The impact of inbound demand on price levels in tourism municipalities: empirical evidence from Catalonia

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It is usually argued that tourism exerts negative economic impacts in host jurisdictions through the increase in prices linked to increasing demand for basic services and goods from tourists. This paper surveys 149 products in 45 tourism and non-tourism jurisdictions in Catalonia (which represent a total of 18,500 prices) in order to test empirically several hypotheses related to differences in price levels in tourism and non-tourism jurisdictions. The main results show that prices in tourism jurisdictions are not significantly higher than those in non-tourism ones. The analysis suggests that tourists are likely to pay higher prices than natives for some products.

Keywords: tourism demand; price level and price dispersion; traded and non-traded goods; search costs

Wherever tourism is a major economic activity, debates abound regarding the benefits and costs of inbound tourism demand for local jurisdictions. One of those debates is concerned with increased tourism flow as a source of inflation in host municipalities. (This paper uses the terms ‘municipality’ and ‘jurisdiction’ as synonyms.) It is usually argued that tourists push demand up, thus increasing consumer prices (which must be understood in a broad sense, including consumption goods, housing, or land plots, for instance) in tourism jurisdictions and widening the gap between price levels in tourism and non-tourism municipalities. Indeed, according to the United Nations (UNEP; UNEP and UNWTO, 2005), even though tourism impinges many positive economic impacts on host communities (such as foreign exchange earnings, contribution to government revenues, generation of employment, stimulation of infrastructure investment and contribution to local economies), it also exerts negative impacts through the increase in prices linked to increased demand for

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basic services and goods from tourists. Other negative impacts are related to
the emergence of the local jurisdiction’s economic dependence on tourism or
the seasonal character of jobs (see also Kim et al., 2006). Furthermore, the
negative effects of increasing prices may spread beyond the economic sphere and
give rise to sociocultural issues. Consider, for instance, the side effects of tourism
demand on the increase of house prices and the ensuing difficulty for young
generations born and raised in second-home jurisdictions to find affordable
dwellings in their native villages (Gallent and Tewdwr-Jones, 2000; Fountain
and Hall, 2002; Gallent et al., 2005).

A few studies exist on the impact of tourism on prices (and other variables,
such as gross domestic product, employment and exchange rates) from a
macroeconomic point of view (Hazari and Ng, 1993; Adams and Parmenter,
1995; Zhou et al., 1997; Nowak et al., 2003; Narayan, 2004; Chao et al., 2005,
2006). These studies rely on strong assumptions rather than on empirical results
(see the ‘theoretical framework’ section). Since, in a macroeconomic setting,
tourism is understood as a demand shock that increases the prices of non-traded
goods, these studies assume a positive relationship between tourism and
price levels without testing whether this hypothesis actually holds in the real
world.

To the best of the authors’ knowledge, the present study is the first to analyse
the effects of tourism demand on prices from a microeconomic perspective,
sidestepping general equilibrium (GE) models and relying instead on survey
data. Thus, this paper collects about 18,500 retail prices in a sample of 149
products sold in 45 tourism and non-tourism municipalities in Catalonia (in
the north-east of Spain, on the shores of the Mediterranean Sea), where tourism
is one of the major industries. In contrast to GE models, the paper’s perspective
makes it possible to test empirically several refutable hypotheses regarding
differences in price levels in tourism and non-tourism jurisdictions.

To do so, the paper proceeds in seven sections, in addition to this
introduction. It starts with some preliminary considerations needed to
understand the paper’s framework of analysis and to dispel some common
misunderstandings. Then, basic principles of economic analysis are used to set
up the empirical framework. The design of the survey used for collecting prices
is described next. A section underlying the framework of statistical analysis
precedes the testing of the hypotheses. The relevance of the results and their
validity for other destinations and countries is discussed before the last section,
which summarizes the paper’s main results.

Inflation, price levels and tourism prices

Measuring the cost of living is notoriously difficult in general (Deaton, 1998).
This is especially so when one wishes to discern the effects of tourists and
visitors on the cost of living faced by local residents. A first difficulty arises
because in practice there is some confusion among three similar terms, which
in this paper will be summarized as prices related to leisure and tourism, tourism
consumption prices and price levels in tourism jurisdictions. To understand clearly the
effects of tourism on a jurisdiction’s existing prices, the relevant terms used in
this paper are defined first.
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- **Prices related to leisure and tourism** refer to the prices of goods and services typically bought by tourists at their destination and considered as related directly to tourism, although local residents may also consume them. For instance, hotel and restaurant prices fit this definition, since they are consumed mostly by tourists and visitors, but also by locals during their leisure time. In Spain, these prices are measured with hotel price indices and the component of the consumer price index (CPI) including the prices charged by hotels, restaurants and other tourism-related business (INE, 2001).

- **Tourism consumption prices** refer to the prices of goods and services bought by tourists either at their destination or at their region of origin, such as hotels and restaurants, but also food, transport and leisure, for instance. These prices are at the basis of both tourism expenditure (UNWTO, 1995) and the competitiveness of different jurisdictions.

- **Price levels in tourism jurisdictions** refer to the cost of living in tourism municipalities. The comparison of prices in tourism and non-tourism municipalities, after controlling for the relevant variables, yields interesting insights regarding the effects of tourism demand (and the flow of immigrants working in the tourism sector). In order to capture these prices, a general price index (not limited to goods and services consumed by tourists) is needed.

Arguably, these three categories are closely related. Thus, one can imagine a situation where it is found that prices in tourism jurisdictions (in the sense of the third category above) are systematically higher than in non-tourism municipalities. Then, a relevant question is whether price differences are significantly higher for goods and services consumed by tourists (second category above).

This paper elucidates whether (as claimed, for instance, by the UNEP and the UNWTO) tourism exerts negative impacts on tourism jurisdictions through the increase in prices linked to increasing demand for basic services and goods from tourists. Thus, the paper analyses price differences between tourism and non-tourism jurisdictions in the sense of the third category above. That is, the prices of some representative products consumed by both tourists and local residents are taken into account and differences in prices between tourism and non-tourism jurisdictions are analysed. Thus, products/services sold by firms catering mainly for tourists or lacking uniformity between jurisdictions are not considered here.

**Theoretical framework**

In an ideal world with perfectly competitive markets, arbitrage and consumer mobility ensure that in equilibrium the prices of identical traded goods are the same, since the exchange of goods results in price convergence. This is known as the law of one price (see, for instance, Isard, 1977). In this ideal world, price differences for identical traded goods are a symptom of temporary disequilibrium or relevant transport costs. The Balassa–Samuelson hypothesis (Balassa, 1964; Samuelson, 1964) suggests that the prices of traded goods (easily
transportable) must converge between locations, but that the prices of non-traded goods will differ (Kravis et al., 1983; Bhagwati, 1984; De Gregorio et al., 1994). Although it is not always straightforward to distinguish between traded and non-traded goods (Woodland, 2008), it seems clear that many services related to tourism are non-traded. This suggests that tourism can be understood as a demand shock that increases the prices of non-traded goods.

This reasoning is the point of departure of many studies that consider the impact of tourism on prices from a macroeconomic point of view. For instance, Adams and Parmenter (1995) analyse the economic effects of tourism on the industrial and regional structures of the Australian economy and find that Queensland would be a net loser from an economy-wide expansion of tourism. Chao et al. (2005) examine the impact of tourism in a cash-in-advance economy and find that as a result of the expansion in tourism, the price of the non-traded good increases. This gives rise to a terms-of-trade improvement but also worsens the distortion in consumption caused by cash in advance. Chao et al. (2006) examine the effects of an expansion in tourism on capital accumulation, industry output and resident welfare in an open economy with an externality in the traded good sector. They find that although an expansion of tourism increases the relative price of the non-traded good, improves the tertiary terms of trade and yields a gain in revenue, it results in a lowering of the demand for capital used in the traded sector, with a subsequent de-industrialization in the traded good sector which may lower resident welfare. Hazari and Ng (1993) analyse the consequences of tourists’ consumption of non-traded goods and services on the domestic economy of the country receiving the tourist. They show how the consumption of non-traded goods and services affects the domestic consumption possibility locus and how this may reduce the welfare of the local residents. Besides, they find that an increase in the foreign demand for non-traded goods and services may lower welfare because of monopoly power in the trade of non-traded goods and services. Narayan (2004) uses a computable general equilibrium (CGE) model to assess the long-run impact of a 10% increase in tourist expenditure on Fiji’s economy. Nowak et al. (2003) present a model that captures the interdependence between tourism and the rest of the economy and find that the tourist boom may ‘immiserize’ the residents when the non-traded tourism sector is more labour-intensive than the agricultural traded sector. Zhou et al. (1997) use a CGE model to examine the impacts of tourism on the economy of a region.

The previous macroeconomic approaches are based on GE models and on simulations performed in a CGE setting (Johansen, 1960), and rely on strong assumptions (Sandler, 2001; Croes and Severt, 2007). Those models limit themselves first to calibrate a GE with the relevant macroeconomic data and then to perform simulations with the help of the calibrated model. Thus, in Fiji, for instance, an increase in consumer expenditure leads to an increase in domestic prices and wages (Narayan, 2004). In Hawaii, a 10% reduction in visitor expenditure is at the origin of a reduction in prices ranging from 0.089% to 3.060% (Zhou et al., 1997). Summing up, GE and CGE studies assume a positive relationship between tourism and price levels, but do not test whether this relationship actually holds in the real world.

