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Are Subsidies to Hotel Investment an Effective Tool to Enhance Regional Tourism? A Firm Level Analysis

This paper undertakes an ex-post evaluation of the impact of public subsidies aimed to co-finance capital investments of micro and small hotel businesses in the Province of Trento (Italy) within the Provincial Law 6/99 in the period 2002–2006. We considered two performance indicators: the occupancy rate and the revenues per room. We used a matching approach to quantitatively assess the impacts of subsidies. Our results show that public subsidies have a positive effect on revenues and occupation rates of hotels.

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1. Introduction

Tourism is one of the most important economic activities to generate growth and employment in European countries (Balaguer & Cantavella-Jorda, 2002; Gülcan, Kuştepeli, & Akgüngör, 2009). The Lisbon Treaty specifically acknowledges tourism as a key sector of the European economy. However, the low productivity resulting from the small-business structure of the sector in many regions undermines its economic and social potential (Keller & Bieger, 2007; OECD, 2006). In the last few decades, overcoming these difficulties often included the design of policies aimed to foster tourism competitiveness (Keller, 2005), meet the increasing globalisation of demand, and increase sustainability. The provision of subsidies is seen as a major policy instrument to overcome firm underinvestment due to the high degree of fragmentation (Thomas, 1994, 1995; Wanhill, 2000). The competitive position of a tourism destination depends indeed on the joint decision of many micro and small firms that can underinvest in the improvement of their own facilities, in the hope to gain from the externalities generated by other firms' investment. Subsidies to the tourism sector were in fact mentioned by 62 of the 97 Members of the World Trade Association between 1995 and 2004 (WTO, 2006).

The effectiveness and efficiency of public spending on tourism businesses remains, however, an open issue (OECD, 2010). Although subsidies can be seen as effective and highly acceptable instruments of tourism policy management (Logar, 2010), what might be contended is the ability of policymakers to provide effective incentives to firms to rectify market failures. Indeed, selecting some hotels into a subsidy programme could introduce distortions in the competitive arena (Weiermair, 2006) and give rise to inefficiencies (Bergström, 2000). Quantitative analysis on the efficacy of subsidisation policies to tourism firms is still scant and does not refer to small firms (see e.g. Bernini & Pellegrini, 2013). The impact of mainstream small and medium enterprise (SME) policy on tourism businesses thus deserves enquiry (Thomas, Shaw, & Page, 2011). A more detailed analysis of past and

existing policies would provide policymakers with the tools to implement evidence-based support to the policies for the growth of the tourism industry.

This paper aims to provide evidence on the effectiveness of public subsidies to micro and small hotels in the context of the Provincial Law 6/99 (PL 6/99) of the Trentino province. The form of intervention directed to tourism firms consists of co-financing firm investment in fixed capital and on sustainability (e.g. improvements of energy efficiency of facilities).

From a methodological point of view, we used a matching approach to identify the treatment impact on outcomes (Rubin, 1986). In particular, we employed the matching estimator proposed by Abadie and Imbens (2002) and Imbens (2004).

The remainder of the paper is organised as follow: In Section 2, we present the theoretical and empirical background on which the paper is based. Section 3 describes the details of the evaluation exercises we conducted and the methodological aspects. Section 4 presents data and variables used in the analysis. Section 5 shows the results. Section 6 comments and concludes.

2. Theoretical Background and Empirical Literature

European tourism supply is dominated by micro and small family-owned firms (OECD, 2010). The hotel, restaurant, and travel agency industries combined have one of the highest proportion of micro and small firms in the European Union (EU) economy. In particular, around 80% of hotels are classified as micro and small firms. Italy has, in comparison to the other major European countries, the second highest number of hotels (85% of the total). Such an industrial structure has both advantages and weaknesses. Small firms are flexible and can adapt to the industry's changing demands; for example, they can focus on providing tailor-made and personalised solutions to meet visitors' requirement. On the negative side, small family-owned firms often have limited resources that may restrict their

investments, and scarce ability to adapt rapidly to new challenges and to capture opportunities in the market.

Two main rationales lie behind the advocacy of public intervention in the tourism sector. First, the presence of externalities creates a discrepancy between the private and public rate of return of investments, with the consequence of under-investment in projects aimed to upgrade hotel quality (Calveras & Vera-Hernández, 2005). The risk of underinvestment is more sensible when there are many dispersed entrepreneurs (Wanhill, 2000) and the positioning of a tourist destination depends on the perceived quality of instalments (Calveras & Vera-Hernández, 2005): in such cases, public subsidies can help co-ordinate firms upgrading decisions.

