



Tourism taxation: a synthetic control method for policy evaluation

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Review

Tourism taxation: a synthetic control method for policy evaluation

Abstract

So far, the Synthetic Control Method has not been employed for evaluating the impact of tourism taxation. This lack of research is possibly due to the fact that in many European municipalities a tourism tax has been levied only very recently. The objective of the present paper is to investigate the effects of a taxation intervention on tourism flows by using the SCM. This work presents a case study based on a panel of municipalities in Italy, for the time span 2006-2011. Results highlight that tourism taxation has affected domestic and international tourism flows in a different manner.

Keywords: Synthetic control; tourism taxation; policy evaluation; Italy

Jel classification: D04, H23, L83, Z18.

1. Introduction

Public institutions levy taxes for three main reasons: allocate a budget to supply goods and services; redistribute wealth amongst residents; internalize negative externalities. In the presence of market failure, governments may issue taxes to internalize the negative impact exerted by free riders on, amongst others, common resources. This is particularly true for the tourism activity where consumers tend to purchase and make use of environmental resources at the visited destination, without directly contributing to public budget.

Environment and public services are two fundamental components of the tourism product. A uncontaminated landscape along with efficient public services is essential to foster both tourism-based economic growth and residents' quality of life in both the short and long run. However, during the tourism season, destinations often struggle to maintain unaltered quality of life perceived by tourists as well as by residents. Furthermore, many local governments face budget constraints that limit ways to mitigate against negative externalities on the environment.

In this respect, a government can achieve an internalisation of negative externalities via either a subsidy to pursue certain public interest objectives (see e.g. United Nations, 2000; Dixon et al., 2001) or issuing taxes. Specifically, taxes correcting any environmental externality caused by the presence of tourism are called *eco-taxes*. Tourism eco-taxes can be defined as those raised on tourists for improving and protecting the environmental. In recent times, the debate to introduce, or reintroduce, tourism taxation in specific destinations has become a relevant and controversial issue. As reported by the World Tourism Organization (UNWTO, 1998), while before the 1960's international tourism was effectively free of taxation, currently there are

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4 approximately forty different types of taxes issued on the tourism sector in both
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6 developed and developing countries. The aim of issuing tourism taxes is to raise more
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8 revenue in order to fund environmental preservation, improve public infrastructure and
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10 overall quality of services supplied at a destination. Therefore, on the one hand, local
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12 governments support tourism taxation as an instrument to increase revenues from the
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14 non-resident population, on the other hand, stakeholders argue on the possible loss of
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16 competitiveness caused by its application (Aguilò et al, 2005).
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19 From an economic perspective, a tax is generally associated with a deadweight loss
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21 that diminishes the overall welfare of the society in terms of less income, employment,
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23 fiscal revenue and foreign currency. Also, the amount of the deadweight loss is related
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25 to the demand and supply price elasticity and the overall effect is not so clear-cut
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27 (Bonham *et al.*, 1992; Gooroochurn and Sinclair, 2003). Therefore, a policy evaluation
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29 analysis, that monitors the effects of tourism taxation, is essential to establish who gains
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31 and who loses from the policy intervention. In this respect, the main aim of this paper
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33 is to estimate the effect of a policy taxation on tourism demand. The objective is
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35 twofold: firstly, to provide an update literature review on the economic models and
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37 applications on tourism taxation; secondly, to employ a policy evaluation method called
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39 Synthetic Control to empirically investigate the effects of the tourism tax on tourism
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41 flows, on tourist destination, taking the municipality of Villasimius in the island of
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43 Sardinia (Italy) as a case study. As far as the authors are concerned, this method is
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45 applied for the first time in tourism analysis. Within the Italian administrative and
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47 normative setting, the Island of Sardinia represents an interesting policy case study.
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49 Firstly, it is a “Special Statute Region” since by national Constitution it has the right to
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4 levy additional regional taxes. Secondly, it is the first Italian region that has allowed
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6 Town Councils to levy tourism taxes as a means to internalize negative externalities.
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9 The *synthetic control method* has been used for the first time by Abadie and
10 Gardeazabal (2003), who investigate the economic impact of the conflict in the Basque
11 Country as a case study. This approach consists in comparing a set of “treated”
12 destinations with a set of “non treated” destinations. Hence, it overcomes the
13 shortcomings of a pair-wise comparison. Basically, it provides a methodology to build a
14 control group (*i.e.* a set of destinations where no tax is levied) that adequately
15 reproduces the counterfactual tourism flows trajectory that the “treated” destinations
16 would have experienced in the absence of the policy intervention. To test the effects
17 that the policy intervention may have had on tourism flows, panel data were collected
18 for a time span that included the pre-treated period and the post-treated period from
19 2006 up to 2011. The dependent variable is expressed in terms of number of nights
20 spent by tourists in registered official accommodation during the summer months, as a
21 proxy of tourism expenditure (Brida *et al.*, 2013). The empirical findings provide a
22 unbiased basis to evaluate the effects of tourism taxation that may provide directions to
23 policy makers on the actual effects of tourism taxation.
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42 The paper is organized as follows. The next section provides an update literature
43 review on tourism taxation. Section 3 illustrates the case study under analysis. Sections
44 4 presents the methodology employed and Section 5 gives an account on the data used
45 in the empirical application. Section 6 presents the main results from the empirical
46 analysis, while last section draw the main concluding remarks along with policy
47 implications.
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2. Related literature