This paper sheds light on the actual validity of that assumed relationship.
The paper proceeds by testing several hypotheses related to differences in price levels in tourism and non-tourism jurisdictions:

- **Hypothesis 1**: General differences (that is, for both traded and non-traded goods) exist in price levels between tourism and non-tourism jurisdictions.
- **Hypothesis 2**: Differences exist only at the height of the tourism season, when demand is at its highest level in tourism jurisdictions.
- **Hypothesis 3**: Differences exist only for different groups of products, particularly those purchased by tourists. That is, the demand shock caused by tourists affects only certain products.
- **Hypothesis 4**: Differences exist when sales are taken into account. It could be argued that retailers resort to sales in order to differentiate among several types (informed and uninformed) of customers (Varian, 1980). If sales are used as a tool for charging different prices in tourism and non-tourism jurisdictions (and presumably higher in the former), then list prices will not reflect the actual price differences between both types of jurisdictions.
- **Hypothesis 5**: Differences exist when the distribution channel is taken into account. It is reasonable to assume that distribution channels with pricing strategies relying on higher prices are located in tourism jurisdictions. (Of course, the cause–consequence link might go in the opposite direction: higher prices in tourism municipalities may attract distribution channels with pricing strategies based on high prices and repel retailers with pricing strategies based on low prices.)
- **Hypothesis 6**: Differences exist for non-traded goods only, that is for goods (such as personal services or pub drinks) that must be consumed where they are purchased (that is, for which no resale opportunities exist). This is a form of the Balassa–Samuelson hypothesis (Balassa, 1964; Samuelson, 1964).
- **Hypothesis 7**: Differences exist in price levels in tourism and non-tourism zones within a particular tourism jurisdiction. It could be argued that informed natives know the prices charged for identical products by different sellers and always go to low-priced stores, while uninformed tourists shop at random (Salop and Stiglitz, 1977). Indeed, if individuals must incur search costs (Diamond, 1971) to obtain information, then the market equilibrium may be characterized by price dispersion (Stiglitz, 1979; Carlton and Perloff, 2005).

**Survey design**

No institution exists, either in Catalonia or in Spain, which collects systematically the prices of different products in tourism and non-tourism, compares them and analyses their evolution throughout time. In Spain, the CPI is computed at national, regional and local level by the Spanish National Statistics Institute. However, because of sample design, it is not possible to disaggregate the CPI data to take into account prices in tourism and non-tourism jurisdictions. Therefore, this paper starts from scratch, building a representative bundle of goods and services, determining a sample of establishments and of tourism and non-tourism jurisdictions, collecting prices and analysing them. The statistical analysis consists of mean-comparison tests for the prices in
tourism and non-tourism municipalities of every product surveyed (see the ’statistical framework’ section). This section goes into the details of the survey and the sample design.

Sample of jurisdictions

The study considers 45 tourism and non-tourism jurisdictions in Catalonia and 6 districts of the city of Barcelona. Determining which Catalan jurisdictions should be classified as tourism is not straightforward. It is not possible to rely on international tourist arrivals and international tourist receipts since this information, although available at country level (UNWTO, 2008), does not exist for individual jurisdictions. Nevertheless, the Statistical Institute of Catalonia (2009) measures the *de facto* population for the Catalan jurisdiction with more than 5,000 *de jure* inhabitants (Costa and Rovira, 2001). *De facto* population (Siegel, 2002) takes into account both temporary and permanent residents. However, not all temporary residents are tourists, since temporary residents can be categorized as (Smith, 1989): daytime production (for example, job commuters), daytime consumption (for example, hospitalization, shoppers, daytime tourists), overnight production (for example, temporary workers) and overnight consumption (for example, owners of second homes, overnight tourists). Thus, *de facto* population must be complemented with other data, such as the presence of major tourism attractions in the jurisdiction.

Indeed, it could be argued that jurisdictions hosting major tourism attractions can be classified directly as tourism jurisdictions without taking into account the *de facto* population. However, in many instances this is not sensible. For instance, Figueres is a town with 40,000 inhabitants close to the Costa Brava, which hosts the Salvador Dalí Theatre-Museum that attracts tourists from around the world (for instance, the museum received more than 837,000 visitors in 2005 [Rigall-I-Torrent, 2007]). Nevertheless, Figueres can hardly be considered as a tourism jurisdiction, since nowadays most visitors to the town are daytime tourists staying at hotels on the Costa Brava (Rigall-I-Torrent, 2007). These tourists are unlikely to exert significant impacts on the prices of the products considered in this paper. This suggests that a third dimension, hospitality infrastructure (that is, hotel and camping capacity, second homes, etc), must be considered.

Thus, this study classifies a jurisdiction along three dimensions:

- the ratio of non-registered (*de facto*) residents over *de jure* inhabitants in the jurisdiction
- the ratio of hospitality infrastructure per capita in the jurisdiction
- major tourism attractions located in the jurisdiction.

The specific variables used for classifying municipalities between tourism and non-tourism along these dimensions are (Rigall-I-Torrent, 2003):

- ratio of the *de facto* over *de jure* population
- hotel capacity per 1,000 *de jure* inhabitants
- camping capacity per 1,000 *de jure* inhabitants
- second homes per 1,000 *de jure* inhabitants
- restaurants per 1,000 *de jure* inhabitants
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- local police officers per 1,000 de jure inhabitants
- ratio of the de facto population in June–July over the de jure population
- ratio of the de facto population in November–December over the de jure population
- presence of major tourism attractions (beaches, ski resorts or renowned museums, for instance).

Table 1 shows the municipalities included in the sample, together with the values taken by the variables considered. Notice how all the values for Lloret the Mar (an outstanding Catalan tourism jurisdiction) are above Catalonia’s average, while those for Figueres (except the number of local tourism officers) are below average. The variables in Table 1, together with the authors’ knowledge of the different jurisdictions and the opinion of experts at the Observatory of Tourism of Catalonia (a public institution which studies, researches and keeps an ongoing eye on tourism), are at the basis of the final classification of tourism and non-tourism jurisdictions.1

The particular jurisdictions in Table 1 were selected according to their number of inhabitants and proximity between jurisdictions, so that a representative cross section of similar tourism and non-tourism jurisdictions was available for comparison (that is, so that the ceteris paribus clause holds). All the tourism municipalities surveyed are located along the coast and in the Pyrenees, whereas the non-tourism municipalities are distributed across the region (see Figure 1).

Sample of retailers

Prices come from a sample of retailers. Since different retailers may apply different marketing and pricing strategies, the sample includes the main supermarket chains with broad geographical presence in the jurisdictions analysed (Caprabo, Dia, Suma, Carrefour, Mercadona, Bon Preu, Condis and Lidl). Besides, some prices were collected in local markets (fresh foods), bakeries (bread) and bars (certain drinks).2 Thus, prices are available for 225 supermarkets and 204 bars, bakeries and local markets in 45 jurisdictions and 6 districts of the city of Barcelona. Table 2 shows the distribution of supermarket chains in the sample. As stands to reason, retail outlets catering mainly for tourists are not considered, since if they display higher prices, then informed locals are unlikely to shop there.

Sample of products

The sampling scheme relies on the criteria set up by the Spanish Statistical Institute regarding the consumption patterns of a representative consumer (INE, 2001). Since this paper’s goal is to evaluate price differences between tourism and non-tourism jurisdictions (rather than absolute price levels for both types of jurisdictions), the sample does not include any products or services which, because of their characteristics, lack uniformity between different municipalities, or whose prices do not differ systematically between municipalities. For instance, regulated goods and services (such as butane gas, tobacco or prescription drugs), products with prices set at a national level (such as services related to telecommunications), products whose quality and
Table 1. Jurisdictions in the sample and selection criteria (tourism jurisdictions in bold).

