as already observed, they have a negative effect on the extensive margin (less visitors) and a positive one on the intensive margin (higher per-capita expenditure and/or longer stays). For business tourism this pattern is almost reversed, as data suggest a positive relation between travel costs and tourism expenditures, via more arrivals. International business travels however have a structure of travel costs substantially different from leisure tourism: car is seldom used and, when the choice is the airplane, business class is a more frequent choice than in the case of leisure trips.

As a final step in our process of digging into Italian tourism data, we considered a further level of detail and split leisure tourism observations for the four Italian macro-regions: North-West, North-East, Centre and South.[34] In this way, observations are increased to 6,080 (see table 1).

In order not to reduce the number of observations, we did not run separate regressions on each macro-region but we rather introduced a dummy-variable matrix D for the four macro-regions, which was interacted with the three explanatory variables of interests: *lprel*, *lner*, and *lygap*. The model was therefore specified as follows:

$$ln[E_{it}] = \beta_1 \mathbf{D} \cdot lprel_{\mathrm{it}} + \beta_2 \mathbf{D} \cdot lner_{it} + \beta_3 lpop_{it} + \beta_4 \mathbf{D} \cdot lygap_{it} + \beta_5 ltravel_{it} + \gamma_{\mathrm{i}} + \varepsilon_{\mathrm{t}} \quad (6)$$

Results are reported in Table 5. Per-capita income elasticities display different values across macro-regions, with statistically significant differences. The South and the Centre have an intensive margin that account for about 15% of total effect, while Northern regions have a very small and non-significant effect of income differential on the intensive margin of expenditure. In other words, the richer the tourists, the more they spend and/or the longer they stay in Southern and Central Italy; in the rest of Italy instead an increase in per-capita income of the importing country is channelled on total

[33] Bripi (2018) finds that Italy's business travel receipts are significantly correlated with trade flows and FDI stocks.

[34] See footnote 14.

expenditure via the extensive margin (more arrivals). This result may be influenced by the fact that holidays in the South tend to be longer than in the rest of the country, hence an increase in the spending capacity is more likely to be translated into longer and/or more expensive stays (intensive margin effect).[35] The opposite is observed in Northern regions, where as tourists get richer, they seem to prefer more frequent trips rather than longer sojourns.

Table 5. Elasticity estimates disaggregated by Italian macro-region and travel purpose.

	Leisure tourism		
	ln(E)	ln(N)	ln(e)
lprel_NW	-0.327*	-0.280	-0.0466
	(0.152)	(0.161)	(0.0714)
lprel_NE	-0.185	-0.245	0.0595
	(0.152)	(0.161)	(0.0713)
lprel_CE	-0.365*	-0.473**	0.107
	(0.152)	(0.161)	(0.0712)
lprel_SI	-0.628***	-0.699***	0.0711
	(0.147)	(0.156)	(0.0691)
lner_NW	-0.410***	-0.219	-0.191***
	(0.108)	(0.114)	(0.0506)
lner_NE	-0.496***	-0.239*	-0.256***
	(0.108)	(0.114)	(0.0505)
lner_CE	-0.256*	0.0147	-0.271***
	(0.107)	(0.114)	(0.0503)
lner_SI	-0.369***	-0.152	-0.218***
	(0.106)	(0.112)	(0.0495)
lpop	2.127***	2.759***	-0.632***
	(0.393)	(0.416)	(0.184)
lygap_NW	1.020***	1.023***	-0.00387
	(0.0762)	(0.0807)	(0.0357)
lygap_NE	0.827***	0.786***	0.0404
	(0.0762)	(0.0807)	(0.0357)
lygap_CE	0.754***	0.649***	0.105**
	(0.0760)	(0.0805)	(0.0356)
lygap_SI	1.104***	0.933***	0.171***
	(0.0774)	(0.0820)	(0.0363)
ltravel	-0.438***	-0.541***	0.103***
	(0.0645)	(0.0683)	(0.0302)
N	6080	6080	6080
adj. R^2	0.768	0.794	0.651

Country-level and time fixed effects are *always* included; their coefficients and the constant are not reported for brevity. Robust standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Estimated relative price elasticities deliver another interesting result: with respect to the North and the Centre, the South stands out with elasticities that are larger and significant. When Italian prices relative to the importing country get higher, the number of holiday travellers in Southern Italy decreases