This section provides a literature review on the economic models and empirical applications on this topic. As Gooroochurn and Sinclair (2005) point out, the topic of tourism taxation is rather complex and a few studies focus on the effects of such policies on the tourism activity.

One of the first investigations by Mak and Nishimura (1979) analyses the effect of a hypothetical tourist tax levied on hotels in Hawaii. The authors find that tourists are insensitive to price changes and that an increase of the tax does not significantly decrease tourist arrivals. Combs and Elledge (1979) examine taxation on tourists selecting hotels and motels in the United States and highlight as a small *ad valorem* tax has very little impact on the tourism sector although it generates substantial revenues for the local government. All the above-mentioned studies highlight that, given the composite nature of the tourism product, an increase in taxation on one component may reduce expenditure on other components if substitute effects are present (see also Papatheodorou, 2001). Fujii *et al.* (1985), by using a system approach and time series data for the period 1961-1980 in Hawaii, find that a hotel room tax has a negative output effects on the lodging industry. A further empirical analysis on tourism tax in Hawaii, by Bonham *et al.* (1992), show that the tax effect on real net revenues is not significant (see also Bonham and Gangnes, 1996). On the same line, Gooroochurn (2004) and Gooroochurn and Sinclair (2005), analyzing the case of Mauritius, via Computable General Equilibrium (CGE), confirm that tourism taxation is more efficient than taxing other sectors in terms of domestic welfare.

Also studies applied to European cases find controversial results. On the one hand, Durbarry and Sinclair (2001), investigate the effect of tourism taxation in the United

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4 Kingdom during the 1990's. The authors find that tourism expenditure is sensitive to
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6 changes in prices with an elasticity value of unity: this implies that when prices increase
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8 of certain percentage tourism expenditures will decrease by the same percentage. Jensen
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10 and Wanhill (2002), examining the case of Denmark accommodation *value added tax*
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12 (VAT), argue that the tourism tax growth in recent years is not welfare enhancing. In
13
14 fact, governments often consider tourism taxes as "easy money" obtained from non-
15
16 resident population. On the other hand, Taylor *et al.* (2003) investigating the
17
18 willingness-to-pay (WTP) for environmental quality in the Croatian island of Hvar, find
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20 that the WTP for environmental protection is higher (0.65€ per day) than the proposed
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22 tax. On the same topic, Guzmán (2004) and Aguilò *et al.* (2005) analyze the impact of
23
24 eco-taxes in the Balearic Islands (Spain). According to Guzmán (2004), tourism
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26 taxation is an adequate solution to counteract negative impacts of tourism. Furthermore,
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28 Aguilò *et al.* (2005) find that international tourism demand (German, British and Dutch)
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30 is less price sensitive. A study for the case of Spain, by Gago *et al.* (2009), finds that
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32 both direct and indirect taxation - hotel room tax and VAT respectively- has
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34 insignificant effect on the economy as well as on the tourism sector in general. Sheng
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36 and Tsui (2009), via a theoretical general equilibrium structure, reveal the key role
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38 played by the government in reducing negative externalities on the community. Yet,
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40 under a biased political system in which the interests of a certain stakeholder prevails on
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42 the market a social optimum may be difficult to achieve. In these circumstances, local
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44 firms together with external tourism enterprises successfully may force policy makers to
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46 limit tourism taxes hence undermining the sustainable development of the destination.
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53 In Italy, since the tourism tax has only recently been re-introduced (2011), empirical
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55 research is rather limited. Perelli *et al.* (2011) find that tourism taxation does not
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4 significantly affect tourist' choice in Villasimius. From their analysis, it emerges that
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6 the location is chosen for its high environmental quality. Biagi *et al.* (2013), by using
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8 descriptive analysis, find results in line with those of Perelli *et al.* (2011).
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11 Overall, this literature review highlights that most studies focus on the United States
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13 and that the effect of this type of taxes depends on the demand elasticity. According to
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15 Bonham *et al.* (1992) 47 out of 50 American states levied taxes on hotel room
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17 occupancy in 1990. On the contrary, this topic is of relatively recent interest in Europe.
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19 Although, the tax is levied in the majority of countries, the real impact on tourist flows
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21 has not been extensively measured. The papers analyzed so far suggest the important
22
23 role of tourism and the consequent potential benefits generated by tourism taxation.
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25 However, the distortions generated by a tourism tax needs to be assessed for effective
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27 policy implementation. In this context, an *ex ante* and *ex post* analysis on the tourism
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29 tax recently introduced in Italy might provide policy makers with a clearer picture of its
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31 overall effects.
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37 **3. Tourism taxation: the case of Villasimius**

