Visitors of two types of museums: do expenditure patterns differ?

Juan Gabriel Brida (corresponding author)
JuanGabriel.Brida@unibz.it
Tel.: +39 0471 013492
Fax: +39 0471 013009

Marta Disegna
Marta.Disegna@unibz.it

Raffaele Scuderi
Raffaele.Scuderi@unibz.it

School of Economics and Management
Free University of Bozen-Bolzano
Universitätsplatz 1 - piazza Università, 1
39100 Bozen-Bolzano – Italy

ABSTRACT

This study aims at estimating and comparing the determinants of expenditure behaviour of visitors in two types of museums. An ad-hoc survey was conducted between June and September 2011 among the visitors of the principal museums of the two provinces of Bolzano and Trento: the South Tyrol Museum of Archeology (Bolzano), hosting the permanent exhibition of the "Iceman" Ötzi, and the Museum of Modern and Contemporaneous Art of Trento and Rovereto (MART). The double-hurdle procedure of Heien and Wessels (1999) is used in order to obtain consistent estimates and split the process of spending decision into the stages of 'activation' and 'outcome'. Results highlight two distinct profiles of visitors. Spending of the modern art museum visitor was positively related to her cultural interest, whereas the spending profile of the archaeological museum guest was in relation with a more 'generalist' interest.

Keywords: Visitors' expenditure, museum, double-hurdle model, spending behaviour.

JEL Codes: C19; D12; L83

1. Introduction

Museums are the most popular cultural attractions (McKercher, 2004) followed by art galleries and monuments. Their unique role for culture is related to the creation of new understandings of the past, and the reaffirmation of an identity in time and space (McIntosch and Prentice, 1999) that is often unavailable elsewhere (Graburn, 1983, 1998; Tufts & Milne, 1999). For a long time visitors of cultural attractions have been treated as a homogeneous mass of people, all having in common the fact to be 'cultural' tourists. The tendency of the recent literature is instead to consider them as a heterogeneous market with different characteristics, perceptions, and needs (Hughes, 2002). Knowledge of the market becomes then a complex issue where it is difficult to define the profile of the average 'cultural' visitor. This has nontrivial implications for planners and policymakers when dealing with the economic impact of the cultural visit, and the search of the factors most significantly influencing expenditure. Relevant differences between the spending of visitors interested at different typologies of museums emerged in Istat (2010), where average expenditure in entrance fee and shops at archaeological museums (€.9,35) is found to be lower than the one at modern art museums (€.12,65). Such values can be indicative of dissimilar profiles of spenders. A question that arises from these data concerns, in fact, whether the 'economic trace' left by visitors is influenced by different characteristics related to each peculiar typology of museum. The presence of a common profile of visitors between diverse types of museums' visitors can have a deep impact, for instance, on their promotion as tourist attraction, or rather as means to cultural enhancement of territories. On the contrary, finding that spending is significantly influenced by dissimilar sets of determinants, each characterizing a specific type of museum, can offer precious indications about the leverages to act on in order to improve their economic effects on territories.

The present paper aimed at comparing the determinants of spending of visitors to two types of museums, that is a modern art and an archaeological. An ad-hoc survey was conducted at the two principal museums of Trento and Bolzano, the two provinces of the Trentino-South Tyrol region in

Northern Italy: the South Tyrol Museum of Archaeology, the permanent exhibition of Ötzi, "the Iceman" and the Museum of Modern and Contemporary Art of Trento and Rovereto. Both museums are the most visited ones of their area and are both important at an international level. Expenditure is analysed via opportune econometric techniques that allow to investigate on the determinants of spending according to its nature of censored variable.

Literature on the determinants of visitor spending has focused on the behaviour of visiting a whole country, a destination or an event. Nothing can be found, instead, for what concerns museums. An improved knowledge of how socioeconomic, trip-related and psychographic factors influence an individual's expenditure pattern can be used to better target high market spenders, and to improve visitor satisfaction, motivation, and likelihood of returning.

The paper is organized as follows. Section 2 briefly reviews the literature on tourist spending. Section 3 illustrates the survey method. Section 4 reports both the theoretical and econometric frameworks. Section 5 reports empirical evidence. Section 6 discusses the results and draws the conclusions also in terms of policy implications.

2. Literature review

During last decades the attention of tourism literature towards the empirical analysis of demand has grown. The reviews of Lim (1997) and Song and Li (2008) testify the increasing number of studies on this field and the relevant variety of methodologies that have been proposed. Contributions have manly focused on the characteristics and determinants of macro-level data, whereas less attention has been paid to spending at individual level. This is reported by the two review studies on micro data that to the best knowledge of the authors are present in literature. Wang and Davidson (2010) found 27 studies that used expenditure as the measure of individuals' demand for tourism. The review of Brida and Scuderi (2012) specifically focused on the use of

microeconometric models and analysed 86 studies from 1977 to the early 2012 where expenditure was taken as dependent variable.

Works making use of econometric techniques to study expenditure can be classified into two main groups. A limited number of them analyses the influence of a set of variables on the decision of whether spending or not as dichotomic variable (Alegre et al., 2010; Brida et al., 2012; Dolnicar et al., 2008; Mehmetoglu, 2007; Thrane, 2002). The majority instead considers the level of spending, overall per interviewee or standardised in terms of per capita and/or per day amount. The use of OLS estimator, though very frequent, produces inconsistent and biased estimates that are related to the presence of a zero-censored dependent variable and to the violation of standard assumptions (Amemiya, 1984; Maddala, 1983). Models such as Tobit (Tobin, 1958) are instead specifically conceived for being used with censored responses (Barquet et al., 2011; Downward et al., 2009; Leones et al., 1998; Zheng and Zang, 2011).