| Jurisdiction          | De jure population (2007) | Ratio of de facto population (2003) | Hotel capacity per 1,000 inhabitants (2003) | Camping capacity per 1,000 inhabitants (2003) | Second homes per 1,000 de jure inhabitants (2001) | Restaurants per 1,000 de jure inhabitants (2000) | Local police officers per 1,000 inhabitants (2006) | De facto population June–July/December (2006) | De facto population (1996) | Tourism attractions |
|-----------------------|---------------------------|-------------------------------------|--------------------------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|----------------------------------|-----------------------|---------------------|
| Calafell              | 21,871                    | 1.40                                | 92.74                                      | 25.18                                         | 1,236.44                                        | 9.41                                           | 3.31                                           | 5.80                             | 4.98                  | Beach               |
| Calella               | 18,034                    | 1.62                                | 900.97                                     | 121.50                                        | 181.12                                         | 9.04                                           | 2.66                                           | 4.52                             | 3.21                  | Beach               |
| Calonge               | 10,009                    | 1.92                                | 162.40                                     | 900.63                                        | 923.09                                         | 7.81                                           | 2.22                                           | 7.61                             | 5.59                  | Beach               |
| Cambrils              | 29,112                    | 1.46                                | 230.86                                     | 579.28                                        | 714.48                                         | 10.43                                          | 2.33                                           | 5.07                             | 4.03                  | Beach               |
| Castell-Platja d’Aro  | 9,766                     | 2.66                                | 592.66                                     | 1,226.57                                      | 1,307.51                                       | 14.65                                          | 3.28                                           | 9.91                             | 6.80                  | Beach               |
| L’Escala              | 9,330                     | 2.18                                | 118.34                                     | 770.04                                        | 1,549.68                                       | 10.98                                          | 2.84                                           | 8.49                             | 6.62                  | Beach               |
| Lloret de Mar         | 34,997                    | 2.07                                | 1,218.01                                   | 134.38                                        | 331.84                                         | 11.72                                          | 2.63                                           | 5.72                             | 4.07                  | Beach               |
| Malgrat de Mar        | 17,822                    | 1.31                                | 399.06                                     | 265.27                                        | 92.94                                          | 4.31                                           | 2.62                                           | 3.26                             | 2.63                  | Beach               |
| Mont-Roig del Camp    | 10,292                    | 1.66                                | 79.40                                      | 1,568.44                                      | 679.97                                         | 9.13                                           | 2.01                                           | 7.96                             | 5.38                  | Beach               |
| Pineda de Mar         | 25,568                    | 1.15                                | 169.37                                     | 122.23                                        | 169.52                                         | 3.79                                           | 2.31                                           | 3.53                             | 3.11                  | Beach               |
| Puigcerdà             | 8,949                     | 1.10                                | 95.59                                      | 98.95                                         | 219.06                                         | 6.66                                           | 1.35                                           | 2.96                             | 2.74                  | Nature, sports      |
| Roses                 | 18,139                    | 1.96                                | 459.75                                     | 142.74                                        | 1,259.53                                       | 11.43                                          | 2.04                                           | 6.11                             | 4.90                  | Beach               |
| Salou                 | 23,398                    | 2.49                                | 1,500.41                                   | 315.07                                        | 957.43                                         | 18.76                                          | 2.93                                           | 9.89                             | 7.22                  | Beach               |
| Santa Susanna         | 3,019                     | N/A                                 | 3,734.77                                   | 1,061.33                                      | 446.39                                         | 6.29                                           | 5.44                                           | 13.69                            | 7.82                  | Beach               |
| Sitges                | 26,225                    | 1.17                                | 175.51                                     | 106.30                                        | 264.00                                         | 7.61                                           | 3.12                                           | 3.50                             | 3.00                  | Beach               |
| Sort                  | 2,264                     | 1.32                                | 259.88                                     | 714.66                                        | 384.91                                         | 3.35                                           | 0.00                                           | 3.81                             | 3.33                  | Nature, sports       |
| Torroella de Montgrí  | 10,924                    | 2.16                                | 220.80                                     | 1,324.28                                      | 633.81                                         | 10.65                                          | 2.27                                           | 6.55                             | 4.30                  | Beach               |
| Tossa de Mar          | 5,662                     | N/A                                 | 1,545.55                                   | 1,369.41                                      | 1,028.72                                       | 29.08                                          | 4.99                                           | 10.81                            | 6.73                  | Beach               |
| Vielha                | 5,385                     | 1.37                                | 528.92                                     | 229.82                                        | 406.09                                         | 13.77                                          | 0.00                                           | 4.01                             | 3.56                  | Nature, sports       |
| Vila-Seca             | 18,678                    | 1.47                                | 456.42                                     | 58.43                                         | 583.98                                         | 2.82                                           | 1.68                                           | 4.12                             | 3.60                  | Beach               |
| Balaguer              | 15,781                    | 0.94                                | 8.67                                       | 22.89                                         | 1.36                                           | 1.20                                           | 1.84                                           | 1.84                             | –                     | –                   |
| Banyoles              | 17,451                    | 0.99                                | 13.05                                      | 0.00                                          | 46.13                                         | 1.53                                           | 1.62                                           | 1.91                             | 1.94                  | Lake                |
| Municipality      | Inbound demand | Price level | Unit Price | Foreign demand | Capacity | Price level | Unit Price | Price level | Unit Price |
|------------------|----------------|-------------|------------|----------------|----------|-------------|------------|-------------|------------|
| Cassà de la Selva | 8,994          | 0.96        | 2.70       | 0.00           | 26.16    | 0.78        | 2.28       | 1.98        | 1.99       |
| Castelldefels     | 58,955         | 0.95        | 27.80      | 25.05          | 116.87   | 2.33        | 1.47       | 2.11        | 1.93       |
| Cervera           | 9,093          | 1.01        | 9.62       | 0.00           | 49.18    | 2.15        | 0.86       | 2.20        | 2.11       |
| El Vendrell       | 33,340         | 1.24        | 65.59      | 115.81         | 656.22   | 3.06        | 2.25       | 3.87        | 3.34       |
| Esparreguera      | 21,260         | 0.93        | 2.16       | 0.00           | 55.54    | 0.64        | 1.61       | 2.04        | 1.95       |
| Figueres          | 41,115         | 1.01        | 34.45      | 5.78           | 44.18    | 2.12        | 1.64       | 1.88        | 1.90       |
| Girona            | 92,186         | 1.06        | 13.24      | 0.00           | 66.07    | 2.74        | 1.49       | 1.79        | 1.83       |
| Lleida            | 127,314        | 1.02        | 18.27      | 4.53           | 61.54    | 2.57        | 1.44       | 1.77        | 1.86       |
| Mataró            | 119,035        | 0.95        | 3.48       | 4.36           | 9.70     | 1.28        | 1.36       | 1.81        | 1.89       |
| Mollerussa        | 13,086         | 1.00        | 13.27      | 0.00           | 20.28    | 1.67        | 1.43       | 2.04        | 1.98       |
| Montblanc         | 6,818          | 1.06        | 24.11      | 83.44          | 84.64    | 2.32        | 2.07       | 2.22        | 2.10       |
| Olot              | 32,357         | 0.97        | 10.49      | 20.07          | 17.89    | 1.64        | 1.44       | 1.89        | 1.91       |
| Reus              | 104,855        | 0.96        | 8.11       | 0.00           | 27.08    | 1.47        | 1.41       | 1.70        | 1.82       |
| Sabadell          | 201,712        | 0.94        | 4.39       | 0.00           | 11.65    | 1.08        | 1.29       | 1.78        | 1.88       |
| Santa Coloma de   | 11,090         | 0.98        | 21.46      | 0.00           | 69.57    | 1.47        | 1.80       | 1.95        | 1.91       |
| Santa Maria de    | 8,235          | 0.96        | 1.91       | 0.00           | 149.37   | 1.11        | 2.22       | 2.21        | 2.07       |
| Palautordera      | 134,163        | 1.04        | 20.80      | 56.09          | 60.02    | 2.24        | 1.61       | 1.87        | 1.93       |
| Tarragona         | 14,017         | 0.97        | 6.27       | 0.00           | 67.49    | 1.84        | 2.09       | 2.32        | 2.07       |
| Tordera           | 14,524         | 1.25        | 34.34      | 191.53         | 688.46   | 7.84        | 3.77       | 4.10        | 3.43       |
| Torredembarra     | 34,852         | 1.01        | 21.72      | 0.00           | 47.65    | 1.22        | 1.61       | 1.97        | 1.95       |
| Tortosa           | 23,948         | 0.99        | 6.28       | 0.00           | 42.40    | 1.28        | 1.76       | 2.03        | 1.97       |
| Valls             | 38,321         | 1.06        | 9.93       | 0.00           | 43.26    | 2.51        | 1.63       | 1.97        | 1.98       |
| Vilafranca del    | 36,656         | 0.97        | 12.70      | 0.00           | 28.24    | 1.97        | 1.63       | 1.91        | 1.91       |
| Penedès           | 7,210,508      | 1.29        | 38.08      | 35.94          | 80.95    | 2.23        | 1.44       | 2.11        | 2.08       |

**Source:** Own elaboration with data from the Statistical Institute of Catalonia (2009).
composition may differ between jurisdictions (for example, clothing, footwear, furniture, or housing), goods and services not consumed by tourists (for example, education) and products with a small weight in the CPI shopping basket (for example, culture and leisure) are not considered. Other services, such as hotels, are also ignored, since they are typically consumed only by tourists and they are not included in the shopping basket of local residents. Following CPI conventions, the prices considered include value-added taxes. The final sample contains 149 different products which range from fresh food, bread, bar drinks, cleaning and drugstore products. Table 3 presents a summary of the products analysed. (A complete list of the products surveyed featuring their brand, characteristics and establishment where prices were surveyed is available from the authors on request.)

**Pilot and definitive survey**

A pilot survey was conducted in six jurisdictions (including Barcelona) prior to the definitive survey. The pilot revealed that certain products were not available at every supermarket chain surveyed. Unavailable products were replaced with similar ones that were more widely available. In the definitive survey, prices were collected twice. First, prices were recorded for the low tourism season (from 6 November 2006 to 15 December 2006). Another survey was conducted for the high tourism season (from 18 June 2007 to 16 July...
Table 2. Sample of supermarket chains, bakeries, bars and local markets.