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39 According to Biagi and Pulina (2008), the Sardinian government's interest in the
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41 natural environment and sustainability issues is characterised by four main stages:
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43 *neutrality, concern, change* and *reinforcement*. The application of tourism taxation by
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45 the regional government can be included in the stage of *reinforcement* of environmental
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47 policies. This period is characterized by a different attitude of regional institutions
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49 towards a more responsible use of natural resources, the conservation of cultural
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51 heritage and maintaining the biodiversity.
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4 Since 2007, Sardinia has been the first Italian region that has allowed town councils
5 to levy tourism taxes as a means to internalize negative externalities. A regional law
6 enacted in May 2007 (law number 2, May 29, 2007, art. 5) authorized local councils to
7 apply a tourism tax during the peak season. The tax applies to those tourists who choose
8 official accommodation over the summer period (15th of June until 15th of September).
9 Owners or managers of accommodation collect the tax, and the public revenues are
10 allocated to improve tourism services and the environment.
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19 In 2008, Villasimius located in the southern part (Cagliari Province) levied the tax.
20 However, it lasted for a very short period of time as this tax was repealed in 2009 (after
21 the fall of the regional government). Two years later, 2011, the national government
22 introduced a national tourism taxation law and the municipality of Villasimius
23 reintroduced the tax (Table 1).
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33 [TABLE 1 HERE]
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37 Villasimius ranks first in the province for number of tourists with a share of 22% of
38 the province's number of nights of stay. The supply of tourist accommodation has
39 constantly increased in the town. However, unlike the rest of Sardinia, Villasimius has
40 not experienced a sharp increase in the number of B&B (in 2012, the official statistics
41 recorded only 3 units compared to around 40 hotels). Therefore, its tourist supply is
42 characterized by high quality of tourist services, and it is considered as one of the most
43 famous in the Mediterranean Sea. The town council of Villasimius includes the marine
44 protected area of *Capo Carbonara* that extends over an area of approximately 8.6 km²,
45 that comprises sandy beaches and the Notteri pond characterized by a rather fragile
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4 environmental setting. Since the second half of the Nineties of the past century,
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6 Villasimius has pursued a process of environmental improvement trading off
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8 preservation and exploitation of resources in an attempt to get the most benefit and to
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10 ensure at the same time the sustainability of the tourism development. For these reasons,
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12 Villasimius is configured as an interesting case study whose results in the management
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14 policy represent a useful reference for other tourism destinations.
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18 As far as revenues are concerned, Villasimius collected approximately 503,430 euros
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20 from June to September 2008. The other three years' revenues were 392,104 euros from
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22 July to August 2011, 631,000 euros from June to September 2012, and 637,640 euros
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24 from June to September 2013. The revenues obtained in 2011 and 2012 were allocated
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26 to improve tourist services and to finance local environmental policies.
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29 30 **4. Methodology**