Tobit regressions require very strict conditions as the normality and heteroschedasticity of residuals. For this reason some authors prefer using the so called 'two–part' (or 'double–hurdle') model where decision of spending is split into two stages of i) deciding whether to spend or not and 2) if decided to spend, choosing the amount. Double–hurdle approaches have been used widely in fields different than tourism analysis, such as evaluation of public goods (Saz–Salazar and Rausell–Köster, 2008; López–Mosquera and Sánchez, 2011), food expenditure (Newman and Matthews, 2001; Bai *et al*., 2010), analysis of consumption (Jones and Yen, 2000; Aristei and Pierani, 2008), and visitors' expenditure (Brida et al., 2010).

Hong et al. (1999) and Weagley and Huh (2004) apply the two-part model proposed by Cragg (1971) to tourism, where the residuals of the two parts are supposed to be uncorrelated. Cragg's approach estimates a Probit model for the first stage, whereas a log-normal or truncated normal model is used to model the amount of spending. A more general methodological proposal is the one of Heckman's (1979), a less restrictive approach that explicitly considers the possibility that the two

parts are related. Although it provides interesting evidence about the making of the spending decision process, a limited number of contributors applied this technique (Hong et al., 2005; Jang and Ham, 2009; Jang et al., 2007; Nicolau and Mas, 2005).

3. Research method

3.1. The museums

The research involved two different typologies of museums that are also the most important ones in the Trentino-South Tyrol Italian region. The first was the Museum of Modern and Contemporary Art whose buildings are placed in the cities of Trento and Rovereto, the two main centres of the province of Trento. The main building is located in Rovereto, the hometown of the futurist artist Fortunato Depero, and was designed by the Swiss architect Mario Botta. The museum hosts a permanent collection where works are displayed on a rotating basis, and a temporary exhibition. It holds the most important collections in Italy for what concerns different artistic genres of modern and contemporary art. Figure 1 reports monthly visitors flows. Although the number of observations is limited there can be deduced an increasing trend in visits.

The second one was the South Tyrol Museum of Archeology (STMA). It is located in Bozen, the main city of South Tyrol, and hosts the permanent exhibition of Ötzi 'the iceman', a mummy from the Neolithic period of a man living in the region more than 5,000 years ago. Ötzi was found in September 1991 on Ötztal Alps by two German hikers and at a first sight was thought to be an unfortunate victim of the mountains. Later scholars discovered that it was one of the oldest mummies in the world. Due to its good preservation status and the presence of several belongings it allows scientists to make several investigations about the living conditions of ancient men. The mummy can be seen by visitors from a window on the so-called 'Iceman Box', a refrigerator that keeps Ötzi at particular temperature and humidity conditions. Figure 2 reports the monthly time

series of the number of visitors. What emerges is the more marked seasonal pattern than MART and the increase in the number of visitors in the last available year.

Due to their geographical location in a valley of a mountain region, both MART and STMA are potentially addressed to the audience of mountain tourists. Nevertheless, due to its location in South-Tyrol STMA is accessible by Austrian and German tourists more easily, although the same transportation lines serve Rovereto (i.e., same highway and railway).

3.2. The questionnaire

The survey was conducted from June to September 2011. A total of 1288 interviews (tourists, day–visitors, and local residents) were successfully collected from the two museums almost evenly (46% for MART, 54% in the Ötzi museum). In order to encourage cooperative behaviour respondents were informed that the research had exclusively scientific aims and that impartiality in data analysis was guaranteed. Furthermore a pilot survey was carried out to test the questionnaire before conducting the full survey, in order to avoid biases related to the questionnaire structure and wording. Interviews were held to visitors exiting the museums after their visit, in selected working and week-end days of the four months analysed, and during different time periods of the day. Only one person per travel party was selected. The questionnaires were anonymous and self-administrated in three languages (Italian, German, and English), though a research team member was present to respond if questions or doubts emerged. A convenience sampling method was used, as there were no sufficient information on the characteristics of museums' visitors in order to apply a probabilistic design. Of course well known limitations exist in making inference from a non-probability sampling.

The questionnaire was structured in three sections – see Table 1. The first concerned information related to the visit to the museum. The second one included trip-related characteristics, whereas the third related to socio-economic variables such as gender, age, education, occupation, income.

3.3. Profile of visitors

Table 2 compares the profile of visitors to MART and STMA. Three clusters are analysed: total expenditure, spending in accommodation, and on food and beverage. This distinction will be kept also in econometric estimates. Total expenditure includes all the items referring to a direct 'economic trace' on the visited territory accommodation, food and beverage, shopping in both museum's shop and other shops of the city, pharmacy, tour guide services, other expenditures. It excludes spending on transportation, which usually benefit residents marginally. Expenditure in accommodation catches the behaviour of those who decided to spend an overnight holiday on the territory, and as such it includes only tourists. Food and beverage instead is the most non-discretionary expenditure item besides accommodation that leaves economic traces on the territory, and unlike accommodation it includes also same-day visitors and residents.

The size of households visiting the museums was bigger for STMA and did not differ significantly for those who spent in accommodation. This may indicate that same-day visitors contribute to visit the museum with families of bigger size. The importance of family size is also confirmed by the higher presence of children and married people in STMA that differed significantly from MART. A relevant presence of same-day visitors emerges also from comparing the average length of stay (not reported in Table 1) that equals 1.7 nights for MART and 6.3 for STMA.

Also the tourists' origin distribution was significantly heterogeneous. Visitors coming from abroad, and Germany in particular, are more frequent for STMA, whereas MART appears to attract more visitors from neighbour regions. Gender differs significantly only for non-overnight visitors, but the gap between mean ages of visitors is not significant between the two museums.

Variables measuring the economic status provide significant indications about the profile of visitors. MART had an average visitor with higher education and being more frequently a retired

person or student – the latter feature being significant for non-overnight visitors. The household annual income is instead higher for those who visited STMA and did not stay overnight.