| Jurisdiction          | Caprabo | Dia | Carrefour | Mercadona | Lidl | Condis | Suma Preu | Bon Beries | Bars Local markets |
|-----------------------|---------|-----|-----------|-----------|------|--------|-----------|------------|-------------------|
| Calonge               | x       | x   | x         | x         | x    | x      | x         |            |                   |
| Castell-Pl. Aro       | x       | x   | x         | x         | x    | x      | x         |            |                   |
| L’Escala              | x       |     |           |           | x    | x      | x         |            |                   |
| Lloret de M.          |         |     |           |           | x    | x      | x         |            |                   |
| Puigcerdà             | x       |     |           |           | x    | x      | x         |            |                   |
| Roses                 | x       | x   | x         | x         | x    | x      | x         |            |                   |
| Tossa de Mar          | x       |     |           |           | x    | x      | x         |            |                   |
| Calella               | x       |     |           |           | x    | x      | x         |            |                   |
| Malgrat M.            | x       |     | x         | x         |      | x      | x         |            |                   |
| Pineda M.             | x       | x   | x         | x         |      |        |           |            |                   |
| Sta. Susanna          |         |     |           |           | x    | x      | x         |            |                   |
| Sitges                | x       | x   | x         | x         |      |        |           |            |                   |
| Barcelona-Rambla      | x       | x   |           |           |      |        |           |            |                   |
| Barcelona-S. Família  | x       | x   | x         | x         | x    | x      | x         |            |                   |
| Barcelona-P. Olímpic  | x       | x   | x         | x         |      |        |           |            |                   |
| Calafell              |         |     |           |           | x    | x      | x         |            |                   |
| Cambrils              | x       | x   | x         |           |      |        |           |            |                   |
| Mont-Roig             |         |     |           |           | x    | x      | x         |            |                   |
| Salou                 | x       | x   |            |           |      |        |           |            |                   |
| Vila-Seca             |         |     |           |           | x    | x      | x         |            |                   |
| Sort                  |         |     |           |           | x    | x      | x         |            |                   |
| Vila                   |         |     |           |           | x    | x      | x         |            |                   |
| Girona                | x       | x   | x         | x         |      |        |           |            |                   |
| Figueres              | x       | x   | x         | x         |      |        |           |            |                   |
| Olot                  | x       | x   | x         | x         |      |        |           |            |                   |
| Banyoles              | x       | x   | x         | x         |      |        |           |            |                   |
| Sta. Coloma F         |         |     |           |           | x    | x      | x         |            |                   |
| Cassà Selva           | x       |     |           |           |      |        |           |            |                   |
| Sabadell              |         |     |           |           | x    | x      | x         |            |                   |
| Mataró                |         |     |           |           | x    | x      | x         |            |                   |
| Castelldefels         |         |     |           |           | x    | x      | x         |            |                   |
| Vic                   | x       | x   | x         | x         |      |        |           |            |                   |
| Vilafraanca P.        |         |     |           |           | x    | x      | x         |            |                   |
| Esparreguera          | x       | x   | x         | x         |      |        |           |            |                   |
| Tordera               |         |     |           |           | x    | x      | x         |            |                   |
| Sta. Maria P.         | x       | x   | x         |           |      |        |           |            |                   |
| Barcelona-El Clot     | x       | x   | x         | x         | x    | x      | x         |            |                   |
| Barcelona-Gràcia      | x       | x   | x         | x         | x    | x      | x         |            |                   |
| Barcelona-Sarrí       | x       | x   | x         |           |      |        |           |            |                   |
| Tarragona             | x       | x   | x         | x         | x    | x      | x         |            |                   |
| Reus                  | x       | x   | x         | x         |      |        |           |            |                   |
| Tortosa               | x       | x   | x         | x         |      |        |           |            |                   |
| El Vendrell           | x       | x   | x         |           |      |        |           |            |                   |
| Valls                 | x       | x   | x         | x         |      |        |           |            |                   |
| Torredembarra         | x       |     |           |           |      |        |           |            |                   |
| Montblanc             | x       |     |           |           |      |        |           |            |                   |
| Lleida                | x       | x   | x         | x         |      |        |           |            |                   |
| Balaguer              | x       | x   | x         |           |      |        |           |            |                   |
| Mollerussa            | x       |     | x         |           |      |        |           |            |                   |
| Cervera               | x       | x   | x         | x         |      |        |           |            |                   |
Table 3. Summary of products surveyed.

| Product code | Product code | Product code | Product code |
|--------------|--------------|--------------|--------------|
| 10           | 391          | 1061         | Manchego cheese |
| 12           | 399          | 1064         | Grated cheese |
| 25           | 402          | 1074         | Paëstrus cheese |
| 39           | 419          | 1091         | Melted cheese |
| 85           | 495          | 1123         | Sliced cheese |
| 118          | 509          | 1144         | Skinless hake fillet |
| 132          | 523          | 1155         | Cheese-filled escalope |
| 138          | 528          | 1182         | Cheese and ham pizza |
| 152          | 545          | 1194         | Stewed vegetables |
| 166          | 561          | 1221         | Liquid laundry soap |
| 182          | 565          | 1230         | Liquid laundry soap |
| 198          | 572          | 1320         | Liquid toilet cleaner |
| 204          | 573          | 1350         | Disinfectant |
| 231          | 585          | 1356         | Laundry bleach |
| 237          | 588          | 1384         | Dishwasher detergent |
| 301          | 596          | 1454         | Aluminium foil |
| 321          | 616          | 1516         | Deodorant |
| 336          | 620          | 1551         | Shower gel |
| 337          | 635          | 1568         | Toothpaste |
| 356          | 656          | 1603         | Styling gel |
| 358          | 699          | 1640         | Shampoo |
| 362          | 729          | 1699         | Diapers |
| 363          | 766          | 1723         | Batteries |
| 364          | 774          | 2036         | Toilet paper |
| 366          | 781          | 2117         | Dishwashing foam |
| 367          | 785          | 8383         | Apples |
| 368          | 786          | 9002         | Tea bags |
| 369          | 787          | 9003         | Potato crisps |
| 370          | 826          | 9004         | Sandwich bread |
| 371          | 840          | 9007         | Roasted ground coffee |
| 372          | 868          | 9010         | Washing powder |
| 373          | 876          | 9012         | Floormats |
| 374          | 884          | 9015         | Fresh cheese |
| 375          | 895          | 9016         | Fabric softener |
| 378          | 903          | 9029         | Cured ham |
| 380          | 920          | 9031         | Canned crushed tomatoes |
| 381          | 924          | 84000        | Cookies |
| 382          | 954          | BC1/BT1      | Mineral water (bar) |
| 383          | 944          | BC2/BT2      | Beer (bar) |
| 384          | 947          | BC3/BT3      | Chocolate milkshake (bar) |
| 385          | 958          | BC4/BT4      | Cola drink (bar) |
| 386          | 959          | BC6/BT6      | White coffee (bar) |
| 387          | 975          | BC7/BT7      | Black coffee (bar) |
| 388          | 1033         | BC8/BT8      | Tea (bar) |
| 389          | 1040         | BC5/BT5      | Espresso coffee with a dash of milk (bar) |
| 390          | 1060         | Fresh Manchego cheese |
2007). Since low-season prices refer to 2006, whereas high-season prices refer to 2007, price differences between periods may be due to end-of-year price revisions linked to general inflation, rather than to tourism demand. Nevertheless, it is unlikely that tourism and non-tourism municipalities display different patterns of general inflation (see the ‘discussion’ section).

University students were trained as pollsters. They recorded each product’s price (regular and sale price of products on sale) in a questionnaire. If a certain product was unavailable, the pollsters collected the price of the closest (in terms of characteristics, weight and volume) substitute, staying with the original brand or, when this was not possible, resorting to distributor brands. The prices of fresh food at local markets were collected randomly: the pollsters entered the market through its main entrance and surveyed the first vendor on their right-hand side, proceeding to adjacent vendors until the price of every product on the list was recorded. A similar procedure was used for bars and bakeries. For bars in tourism jurisdictions, prices were collected (and recorded separately) for establishments located in tourism and non-tourism zones within the jurisdiction.

At the end of the process, a sample containing a total of 18,500 prices resulted. The analysis of the prices recorded reveals a few ‘outliers’ (that is, individual prices which differ a lot from one certain jurisdiction or supermarket to another). Since it is not possible to discard the hypothesis that those differences are motivated by particular marketing strategies, outlier prices are kept in the sample. (In any case, if outliers are true errors, then they are likely to be distributed randomly among jurisdictions, so that they do not affect the paper’s results).

Statistical framework

The statistical analysis of the data collected through the survey relies on two kinds of mean comparison tests. First, it is assumed that population variances are unknown and equal. Thus, two independent random samples of prices of the same product (denoted by $j$) are available, with respective sizes $n_X$ and $n_Y$ (where $X$ and $Y$ refer, respectively, to tourism and non-tourism jurisdictions), drawn from normally distributed populations with respective means $\mu_X$ and $\mu_Y$ and identical variances. The pooled variance estimator is computed from the sample variances $s^2_X$ and $s^2_Y$ (Newbold et al., 2003):

$$s^2_p = \frac{(n_X - 1)s^2_X + (n_Y - 1)s^2_Y}{n_X + n_Y - 2}.$$  \hspace{1cm} (1)

The null hypothesis ($H_0$) states that no differences in prices exist between tourism and non-tourism municipalities, whereas the alternative hypothesis ($H_1$) states that differences do exist. Formally,

$$H_0 : \mu_X - \mu_Y = 0 \text{ and } H_1 : \mu_X - \mu_Y \neq 0.$$  \hspace{1cm} (2)

At a significance level of 5%, the null hypothesis is rejected when
where $\bar{X}$ and $\bar{Y}$ are, respectively, the sample means of the prices of product $j$ in tourism and non-tourism jurisdictions and $t_{n_X+n_Y-2.5\%}$ is the value for which $\text{Prob}(t_{n_X+n_Y-2.5\%}) = 5\%$.

A second mean comparison test assumes that population variances are unknown and different. Samples of size $n_X$ and $n_Y$, respectively, are drawn from normally distributed populations of prices of product $j$ with respective means $\mu_X$ and $\mu_Y$. The number of degrees of freedom of the statistic $t$, $\nu$, is computed through (Newbold et al., 2003):

$$\nu = \frac{\left(\frac{s^2_{jX}}{n_X^2} + \frac{s^2_{jY}}{n_Y^2}\right)}{\frac{n_X}{n_X - 1} + \frac{n_Y}{n_Y - 1}}.$$  (4)

The null and the alternative hypotheses are identical as before. At a significance level of $5\%$, the null hypothesis is rejected when:

$$\frac{\bar{X} - \bar{Y}}{\sqrt{\frac{s^2_{jX}}{n_X} + \frac{s^2_{jY}}{n_Y}}} < - t_{\nu,2.5\%}, \text{ or } \frac{\bar{X} - \bar{Y}}{\sqrt{\frac{s^2_{jX}}{n_X} + \frac{s^2_{jY}}{n_Y}}} > t_{\nu,2.5\%}.$$  (5)

Levene’s statistic for equality of variances is used to decide which of the two contrasts above is the most appropriate (Levene, 1960):

$$L = \frac{(n_X + n_Y - 2)(\sum_{j=1}^{n_X} (Z_{jX} - \bar{Z})^2 + \sum_{j=1}^{n_Y} (Z_{jY} - \bar{Z})^2)}{\sum_{j=1}^{n_X} (Z_{jX} - \bar{Z})^2 + \sum_{j=1}^{n_Y} (Z_{jY} - \bar{Z})^2}.$$  (6)

where

$$k = X,Y,Z_{ki} = |j_i - \bar{j_i}|, \bar{Z}_{ki} = \frac{\sum_{j=1}^{n_X} j_{ki}}{n_{ki}}, \text{ and } \bar{Z} = \frac{\bar{Z}_{iX} + \bar{Z}_{iY}}{n_{iX} + n_{iY}}.$$  (7)

The null and the alternative hypotheses are, respectively,
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\[ H_0 : \sigma_{jX} = \sigma_{jY} \text{ and } H_1 : \sigma_{iX} \neq \sigma_{jY} . \]  

(8)

Levene's test rejects the null hypothesis of equal variances whenever

\[ L > F(5\%, 1, n_{jX} + n_{jY} - 2) . \]

This statistical framework (with the appropriate minor modifications) is used to test the seven hypotheses formulated in the theoretical framework. The main results of the empirical analysis are presented in the next section.