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32 In this section, an in depth account on *the synthetic control* approach is provided.
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34 Normally, in policy evaluation analysis, the “*treated*” group under investigation is the
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36 group of individuals targeted by the policy. By means of specific techniques, this group
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38 is compared to the “*non-treated*” group (or control group) before and after “*treatment*”,
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40 i.e. the policy under analysis. Specifically, the non-treated consists of individuals having
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42 the same, or similar, characteristics of the treated one but not targeted by the policy
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44 under analysis. One of the most difficult tasks researchers generally face when using
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46 policy evaluation technique is the definition of the control group. According to Abadie
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48 and Gardeazabal (2003), the novelty of the so-called Synthetic control method (SCM) is
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50 to use a “composite” control group. The control group does not consist of specific
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52 already-existing individuals chosen a priori by the researcher but rather is an artificially
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54 created group of already-existing individuals. In other words, the control consists of a
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4 set of J (which can be individuals, municipalities, regions, countries, etc.), where each j
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6 is weighted by $W = (w^1, \dots, w^j)$, which is a $(J \times I)$ vector of nonnegative weights whose
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8 sum equals one. The scalar w_j corresponds to the relative weight of each j under analysis
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10 in the synthetic control. The choice of a valid subset of control units is crucial to
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12 minimize the differences between the synthetic control and the case under study before
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14 policy application. In other words, the basic idea is that the future path of the synthetic
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16 control group mimics the path that would have been observed in the treated unit in the
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18 absence of treatment.
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22 In detail, this methodology employs two main steps. The former consists in creating
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24 the synthetic control, while the latter involves of calculating the counterfactual outcome
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26 $Y_{it}^I = Y_{it}^N$, where Y_{it}^N is the outcome matrix for the control group. By comparing the
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28 counterfactual to the treated unit, outcome treatment effects can be eventually evaluated
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30 such that:
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$$\alpha_{it} = Y_{it}^I - Y_{it}^N \quad (1)$$

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35 Although Abadie *et al.* (2010) argued that the potential applicability of SCM to
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37 comparative case studies is very large, especially in situations where traditional
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39 regression methods are not appropriate, SCM has been rarely applied so far (see for
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41 example, Abadie and Gardeazabal, 2003; Abadie *et al.* 2010, Lee, 2011; Coffman and
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43 Noy, 2012; Pinotti, 2012, Hinrichs, 2012; Billmeier and Nannicini, 2013; Cavallo *et al.*,
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45 2013; Abadie *et al.*, 2015). In a recent study by the Bank of Italy, Pinotti (2012) uses
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47 SCM to estimate economic performance in two Italian regions exposed to mafia
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49 activity. At a regional level, other authors have applied SCM to study the economic
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51 effects of the terrorism in the Basque country (Abadie and Gardeazabal, 2003) and to
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53 analyze anti-tobacco policies in California (Abadie *et al.*, 2010). At a country level, Lee
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4 (2011) examines the effects of inflation in emerging economies and, in a wider study,
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6 Billmeier and Nannicini (2013) investigate the impact of economic liberalization on real
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8 Gross Domestic Product (GDP) per capita within a sample of 180 countries worldwide.
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10 Cavallo *et al.* (2013) examine the impact of natural disasters in economic growth using
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12 a dataset of 196 countries over the period 1970-2008. More recently, Abadie *et al.*
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14 (2015) estimate the economic impact of the German reunification. The authors use data
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16 on GDP over the time span 1960-2003 for sixteen OECD countries as synthetic control
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18 for the West Germany.
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22 The common features of these works include territorial applications, although they
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24 still propose empirical analyses at the regional level. Within this thread of literature, the
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26 present study goes a step further by employing SCM at a municipality level, thus
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28 providing a more microeconomic framework. The objective is to assess the impact that
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30 tourism taxation has on tourist flows in Villasimius. As indicators, tourist arrivals,
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32 tourist nights of stay and length of stay are considered in the pre- and post-treatment
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34 period for international and domestic demand. To this aim, tourist flows in Villasimius
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36 during the tax application are compared to a weighted combination of other Sardinian
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38 municipalities chosen as control group before the tax imposition. Therefore, the
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40 weighted average of other Sardinian municipalities represents a “synthetic” control
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42 without tourism taxation. The control consists of 41 municipalities with similar
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44 characteristics that have been chosen in order to minimize the differences between the
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46 synthetic control and Villasimius before the tax implementation.
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52 53 **5. Data** 54 55 56 57 58 59 60

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4 The National Institute for Statistics (ISTAT) provides annual data on the tourism
5 sector in Italy. Whereas demand-side data are available at a provincial, regional and
6 national level, supply-side data are provided at the municipality level. Statistical
7 information on tourism supply and demand of the officially registered accommodation
8 (hotels, campsites, B&B) is collected on a monthly frequency by the relevant local
9 office, which transmits the data to the Regional office (the so called, *Ufficio della*
10 *Statistica Regionale*), and the latter to ISTAT. After appropriate adjustments, ISTAT
11 publishes the definitive data. Unfortunately, this process is time consuming and ISTAT
12 data are normally published after two years (for example, ISTAT published 2012 data in
13 January 2014). Furthermore, ISTAT data for the demand side of the market (i.e., tourist
14 arrivals and nights of stay) are not provided at a monthly frequency or at the
15 municipality level. Therefore, data for the present analysis were obtained from the local
16 and provincial level statistical offices.