The earlier descriptive evidence of the spenders' profiles suggests the presence of two different typologies of visitor. People with a higher culture and resident in nearby areas visit MART more frequently. STMA's audience is instead more attractive for foreigners and families with children. Often differences between the two museums' visitors do not appear to be significant for overnight stayers.

4. Modelling tourist expenditure

4.1. Theoretical framework

Economic theory on tourist consumer behaviour is usually analysed under the classical utility model. The consumer chooses the quantities of goods and services that maximize her utility, given a budget constraint and a set of preferences (Papatheodorou, 2006). A basic theoretical model for studying the factors influencing the level of expenditure can be derived from Downward and Lumsdon (2000, 2003). If $q_j \mid t$ represents the quantity demanded of the commodity *j* at time *t*, p_j is the commodity's relative price, B_k and T_k are respectively consumer *k*'s budget constraint and tastes, demand can be seen as:

$$q_j \mid t = q\left(p_j, B_k, T_k \mid t\right) \tag{1}$$

Considering prices explicitly provides a formulation of demand that is difficult to assess from sectional data. A more convenient representation of (1) is the Engel curve:

$$\sum_j p_j q_j \mid t = pq\left(B_k, T_k \mid t\right). \tag{2}$$

Empirical studies express budgetary limitations and tastes as function of measurable characteristics. In literature there can be found different classifications of these explanatory variables. The one used as guideline in this work in order to choose the regressors is the one of Brida and Scuderi (2012), who distinguish between economic constraints, socio demographic, psychographic and trip-related variables.

4.2. Econometric model

This study adopts a particular estimation process introduced by Heien and Wessels (1990) in order to study the determinants of overall expenditure and the two subsets of spending in accommodation and food and beverage. The choice is driven by the presence of a nontrivial number of visitors that declared zero expenditure.

Heien and Wessels approach falls into the category of double–hurdle models that were introduced in Section 2. Also here the consumer is supposed to pass two 'hurdles' before purchasing that are related to 'selection' (she decides whether or not to purchase) and 'outcome' (she decides how much money to spend for that purchase). Each step corresponds to a distinct equation, where in Heckman's (1979) generalized version a Probit model is used for the selection stage and OLS assesses the factor influencing the outcome. The two models are joined through the 'inverse Mills Ratio' (MR), a vector that is added as independent variable to the second stage. MR is calculated from the estimations of the Probit model (selection stage). Besides being a correction factor for the censoring, MR's statistical significance indicates that there have been two stages in the purchasing decision process. In case MR is not significant the two stages are independent and a Tobit model can be used. Moreover Heien and Wessells improve Heckman's (1979) approach with the use all available observations in both stages, whereas the Heckman's estimation procedure

considers in the second stage only those units that declared a positive spending.

4.3. The double–hurdle model: a technical description

Suppose that the willingness to spend of *i*th visitor from a set of *n* individuals is a latent variable expressed by y_{1i}^{*}. If $\mathbf{X}_{1i}$ is a (n × (1+K)) matrix reporting a column of 1's corresponding to the intercept, and K columns each corresponding to an independent variable, the linear relation of dependence of y_{1i}^{*} from $\mathbf{X}_{1i}$, plus an error term, v_i, normally distributed with zero mean and constant variance, is expressed by

$$y_{1i}^{*} = \mathbf{X}_{1i}\beta_1 + v_i, \tag{3}$$

where β_1 is a (n × 1) vector. Due to the unobservability of the latent variable there can be defined an observable dummy variable (y_{1i}), in which each element is linked to the latent variable by means the following equation:

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^{*} > 0 \\ 0 & \text{otherwise} \end{cases}, \tag{4}$$

that is y_{1i} equals 1 in case the consumer decides to spend. Given equation (3), relation (4) and the assumptions made about the error term, we found that the model that described the selection stage is the Probit model, where the probability that the *i*th visitor will spend (Maddala, 1983) can be expressed as:

$$P(y_{1i} = 1) = P(\mathbf{X}_{1i}\beta_1 + v_i > 0) = \Phi(z_i) \tag{5}$$

with $\Phi(\cdot)$ being the standard normal cumulative distribution, and $z_i = (\mathbf{X}_{1i}\beta_1)/\sigma_1$. Parameters β_1 are usually estimated via maximum likelihood and their sign indicates whether a variable increases or decreases the probability to spend. After estimations of the first stage inverse Mills Ratio (MR) is computed as:

$$MR_i = \begin{cases} \phi(z_i)/[1-\Phi(z_1)] & \text{if } y_{1i} = 1 \\ \phi(z_i)/\Phi(z_1) & \text{otherwise} \end{cases}, \tag{6}$$

where $\phi(\cdot)$ is the density function for a standard normal variable. The vector of MR enters as regressor in the second stage and corrects OLS for inconsistencies and biasedness in presence of a censored variable. The second 'hurdle' supposes again that there exist another latent variable, say y_2^*, but this time corresponding to the amount the visitor is willing to spend, and another set of regressors in the matrix $\mathbf{X}_2$ of dimension (n × (1+J)), reporting a column of 1's and a set of J independent variables. Regressors can differ from the ones of first stage. Also here suppose that for the ith visitor the following linear relation holds:

$$y_{2i}^* = \mathbf{X}_{2i}\beta_2 + u_i, \tag{7}$$

with β_2 being a vector of (1+J) parameters to be estimated and u_i is the error term normally distributed with zero mean and constant variance. Since y_2^* is a latent variable its elements (y_{2i}^*) are not observable, but it is possible to observe the $\mathbf{y}_2$ variable, in which each element (y_{2i}) is linked to the elements of the latent variable as follows:

$$y_{2i} = \begin{cases} y_{2i}^* & \text{if } y_{2i}^* > 0 \text{ and } y_{1i}^* > 0 \\ 0 & \text{otherwise} \end{cases}, \tag{8}$$

which leads to the following linear regression that can be estimated via OLS:

$$y_{2i}^* = \mathbf{X}_{2i}\beta_2 + \alpha \mathrm{MR}_i + \varepsilon_i . \tag{9}$$

In the second-stage regression ε_i is a random component with zero mean. The value of α represents the covariance between v_1 and u_1, that is the errors of the two hurdles (Heckman, 1976).