**Results**

**Hypothesis 1**

When the high- and low-season prices for all supermarkets, bakeries and local markets (excluding bars) are pooled, only 4 (product codes 1144, 321, 868, 9012; see Table 3 for details) out of 149 products surveyed, that is, fewer than 3% of all the products analysed, have significantly (that is, at a 95% confidence level) higher prices in tourism jurisdictions. The prices of 10 products (product codes 1106, 362, 363, 364, 366, 367, 368, 372, 388, 9016), that is, fewer than 7% of the total, are significantly higher in non-tourism municipalities. Thus, no statistically significant price differences exist for 135 products, that is, for more than 90% of the products surveyed.

Table 4 shows the results of the analysis of list prices (excluding sales) for all the establishments available in the sample (excluding bars). (Detailed subsequent results are not displayed in tables for reasons of space. A complete list of tables with detailed results is available from the authors on request.) These results include the districts of Barcelona in the sample. Since the dimensions of these districts are much bigger than those of the rest of the jurisdictions in the sample (in 2007, Barcelona had a total population of 1,595,110) and it is not easy to define the boundaries of its tourism districts, it is reasonable to test the effects on the results of excluding Barcelona from the analysis. When Barcelona's districts are included from the sample, the results do not change substantially. For instance, when low- and high-season prices are pooled, 5 products (product codes 144, 868, 895, 9012, 934) have higher prices in tourism municipalities (4 when Barcelona's districts are included in the sample) and 5 (product codes 364, 367, 368, 380, 388) have higher prices in non-tourism jurisdictions (10 when Barcelona is included). This suggests that the paper's results are robust to small changes in the sample composition.

**Hypothesis 2**

With few variations, the above observations remain valid for the trough and the height of the tourism season. Whereas for the low tourism season only 2 products (product codes 9012, 975) have higher prices in tourism municipalities (1.4% of all the products surveyed), at the height of the season the prices of 9 products (product codes 1144, 1640, 182, 321, 616, 774, 868, 9007, 934), that is 6.4% of all the products, are higher in tourism jurisdictions.
Table 4. List prices (excluding sales) for all the establishments available in the sample (excluding bars).

| Product code | Test for equality of price variances | Test for equality of price means | Confidence interval for the difference (95%) | Data summary |
|--------------|-------------------------------------|----------------------------------|---------------------------------------------|-------------|
|              | Equal variances                     | Different variances              | Type of jurisdiction | N | Price mean | Typical deviation | Typical error of mean |
| 10           | 2.464 0.121                         | 0.2464                           | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.995                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1033         | 1.276 0.262                         | 0.276                            | Tourism | 25 | 1.434 0.1802 | 0.03604            |
|              | –0.995                              | –0.0094                          | Non-tourism | 48 | 1.472 0.0506 | 0.00731            |
| 1040         | 0.733 0.370                         | 0.733                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.370                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1060         | 0.896 0.494                         | 0.896                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.494                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1061         | 1.147 1.126                         | 1.147                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.126                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1064         | 0.694 0.406                         | 0.694                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.406                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1074         | 0.483 0.498                         | 0.483                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.498                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1084         | 0.035 0.855                         | 0.035                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.855                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1091         | 0.553 0.460                         | 0.553                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.460                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1106         | 0.171 0.719                         | 0.171                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.719                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1123         | 0.231 0.632                         | 0.231                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.632                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1144         | 0.396 0.531                         | 0.396                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.531                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1155         | 0.180 0.673                         | 0.180                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.673                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 118          | 5.492 0.200                         | 5.492                            | Tourism | 29 | 1.232 0.0467 | 0.00867            |
|              | 0.200                               | 0.0072                           | Non-tourism | 46 | 0.220 0.0180 | 0.00265            |
| 1182 | Equal variances | 1.533 | 0.219 | 0.269 | 77 | 0.789 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1194 | Equal variances | 0.479 | 0.492 | 0.390 | 55 | 0.698 | 0.01064 | 0.02730 | -0.04408 | 0.06556 | 0.06685 | Tourism | 18 | 1.8950 | 0.09775 | 0.02304 |
| 12 | Equal variances | 1.045 | 0.387 | 0.281 | 77 | 0.789 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1221 | Equal variances | 4.904 | 0.037 | 0.904 | 23 | 0.786 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1230 | Equal variances | 0.479 | 0.492 | 0.390 | 55 | 0.698 | 0.01064 | 0.02730 | -0.04408 | 0.06556 | 0.06685 | Tourism | 18 | 1.8950 | 0.09775 | 0.02304 |
| 132 | Equal variances | 0.479 | 0.492 | 0.390 | 55 | 0.698 | 0.01064 | 0.02730 | -0.04408 | 0.06556 | 0.06685 | Tourism | 18 | 1.8950 | 0.09775 | 0.02304 |
| 1330 | Equal variances | 1.045 | 0.387 | 0.281 | 77 | 0.789 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1349 | Equal variances | 1.114 | 0.295 | -0.489 | 76 | 0.626 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1356 | Equal variances | 8.612 | 0.094 | 1.337 | 0.80 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1388 | Equal variances | 0.262 | 0.610 | 0.452 | 58 | 0.588 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1394 | Equal variances | 0.888 | 0.325 | 0.691 | 79 | 0.492 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1454 | Equal variances | 1.869 | 0.176 | 0.082 | 76 | 0.935 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1516 | Equal variances | 0.450 | 0.505 | -0.971 | 63 | 0.335 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1525 | Equal variances | 0.298 | 0.588 | -0.418 | 42 | 0.678 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1551 | Equal variances | 0.064 | 0.802 | 0.842 | 70 | 0.403 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1608 | Equal variances | 0.026 | 0.871 | -0.777 | 343 | 0.437 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| 1640 | Equal variances | 1.279 | 0.259 | 1.022 | 317 | 0.307 | 0.01040 | 0.03872 | -0.06671 | 0.08751 | 0.07838 | Tourism | 29 | 2.3200 | 0.11414 | 0.02120 |
| Product code | Test for equality of price variances | Test for equality of price means | Confidence interval for the difference (95%) | Data summary |
|--------------|-------------------------------------|----------------------------------|---------------------------------------------|--------------|
|              | Equal variances                     |                                  |                                             |              |
|              | Different variances                 |                                  |                                             |              |
| 166          | 0.411                               | 0.178                           | 0.118                                       |              |
|              |                                     |                                  |                                             |              |
| 1665         | 0.254                               | 0.043                           | 0.150                                       |              |
|              |                                     |                                  |                                             |              |
| 1667         | 0.941                               | 0.111                           | 0.166                                       |              |
|              |                                     |                                  |                                             |              |
| 1699         | 0.184                               | 0.066                           | 0.043                                       |              |
|              |                                     |                                  |                                             |              |
| 1723         | 0.306                               | 0.018                           | 0.010                                       |              |
|              |                                     |                                  |                                             |              |
| 182          | 0.208                               | 0.111                           | 0.166                                       |              |
|              |                                     |                                  |                                             |              |
| 19           | 0.418                               | 0.120                           | 0.178                                       |              |
|              |                                     |                                  |                                             |              |
| 198          | 0.603                               | 0.120                           | 0.031                                       |              |
|              |                                     |                                  |                                             |              |
| 2036         | 0.041                               | 0.184                           | 0.043                                       |              |
|              |                                     |                                  |                                             |              |
| 204          | 0.222                               | 0.119                           | 0.166                                       |              |
|              |                                     |                                  |                                             |              |
| 2117         | 0.100                               | 0.105                           | 0.600                                       |              |
|              |                                     |                                  |                                             |              |
| 231          | 0.652                               | 0.109                           | 0.150                                       |              |
|              |                                     |                                  |                                             |              |
| 237          | 0.014                               | 0.120                           | 0.031                                       |              |
|              |                                     |                                  |                                             |              |
| 25           | 0.065                               | 0.100                           | 0.166                                       |              |

