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## **Has cultural heritage monetary value an impact on visits? An assessment using Italian official data**

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### **Abstract**

A debated issue in cultural economics relates to the role of the value of cultural heritage with respect to both conservation needs and visits to cultural sites. The most relevant problem is that there is not a monetary valuation of cultural heritage and, for this reason, different indirect valuation methods have been proposed in the literature. However, in Italy, the Treasury and the Ministry of Cultural heritage and activities and Tourism now provide official data on the monetary value of State cultural assets. Using these data for the years 2007-2014, this paper aims at evaluating if the monetary value of cultural heritage has a significant role in stimulating visits to cultural sites, considering also the different characteristics of the heritage as well as those of the corresponding local area. To the best of our knowledge, this is the first study that attempts to investigate this type of impact.

**Keywords:** cultural heritage, monetary value, visits.

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## 1. Introduction

In this paper we try to investigate what factors affect the visits to Cultural Heritage (CH), using Italy as a case study. We adopt a quite large definition of CH including not only archaeological and historical sites and historical buildings but also museums and focus our attention on State CH.

More precisely, our research question is twofold: on one hand, we try to assess whether the quality of CH has a role in stimulating the visits and, on the other hand, we investigate if the efficient organization of the touristic sector affects the number of visits.

The above issues are closely related and, in analysing them, useful insights come both from the extensive literature on cultural participation and on cultural tourism, however 'elusive' the definition of cultural tourist is (Guccio et al., forthcoming). In fact, our paper somehow lies at the intersection of these research areas.

In the economic literature the interest for the investigation of the determinants of the individual and social demand for cultural heritage is quite widespread from a theoretical as well as an empirical point of view (Ateca-Amestoy, 2013; Luksetich and Partridge, 1997; Johnson and Thomas, 1992; Gil and Ritchie, 2009). We address this wide issue from a rather specific empirical perspective: we focus on physical visits, leaving aside other forms of fruition such as the 'virtual' ones (Navarrete, 2013). Unlike most of the literature on culture participation (Ateca-Amestoy and Prieto-Rodriguez, 2013), we do not use survey data from CH visitors to investigate the role exerted by the individual features of cultural consumers but we rather pay attention to the effects exerted by the quality of CH and of the surrounding environment.

Indeed, a peculiar and innovative feature of this paper refers to the variables we use: to express the quality of CH we employ an 'objective' indicator such as the monetary value of State movable CH, as officially provided by the Italian Ministry of Economy and Finance (*Ministero dell'Economia e delle Finanze*, MEF), which will be discussed in details later on. Though the role of quality to explain museum attendance has been explored in the literature (Luksetich and Partridge, 1997) to the best of our knowledge, this is the first study that employs objective value measures to investigate this impact.

A further element capturing our attention is the relationship between CH visits and the tourism sector. We do not address the almost endless debate whether visiting CH is the

main motivation for travelling or just a collateral motivation (Richards, 2002; Cellini and Cuccia, 2013; Cuccia and Cellini 2007) but we rather try to assess whether visitors, that are motivated by the CH quality, are also affected by the efficiency of the tourism sector. Again, to explore such a relationship we use a rather innovative variable, i.e. the DEA efficiency scores computed at regional level for the Italian touristic supply (Cuccia et al., 2016). Using a parametric approach we find that both the quality of CH as well as the efficiency of the tourist sectors positively affect the number of visits to the Italian CH State institutions.

The analysis develops as it follows: in section 2 a short review of the literature on cultural participation and cultural tourism is offered. Section 3 analyses the main features of our case study, Italian State CH and section 4 describes the data and the methodology we use. Section 5 presents the results obtained and section 6 offers some concluding remarks.

## **2. Background**

Italy has an important place when it comes to its cultural attractiveness. In the World Economic Forum (2015) ranking it was 6<sup>th</sup> as for its cultural attractiveness.<sup>1</sup> As mentioned above, it is difficult to define cultural tourism (Richards, 1996) however, it constitutes a form of cultural participation and it has been playing an increasingly important role in tourism development, though it is still very difficult to distinguish between ‘accidental’ cultural tourists and tourists who put culture as the main aim of their travel (Richards, 2002; Cellini and Cuccia, 2013; Cuccia and Cellini 2007).