4.4. Selection of regressors

A list of candidate regressors to be included in the model is reported in Table 3. Their classification is made according to the categories mentioned in Section 4.1, that is economic constraints, trip-related, psychographic and socio-demographic variables.

Income and expenditure variables are added by a dummy variable assuming the value of 1 when the respondent does not report the amount. This correction increases the sample size that would nevertheless be affected by a greater nonresponse rate. Income was surveyed in classes in order to increase the response rate, but in regressions models it is used as a unique metric regressor where the centre of each class is the modality. Two other metric variables, that is the number of nights and age, are added by their squared values in order to test for nonlinear effects.

Due to their high number a selection of regressors is required. In this sense guidelines can emerge from economic theory. As reported above, indications of theoretical models about the elements explaining tourist expenditure, and in particular spending behaviour of tourists of cultural attraction as museums, are vague and related to generic explanatory variables such as budgetary

limitations and 'tastes'. An alternative choice could be the selection on the basis of what previous studies considered in regression analysis. Nevertheless as already stressed no past contributions study the determinants of spending of tourists visiting museums. Moreover, as the review of literature by Brida and Scuderi (2012) reports, studies on the determinants of tourist consumption report a high number of heterogeneous regressors. This implies that indications of literature concern only the use of regressors that can be classified into categories, such as the four ones we mentioned above of economic constraints, socio-demographic, trip-related and psychographic variables. Of course such heterogeneity can be related also to the absence of a robust theoretical framework in guiding the selection of indicators.

For all these reasons in this paper the choice is oriented by a statistical criterion. In particular identification is made through a backward stepwise analysis at each 'hurdle' of the model. Stepwise analysis selected those regressors that were significant at a level less than 0.05. Such an approach has the advantage to operate a choice among the regressors on the basis of an optimality criterion. The main negative aspect concerns the difficulty in comparing estimated coefficients if different regressors are selected for each museum. This may affect the objective of comparing the intensity of coefficients, whereas it allows a qualitative comparison between those elements that emerge as most significant. Moreover the use of stepwise might sometimes appear as a merely mechanical selection of regressors, as also stressed by Brida and Scuderi (2012). Nevertheless in a field where no robust theoretical indications emerge about the selection of regressors this appears as the most reasonable criterion in order to characterize the spending profile for each museum. Of course future research would greatly benefit from theoretical works on the economics of cultural visitors.

5. Results

5.1. Total expenditure

Table 4 reports the significant variables explaining total expenditure that were selected by the

stepwise at each stage and for each museum. The significance of MR for both models indicates that the two-stages model is appropriate.

There emerge two distinct profiles of visitors for each museum. Evidence on MART visitors shows that the probability of spending is positively influenced by the fact that the museum was visited before going to the city. Variables affecting only the level of expenditure are instead the number of museums visited in the past twelve months and the high level of education of the visitor, both influencing it positively; a negative coefficient emerges instead from those who decided to visit the city only to accompany a friend or a relative. The rest of significant variables affect both the decision and outcome levels. This concerns those who visited the museum in order to learn something new, married visitors, and residents outside the province, all being in a positive relationship with spending. Among non-residents the greatest impact on the level of spending is given by those who live in foreign countries other than Germany, followed by those living in the Centre and South of Italy. Instead 'generalist' visitors, that is those whose motivation for visiting is 'doing something worthwhile', show negative coefficients for both decision and level of spending.

A negative association with those who do not declare their income affects the probability of spending for STMA visitors, which indicates that those who omitted their wealth status decided to spend less frequently. The probability of spending is instead higher for weekend visitors and first-timers. Level of spending is positively influenced by income level and declaring a specific interest in visiting STM, whereas those who visited temporary showroom and came with a high number of household members spent a lower amount. Factors influencing both stages are instead the decision to visit the museum as main motivation to come to Bozen and the origin of visitors, the former having a negative effect to spending. Similar to MART the spending of visitors is higher for residents in foreign countries other than Germany and the Centre-South of Italy, meaning that the higher is the distance the higher is the willingness to spend in general.

5.2. Expenditure on accommodation and food and beverage: MART

The decision of spending in accommodation facilities measures the choice of staying overnight. As expected income is a significant driver in deciding whether to afford an overnight vacation. Visit on weekends influences the probability of spending on accommodation facilities. The number of nights has also a positive influence on the probability of staying in accommodations but the probability of spending increases at a lower rate as the number of nights raises. Party size has instead a negative role in deciding whether to stay overnight. Results show also that overnight stayers visit the museum as one of the attractions of the city, and accordingly think that visiting the museum is something that one ought to do. The probability to spend on accommodation facilities is positively related to spending on transportation, food and beverage, and, of course, to living outside the province, whereas married visitors are likely to decide spending less frequently.

The amount of spending on accommodation appears to be positively associated with first time visit, spending in transportation, food and beverage, and male respondent. Those who declare that museum is a chance to learn something new are instead in an inverse relationship with spending, as well as married respondents. The origin of visitors was not significant in discriminating the decision of the amount to allocate on this item, whereas it was on deciding whether to spend on overnight stay. With respect to foreign tourists the ones living in the North-East of Italy (i.e., the nearest area) is not significant as expected.

The distinction between the two stages of decision and outcome is not significant for expenditure on food and beverage. As stressed above, the use of Tobit model is here necessary. There emerges a positive relationship of spending with the number of museums visited, married visitors, spending on accommodation facilities, and those declaring that the visit is a chance to learn something new. A negative relationship is instead found with the household size and the generalist opinion that visiting MART is worthwhile. The only significant category of visitors for what concerns the origin is the one of those who come from foreign countries other than Germany.