**Notes:**
- Equal variances: 
- Different variances: 
- Price mean: 
- Typical error of mean: 
- Type of jurisdiction: Tourism, Non-tourism.
| 301 | Equal variances | Different variances | 5.151 | 0.698 | 3.360 | 308 | 0.175 | 0.05226 | 0.03844 | −0.02239 | −0.02346 | 0.12790 | 0.12797 | Tourism | Non-tourism | 112 | 198 | 2.3409 | 2.2886 | 0.32844 | 0.32533 | 0.03069 | 0.02312 |
| 321 | Equal variances | Different variances | 5.464 | 0.020 | 2.433 | 23.47 | 0.017 | 0.40684 | 0.18114 | 0.08019 | 0.08012 | 29 | Tourism | 3.6428 | 0.84427 | 0.15678 |
| 336 | Equal variances | Different variances | 0.174 | 0.678 | −0.235 | 81 | 0.815 | −0.02745 | 0.11675 | −0.25974 | −0.26675 | 0.20848 | 0.21185 | Tourism | 31 | 5.0577 | 0.54548 | 0.09781 |
| 337 | Equal variances | Different variances | 3.548 | 0.060 | 0.436 | 344 | 0.294 | 0.02397 | 0.05504 | −0.08429 | −0.07684 | 0.13224 | 0.12441 | Tourism | 119 | 4.1634 | 0.40849 | 0.03745 |
| 356 | Equal variances | Different variances | 0.334 | 0.565 | 0.280 | 83 | 0.780 | 0.00618 | 0.02205 | −0.03776 | −0.04076 | 0.05003 | 0.05131 | Tourism | 30 | 1.2100 | 0.10954 | 0.02000 |
| 358 | Equal variances | Different variances | 0.026 | 0.872 | −1.596 | 61 | 0.116 | −0.51106 | 0.32031 | −1.15155 | 0.12943 | 26 | Tourism | 6.1346 | 1.19614 | 0.23458 |
| 359 | Equal variances | Different variances | 1.841 | 0.180 | −0.860 | 60 | 0.393 | −0.26035 | 0.32090 | −0.86624 | −0.91364 | 0.34555 | 0.39294 | Tourism | 27 | 6.0622 | 1.49350 | 0.28742 |
| 361 | Equal variances | Different variances | 2.426 | 0.124 | −0.920 | 62 | 0.361 | −0.73276 | 0.79667 | −2.32527 | −2.39991 | 0.85975 | 0.94348 | Tourism | 27 | 14.0307 | 3.90942 | 0.69098 |
| 362 | Equal variances | Different variances | 3.516 | 0.066 | −2.409 | 61 | 0.019 | −0.65787 | 0.27308 | −1.20932 | −1.13571 | 7 | Non-tourism | 7.6652 | 0.87269 | 0.16791 |
| 363 | Equal variances | Different variances | 0.001 | 0.976 | −2.441 | 61 | 0.118 | −0.83241 | 0.34096 | −1.51419 | −1.50662 | 0.79272 | 0.73425 | Non-tourism | 27 | 7.0948 | 1.34595 | 0.25903 |
| 364 | Equal variances | Different variances | 6.747 | 0.012 | −2.939 | 61 | 0.305 | −1.50731 | 0.51285 | −2.53282 | −0.48181 | 7 | Tourism | 9.6119 | 1.23710 | 0.23808 |
| 365 | Equal variances | Different variances | 0.125 | 0.725 | −2.360 | 62 | 0.021 | −2.15177 | 0.91179 | −3.97441 | −0.92949 | 17 | Non-tourism | 18.9944 | 3.90666 | 0.75184 |
| 367 | Equal variances | Different variances | 6.372 | 0.014 | −2.216 | 61 | 0.030 | −0.39843 | 0.17979 | −0.75782 | −0.03904 | 27 | Tourism | 2.8484 | 0.55848 | 0.10478 |
| 368 | Equal variances | Different variances | 3.409 | 0.059 | −3.856 | 61 | 0.000 | −2.28343 | 0.59218 | −3.46756 | −1.09930 | 26 | Tourism | 9.6285 | 1.74595 | 0.34241 |
| 369 | Equal variances | Different variances | 0.596 | 0.443 | −1.889 | 61 | 0.064 | −1.09629 | 0.58043 | −2.25693 | 0.06435 | 26 | Tourism | 8.9188 | 2.01382 | 0.39494 |
| 370 | Equal variances | Different variances | 0.744 | 0.392 | −1.399 | 48.478 | 0.079 | −0.57358 | 0.13942 | −1.12156 | 0.08580 | 23 | Tourism | 3.2022 | 0.75551 | 0.15700 |
| 371 | Equal variances | Different variances | 0.039 | 0.844 | 0.527 | 55 | 0.600 | 0.47994 | 0.90342 | −1.133456 | 2.28643 | 25 | Tourism | 5.8900 | 3.03503 | 0.66106 |
| 372 | Equal variances | Different variances | 1.522 | 0.223 | −2.415 | 53 | 0.019 | −3.73348 | 1.54597 | −6.83431 | −0.63265 | 23 | Non-tourism | 12.0865 | 5.40419 | 1.12685 |

In addition demand and price levels in tourism municipalities are highlighted.
| Product code | Test for equality of price variances | Test for equality of price means | Confidence interval for the difference (95%) | Data summary |
|--------------|-------------------------------------|---------------------------------|---------------------------------------------|--------------|
|              |                                     |                                 | Inferior | Superior |
|              |                                     |                                 | N | Price mean | Typical deviation | Typical error of mean |
| 373          | Equal variances                     | Tourism                         | 25 | 3.6652    | 0.901080          | 0.18216          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 374          | Equal variances                     | Tourism                         | 23 | 6.6457    | 2.13802          | 0.44581          |
|              | Different variances                 | Non-tourism                     | 35 | 15.8443   | 3.81118          | 0.64421          |
| 375          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 376          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 377          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 378          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 379          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 380          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 381          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 382          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 383          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 384          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 385          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 386          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 387          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 388          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| 389          | Equal variances                     | Tourism                         | 23 | 6.0359    | 1.15061          | 0.20340          |
|              | Different variances                 | Non-tourism                     | 32 | 7.0353    | 2.49698          | 0.44141          |
| Week   | Equal variances | Different variances |
|--------|-----------------|---------------------|
| 39     | 0.390           | 0.534               |
|        | 0.227           | 0.216               |
|        | 86              | 53.757              |
|        | 0.821           | 0.830               |
|        | 0.00718         | 0.00718             |
|        | 0.03167         | 0.03324             |
|        | −0.05578        | −0.05947            |
|        | 0.07015         | 0.07383             |
| Tourism| 31              | 1.1361              |
|        | 0.821           | 0.534               |
|        | 0.03167         | 0.03324             |
|        | −0.05578        | −0.05947            |
|        | 0.07015         | 0.07383             |
| Non-tourism| 57          | 1.1289              |
|         | 0.821           | 0.534               |
|         | 0.03167         | 0.03324             |
|         | −0.05578        | −0.05947            |
|         | 0.07015         | 0.07383             |
| 390    | 1.924           | 1.139               |
|        | 0.260           | 0.22076             |
|        | 0.19374         | 0.17855             |
|        | −0.16819        | −0.13796            |
|        | 0.60971         | 0.57948             |
| Tourism| 20              | 3.5050              |
|        | 0.821           | 0.534               |
|        | 0.03167         | 0.03324             |
|        | −0.05578        | −0.05947            |
|        | 0.07015         | 0.07383             |
| Non-tourism| 33          | 3.2842              |
|         | 0.821           | 0.534               |
|         | 0.03167         | 0.03324             |
|         | −0.05578        | −0.05947            |
|         | 0.07015         | 0.07383             |
| 391    | 0.828           | 0.865               |
|        | 0.391           | 0.2053              |
|        | 0.23177         | 0.22587             |
|        | −0.26477        | 0.66588             |
|        | 0.07015         | 0.07383             |
| Tourism| 20              | 3.4075              |
|        | 0.821           | 0.534               |
|        | 0.03167         | 0.03324             |
|        | −0.05578        | −0.05947            |
|        | 0.07015         | 0.07383             |
| Non-tourism| 33          | 3.2070              |
|         | 0.821           | 0.534               |
|         | 0.03167         | 0.03324             |
|         | −0.05578        | −0.05947            |
|         | 0.07015         | 0.07383             |
| 399    | 4.225           | 0.956               |
|        | 0.342           | 0.00644             |
|        | 0.00718         | 0.00814             |
|        | −0.00696        | 0.01984             |
|        | 0.0674          | 0.0674              |
|        | 0.07383         | 0.07383             |
| Tourism| 31              | 0.3610              |
|        | 0.821           | 0.534               |
|        | 0.03167         | 0.03324             |
|        | −0.05578        | −0.05947            |
|        | 0.07015         | 0.07383             |
| Non-tourism| 53          | 0.3545              |
|         | 0.821           | 0.534               |
|         | 0.03167         | 0.03324             |
|         | −0.05578        | −0.05947            |
|         | 0.07015         | 0.07383             |
| 402    | 0.444           | 0.506               |
|        | 0.865           | 0.00153             |
|        | 0.00718         | 0.00819             |
|        | −0.00696        | 0.01984             |
|        | 0.0839          | 0.0674              |
|        | 0.07383         | 0.07383             |
| Tourism| 125             | 0.5887              |
|        | 0.821           | 0.534               |
|        | 0.03167         | 0.03324             |
|        | −0.05578        | −0.05947            |
|        | 0.07015         | 0.07383             |
| Non-tourism| 221         | 0.5872              |
|         | 0.821           | 0.534               |
|         | 0.03167         | 0.03324             |
|         | −0.05578        | −0.05947            |
|         | 0.07015         | 0.07383             |
### Table 4 continued.

| Product code | Test for equality of price variances | Test for equality of price means | Confidence interval for the difference (95%) | Data summary |
|--------------|--------------------------------------|----------------------------------|---------------------------------------------|-------------|
| 596          | Equal variances                     | 0.052 0.819                      | $\pm 0.443$                                 |             |
|              | Different variances                 | 0.094 375.948                    | $\pm 0.621$                                 |             |
| 616          | Equal variances                     | 0.004 73.991                     | $\pm 0.043$                                 |             |
|              | Different variances                 | 0.007 0.047                      | $\pm 0.043$                                 |             |
| 620          | Equal variances                     | 0.079 53.913                     | $\pm 0.147$                                 |             |
|              | Different variances                 | 0.079 0.147                      | $\pm 0.046$                                 |             |
| 635          | Equal variances                     | 0.162 15                         | $\pm 0.781$                                 |             |
|              | Different variances                 | 0.154 0.781                      | $\pm 0.047$                                 |             |
| 656          | Equal variances                     | 0.632 81                         | $\pm 0.411$                                 |             |
|              | Different variances                 | 0.827 0.411                      | $\pm 0.055$                                 |             |
| 699          | Equal variances                     | 0.009 69                         | $\pm 0.079$                                 |             |
|              | Different variances                 | 1.410 26.858                     | $\pm 0.170$                                 |             |
| 705          | Equal variances                     | 0.664 84                         | $\pm 0.743$                                 |             |
|              | Different variances                 | 0.364 80.589                     | $\pm 0.717$                                 |             |
| 719          | Equal variances                     | 0.699 175                        | $\pm 0.164$                                 |             |
|              | Different variances                 | 1.394 109.823                    | $\pm 0.166$                                 |             |
| 729          | Equal variances                     | 0.003 54                         | $\pm 0.111$                                 |             |
|              | Different variances                 | 1.843 53.186                     | $\pm 0.071$                                 |             |
| 766          | Equal variances                     | 0.346 74                         | $\pm 0.793$                                 |             |
|              | Different variances                 | 0.285 54.789                     | $\pm 0.776$                                 |             |
| 774          | Equal variances                     | 0.143 531                        | $\pm 0.423$                                 |             |
|              | Different variances                 | 0.802 304.431                    | $\pm 0.404$                                 |             |
| 781          | Equal variances                     | 0.316 81                         | $\pm 0.727$                                 |             |
|              | Different variances                 | 0.353 61.437                     | $\pm 0.261$                                 |             |
| 785          | Equal variances                     | 0.583 93                         | $\pm 0.361$                                 |             |
|              | Different variances                 | 0.918 89.084                     | $\pm 0.356$                                 |             |
| 786          | Equal variances                     | 0.016 93                         | $\pm 0.615$                                 |             |
|              | Different variances                 | 0.504 68.131                     | $\pm 0.632$                                 |             |
### Inbound demand and price levels in tourism municipalities