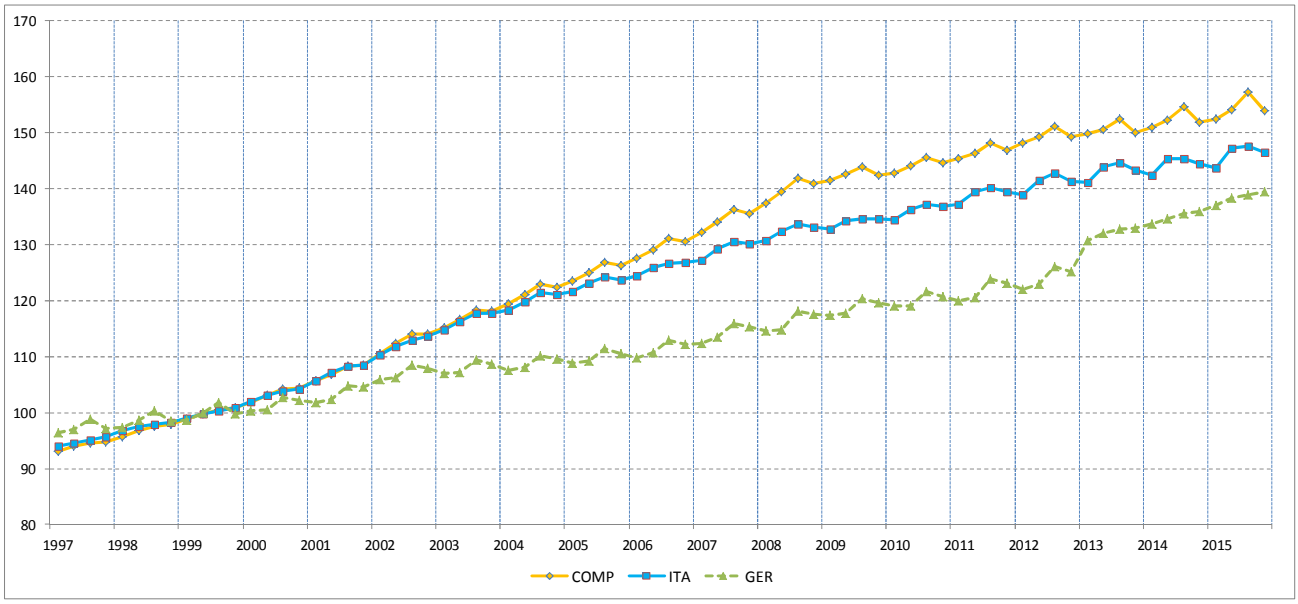
[35] The longer average length of holidays in Southern Italy is probably due to two main reasons: first, the share of "beach holidays" over other purposes holidays (e.g., art and culture holidays), is higher there than in the rest of the Country (see Filippone *et al.*, 2018). Second, due to past history of emigration from Southern Italy, there is a relatively larger number of foreign residents that have family ties in Southern Italian regions; hence during summer they tend to visit their hometowns and family relatives for longer-than-average holidays.

comparatively more than in the rest of the country (almost twice as much). This result provides empirical support for a "sun-and-sea effect" hypothesis; as stated in Crouch (1994): «marketing theory suggests that the demand for tourism to a "differentiated" destination would be less susceptible to changes in price than the demand for a "sun and sea" destination, of which there are many to choose from». Destinations whose main attracting factors are landscape and climate are more exposed to price competition than destinations which are less substitutable, because their attraction capacity lies in unique features like historic and natural landmarks, cultural heritage sites or biodiversity endowment. According to this hypothesis, Southern Italy higher elasticity to relative prices could be due to the fact that with respect to the Centre and the North (were worldwide famous attractions like Rome, Florence, Milan, and Venice are located), the southern regions and the islands compete more directly with other "sun and sea" Mediterranean destinations like those offered by Spain, Greece, Croatia and, before the current phase of geopolitical tensions, Tunisia and Turkey.