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33 Specifically, municipality-level monthly data on tourist arrivals and nights of stay in
34 the official accommodation for the period 2006-2011 are used for six indicators:
35 domestic tourist arrivals, international tourist arrivals, domestic overnights stay,
36 international overnights stay, length of stay of domestic tourists and finally the length of
37 stay of international tourists. Specifically, these two segments of demand are analyzed
38 separately since characterized by distinctive features (Pulina, 2011). Given the
39 availability of homogeneous data for the control group, the sample period begins in
40 2006, two years before the treatment, and it ends in 2011. A complete list of variables
41 and the respective sources are illustrated in the appendix (Table A.1)

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53 The synthetic control is constructed according to two criteria: location of the
54 municipalities and data availability. Data were first collected on the municipalities of
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4 the Cagliari Province, which includes the treated unit (Villasimius). The sample was
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6 then extended to the municipalities located in the two neighboring provinces: Carbonia-
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8 Iglesias and Ogliastra. Data on an important tourism municipality, Alghero (located in
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10 the north of Sardinia, Sassari province), have also been included to minimize output
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12 differences between the treated unit and the control group, since it is characterized by
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14 similar number of tourism flows of the treated unit. A list of all the municipalities
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16 considered in this empirical study is provided in the Appendix (Table A.2).
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20 21 **6. Results**

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23 This section discusses the results obtained from the application of SCM to the case
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25 study. To this aim, the STATA command *synth* developed by Abadie *et al.* (2003) is
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27 employed.
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30 Figure 1 shows the trend of each of the tourism variables under analysis for the
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32 treated (continuous line) and the synthetic control unit (dashed line). The synthetic
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34 control algorithm attributes the weights by using all 41 municipalities in the control
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36 group, with the only exception for domestic tourist arrivals and overnights stay (see
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38 Figure 1, Graphs 1 and 2 – row “Control Number”), where the control number collapses
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40 to two and one municipalities, respectively. Furthermore, the root mean square
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42 prediction error statistic (RMSPE), which is minimized for the pre-treatment period, is
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44 higher than in the other cases. Overall, these results indicate that, on average, the pre-
45
46 treatment features of the domestic demand are different from those of the treated unit.
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48 For this reason, one can argue that the interpretation for the variables presented in
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50 Graphs 3, 4, 5 and 6 is robust and statistically reliable, and hence discussed further
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52 below.
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4 Notably, from Graph 3, it emerges that since 2007 both the treated unit and the
5 control unit have shown a decline in the domestic demand, expressed in terms of length
6 of stay. However, it also appears that since the introduction of the tourism tax, the
7 treated unit has experienced a sharper decline in this segment of demand with respect to
8 the control unit. This negative trend of domestic tourism is in line with the regional
9 trend. As reported in CRENoS (2013, 2012), in the last decade, domestic demand in
10 Sardinia has in fact shown an overall decrease.
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19 A different picture emerges when considering the international demand. Taking into
20 account Graph 4, in the pre-treatment period (2007), the treated unit experiences an
21 increase of international tourists while the control unit experiences stabilization.
22 Overall, after the treatment, the number of international arrivals in the control unit
23 shows a higher volatility than the treated unit but the latter remains at a significantly
24 higher level. The number of international overnights stay depicted in Graph 5 shows an
25 increase after the treatment in Villasimius, especially in 2011, while a pronounced
26 decrease is detected in the control unit, with a slight recover in 2011. Finally, while in
27 the pre-treatment period both, the treated and non-treated unit, present a decline in the
28 international length of stay (Graph 6), after the treatment Villasimius does not follow
29 the same pattern denoting a clear increase and less volatility than the control unit.
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46 [FIGURE 1 HERE]
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50 **6.1 A cost and benefit analysis**

51 To better understand whether tourism taxation has a positive or negative impact on
52 the resident population in Villasimius, as well as the entire municipality, a *cost-benefit*
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4 *analysis* (CBA) is run. The CBA is a tool that allows comparison between total benefits
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6 and total costs -in a specific place and in a specific time- in order to evaluate if the
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8 policy under analysis would generate a net benefit. If the aggregate of benefits exceeds
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10 the losses, it indicates a net benefit:

$$\sum V_i > 0 \quad (2)$$

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16 where V_1, V_2, \dots, V_n are the benefits for each n tourists. In this analysis, the total benefit
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18 is the total tourism taxation revenues in Villasimius in 2008, the first year in which tax
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20 was levied. The cost is considered as an opportunity cost. In fact, one can obtain a
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22 satisfactory proxy for total costs by multiplying the average individual tourist
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24 expenditure per day in Villasimius by the variation in nights of stay in 2008 compared
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26 with 2007. The average expenditure per day is the result of a survey conducted by
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28 *Centro di Ricerche Nord Sud Sardegna* (CRENoS) in 2012 where tourists were asked
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30 about their amount of holiday expenditure in the visited destination in Sardinia (travel
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32 costs are not considered here). Hence, data can be divided by segment of demand and
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34 by municipality.