| Equal variances | Different variances | Non-tourism | Tourism |
|-----------------|---------------------|-------------|---------|
| 0.465           | 0.497               | 0.005       | 0.004   |
| 0.826           | 0.797               | 0.005       | 0.004   |
| 0.181           | 0.163               | 0.011       | 0.005   |
| 0.840           | 0.863               | 0.005       | 0.004   |
| 0.868           | 0.874               | 0.005       | 0.004   |
| 0.884           | 0.891               | 0.005       | 0.004   |
| 0.900           | 0.907               | 0.005       | 0.004   |
| 0.903           | 0.904               | 0.005       | 0.004   |
| 0.906           | 0.907               | 0.005       | 0.004   |
| 0.910           | 0.912               | 0.005       | 0.004   |
| 0.915           | 0.916               | 0.005       | 0.004   |

### Equal variances

| 0.465           | 0.497               | 0.005       | 0.004   |
| 0.826           | 0.797               | 0.005       | 0.004   |
| 0.181           | 0.163               | 0.011       | 0.005   |
| 0.840           | 0.863               | 0.005       | 0.004   |
| 0.868           | 0.874               | 0.005       | 0.004   |
| 0.884           | 0.891               | 0.005       | 0.004   |
| 0.900           | 0.907               | 0.005       | 0.004   |
| 0.903           | 0.904               | 0.005       | 0.004   |
| 0.906           | 0.907               | 0.005       | 0.004   |
| 0.910           | 0.912               | 0.005       | 0.004   |
| 0.915           | 0.916               | 0.005       | 0.004   |

### Different variances

| 0.497           | 0.529               | 0.013       | 0.005   |
| 0.797           | 0.764               | 0.013       | 0.005   |
| 0.163           | 0.181               | 0.013       | 0.005   |
| 0.863           | 0.840               | 0.013       | 0.005   |
| 0.874           | 0.868               | 0.013       | 0.005   |
| 0.891           | 0.884               | 0.013       | 0.005   |
| 0.907           | 0.903               | 0.013       | 0.005   |
| 0.904           | 0.906               | 0.013       | 0.005   |
| 0.907           | 0.910               | 0.013       | 0.005   |
| 0.912           | 0.915               | 0.013       | 0.005   |
| 0.916           | 0.919               | 0.013       | 0.005   |
| Product code | Test for equality of price variances | Test for equality of price means | Confidence interval for the difference (95%) | Data summary |
|-------------|-------------------------------------|---------------------------------|---------------------------------|--------------|
|             | Equal variances                     | Different variances             | Inferior | Superior | Type of jurisdiction | N | Price mean | Typical deviation | Typical error of mean |
| 9029        | 3.665                               | 0.345                           | 0.378    | 32       | 0.708 | 98.924        | 2.61424 | -0.33578 | 6.31427         | 2.52209         |
|             | 0.345                               | 0.065                           | 0.070    | 17.580   | 0.734 | 98.924        | 2.86084 | -0.04080 | 7.92286         | 1.36519         |
| 903         | 1.182                               | 0.070                           | 0.05345  | 281.180  | 0.624 | -0.01736     | 0.02368 | -0.05484 | 0.03488         | 0.03388         |
| 9031        | 1.604                               | 0.098                           | 0.00005  | 60.063   | 0.994 | 0.00005      | 0.04469 | -0.08750 | 0.03804         | 0.03546         |
| 920         | 2.274                               | 0.033                           | 0.00005  | 66.935   | 0.667 | -0.0125      | 0.03289 | -0.00070 | 0.00451         | 0.00254         |
| 924         | 0.001                               | 0.008                           | 0.00005  | 60.063   | 0.994 | 0.00005      | 0.04469 | -0.08750 | 0.03804         | 0.03546         |
| 934         | 21.13                               | 0.000                           | 0.00448  | 29.716   | 0.071 | 0.00448      | 0.03447 | 0.08594  | 0.03076         | 0.03076         |
| 944         | 1.202                               | 0.082                           | -0.1510  | 0.18445  | 0.17130 | -0.52025 | 0.21765 | 0.19226 | 0.03076         | 0.03076         |
| 947         | 0.019                               | 0.051                           | 0.00005  | 51.447   | 0.621 | 0.00005      | 0.04469 | -0.08750 | 0.03804         | 0.03546         |
| 958         | 0.325                               | 0.569                           | 0.596    | 335.429  | 0.559 | 0.00005      | 0.00799 | -0.02090 | 0.12560         | 0.05359         |
| 959         | 1.148                               | 0.045                           | -0.1830  | 49.728   | 0.072 | -0.14693     | 0.10396 | -0.35408 | 0.06021         | 0.03072         |
| 975         | 0.325                               | 0.451                           | -0.1830  | 49.728   | 0.072 | -0.14693     | 0.10396 | -0.35408 | 0.06021         | 0.03072         |
| BC1         | 5.878                               | 0.035                           | -0.09000 | 101.696  | 0.032 | 0.00005      | 0.04245 | -0.17420 | 0.05080         | 0.04333         |
| BC2         | 0.087                               | 0.769                           | 0.00005  | 85.335   | 0.237 | 0.00005      | 0.04948 | -0.03941 | 0.15736         | 0.05023         |
| BC3         | 1.045                               | 0.310                           | 0.00005  | 78.530   | 0.255 | 0.00005      | 0.04925 | -0.04152 | 0.15457         | 0.05023         |
### Table: Inbound Demand and Price Levels in Tourism Municipalities

| BC4 | Equal variances | Different variances | Tourism | Non-tourism |
|-----|-----------------|---------------------|---------|-------------|
| 3.463 | 0.066 | -1.594 | 0.114 | -0.07519 | 0.04716 | -0.16870 | 0.01832 | 0.00692 | 1.3938 | 1.4689 | 0.27313 | 0.03562 |
| BC5 | Equal variances | Different variances | Tourism | Non-tourism |
| 2.142 | 0.146 | 0.710 | 0.114 | 0.11452 | 0.16134 | -0.20546 | 0.43450 | -0.29314 | 0.52218 | 0.1139 | 0.26509 | 0.03288 |
| BC6 | Equal variances | Different variances | Tourism | Non-tourism |
| 0.706 | 0.403 | -0.538 | 0.578 | -0.01920 | 0.03442 | -0.08746 | 0.49090 | -0.15730 | 0.3999 | 0.1176 | 0.10500 | 0.01660 |
| BC7 | Equal variances | Different variances | Tourism | Non-tourism |
| 0.475 | 0.492 | -0.990 | 0.325 | -0.03076 | 0.03108 | -0.09238 | 0.3807 | -0.08572 | 0.2421 | 0.1196 | 0.17488 | 0.02185 |
| BC8 | Equal variances | Different variances | Tourism | Non-tourism |
| 6.776 | 0.011 | -0.110 | 0.270 | -0.01920 | 0.03442 | -0.08746 | 0.49090 | -0.15730 | 0.3999 | 0.1176 | 0.10500 | 0.01660 |
| BT1 | Equal variances | Different variances | Tourism | Non-tourism |
| 5.685 | 0.023 | 2.108 | 51 | 0.041 | 0.13814 | 0.06579 | 0.00606 | 0.27022 | 0.3281 | 0.20190 | 0.03079 |
| BT2 | Equal variances | Different variances | Tourism | Non-tourism |
| 1.581 | 0.214 | 2.079 | 51 | 0.043 | 0.08651 | 0.03161 | 0.00298 | 0.17005 | 0.1457 | 0.1000 | 0.06749 | 0.02134 |
| BT3 | Equal variances | Different variances | Tourism | Non-tourism |
| 0.486 | 0.489 | 1.603 | 50 | 0.115 | 0.08476 | 0.05288 | -0.02145 | 0.19098 | 0.20152 | 0.1159 | 0.14923 | 0.02303 |
| BT4 | Equal variances | Different variances | Tourism | Non-tourism |
| 2.088 | 0.757 | 0.946 | 51 | 0.549 | 0.10221 | 0.07695 | -0.05651 | 0.26993 | 0.3192 | 0.1590 | 0.18477 | 0.05843 |
| BT5 | Equal variances | Different variances | Tourism | Non-tourism |
| 4.858 | 0.032 | 1.792 | 51 | 0.079 | 0.24407 | 0.13616 | -0.02929 | 0.51743 | 0.40283 | 0.1629 | 0.42219 | 0.06438 |
| BT6 | Equal variances | Different variances | Tourism | Non-tourism |
| 0.896 | 0.348 | 0.975 | 50 | 0.334 | 0.11810 | 0.12110 | -0.12514 | 0.36133 | 0.32495 | 0.1363 | 0.36040 | 0.05561 |
| BT7 | Equal variances | Different variances | Tourism | Non-tourism |
| 0.114 | 0.737 | 0.829 | 51 | 0.411 | 0.08535 | 0.10290 | -0.12124 | 0.29194 | 0.28580 | 0.1755 | 0.29970 | 0.04570 |
| BT8 | Equal variances | Different variances | Tourism | Non-tourism |
| 1.466 | 0.232 | 1.802 | 48 | 0.078 | 0.22062 | 0.12241 | -0.02550 | 0.46675 | 0.39018 | 1.7595 | 0.35512 | 0.05546 |

Note: The differences highlighted in grey are significant at the 95% confidence level.
Hypothesis 3

No particular group of products displays higher prices in tourism jurisdictions. The only significant differences in prices arise for fresh food in local markets. However, for these products, prices in tourism jurisdictions are significantly lower than in non-tourism ones. Specifically, 8 fresh foods (product codes 362, 363, 364, 366, 367, 368, 372, 388) out of 29, that is, 28% of all the fresh foods considered, have significantly higher prices in non-tourism jurisdictions. Notice, however, that the quality of (unbranded) fresh food is not easy to assess. Therefore, differences in prices may hide differences in qualities.