The second rationale lies in the financial constraints small firms face, in the presence of imperfect financial markets (Carreira & Silva, 2010). Small firms rely for founding mostly on banks, which are reluctant to engage in long-term risky loans without sound collateralization. Family entrepreneurs tend to restrain from the use of private assets to collateralise, and this eventually ends on underinvestment. The provision of public subsidies to investments is a possibly a way to alleviate the problem.

Our strategy is then to look at firm level observables to test the achievement of public policy goals. The effects of subsidies directed to tourism firms have been analysed either theoretically (Schubert & Brida, 2008) or by conducting qualitative analyses (Logar, 2010). Quantitative analysis is scant in this respect. Bernini and Pellegrini (2013) carried out a quantitative evaluation of the effectiveness of public subsidies to private firms in tourism.

3. The Evaluation of the Effect of Subsidies on Trentino Hotels

3.1 The Context of Analysis

Trentino is an Alpine province in northeast Italy with nearly 500,000 inhabitants. Thanks to the variety of attractions – Lake Garda and its surroundings, the Dolomites, and

many historic towns and cities – about 2,300,000 tourists visited the region in 2006, spending more than 11,000,000 nights there. The contribution of hotel and restaurant industries to the local value added ranged between 6.7% and 6.9% in the period 2004–2006.

Trentino is a developed, mature destination that spans more than 14 tourist districts with quite different environmental conditions. A number of districts enjoy a mild climate most of the year and a long peak season (Lake Garda). The districts in the best Alpine resorts are characterised by full winter and summer seasons, and have a two-peak tourist season, while other districts have only a short summer peak season. Lastly, ancient towns enjoy a fairly constant arrival of tourists throughout the year.

Differences among tourist districts are due not only to their endowment in natural resources, but also to their structure because they are community-type destinations (Beritelli, Bieger, & Laesser, 2007; Franch, Martini, & Buffa, 2010) and are therefore areas with a variety of autonomous tourist operators, in which destination marketing is managed by several local agencies *(Aziende di Promozione Turistica)*. In these areas, destination management plays a fundamental role in coordinating tourist operators to achieve an overall image and increase destination package tours.

The hotels are unevenly distributed in the tourist districts. There are very many in Valle di Fassa (18.31% of the total in 2006), near Lake Garda (9.75%), and in the high mountain resorts. As regards class, measured as one to five stars, the majority (more than 60%) are three-star hotels. The Trentino hotel industry is characterised by the widespread presence of small family firms. In 2006, hotels had an average of 30 rooms with 6.2 employees; only 15% were owned by limited liability companies.

3.2 The Policy: Provincial Law 6/99

Public intervention in the Trentino province is aimed to promote the economic growth and competitiveness of the province. With respect to tourism, the intervention consists of co-financing capital investments to foster firms' renewal and quality upgrading processes.

A distinguishing feature of this institutional setting is that firms operating in the Trentino province can apply only for subsidies awarded by the local government. Provincial Law 6/99 (PL 6/99) provides guidelines on the economic incentives to firms operating in the province. All firms operating in the Trentino province can apply for PL 6/99 grants by submitting a project to the local authority. Although there is no deadline for submission during the calendar year, a first-in-first-out criterion is used to assign financial resources, meaning that some firms may be refused once the budget is exhausted. There are two types of evaluation mechanisms, basically determined by the magnitude of the investment: selective and automatic. Through the selective mechanism, once a hotel applies for a grant, its application is examined for its economic viability and financial sustainability. Only if the project receives a positive assessment can it be co-financed by the local government. In contrast, automatic subsidies are granted only after checking that the applicant meets the requirements dictated by the law. The co-financed part of the investment is up to 35% of the total amount needed, depending on hotel size (smaller hotels receive more aids). The median value of co-financing observed in our database is about 25.000 euros.

3.3 The Econometric Framework

The econometric framework is based on Rubin's causal model (Rubin, 1977, 1986). As in Rubin's standard model, the identification and estimation of treatment is based on a set of assumptions: (a) the conditional independence, (b) the probability of assignment is bounded away from one (overlap), (c) potential outcomes are fixed and one-dimensional and each treated unit receives the same type of treatment. The estimation of the effect of a policy

on an objective variable is problematic given that grants cannot be assumed to be randomly assigned to firms. In our context, some hotels may be more likely to apply for a public subsidy than others, resulting in selection bias (Bernini & Pellegrini, 2013). The causal effect of a subsidy on a hotel's performance should be estimated by comparing the performance outcome if the hotel receives the treatment (the potential outcome under treatment), $Y_i(1)$, and the outcome if the hotel receives the control (the potential outcome under control), $Y_i(0)$.