4. Italian tourism demand under alternative price dynamics

As a final step of our analysis, we build on the results from the estimation of the elasticities to relative prices and perform a simulation exercise to assess how foreign tourism demand would have evolved if Italian prices had shown different dynamics. To this purpose, we now exclude year fixed effects from our model and include the *pcomp* variable, i.e. the ratio between the hotels-and-restaurants price index of Italy and the weighted average of the corresponding indices of its four main competitors (see previous section).

Figure 1: Dynamics of Tourism price indexes for Italy, Germany, and Italy's Group of Competitors.
(1999 = 100)



Source: Authors' calculations on Eurostat data.

We consider two alternative scenarios, one in which Italy's prices grow faster and another one in which they grow more slowly than the observed dynamics. For the "lower inflation" scenario we chose the pattern observed in Germany, one of the countries in the euro area where inflation, both in CPI terms and in the narrower Hotels-and-restaurants price indicator, was lower than in Italy, at least until 2012. For the "higher inflation" scenario we considered price dynamics in the same set of competitors

included in the construction of the *pcomp* variable.[36] The relevance of these two alternative scenarios with respect to Italian prices data can be appreciated in Figure 1, which reports the price index for the item "Hotels and restaurants" in Italy, in Germany and in the average of France, Spain, Portugal, and Greece.

By substituting the Italian price vector with each of the two indices, we obtain an estimation of how different foreign tourism demand in Italy would be, both in terms of total expenditure and broken down in arrivals and per-capita expenditure. It should be noted that our exercise is *not* equivalent to applying estimated elasticities to a shift in price levels, since the alternative price vector is replacing Italy's price vector in two different points of the model: (i) in the numerator of the index *prel* (price ratio between Italy and the importing country) and (ii) in the numerator of the index *pcomp* (price ratio between Italy and the weighted average of the four Euro-Mediterranean competitors).

Results are reported in table 6. Under the "lower inflation" scenario, that is to say if Italian prices had followed the same trajectory of German prices, at the end of the observation period total revenues from foreign tourism for Italy would have been 8% larger, other things being equal.[37] As implied by the estimated coefficients, the gain would be all concentrated in the extensive margin (arrivals would rise by 19%), and would be partly offset by a deterioration in the intensive margin (per-capita expenditure would decrease by 9%, reflecting lower domestic prices).[38]

Table 6. Impact of different domestic price dynamics on Italy's tourism exports

	lower inflation			higher inflation		
% shift in 2015	E	N	e	E	N	e
	7.9	18.8	-9.1	-14.2	-24.3	13.3

An opposite result is obtained in the "higher inflation" scenario: Italy's total revenues from foreign tourism in 2015 would be about 14% lower, because of a 24% decrease in the number of visitors; the latter impact would not be completely compensated by the improvement in the intensive margin (+13% in per capita expenditure), fuelled by growing domestic prices.

5. Concluding remarks

Tourism elasticities to relative prices and exchange rates provide information on the competitiveness of countries in the tourism industry: a higher "market power" implies a less price-elastic demand, other things being equal. However, estimation of such elasticities has delivered a wide variety of results in the literature, as they depend not only on the selection of countries of origin of tourists, but also on the features of the destinations, which are not fixed in time.

We estimate a model for tourism demand in Italy, where the dependent variables are the three fundamental dimensions of demand: total expenditure, number of arrivals, and per-capita expenditure. We are hence able to separate the effect of the model's covariates on total tourism expenditure in Italy

[36] Since in this context we are not interested in considering extreme scenarios (as it is the case when running a "stress test") the approach of using real world data rather than invented "artificial" data is appropriate and does not pose any issue of scenario plausibility.

[37] The impact of different price dynamics was calculated for 2015, i.e. at the end of the observation period, because it is the furthest from the base year (in our case 1999). This means that the impact calculated at the end of the period can be considered as an upper bound.

[38] This is a comparative statics partial equilibrium (*ceteris paribus*) exercise, as we do not take into account that the increase in the number of arrivals could exert an upward pressure on domestic prices (and *a fortiori* on tourism prices) and we do not consider the impact of different internal price dynamics on bilateral exchange rates.

into an extensive margin (arrivals) and an intensive margin (per-capita expenditure). Another important feature of our approach with respect to the existing literature is the distinction between leisure and business tourism and the use of an accurate measure of travel costs instead of geographical distance between the destination and the origin country.