5.3. Expenditure on accommodation, and food and beverage: STMA

Similarly to total expenditure, the decision of spending on both accommodation and food and beverage for STMA visitors is negatively associated with the omission of income on the questionnaires. The decision of paying for accommodation is negatively related also with the number of museums visited. Variables positively affecting the decision of overnight staying are instead spending on food and beverage, the willingness to visit the city, age, and residence in Germany and Centre-South of Italy with respect to those living in other foreign countries. The amount of spending in accommodation facilities is positively associated with income, spending on food and beverage, willingness to visit the city an age. Negative factors of influence to that amount of expenditure are the number of museums visited in the last year, shopping at the museum and the household size.

The probability to spend on food is higher for first time visitors and those who spent on transportation. Inverse relationship instead emerges from those who are aimed at visiting both the museum and the city as main activity of the trip and autonomous workers. The amount of spending is instead positively related to income level, group size and specific interest in visiting STMA. A negative coefficient instead involves both the museum visit and knowledge of the city as main motivations for the trip, residence in the North of Italy, household size.

6. Discussion and conclusions

Museums are important attractors for tourists. Nevertheless their role for local communities goes beyond being a mere attraction for those who take an overnight holiday. The presence of a museum can be in fact a value added also for residents and for the improvement of the supply of culture in a territory. Museums visitors are also consumers, and as such they generate positive economic effects for local economies. Understanding the profile of visitors as spenders can shed light on the positioning of museums within the tourist supply of a community, and their role in determining economic flows. This research aimed at understanding the differences of visitors as spenders in two

different typologies of museums that are located in the same region, and both being potential attractions for mountain tourists.

The use of opportune econometric modelling was necessary in order to avoid inconsistency and biasedness of classical OLS estimates. An improved version of double-hurdle modelling as proposed by Heien and Wessels (1990) was then applied. The analysis considered three different categories of expenditure. Total spending excluding transportation reflects the 'economic trace' that the tourist leaves on the visited community. Accommodation expenditure characterizes tourists and their decision of overnight stay. All visitors instead may spend on food and beverage.

Significant differences emerge between the two museums and concur in defining two distinct profiles of visitors. MART appears as a very relevant attractor for tourism in Rovereto and seems to exert positive spillover effects to the city. The average visitor has a higher education level than in STMA and comes with families of smaller size and less frequently in presence of children. For this museum tourists interested in its cultural value exert a significant and positive effect on total spending. This is revealed by the positive coefficient of the number of museums visited, of visitors with higher education, and of those that declared to visit the museum to 'learn' something new. A further support to this interpretation is the negative effect of the 'generalist' visiting, that is those who think that the visit is something worthwhile or come to the museum for accompanying someone. The subset of those who decided to stay overnight considers MART as one of the attractions of the territory, but at the same time they are aware that visiting something that one ought to do. These overnight stayers visit MART mainly on weekends. The intensity of spending on accommodation is instead negatively related to the opinion of the visiting to the museum as a moment for learning. Also spending on food and beverage suggests a positive association with the 'cultural' tourist. Overall an increasing attention to cultural aspects of exhibitions and activities and a proper promotion of the cultural value of MART may boost its economic impact. At the same time overnight stayers seem to mean the museum as 'one of the available attractions'. Proper

policies should be addressed also to this segment of visitors, although MART effects on the local economy appear to be mainly due to those that are in search of a 'cultural' attraction.

The impact of STMA on the local economy is instead associated to a more 'generalist' profile of visitor. What appears on the whole is that it is perceived more as one of the main attractions that are part of the tourist supply than for its strict 'cultural' value. Moreover the 'history of the iceman' seems to attract an audience of families with children more frequently than MART, and that have also higher income. The pronounced seasonality of visitors' flows highlight its role of being a fundamental part of the tourist supply of Bozen, and as such it is influenced by the typical infra-annual fluctuations similar as to arrivals. This emerges also from the analysis of accommodation and food and beverage spending, where no particular proxy of 'cultural' aspects is related to spending.

The proposed analysis highlighted how different are the profiles of 'tourists as spenders' in two typologies of museums. Methodologies such as the one proposed can be helpful for both public policymakers and private investors in order to act on the factors that are likely to boost the economic impact on territories. One of the limitations of this study is that expenditure patters are analysed separately for each typology of spending, rather than in an integrated way. Future research should then consider the consumer's decision making process in a more complex way, where the choice to spend a given amount of money for one activity can influence the amount of money that the visitor is willing to pay for another activity. Interesting suggestions in this sense come from the work of Zhang et al. (2012) and their quantitative integrated modelling of tourism behaviour.