We used the nearest neighbour matching estimator introduced by Abadie and Imbens (2002) and Imbens (2004) that summarises information from multiple variables in a single index. Moreover, in order to fully exploit a longitudinal setting, we extended the cross-sectional matching estimator by implementing a Conditional Difference-in-Differences matching estimator (CDiD):

$$\hat{\delta}^{CDiD} = \frac{1}{N_1} \sum_{i \in I_i \cap S_p} \left\{ \left[Y_{t_1 i}(1) - Y_{t_0 i}(0) \right] - \sum_{j \in I_0 \cap S_p} W_{ij} \left[Y_{t_1 j}(0) - Y_{t_0 j}(0) \right] \right\} \tag{1}$$

where N_1 is the number of treated firms; Y_{t0i}, Y_{t1i} are the values of the outcome variable respectively before and after the treatment for firm i in the treated group (I_1); Y_{t0j}, Y_{t1j} are the values of the objective variable respectively before and after the treatment for firm j in the control group (I_0); and W_{ij} represents the weights and depends on the particular cross-sectional matching estimator employed.

The CDiD estimator allowed us to control also for temporally invariant differences in outcomes between treated and non-treated firms (Smith & Todd, 2005). The control group used in the CDiD is the sample of M non-subsidised hotels which are matched to the treated hotel i in the period (t_0) before receiving the treatment. We then compared the differences in performance before (t_0) and after the treatment (t_1) of the two groups.

4. Data and Empirical Setting

4.1 Database Construction

We relied on several sources to construct the database. Administrative archives, held by the local government, were the primary source of information on hotels receiving grants. Primary data on firms' applications for public subsidies come from the APIAE (*Agenzia provinciale per l'incentivazione attività economiche*), the administrative body that manages the subsidisation programme on behalf of the local government. We considered subsidies granted through both selective and automatic procedures.

We complemented such data with an extensive repertoire built in partnership with the Statistical Office of the Trentino province and already used in previous analysis of the hotel sector in the Trentino province (see Corsino, Mirabella, Tundis, & Zaninotto, 2011). The database contains information on hotel characteristics for a representative sample of the population of hotels operating in the province. The final database (BDevalHTN) contained data for 426 subsidised and 410 non-subsidised hotels over the period 2002–2006.

4.2 Outcome Variables

We concentrated on the following measures of hotel performance:

- Occupancy rate (*occ_rate*), defined as the ratio of total guest nights spent in a year to the number of beds available, divided by the number of days the hotel was operative. Consequently, the occupancy rate is expressed in terms of number of guest nights per each available bed in a day of activity of the hotel. It is an index of the hotel's level of activity and a performance indicator in the hotel industry (Orfila-Sintes & Mattsson, 2009; Sainaghi, 2010; Yu & Lee, 2009). The increase of occupancy rate is an important outcome for public policies because it reflects the goal of meeting a higher demand without increasing the size or the number of physical facilities; and

- The revenue per available room (*revpar*), obtained as the ratio of the (deflated) yearly revenue to the number of rooms (deflated with base year 2002), divided by the number of days the hotel was operative: it is expressed as euros per day that an hotel on average earns each day on each room. It is considered as a proxy of capital productivity. From the point of view of the policymaker, this reflects the need to increase the quality of the tourist services offered by firms.

4.3 Control Variables

We considered a set of hotel characteristics in the matching estimation that can affect the propensity of hotels to apply for public grants and hotel performance:

- The legal form (*legal_form*) assumes the following values: individual firm (ditte individuali) limited liability company (società di capitali) and partnership of persons (società di persone); it can be considered as an indicator of the attitude of the firm towards risk and also the chance of entering public subsidisation programmes (Almus & Czarnitzki, 2003);

- Firm size: we used the number of available beds as a proxy for hotel size (*size*);

- Hotel category, which indicates the level and complexity of services provided. We defined a variable (*category*) with two values: high for three- and four-star hotels, and low for one- and two-star ones;

- Hotels which are attractive to international tourists are expected to be more efficient (Assaf & Kneževic´ Cvelbar, 2011). We defined a measure of internationalisation (*int*) for each hotel as the ratio of the number of nights spent by foreign guests to the total number of nights over the year;

- Location defines the environment in which firms operate and thus influences firms' behaviour and performance (Morikawa, 2011). We introduced a set of dummy variables (*dest*) to control for touristic destinations;

- We used a measure of "proximity" (*prox*), so that the impact of attraction points decreases with distance from the hotel, like the market-potential function (Harris, 1954).