We find that over the period 1997Q1-2015Q4 the elasticities of Italy's foreign tourism expenditure to relative prices and to exchange rates were about 0.6. While the estimate for relative price elasticity is broadly in line with the results obtained in the empirical literature, the estimate for exchange rate elasticity is lower, but still quite close to the one found for Spain (Garín-Muñoz and Pérez-Amaral, 2000), a country that like Italy is a member of the EMU and displays similar characteristics as a tourist destination. When separating the intensive and the extensive margin, the effect of relative prices on expenditure is completely channelled via its effect on arrivals (extensive margin), and it has only a small reverse effect on per-capita expenditure (intensive margin); the impact of exchange rates on expenditure is instead reflected both via the extensive and the intensive margin. In other words, a real and a nominal appreciation of the same size have a negative impact on tourism revenues of comparable size, but they affect arrivals and per capita expenditure in different ways: an appreciation of Italian currency lowers both tourists' arrivals and per capita expenditure (for example via a reduction in average length-of-stay) while, on the contrary, an increase in domestic prices is reflected positively on per-capita expenditure (the elasticity is about 0.2). Since per-capita expenditure is determined to a large extent by the length of stay, we may interpret this result as indirect evidence that exchange rate variation appears, among other things, to impact the average length of stay, which is usually determined before starting the trip. Under the hypothesis that information on the exchange rate is known prior to departure, while information on relative prices is gathered only once at destination, this finding contributes to the debate in the literature on whether tourists are more sensitive to exchange rates or to relative prices. These differences along extensive and intensive margins may also help explaining why empirical estimates of elasticities are so discouragingly different across studies (Eilat and Einav, 2004).

Concerning the other determinants, we find that a 1% increase in the per-capita income of the importing country with respect to Italy's per-capita income is associated with a 0.5% increase of Italy's international tourism revenues, because of a higher number of incoming travellers (extensive margin). The population size of the importing country also has a positive effect on revenues, thanks to an increase in the number of arrivals. Travel costs have a non-significant aggregate effect, as the two opposite impacts on arrivals and total expenditure offset each other. However, they display the expected negative elasticity (equal to –0.3) when the model is estimated on leisure tourism only. Separating leisure from business data is crucial in order to estimate properly a model of tourism demand, since in the latter case there are other determinants at play.

The recession that hit European countries after the financial crisis of 2007-08 did not induce changes in the elasticity of tourism demand to the nominal exchange rate, but increased the elasticity to relative prices, meaning that after 2009 travellers to Italy became more price-sensitive. Other structural changes were non-significant or smaller in size.

Finally, we find that Southern Italy faces a more price-elastic demand than the other Italian macro-regions, possibly as a result of higher competitive pressure from other Mediterranean "sun and sea" destinations. The fact that Central and Northern Italian regions seem to retain more market power – i.e. they face a demand which is less sensitive to relative prices variations – can be interpreted as an indirect evidence of the fact they promote more effectively their unique artistic and historical heritage endowment. This result stresses the importance for Southern Italy of an appropriate calibration of tourism promotion policies and attraction strategies, which should be more focused on the rich artistic and cultural heritage endowment. This is a distinctive feature that can help to set them apart from other

competing destinations, in order to reduce the price and exchange rate elasticities of Southern Italy's tourism demand and help to close the gap in tourism revenues with respect to the rest of the country.[39]

[39] In 2016 Southern Italy's international tourism revenues accounted for just 13% of Italy's revenues; this value was even lower than Southern Italy's share on Italian GDP (23%): see Breda *et al.* (2018).

References

ALIVERNINI, A., E. BREDA, and E. IANNARIO (2014): "International tourism in Italy (1997-2012)", *Bank of Italy Occasional papers*, 220, July.

BIAGI, B., M. G. BRANDANO, and D. LAMBIRI (2015): "Does Tourism Affect House Prices?", *Growth Change*, 46

BIAGI, B. and C. DETOTTO (2014): "Crime as tourism externality". *Regional Studies*, 48.4: 693-709.

BREDA, E., R. CAPPARIELLO and V. ROMANO (2018): "Il turismo internazionale dell'Italia: recenti tendenze evolutive, domanda potenziale e confronto con i principali concorrenti europei", *Bank of Italy Occasional Papers*, forthcoming, Banca d'Italia.