Another issue to consider relates to the changes in the place of origin of visitors. Italy maintains the 5<sup>th</sup> position in term of international tourist arrivals according to the World Tourism Organisation (UNWTO, 2016), still there is an increasing number of visitors from within the same region and/or town (ibidem).

There is an extensive literature trying to assess the demand function for cultural activities. Most papers consider demand for performing arts (see for example the extensive survey of Seaman, 2006 and Ateca-Amestoy, 2008), however several studies concentrate on the demand of cultural heritage and museums. Fernandez Blanco and Prieto Rodriguez (2004) suggest the classification of these studies in two groups: one focusing on the

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<sup>1</sup> Please note that the indicator includes cultural and business travel attractiveness.

estimation of the demand function (Luksetich and Partridge, 1997; Johnson and Thomas, 1992; Gil and Ritchie, 2009) and one focusing on the identification of the socio-economic characteristics of museum audiences (Fernández Blanco and Prieto Rodríguez, 1998 and 2004; Ateca-Amestoy and Prieto-Rodríguez, 2013). In particular, Luksetich and Partridge (1997), using the data from the 1989 Museum Survey, estimate the demand functions considering several demographic indicators (income, age, sex, race, museum membership) to assess the characteristics of museums visitors. They also consider the quality of the museum using as explicatory variables the five dummies for the museums' collection value, the age of the museum, the annual number of weeks, and the average number of hours per week a museum was open. In their conclusion they found a positive association between attendance and their measure of quality. Findings about the demographic characteristics of audiences are in line with most studies (Seaman, 2006; Ateca-Amestoy and Prieto-Rodríguez, 2013) about cultural attendance: low elasticity of demand, lower museum attendance among minorities, possibility to use increased revenues from admission fees to enhance quality and stimulate new visitors to enter museums. Gil and Ritchie (2009) use a survey to assess the causal relationships between the image of a museum and visitors' satisfaction. In the analysis they differentiate residents and tourists and find the same positive effect on both groups with differences in the definition of the image of the museum. Fernandez Blanco and Prieto Rodríguez (1998 and 2004) refer to the data of a National Survey on cultural consumption run in 1991 in Spain. They use a multinomial probit model to identify the role of socio-economic variables (sex, age, education, civil state, workload, region of residence, income) to explain attendance to museums, among other types of cultural consumption. Ateca Amestoy and Prieto Rodríguez (2013) contribute to the economic literature on cultural participation concentrating on the forecasting properties of regression models for arts participation..

Next to these studies on cultural participation, there is a rich bulk of studies on cultural tourism that try to assess the determinants of this branch of tourism. Similarly to Brida et al (2015) we could argue that this work is between these two main lines of research. As a matter of fact, looking at the determinants for museums and cultural heritage sites visits in Italy, our study includes the former analysis concentrating on cultural participation. However, part of the data refers to tourists' visits, hence the connection to the literature on cultural tourism. The difference compared to most tourism studies, however, is

that our data include tourists as well as local inhabitants shifting, thus, the focus on the attractiveness of cultural destinations and not on their ‘users’. From this point of view we argue that our work follows a different path and concentrate on the capacity of a cultural destination to attract visitors (locals and not).

Within cultural economics this is another strand of research that has been followed. For instance Di Lasco et al. (2011) looked at the impact of art exhibitions upon tourist flows in Italy finding a positive 1-year lagged effect of Modern art exhibitions on tourism and a positive (mild) effect of contemporary (temporary) art exhibitions on the tourist flow when their organization is continuous over time. Thus they concluded that ‘temporary art exhibitions contribute to increase the tourist flow if they are part of a structural characteristic of a destination’ (Di Lasco et al. 2011: 536). Suggesting the need of continued investment on this type of exhibitions to have positive effects on tourist flows.

As mentioned, Luksetich and Partridge (1997) in their study also consider the quality of the museum as an attraction elements, in particular they use the value of the collection indicated by five dummy variables for collection values as an indicator of quality. The peculiarity of our approach is that, we use an objective measure of the monetary value of State cultural heritage that is provided by the Italian Ministry of Finance to indicate the quality of the museum and explain the number of visitors to the corresponding State museums, historical and archeological sites in the Italian regions. To our knowledge it is the first time that such a measure is used to explain attendance to cultural sites.