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FIGURES

Figure 1 – MART: monthly visitors flows

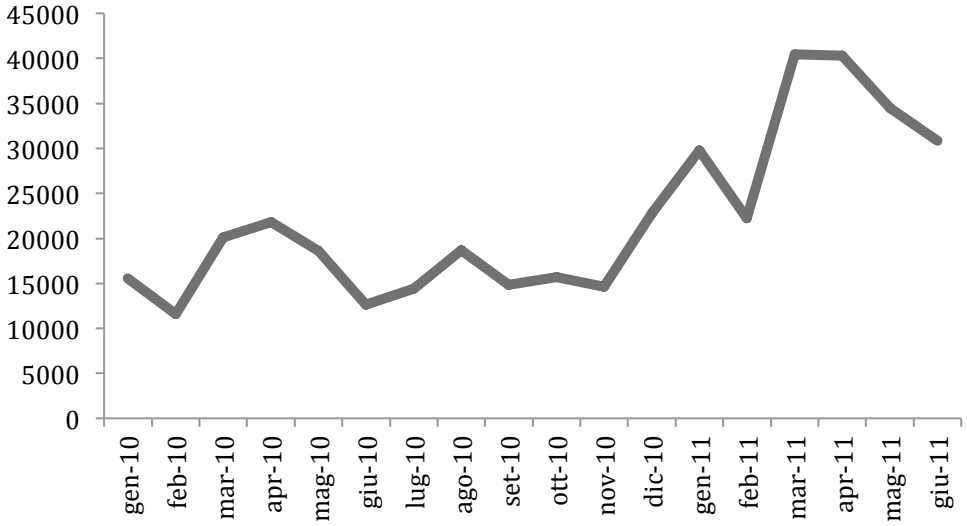
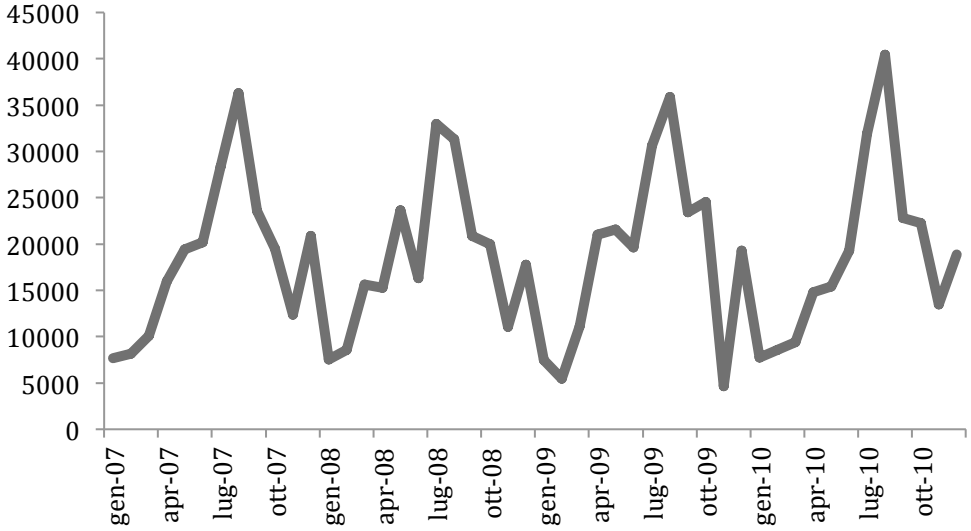


Figure 2 – STMA: monthly visitors flows



TABLES

Table 1 – Structure of the questionnaire

Sections	Object	Description
I	Museum information	Repeat visiting; number of museums visited in the last year; push factors*; rating of factors that describe the visit**; shopping expenditure at the museum; authenticity perception*.
II	Trip information	Purpose of the trip; number of nights, expenditure per night and type of accommodation used by tourists; expenditure per day for different items.
III	Interviewees' profile	Some socio-demographic and economic characteristics of interviewees and their families.

Notes: * dichotomous variables have been used; **A Likert scale from 1 to 5 has been used.

Table 2 – Socio-demographic and economic characteristics of the visitors: significance (*p*-value) of Chi-square and *t*-tests.

Variables	*Total expenditure*			*Accommodation*			*Food and beverage*		
	MART	STMA	*p*-value	MART	STMA	*p*-value	MART	STMA	*p*-value
Household size (mean)	2.05	2.46	**	2.28	2.49	0.08	1.99	2.38	**
Presence of children (%)			**			**			**
Yes	13.88	37.25		19.63	38.15		15.09	35.62	
No	86.12	62.75		80.37	61.85		84.91	64.38	
Marital status (%)			**			**			**
Married	54.94	75.37		56.07	76.88		59.25	73.77	
Not Married	45.06	24.63		43.93	23.12		40.75	26.23	
Origin of tourist (%)			**			**			**
Abroad	3.19	18.74		9.35	17.91		5.28	21.57	
Germany	3.70	34.70		14.02	36.90		6.42	33.01	
Centre/South of Italy	9.58	14.93		25.23	18.18		12.08	16.34	
North–East of Italy	40.34	12.15		26.17	11.82		39.25	13.40	
North–West of Italy	13.78	14.35		25.23	15.19		16.98	14.38	
Resident (Bolzano-Trento)	29.41	5.12		---	---		20.00	1.31	
Gender (%)			**			0.54			*
Male	44.05	51.33		50.47	53.77		44.91	53.29	
Female	55.95	48.67		49.53	46.23		55.09	46.71	
Age (mean)	44.29	44.32	0.97	44.36	44.97	0.63	45.09	44.01	0.31
Level of education (%)			**			**			**
University degree	82.58	68.45		85.05	69.11		83.77	68.65	
Not university degree	17.42	31.55		14.95	30.89		16.23	31.35	
Occupation (%)			**			0.48			**
Autonomous worker	17.76	20.30		21.50	19.95		18.49	17.49	
Employed	47.40	59.10		51.40	59.60		45.66	64.03	
Other occupation	10.55	8.36		10.28	7.83		12.08	7.92	
Retired	12.73	7.46		9.35	8.33		13.21	5.28	
Student	11.56	4.78		7.48	4.29		10.57	5.28	
Household annual income (%)			**			0.06			**
0 -| 25 000	19.57	9.28		12.15	9.23		13.96	11.11	
25 000 -| 50 000	39.13	26.52		41.12	28.43		44.91	28.10	
51 000 -| 75 000	11.71	15.36		14.95	19.20		13.96	20.26	
> 76 000	7.36	15.36		14.95	17.21		8.30	20.59	
Missing income	22.24	33.48		16.82	25.94		18.87	19.93	

Notes:
Results are not statistically significant unless indicated as: ** (significant at $p \leq 0.01$) or * (significant at $p \leq 0.05$).

Table 3 – List of independent variables.