BRIDA J. G. and R. SCUDERI (2013): "Determinants of tourist expenditure: a review of micro-econometric models". *Tourism Management Perspectives*, 2013, 6: 28-40.

BRIPI F. (2018): "Business travels, multinational firms and international trade", *mimeo*, Banca d'Italia.

CASTRO-NUNO M., J. A. MOLINA-TOUCEDO, and M.P. PABLO-ROMERO (2013): "Tourism and GDP: A meta-analysis of panel data studies". *Journal of Travel Research*, 52(6).

CROUCH G. (1995). "A Meta-Analysis of Tourism Demand". *Annals of Tourism Research*, Vol. 22, 103-118.

CROUCH G. and J.R. B. RITCHIE (2012): *Competitiveness and Tourism*, Edward Elgar Publishing Ltd.

CROUCH G. and R. J. BRENT (1999): "Tourism, Competitiveness, and Societal Prosperity". *Journal of Business Research.*

CROUCH G., H. OPPELWAL, T. HUYBERS, S. DOLNICAR and J.J. LOUVIERE (2007): "Discretionary expenditure and tourism consumption: insights from a choice experiment". *Journal of Travel Research.*

DE VITA G. (2014), "The long-run impact of exchange rate regimes on international tourism flows". *Tourism Management*, *45*, 226-233.

DE VITA G. and K. S. KYAW (2016), "Tourism development and growth". *Annals of Tourism Research*, 60, 23-26.

DI GIACINTO V. and A. MIGLIARDI (2014), "Low Cost Carriers and Foreign Tourism Inflows: a Cointegrated VAR Analysis for Italy", *Almatourism*, Vol 5.

EILAT Y. and L. EINAV (2004): "Determinants of international tourism: a three-dimensional panel data analysis". *Applied Economics*, 1315-1327.

EUGENIO-MARTÍN J., N. MARTÍN MORALES, and R. SCARPA (2004), "Tourism and economic growth in Latin American countries: A panel data approach". *Nota di Lavoro, Fondazione Eni Enrico Mattei*.

FILIPPONE A., M. GALLO, P. PASSIGLIA and V. ROMANO (2018) "Il turismo internazionale in Italia: destinazioni e caratteristiche dei viaggiatori", *Bank of Italy Occasional papers*, forthcoming, Banca d'Italia.

FOURIE J. and M. SANTANA-GALLEGO (2011): "The impact of mega-sport events on tourist arrivals". *Tourism management*, 32.6: 1364-1370.

FOURIE J., J. ROSSELLÓ and M. SANTANA-GALLEGO (2015): "Religion, religious diversity and tourism". *Kyklos*, 2015, 68.1: 51-64.

GARIN-MUNOZ T. and T. PEREZ-AMARAL (2000): "An econometric model for international tourism flows to Spain", *Applied Economic Letters, 7:8.*

GIL-PAREJA S., R. LLORCA-VIVERO, and J.A. MARTINEZ-SERRANO (2007): "The effect of EMU on Tourism", *Review of International Economics, 302-312.*

GUNTER U. and E. SMERAL (2016): "The decline of tourism income elasticities in a global context", *Tourism Economics, Vol. 22(3) 466-483.*

HOLZNER, M. (2011). "Tourism and economic development: The beach disease?", *Tourism Management*, 32(4), 922-933.

IMF (1993) Balance of Payments Manual, 5th edition.

IMF (2009) Balance of Payments and International Investment Position Manual, 6th edition.

Istat (2017) "Conto satellite del turismo per l'Italia – Anno 2015", *Statistiche report*, Rome.

KRUGMAN, P. (1994). "Competitiveness: A dangerous obsession", *Foreign Affairs*, vol. 73 (2), 28-44.

LAWLESS, M. (2010): "Deconstructing gravity: trade costs and extensive and intensive margins", *Canadian Journal of Economics*. Vol. 43, Issue 4.

LEVIN, A., C.-F. LIN, and C.-S. J. CHU (2002). "Unit root tests in panel data: Asymptotic and finite-sample properties". *Journal of Econometrics* 108: 1–24.

LIM C. (1997): "Review of international tourism demand models". *Annals of tourism research*, 24.4: 835-849.