The possibility to use the value of the collection of immovable heritage contrasts most studies within cultural economics that have looked at the value of cultural heritage. The analysis, has normally been undertaken with an opposite perspective; using the travel cost method and hedonic pricing, visitors’ numbers, expenditures and preferences have been used to assess the value of cultural heritage and museum. For instance, Alberini and Longo (2006) use a travel cost study to determine the value of conservation for domestic visitors of four cultural heritage sites in Armenia. Rowendal and Boter (2009) focus on Dutch museums and poor and Smith (2004) on the historic St. Mary’s City of Maryland. Moro et al (2011) use hedonic pricing to assess the value of cultural heritage in Dublin,

Here we follow an opposite trajectory, and the value of cultural heritage and museum is a given and is used to try to explain/forecast visitors’ behavior: we aim to assess the impact of the value of heritage in attracting visitors. By doing this we also include in the

analysis a series of variables (presence of different amenities, i.e. sea; security; quality of tourism services; presence of UNESCO World Heritage sites) related to other aspects that can explain the attractiveness of a specific region for visitors. This last aspect of our analysis is in line with several other studies on tourism that try to explain the capacity of an area/tourism destination to attract visitors. For instance, Devesa et al. (2010) look at the various element behind the motivation of visitors to a rural destination in Spain; Yoon and Uysal (2005) suggest that the positive experience from the service offered by a tourism destination can stimulate repeated visits.

### **3. Italian state cultural heritage: institutions and organization**

Italian CH is outstanding and spread out all over the country<sup>2</sup>. CH has always been the ‘core’ of Italian cultural policy, with responsibilities shared between the State and the decentralised levels of government – Regions and Municipalities<sup>3</sup>. The State, through the Ministry for Heritage, Cultural Activities and Tourism (*Ministero dei Beni e delle Attività Culturali e del Turismo*, MiBACT) is responsible for the CH protection and also for the management of several national heritage institutions<sup>4</sup>, including a rather heterogeneous set of museums as well as archaeological and historical sites, ranging from superstar archaeological sites and museums – such as Pompei or Uffizi – to minor CH with very few visitors.

The close analysis of MiBACT administrative organization is outside the scope of this paper<sup>5</sup>: however, it is useful to note that the management of State CH has been recently reformed.<sup>6</sup> The competences for archaeological and historical sites pertain to technoscientific territorial structures, *Soprintendenze*, operating at peripheral level, respectively,

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<sup>2</sup> According to (MiBACT, 2014) in 2011 in Italy there were 4,588 cultural institutions, which were opened to the public: 3,847 museums, 240 archaeological sites and 501 monuments, of which 63.8% in public ownership and 36.2% in private ownership. 41.6% belong to municipalities, 10% to the Church and 9% to the State. Overall, these institutions attracted 103,888,764 visitors in 2011.

<sup>3</sup> A Constitutional reform is underway to abolish a third decentralised level, the Provinces, and to reallocate functions between State and Regional levels of government.

<sup>4</sup> These institutions are 431, of which 202 museums and 229 monuments and archaeological sites. In addition there are 46 libraries and 100 archives (MiBACT, 2014). The protection and valorisation of CH is regulated by the Heritage and Landscape Codex (*Codice dei beni culturali e del paesaggio*).

<sup>5</sup> A detailed description can be found at <http://www.beniculturali.it/mibac/export/MiBAC/sito-MiBAC/MenuPrincipale/Ministero/La-struttura-organizzativa/index.html>. See also the Country profile in Compedium, [http://www.culturalpolicies.net/down/italy\\_122014.pdf](http://www.culturalpolicies.net/down/italy_122014.pdf).

<sup>6</sup> DPCM 171/2014.

for Antiquities and for Fine Arts and Landscape and to Museums Poles; larger museums enjoy special autonomy while minor ones are grouped and run by Regional Museum Poles (*Poli museali regionali*). These institutions, in terms of visitors as well as of the value of their endowment, constitute the sample of the following analysis.