As attraction points we considered ski areas, touristic lakes, and well-known beauty spots. Formally the index has the following form:

$$prox_i = \sum_{j=1,\dots,n} \left[d_{ij} \right]^{-1} \tag{2}$$

where d_{ij} is the (Euclidean) distance between hotel i and attraction point j, $j = 1,\dots,n$.

- Several studies have addressed the role of agglomeration in the hotel industry (Baum & Haveman, 1997; Baum & Mezias, 1992; Chung & Kalnins, 2001; Kalnins & Chung, 2004). Co-location may provide opportunities for frequent interactions, exchanges of information among hotel managers, and reduced monitoring costs (Gan & Hernandez, 2011). We controlled for the co-location effect by using an index (*co_loc*), which is a decreasing function of the distance of a hotel from all other hotels:

$$co-loc_i = \sum_{j=1,\dots,m} \left[q_{ij} \right]^{-1} \tag{3}$$

where q_{ij} is the (Euclidean) distance between hotel i and hotel j, $j = 1,\dots,m$.

- Hotels may have different investing propensity as well as profitability. We used as a proxy of capital intensity (*cap*) the ratio of amortisation of tangible capital to revenue (Asthana & Zhang, 2006; Baginski, Lorek, Willinger, & Branson, 1999; Cheng, 2005).

4.4 Empirical Setting

The treatment consists of the receipt of a subsidy in a year during the period 2002–2006. Given the definition of treatment used, a condition to be eligible as control is that of not having received any subsidy during the period under analysis. The non-subsidised hotels contained in the BDevalHTN database are then suitable to be used as controls.

We made a preliminary screening of non-subsidised hotels and discarded those with negative changes of amortisation cost on tangible assets over the entire period under analysis. After the screening, we were left with 372 non-subsidised hotels. Under the assumption that hotels in the treatment and control sample show similar propensity to invest, the selection

problem should be addressed. In other words, the counterfactual model employed –that compares only treated and control hotels with similar observable characteristics– with the CDID specification –that cancel out the time invariant idiosyncratic characteristics– helps us in controlling for potential reverse causality effects related with the different probability to apply and getting the subsidies of "better" hotels.

We controlled for the identified factors that are likely to influence both the propensity of hotels to apply for public grants and hotel performance.

We identified the pre-treatment period as the year before the granting of the subsidy. We evaluated differences in outcome between the treated and controls in two post-treatment periods: one and two years after the receipt of the subsidy (Figure 1). Hotels are matched at time t_0 (before treatment), and variations in the outcome of treated hotels are compared with those of comparable controls (the counterfactual) at time t_1 after treatment.
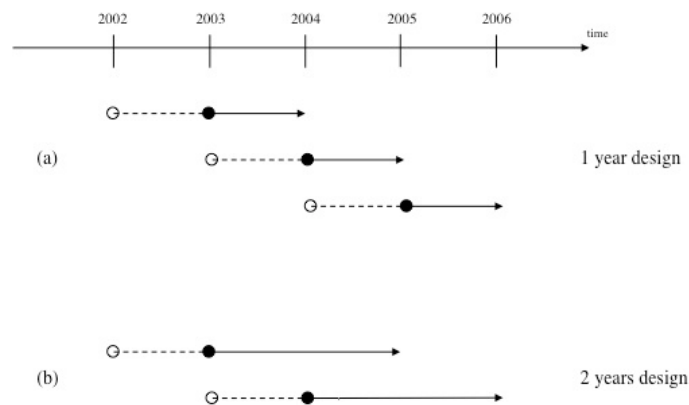

Figure 1. *CDiD matching approach. Black point: year of subsidies concession. White point: year of control variables. End of the arrow: year of evaluation of impacts*

We imposed exact matching on the category, destination, and also on year. Therefore, we matched treated hotels with control hotels that operate in the same destination, in the same category, and with reference to the same year. For the other observed characteristics, we

minimised the differences between treated and non-treated hotels, and we used the procedure suggested in Abadie and Imbens (2002) to correct for bias in the estimations introduced by non-exact matches[1].