MORLEY C., J. ROSSELLÓ and M. SANTANA-GALLEGO (2014): "Gravity models for tourism demand: theory and use". *Annals of Tourism Research*, n. 48: 1-10.

PABLO-ROMERO M. and J. A. MOLINA (2013): "Tourism and economic growth: A review of empirical literature". *Tourism Management Perspectives*, 2013, 8: 28-41.

PATSOURIATIS V., Z. FRANGOULI and G. ANASTASOPOULOS (2005), "Competition in Tourism among Mediterranean countries", *Applied economics. 37 (1865-1870).*

PROENÇA, S. and E. SOUZIAKIS (2008), "Tourism as an economic growth factor: a case study for Southern European Countries", *Tourism Economics*, vol. 14, 791-806.

SANTANA-GALLEGO, M.; F. J. LEDESMA-RODRÍGUEZ and J. V. PÉREZ-RODRÍGUEZ; "International trade and tourism flows: An extension of the gravity model". *Economic Modelling*, 2016, 52: 1026-1033.

Statistical Appendix

Table A1. Panel estimation of tourism determinants: estimates with relative prices of competitors.

	(1)	(2)	(3)
	lnE	lnN	lne
lprel	-0.564***	-0.778***	0.214**
	(0.137)	(0.126)	(0.0724)
lner	-0.545***	-0.406***	-0.139**
	(0.0948)	(0.0874)	(0.0501)
lpop	2.428***	2.764***	-0.337
	(0.348)	(0.321)	(0.184)
lygap	0.541***	0.508***	0.0330
	(0.0658)	(0.0607)	(0.0348)
ltravel	0.0387	-0.0749	0.114***
	(0.0554)	(0.0511)	(0.0293)
lpcomp	-1.548**	-3.363***	1.815***
	(0.586)	(0.540)	(0.309)
quarter FE	yes	yes	yes
country FE	yes	yes	yes
N	1520	1520	1520
adj. R2	0.896	0.947	0.913

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2. Panel estimation of tourism determinants: estimates with real bilateral exchange rates

	(1)	(2)	(3)
	ln(E)	ln(N)	ln(e)
lrer	-0.599***	-0.236**	-0.363***
	(0.0893)	(0.0830)	(0.0475)
lpop	2.308***	2.574***	-0.266
	(0.381)	(0.354)	(0.203)
lygap	0.540***	0.729***	-0.189***
	(0.0591)	(0.0549)	(0.0314)
ltravel	-0.0661	-0.197***	0.131***
	(0.0625)	(0.0581)	(0.0332)
N	1520	1520	1520
adj. R^2	0.896	0.946	0.911

Country fixed effects and time fixed effects are always included. Coefficients were not reported for brevity.
Reported R^2 accounts for the variance explained by fixed effects.
Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A3. Countries in the sample listed in order of their importance as sources of tourism to Italy.

(as a share of total Italy's foreign tourism receipts)

1. Germany	16.4	11. Canada	2.6
2. United States	11.9	12. Belgium	2.1
3. France	9.6	13. Japan	2.0
4. United Kingdom	7.6	14. Poland	1.7
5. Switzerland	7.4	15. Brazil	1.5
6. Austria	5.1	16. Czech Republic	1.1
7. Spain	3.8	17. Denmark	1.1
8. Netherlands	3.5	18. Sweden	1.0
9. Russia	3.4	19. China	1.0
10. Australia	3.1	20. Argentina	0.8

The figures correspond to the period 2010 – 2015, the five most recent years in the sample.

Tab A4. Leisure tourism expenditure by country (average 2012 – 2015)

Country	Per-capita daily expenditure (euro per day)	Average length of stay (days)	Average expenditure (euro)
Japan	212	8	1746
Russia	175	8	1358
China	156	8	1313
United States	146	9	1271
Switzerland	143	1	190
Brazil	133	10	1284
Australia	129	10	1299
Canada	125	10	1236
Argentina	112	10	1166
Great Britain	105	7	694
Sweden	103	6	662
Austria	98	3	282
France	92	4	344
Spain	90	6	533
Belgium	88	7	621
Denmark	87	7	655
Czech Republic	82	7	535
Germany	81	7	531
Netherlands	81	8	613
Poland	73	7	533