## 4. Data and methods

### 4.1 Data sample

The data sample employed for our empirical analysis refers only to State CH, because of the availability of data on the value of CH. As said before, our research question is twofold: on the one hand, we try to assess whether the quality of CH has a role in stimulating the visits and, on the other hand, we investigate if the efficient organization of the tourist sector affects the number of visits.

Looking at the first question, we measure CH quality in a rather innovative way, employing an ‘objective’ indicator, i.e. the monetary value of State CH, as officially provided by the Italian Ministry of Economy and Finance (*Ministero dell’Economia e delle Finanze*, MEF) to measure the State patrimony. It is worth noting that our measure considers only movable assets and, thus, it leaves out immovable heritage. Though questionable, this is a necessary choice, due to the fact that corresponding consistent measures on the monetary value of the immovable heritage are available only at national level and not at the regional one. Nonetheless, we believe that our measure still represents a good proxy for the value of cultural heritage in Italian regions. In fact, the monetary value of immovable CH accounts for no more than 20% of the total State CH value, implying that our measure of movable heritage captures the largest part of the State CH value (RGS, 2012). Furthermore, even if some historical or archaeological sites in our sample do not have movable heritage still it is reasonable to assume that, at the regional level, it should be randomly distributed among Italian regions. Therefore, we believe that our measure of the monetary value of movable heritage can be considered a good proxy for the quality of State CH to investigate its relationship with the number of visitors.<sup>7</sup>

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<sup>7</sup>To control for such an effect, in the next section as robustness check we estimate our models for subsample of regions excluding each region one-by-one.

Furthermore, in a few specifications in our empirical analysis we also include the number of Unesco World Heritage List (WHL) cultural sites in the region, which should partially capture the extent of the immovable CH in Italian regions and the related effects on CH visits in the region.

Finally, it should be noted that the above financial measure is available only for CH owned by the State, and not for CH owned by other public administrations or private owners, for which consistent data on the value of heritage are not available. This is not very limiting, however, as the State is responsible for superstar museums and archaeological sites and monuments and, overall, ticket-paying visitors in State CH accounts for about one third of total CH visitors (MiBACT, 2014). It has to be noted that few Italian regions are *de facto* excluded by this indicator of State CH because of their specific institutional arrangement.<sup>8</sup> Therefore, our sample covers 17 Italian regions over the period 1996–2010, so that our dataset is a balanced panel with 255 observations.

Table 1 provides a concise description of the variables employed in our analysis, along with the corresponding source for each variable. Then, Table 2 displays the descriptive statistics, while Table 3 provides some specific descriptive statistics at the regional level.

### <<Table 1 Variables description>>

The dependent variable in our empirical analysis is the number of ticket-paying visitors to CH owned by the State. We use this measure rather than the number of total visitors because not-paying cultural visitors are not accounted in some Regions and, therefore, the total number of visitors would have provided a biased measure. For this reason, even if they are strongly correlated in our dataset ( $\rho = 0.95$ ), to avoid such a bias,

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<sup>8</sup> For instance, in Sicily all museums, historical and archeological sites are run by the Regional public administration, excluding it from our sample.

in our estimates we consider only the number of paying cultural visitors as the dependent variable.<sup>9</sup>

Our key explanatory variable is the above mentioned monetary value of State movable CH provided by MEF (CULTURAL HERITAGE). Nonetheless, as we said before, to capture the effects of immovable CH, in a few specifications we employ the number of WHL cultural sites (WHS), provided by UNESCO (<http://whc.unesco.org/>). Coherently with the time period of the analysis we consider the cultural sites which have been included in the WHL by 2010.

The other explanatory variables are mainly provided by the Italian Institute of Statistics (*Istituto Nazionale di Statistica*, ISTAT), and their inclusion is based on the previous literature (e.g. Cuccia et al., 2016) and data availability. More precisely, the following variables are used in our regression: number of residents (RESIDENTS) and number of arrivals (ARRIVALS) in each region to account for the potential demand; thefts and robberies per 1,000 inhabitants (THEFT), capturing the effect of an environment with high petty crime in the choice of visiting cultural sites; kilometres of coasts (SEA) in each region, to control for the regional differences in cultural visitors more driven by an alternative tourist attractor rather than CH. We also include a linear time trend (*TREND*), to take into account the time effects on the number of cultural visitors.