Independent variables	Descriptions
Economic constraints	
Income	The mid-point of each income category is considered; 0 = NR
Missing income	1 = income NR; 0 = Ot.
Trip-related	
Week end	1 = visit on Friday, Saturday or Sunday; 0 = Ot.
First time	1 = never been to this museum before the interview; 0 = Ot.
Number of museums visited	Number of visited museums in the last 12 months
Group	1 = the visit is made with an organized group and/or with friends/colleagues; 0 = Ot.
Nights*	Number of nights paid for; 0 = same-day visitor
Nights2*	Squared number of nights
Expenditure on other items	
Accommodation	Expenditure for accommodation; 0 = NR
Missing accommodation	1 = expenditure for accommodation NR; 0 = Ot.
Transportation	Expenditure for transportation; 0 = NR
Missing transportation	1 = expenditure for transportation NR; 0 = Ot.
Food and beverage	Expenditure for food and beverage; 0 = NR
Missing food and beverage	1 = expenditure for transportation NR; 0 = Ot.
Shopping at the museum	Expenditure at the shop of the museum; 0 = NR
Missing shopping at the museum	1 = expenditure at the shop NR; 0 = Ot.
Timing of the visit to the museum	1= the respondent visited the museum before reaching the city; 0 = Ot.
Psychographic	
Why have you visited the museum today?	
Satisfy curiosity	1 = Satisfying curiosity; 0 = Ot.
Rest/Relax	1 = Relaxing; 0 = Ot.
Specific interest	1 = Specific interest in such an attraction; 0 = Ot.
Accompany friend/family member	1 = Specific interest of a friend/family member in such an attraction; 0 = Ot.
Learn something new	1 = Learning something new; 0 = Ot.
Something which one ought to do	1 = Something which one ought to do; 0 = Ot.
Doing something worthwhile	1 = Doing something worthwhile; 0 = Ot.
Occupy some leisure time	1 = Occupying some leisure time; 0 = Ot.
Visit the temporary showroom	1 = Visiting the temporary showroom; 0 = Ot.
What was the main motivation for visiting this city?	
Visit this museum	1 = Visiting this museum; 0 = Ot.
Visit/know the city	1 = Visiting or knowing the city; 0 = Ot.
Accompany friends or relatives	1 = Accompanying or visiting friends or relatives; 0 = Ot.
Socio–demographic	
Household size	Number of members of the family
Children	1 = presence of children under 13; 0 = Ot.
Origin	
Abroad	1 = foreign country, excluding Germany; 0 = Ot. *(reference category for accommodation where residents are excluded)*
Germany	1 = Germany; 0 = Ot.
Centre and South of Italy	1 = province in Centre or South of Italy; 0 = Ot.
North–East of Italy	1 = province in North-East of Italy (excluding the province in which the museum is located); 0 = Ot.
North–West of Italy	1 = province in North-West of Italy; 0 = Ot.
Resident	1 = respondent resides in the province in which the museum is located (Trento for MART, Bolzano for STMA); 0 = Ot. *(reference category for total expenditure and food and beverage expenditure models)*
Male	1 = male; 0 = female
Age	Age of the respondent
Age2	Age squared
Education	
University	1 = university degree or postgraduate; 0 = Ot.
Occupation	
Self-employed	1 = self-employed; 0 = Ot.
Employed	1 = employed, full-time or part-time; 0 = Ot.
Retired	1 = retired; 0 = Ot.
Student	1 = student; 0 = Ot. *(reference category)*
Other	1 = unemployed/housewife/working occasionally or on project/other; 0 = Ot.
Married	1 = married; 0 = Ot.
MR	Inverse Mills Ratio

Notes

* This variable was taken into consideration only for MART museum due to the large number of missing in STMA dataset.

NR = Not Reported; Ot. = Otherwise

Table 4 – Determinants of total expenditure per capita per day (excluding transportation), significant regressors ($p < 0.05$). Standard errors are reported in parenthesis.

	MART		STMA	
Independent variables	*First stage*[*M]	*Second stage*[**M]	*First stage*[*S]	*Second stage*[**S]
Economic constraints				
Income				0.231 (0.04)
Missing income			-0.659 (0.12)	
Trip-related				
Weekend			0.292 (0.12)	
First time			0.380 (0.15)	
Number of museums visited		0.842 (0.24)		
Timing of the visit to the museum	0.391 (0.17)			
Psychographic				
Why have you visited the museum today?				
Specific interest				4.981 (2.52)
Learn something new	0.428 (0.14)	11.060 (3.05)		
Doing something worthwhile	-0.338 (0.15)	-10.777 (2.66)		
Visit the temporary showroom				-5.683 (2.85)
What is the main motivation for visiting this city?				
Visit this museum			-0.274 (0.12)	-8.074 (2.56)
Accompany friends or relatives		-6.871 (2.77)		
Socio–demographic				
Origin				
Abroad	1.473 (0.39)	62.475 (9.86)	2.088 (0.38)	62.910 (6.42)
Germany	1.328 (0.36)	35.368 (5.79)	1.947 (0.36)	52.828 (5.37)
Centre and South of Italy	1.091 (0.23)	40.240 (4.52)	2.172 (0.38)	58.986 (6.81)
North–East of Italy	0.338 (0.14)	19.583 (2.43)	1.679 (0.38)	51.237 (5.88)
North–West of Italy	0.799 (0.19)	35.702 (4.65)	1.780 (0.37)	54.081 (5.73)
University		5.565 (2.38)		
Married	0.352 (0.11)	6.816 (2.96)		
Household size				-8.362 (1.44)
MR		-38.895 (4.41)		-39.576 (2.36)
Constant	-0.802 (0.17)	16.445 (2.82)	-1.244 (0.35)	27.254 (5.7)

Notes: Robust Std. Err. in brackets.
[*M] Number of obs = 590; Wald $chi^2(9) = 82.14$; Prob > $chi^2 = 0$; Log pseudolikelihood = -357.5794; McKelvey and Zavoina's $R^2 = 0.223$;
[**M] Number of obs = 590; F(12,577) = 16.87; Prob > F = 0; Adjusted $R^2 = 0.271$
[*S] Number of obs = 650; Wald $chi^2(9) = 88.05$; Prob > $chi^2 = 0$; Log pseudolikelihood = - 322.29457; McKelvey and Zavoina's $R^2 = 0.248$;
[**S] Number of obs = 650; F(11,638) = 37.97; Prob > F = 0; Adjusted $R^2 = 0.408$

Table 5 – MART: determinants of expenditure on accommodation and food and beverage, per capita per day, significant regressors ($p < 0.05$). Standard errors are reported in parenthesis.