Hypothesis 4

There are no significant changes in the above results when sale prices are taken into account. Besides, although advantages may exist for customers carrying supermarket membership cards, no general schemes exist in Catalonia similar to those in place in, for instance, Hawaii (Kreps, 2004). Hawaiian supermarkets close to tourism areas display very high prices by American mainland standards but, for a lot of items, a second and substantially lower price is given for the holders of the supermarkets’ membership cards, which are available to Hawaiian residents only. Thus, the hypothesis that retailers resort to sales strategies in order to differentiate among types of customers (tourists and local residents) must be rejected (However, see the discussion of Hypothesis 6 for non-traded goods and Hypothesis 7 for goods with search costs).

Hypothesis 5

No significant price differences between tourism and non-tourism jurisdictions are revealed when the distribution channel is taken into account. The only significant differences arise for fresh foods sold in local markets and drinks sold in bars. Fresh food prices are significantly higher in non-tourism jurisdictions. Specifically, 10 different products (product codes 1106, 362, 363, 364, 366, 367, 368, 372, 380, 388), 34.5% of all the products considered, have higher prices in non-tourism jurisdictions (and no products have higher prices in tourism jurisdictions). It is also remarkable that at the height of the tourism season, the number of products with significant differences in prices increases with respect to the trough of the tourism season (that is, there are more products with higher prices in non-tourism jurisdictions). Two additional facts about the magnitude of price differences are: first, when price differences are significant, prices in non-tourism municipalities are, on average, 16% higher; and second, price differences are wider at the height of the tourism season.

Hypothesis 6

Prices of drinks sold in bars are used to test the hypothesis that differences exist for non-traded goods. Bars exhibit prices significantly higher in tourism municipalities: 7 out of 8 products surveyed (that is, all of them except beer) have higher prices. For bar drinks, prices in tourism municipalities are 10% higher than prices in non-tourism jurisdictions. This observation is in accordance with the Balassa–Samuelson hypothesis. Besides, differences are higher
at the height of the tourism season; that is, the cyclical component of bar prices is marked for tourism jurisdictions. Nevertheless, differences disappear when the prices of bar drinks in non-tourism jurisdictions are compared to the prices charged in non-tourism zones within tourism jurisdictions. This evidence cannot be rationalized by the Balassa–Samuelson hypothesis and suggests that price dispersion exists within tourism jurisdictions (see Hypothesis 7).

**Hypothesis 7**

In the case of bars in tourism jurisdictions, differences exist in the prices of products offered by bars located in tourism and non-tourism zones within the jurisdiction, with the former having higher prices. This observation is in accordance with the predictions of tourists-and-natives models (Salop and Stiglitz, 1977; Stiglitz, 1979; Carlton and Perloff, 2005). That is, if there are two types of individuals (uninformed tourists and informed natives), then a two-price equilibrium may exist: natives shop at low-price stores and tourists shop randomly.

**Discussion**

The main result of the paper is that no significant differences in prices exist between tourism and non-tourism jurisdictions in Catalonia for a broad variety of products. However, the analysis shows that bar drinks have significantly higher prices in tourism zones within tourism jurisdictions. This suggests that tourists are likely to pay higher prices than natives. Although the paper has some limitations, the methodology, the survey and the results are relevant for other tourism (and non-tourism) destinations and developed (and developing) countries.

One of the paper’s limitations is that it takes into account only a reduced amount of products. For instance, prices of property and rents, or personal services (hairdressers, discotheques or restaurants, for instance) are not considered. These are non-traded goods, that is, they must be consumed where (and by whom) they are purchased, so that no possibility of arbitrage exists. Nevertheless, consideration of the prices of bar drinks (which are essentially non-traded) provides some hints for non-traded goods and services.

Another limitation is methodological and arises from the reliance on microeconomic data collected in two time periods. The paper does not take into account the adjustment processes leading to an equilibrium considered by GE models. Therefore, it is not possible to assert whether the markets for traded and non-traded goods are in equilibrium.

A possible additional limitation is that Catalonia is a top destination for both international and domestic tourism and that tourism and non-tourism jurisdictions are relatively close to each other. This may explain the general lack of price differences in Catalonia. Certainly, one could still hope to find price differences in an isolated tourist municipality with limited arbitrage and consumer mobility. However, the paper’s results show price differences in the case of bars, so the jurisdictions used in our study are not so close in that respect.
The paper shows that it is important to distinguish price differences caused by the impossibility of arbitrage from differences caused by search costs. The observation that the prices of products sold in bars located in tourism zones within a jurisdiction are higher than the prices charged by bars located in non-tourism zones within the same (tourism) jurisdiction suggests that search costs play an important role. Uninformed tourists are likely to end up paying prices higher than those paid by (informed) local residents for identical goods. This is consistent with theoretical models based on search costs (Salop and Stiglitz, 1977; Stiglitz, 1979; Carlton and Perloff, 2005).

Experiences of market power based on search costs and asymmetries between tourists and residents have been documented widely in the tourism literature. For instance, during slack periods, hotels in Hawaii offer special (far lower than standard) rates for customers who can prove Hawaiian residency (Phillips, 2005). In some Latin American cities, McDonald’s has experimented with charging different prices for meals according to the relative wealth of their neighbourhoods (The Economist, 2004). In Denver, ski resorts use purchase location to segment sales of list tickets so that price-sensitive locals can buy discounted tickets at grocery stores and self-service gas stations (Nagle and Hogan, 2006). As a final example, the prices for being at the beach in New Jersey are US$6 for one day, US$12 for one week, or US$24 for the season (but only US$19 for the season if bought before Memorial Day), so that permanent residents informed about the deal spend US$19 (Hamermesh, 2008).

Besides prices, another obvious mechanism exists which can yield opposite outcomes. The increased demand generated by tourism can be matched by an increased supply: more production of goods and services, particularly those which are non-traded. If tourists pay all the costs they generate (that is, if no externalities exist), local residents who sell products and services to tourists will be better off, whereas local residents with no stakes in the tourism sector will be no worse off. That is, local residents will experience a Pareto improvement in their economic welfare from an increased tourist flow (Clarke and Ng, 1993).

The lack of confirmatory evidence about price differences between tourism and non-tourism jurisdictions could also be viewed as indirect evidence of this quantity effect. Of course, further indirect evidence comes from the fact that tourism jurisdictions consistently enjoy higher levels of per capita income (Rigall-I-Torrent, 2003).

Conclusion

The empirical evidence collected, based on a comprehensive sample containing more than 18,500 prices gathered in 225 supermarkets and 204 bars, bakeries and local markets of 45 jurisdictions in Catalonia and 6 districts of Barcelona at peak and trough periods of the tourism season, shows that for a vast majority of products, first, there is no evidence that systematic differences exist between prices in tourism and non-tourism jurisdictions. Second, as a consequence of the preceding conclusion, there is no evidence of general differences in prices between tourism and non-tourism jurisdictions. Third, no general differences are observed in the prices of those products which are particularly consumed by tourists. Fourth, for those products whose prices differ significantly in
tourism and non-tourism municipalities, no significant evidence of seasonality exists in the behaviour of their prices. Fifth, drinks sold in bars show prices significantly higher in tourism municipalities and a marked cyclical component (with higher differences at the peak of the tourism season) in those jurisdictions. However, differences disappear when the prices of bar drinks in non-tourism jurisdictions are compared to the prices charged in non-tourism zones within tourism jurisdictions. Sixth, differences exist in the prices of products offered by bars located in tourism and non-tourism zones within the jurisdiction, with the former having higher prices.

Summing up, for an immense majority of products the hypothesis that prices are, in general, higher in tourism jurisdictions does not stand close scrutiny in Catalonia. The increased demand derived from tourism seems to have a rather large quantity effect: more production, more jobs and increased economic welfare. The convergence of prices for traded goods means that the quantity effect goes well beyond tourism jurisdictions, affecting the whole economy. The paper’s findings also suggest the importance of the distinction between traded and non-traded goods and services between jurisdictions and search costs within jurisdictions.

Endnotes
1. Since data of the de facto population are not available at the district level, districts in Barcelona are classified according to the presence of major tourism attractions in the district, the authors’ knowledge of the different districts and the opinion of experts at the Observatory of Tourism of Catalonia. The inclusion of Barcelona’s districts in the sample does not change the paper’s results substantially.
2. A bar is a typical catering establishment in Spain and Catalonia similar to a pub or cantina.
3. Since the CPI is not computed at the jurisdiction level and the list of products included in the CPI is not disclosed publicly, it is not possible to check whether this is true in practice or whether the same products in June–July 2007 had higher prices than in November–December 2006.

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