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38 In Table 2, a cost-benefit analysis is considered. After the tourism taxation
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40 implementation, Villasimius collected approximately 250,000 euros – of which 50%
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42 returned to the regional government. From this amount, the total expenditure by tourists
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44 is deducted had their number been the same as in the previous year. Results show that
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46 Villasimius received a net benefit of approximately 115,000 euros, which increases to
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48 367,000 euros in case the total benefit is considered. Conversely, the same exercise run
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50 for 2011 shows a net cost of approximately 1 million euros. However, despite it is
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52 difficult to precisely disentangle the drivers of this loss, the comparison of the loss of
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54 domestic tourism in Villasimius in 2008-2011 with respect to the regional trends shows
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4 that in Villasimius the loss is much lower (-12% versus -17% of domestic tourism in
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6 Sardinia, as a whole). This can be seen as a signal that the loss is not so much related to
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8 the tourism tax *per se*.
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10 [TABLE 2 HERE]
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15 As already stated, it is noteworthy that tax revenues are by law finally allocated to
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17 the tourism sector, with particular regard to the environmental sustainability and tourist
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19 services improvement. In this respect, this fiscal contribution can be defined as an
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21 earmarked tax since its main purpose is to protect the environment and to provide
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23 tourism services. Specifically, the highest quota (18%) was allocated to “Environmental
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25 and sustainability”, which includes the promotion, development and protection of the
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27 marine protected area and the sandy shore.
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32 [FIGURE 2 HERE]
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38 7. Conclusions

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40 The purpose of a tourism tax is to both generate local public revenues and to correct
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42 market failures. As discussed in the introduction, the latter can be seen as a sufficient
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44 but not necessary condition to levy a tourism tax. The present paper has adopted the
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46 SCM to investigate the impact of tourism taxation on tourism demand in the
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48 municipality of Villasimius in Italy. This tourism destination has its own attractions
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50 with its tourism development characterized by high value of its environmental resources
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52 and coastal areas. The intensive development of tourism together with strong
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54 environmental pressure requires a balanced maintenance policy. In fact, an excessive
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4 exploitation of coastal resources would lead to a reduction in their intrinsic value and,
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6 consequently, erosion in their attractiveness - a key factor in the destination's
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8 competitiveness.
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11 In this respect, the present analysis can be considered as a first attempt to evaluate
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13 the strengths and weakness of a policy aimed at protecting the environment. On the one
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15 hand, with the implementation of the tourism tax, Villasimius obtains further local
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17 public revenues that are allocated to protect the environment, promote the municipality
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19 as a tourist destination, and improve the quality of services supplied during the tourism
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21 season. On the other hand, the municipality may suffer some costs due to price
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23 competition from other tourism destinations.
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26 The empirical results indicate that international tourism demand does not loose its
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28 competitiveness after the taxation. Conversely, domestic demand appears to be more
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30 affected by the policy intervention, although other factors may have also had an impact
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32 (e.g. economic crisis, transport costs, substitution effects).
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35 Besides, the cost and benefit analysis gives a more comprehensive picture of the
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37 effect of the tax.
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40 Overall, the tourism tax, as an earmark tax, provides extra resources that can be used
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42 by the public agent to enhance and protect the environment as well as internalize
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44 negative externalities produced by the presence of tourists. The findings encourage
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46 further research on this topic on the direction of monitoring the effects of taxation
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48 across time and possible substitution effects amongst destinations.
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51 Besides, this paper offers an innovative methodological application to encourage further
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53 research on this topic. This is particularly important for many municipalities in Europe
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55 that only very recently have levied tourism taxes.
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Table 1. Main characteristics of tourism tax in Villasimius (L.R. n.2/2007)

Taxable people	Non-resident population in Sardinian municipalities
Application time	From 15 th June to 15 th September
Collection people	Accommodation managers
Rate in €	€ 2 per night in 4 and 5 stars hotels € 1 per night in other accommodation
Tax allocation	Interventions in the field of sustainable tourism with particular regard to the improvement of services provided to tourists and to the use of the environmental resource
Tax distribution	50% to the municipality and 50% to the region of Sardinia (special fund on tourist investments in internal areas)