Table 1 compares the variables of interest for treated and control hotels. We considered 154 treated hotels in the period under analysis and 1,488 potential controls[2]. Differences between the two group exist for some of the objective variables (*occ_rate* and *revpar*) and for covariates (*cap, size co_loc, cat, legal_form*), suggesting the need of a proper matching protocol.

Table 1. *Characteristics and Outcomes for Treated and Non-Treated Hotels 1 Year before Treatment (Not Matched Samples)*

Variable	Diff. between Treated and Non-treated	p-value
Outcomes		
occ_rate	0.032***	0.003
revpar	2.277**	0.037
Cov. (continuous)		
ext	-0.024	0.242
cap	0.031***	<0.001
size	6.201**	0.030
co_loc	-1203.6***	0.005
prox	-0.0014	0.800
Cov. (discrete*)		
cat	0.097***	0.017
legal_form1	-0.107***	0.003
legal_form2	0.111***	0.006
legal_form3	-0.004	0.870

Notes. Data are pooled across years; * only mean values are reported; *** $p<0.01$; ** $p<0.05$.

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[1] The analysis was implemented via the *nnmatch* module in Stata (Abadie et al., 2004). The code is available by request to the authors.

[2] In our empirical setting, non-subsidised hotels can be selected as control in each observed year.

5. Results

The results of the analysis are shown in Table 2, which contains the estimates of the average treatment effect on treated hotels (δ^{CDiD}) obtained using the CDiD. As CDiD controls for time-constant unobserved factors, it is possible to interpret the results as the causal effect of the policy.

Table 2. *Estimates of the Average Treatment Effect on Treated Hotels*

Outcome	After one year				After two years			
	δ^{CDiD}	*Std. Err.*	*z-stat*	p-*value*	δ^{CDiD}	*Std. Err.*	*z-stat*	p-*value*
occ_rate	0.019***	0.008	2.59	0.010	0.036***	0.012	2.99	0.003
revpar	2.624***	0.641	4.09	<0.001	4.223***	1.022	4.13	<0.001

Notes. Estimates are given as the difference in levels between treated and control hotels; exact match on hotel category, destination, and year; % of exact matches: 100; *** $p<0.01$; ** $p<0.05$.

Receiving subsidies had a positive and statistically significant effect on the outcomes considered, and the influence of subsidies increased over time. The daily occupancy rate (*occ_rate*) of subsidised hotels increased on average by about 2% after one year and by about 3.6% after two years. The average effect on the daily revenue per available rooms (*revpar*) was also positive (2.6%) and increased over time (4.2%).

From the point of view of policy makers, these are important results. On average, treated hotels were able to increase their margins and made better use of their facilities along the year, meaning that the same fixed asset is at the same time more marketable and more efficiently used. We can hypothesize that this is an outcome of a co-ordinated effort of investment that improved the attractiveness of a destination; but to verify that the mechanism through which the observed effect take place is co-ordinated investment, a new study is needed. The importance of the observed outcome for tourism policy is in any case glaring: not only the risk of underinvestment was overcome, but tourist resorts were able to get better results by intensifying the use and revenue of assets. In destinations depending mostly on

natural resources and beautiful landscapes, the possibility to rely on intensive margins and on efficient use of capital instead is in itself upmost relevant.

6. Concluding Remarks

The study investigated the ability to foster firms' quality of the co-financing activity in hotel investments in fixed capital and environmental investments implemented through the PL 6/99 in the Trentino province. We took into account agglomeration and localisation factors in determining the magnitude of the effect of the policy. The identification of the causal effect of the policy is granted by the high degree of comparability of subsidised and control hotels and by the absence of confounding effects arising from the overlapping of policies due to multiple levels of interventions.

Results signal that the policy was effective: Competitiveness of subsidised hotels was stimulated through the programme. Subsidised hotels changed the investment policy and consequently their performances.

We can get managerial implications from the results. If subsidised hotels are able to upgrade their competitiveness, then it is important for hotels to have access subsidies. Hotels should endow themselves with the administrative structure to be able to successfully carry on the application process related with the grant concession. Moreover, they have to identify the investments worth being realised and assess their competitive position, strengths, and weaknesses in order to make better use of the additional money coming from the policymaker. The external validity of the evaluation exercise we carried out depends on the local conditions and on the particular structure of the setting under exploration. Finally, while our setting allows the exploration of a short-term effect of subsidies, we cannot foresee the effect over a longer time horizon.

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Introduction