	Accommodation		*Food and Beverage*		
Independent variables	*First stage* A*	*Second stage* A**	*First stage* F*	*Second stage* F**	*Tobit* F***
Economic constraints					
Income	0.006 (0)				
Trip-related					
Week end	0.355 (0.15)				
Nights	0.183 (0.04)				
Nights2	-0.003 (0)				
First time		4.037 (1.31)			
Number of museums visited			0.044 (0.02)	0.326 (0.15)	0.617 (0.22)
Group	-0.486 (0.19)				
Expenditure on other items					
Accommodation	Not included	Not included		0.423 (0.12)	0.54 (0.12)
Missing accommodation			0.81 (0.15)		
Transportation	0.012 (0)	0.13 (0.03)			
Food and beverage	0.031 (0)	0.613 (0.15)		Not included	Not included
Missing transportation/food		3.547 (1.6)		Not included	Not included
Psychographic					
Why have you visited the museum today?					
To learn something new		-4.339 (1.64)	0.342 (0.15)		6.748 (3.31)
Something which one ought to do	0.525 (0.19)				
Doing something worthwhile			-0.356 (0.15)		-5.872 (2.86)
What is the main motivation for visiting this city?					
To visit/know the city	0.534 (0.23)				
Socio–demographic and economic characteristics					
Origin					
Abroad	Not included	Not included		13.992 (6.6)	16.281 (7.37)
Germany	1.278 (0.34)				
Centre and South of Italy	0.973 (0.22)				
North–West of Italy	0.698 (0.2)				
Male		3.234 (1.3)			
Married	-0.546 (0.17)	-2.987 (1.48)		3.234 (1.17)	8.736 (2.23)
Household size					-3.488 (1.17)
Children	0.502 (0.2)				
MR		14.642 (2.21)			
Constant	-2.05 (0.22)	-3.645 (1.14)	-0.31 (0.1)	2.037 (0.92)	-5.79 (3.73)

Notes: Robust Std. Err. in brackets.

A*Number of obs = 589; Wald chi2(14) = 163.88; Prob > chi2 = 0; Log pseudolikelihood = -167.30885; McKelvey and Zavoina's R2 = 0.630;

A**Number of obs = 589; F(8,580) = 14.17; Prob > F = 0; Adjusted R2 = 0.407

F*Number of obs = 504; Wald chi2(4) = 44.61; Prob > chi2 = 0; Log pseudolikelihood = - 324.02271; McKelvey and Zavoina's R2 = 0.151;

F**Number of obs = 504; F(9,499) = 10.39; Prob > F = 0; Adjusted R2 = 0.321;

F***Number of obs = 504; Wald chi2(7) = 66.43; Prob > chi2 = 0; Log pseudolikelihood = - 1320.435; McKelvey and Zavoina's R2 = 0.220

Table 6 – STMA: determinants of expenditure on accommodation and food and beverage, per capita per day, significant regressors ($p < 0.05$). Standard errors are reported in parenthesis.

	Accommodation		*Food and Beverage*	
Independent variables	*First stage*[A*]	*Second stage*[A**]	*First stage*[F*]	*Second stage*[F**]
Economic constraints				
Income		0.136 (0.03)		0.08 (0.02)
Missing income	-0.383 (0.11)		-0.586 (0.13)	
Trip-related				
First time			0.339 (0.16)	
Number of museums visited	-0.026 (0.01)	-0.445 (0.21)		
Group				6.005 (2.41)
Expenditure on other items				
Missing accommodation			0.637 (0.12)	6.824 (1.25)
Transportation			0.076 (0.03)	
Food and beverage	0.025 (0.01)	0.276 (0.07)		
Missing transportation/food	-0.553 (0.16)	-8.657 (3.79)		
Shopping at the museum		-0.125 (0.05)		
Psychographic				
Why have you visited the museum today?				
Specific interest				2.682 (1.23)
What is the main motivation for visiting this city?				
To visit this museum			-0.473 (0.14)	-6.332 (1.71)
To visit/know the city	0.334 (0.11)	6.263 (2.03)	-0.322 (0.14)	-5.086 (1.78)
Socio–demographic				
Origin				
Germany	0.311 (0.12)			
Centre and South of Italy	0.403 (0.16)			
North–East of Italy				-3.157 (1.26)
North–West of Italy				-3.714 (1.37)
Household size		-3.903 (1.04)		-2.936 (0.62)
Occupation				
Autonomous worker			-0.379 (0.14)	
Retired				
Age	0.012 (0)	0.323 (0.09)		
MR		-24.877 (3.12)		-9.676 (2.53)
Constant	-0.484 (0.23)	29.061 (5.05)	-0.026 (0.2)	20.783 (4.14)

Notes: Robust Std. Err. in brackets.

[A*]Number of obs = 647; Wald chi2(8) = 90.54; Prob > chi2 = 0; Log pseudolikelihood = - 380.04211; McKelvey and Zavoina's R2 = 0.282; [A**]Number of obs = 647; F(9,637) = 20.99; Prob > F = 0; Adjusted R2 = 0.238

[F*]Number of obs = 555; Wald chi2(7) = 77.44; Prob > chi2 = 0; Log pseudolikelihood = - 328.88707; McKelvey and Zavoina's R2 = 0.300; [F**]Number of obs = 555; F(10,544) = 13.47; Prob > F = 0; Adjusted R2 = 0.230