Table 2. Cost-Benefit Analysis (year 2008, 2011)

	2008		2011	
	Domestic	International	Domestic	International
(A) Overnight stays (Variation)	-2,973.00	1,675.00	-30,460.00	13,983.00
(B) Average expenditure per day in Villasimius (€)	96.58	90.00	96.58	90.00
A*B	-287.132,34	150.750,00	-2,941,826.80	1,258,470.00
Cost-benefit Analysis				
Total costs	-136.382,34		-1,683,356.80	
Total benefits (tourism tax revenues)	503.430,00		630,000.00	
Total Benefits-Total costs	367.047,66		-1,053,356.80	
Net benefits	251.715,00			
Net benefits-Total costs	115.332,66			

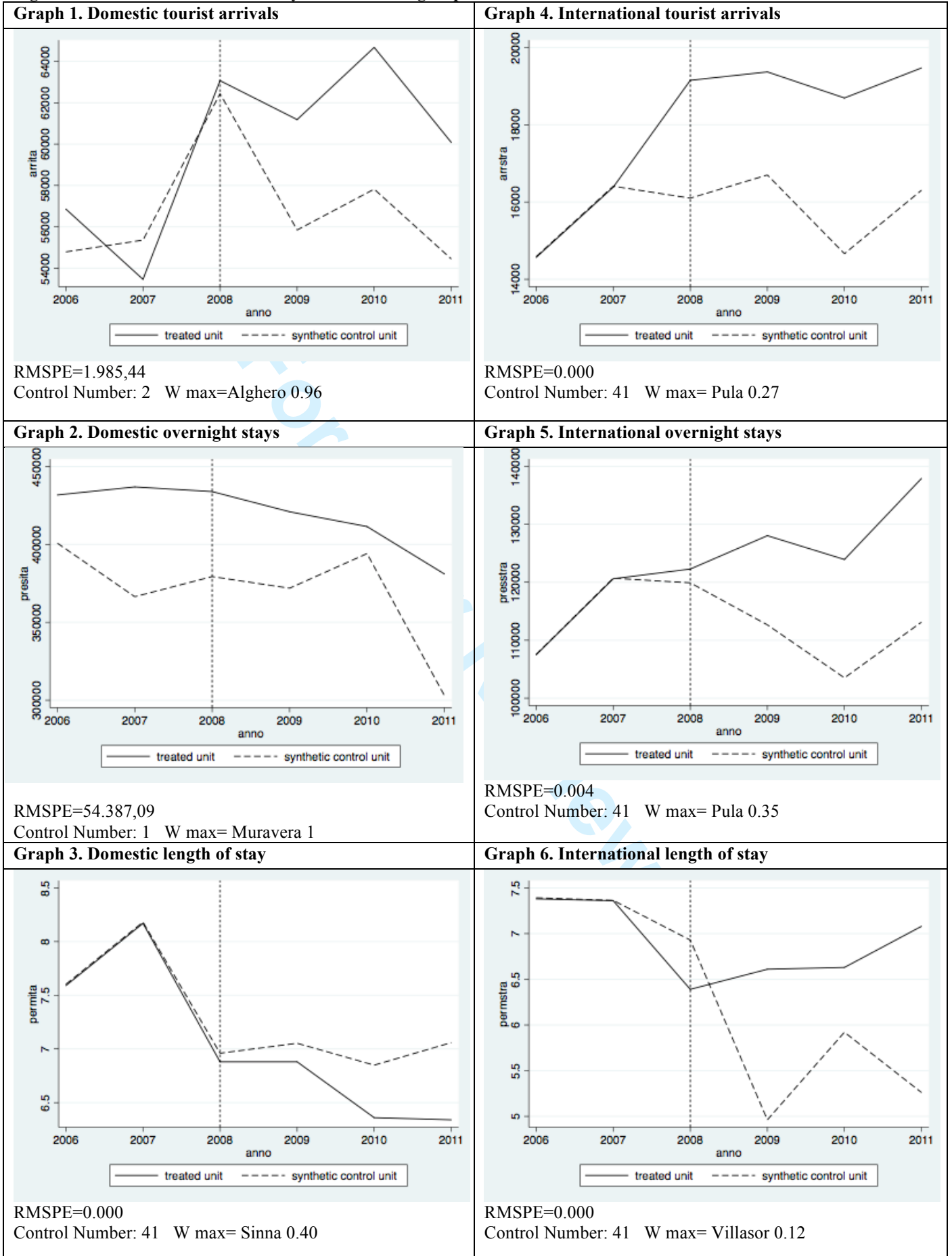
DATA APPENDIX
Table A.1 List of variables

Name	Definition	Period (years)	Type of variable	Source
Domestic tourist arrivals	Arrivals of resident in Italy tourists at a tourist accommodation establishment	2006-2011	Dependent	Provincial administration (Assessorato al Turismo)
International tourist arrivals	Arrivals of non-resident in Italy tourists at a tourist accommodation establishment	2006-2011	Dependent	Provincial administration (Assessorato al Turismo)
Domestic overnight stays	Nights spent by resident in Italy tourists in a tourist accommodation establishment	2006-2011	Dependent	Provincial administration (Assessorato al Turismo)
International overnight stays	Nights spent by of non-resident in Italy tourists in a tourist accommodation establishment	2006-2011	Dependent	Provincial administration (Assessorato al Turismo)
Domestic length of stay	Domestic arrivals/ Domestic overnight stays	2006-2011	Dependent	Our elaboration
International length of stay	International arrivals/ International overnight stays	2006-2011	Dependent	Our elaboration
Number of tourist accommodation	Total number of accommodation establishment	2006-2011	Predictor	ISTAT
Density	Density of population per square kilometre	2006-2011	Predictor	Our elaboration
Coast	Dummy variable that values one if a municipality is located in proximity of the coast and zero otherwise	time invariant	Predictor	Region of Sardinia
Tourist municipality	Dummy variable that values one if a municipality is defined by Sardinia Region as a tourist municipality and zero otherwise	time invariant	Predictor	Region of Sardinia
Distance from the airport	Distance from a municipality to the nearest airport calculated in Euros	2006-2011	Predictor	www.maps.google.com
Distance from the port	Distance from a municipality to the nearest port calculated in Euros	2006-2011	Predictor	www.maps.google.com

Table A.2 List of the municipalities

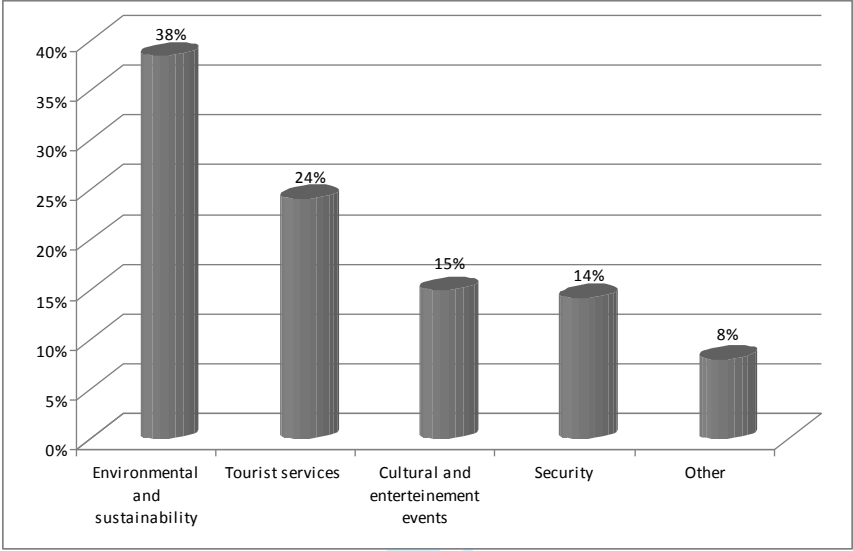
<p>Municipalities in the Cagliari Province: Assemini, Burcei, Cagliari, Capoterra, Castiadas, Dolianova, Domus de Maria, Mandas, Maracalgonis, MOnastir, Muravera, Nuraminis, Ortacesus, Pula, Quartu S.Elena, Quartucciu, S.Sperate, S.Vito, Sarroch, Selargius, Senorbi, Sinnai, Teulada, Uta, Vallermosa, Villa S.Pietro, Villaputzu, Villasor.</p> <p>Municipalities in the Carbonia-Iglesias Province: Calasetta, Carbonia, Carloforte, Iglesias, Portoscuso, S.Antioco, S.Anna Arresi.</p> <p>Municipalities in the Ogliastra Province: Bari Sardo, Cardedu, Gairo, Tortoli, Lotzorai.</p> <p>Municipality in the Sassari Province: Alghero.</p>
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Figure 1. SCM results: Treated vs. synthetic control group



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Figure 2. Tourism tax revenues allocation (year 2011)



Notes: Elaboration of balance sheet, Villasimius

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