Finally, to address the second research question – i.e. whether the efficient organization of the touristic sector affects the number of visits – we use as indicator of regional performance in the management of the tourist sector the DEA efficiency scores estimated by Cuccia et al. (2016)<sup>10</sup> (REGIONAL PERF). More specifically, as the DEA efficiency scores range between 0 and 1, to increase the variance of the explanatory variable we consider, as usual in the literature, the reciprocal of the regional bias-corrected DEA efficiency score, where each efficiency score indicates the relative performance of a

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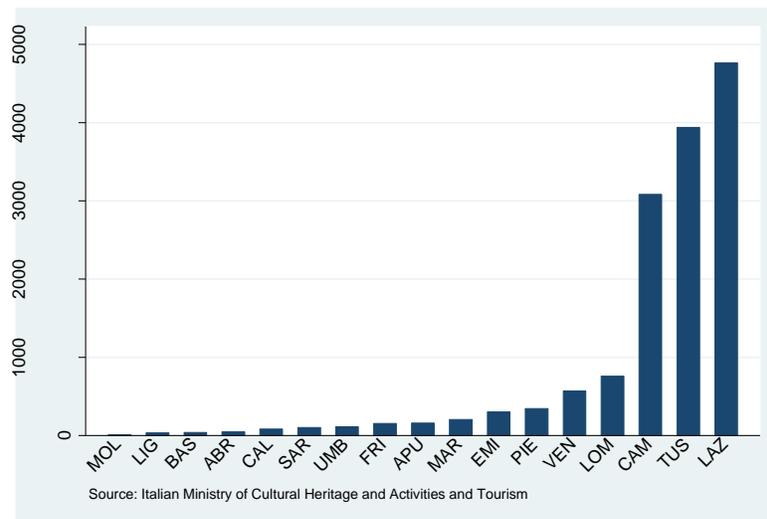
<sup>9</sup> Nonetheless, we have re-run all the estimates in the paper also using the total number of cultural visitors as dependent variable, without any significant change in our results. Indeed, this is not surprising, given the above mentioned strong correlation between ticket-paying and not –paying visitors.

<sup>10</sup> Following the analysis developed by Barros et al. (2011) for French tourism destinations, in Cuccia et al. (2016) the authors imagine a production process where the regional organization in the tourist sector produces overnight stays as output, with tourist arrivals and accommodation capacity as inputs. Therefore, a region with “... large arrivals for a few bed-nights is *ceteris paribus* an inefficient destination as it is not able to maximize the return for the tourist services supplied at local level ...”.

regional organization to maximize the return from the tourist sector<sup>11</sup>. Therefore, a higher value of our indicator means a lower regional performance.

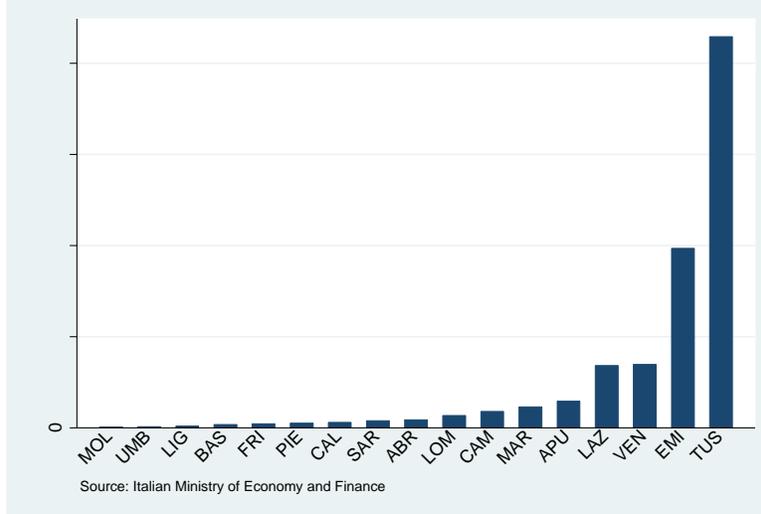
<<Table 2 Descriptive statistics>>

The descriptive statistics in Table 2, show high variation in the number of residents as well as in the value of CH and in the number of cultural visitors and tourist arrivals. This is not surprising, as it is well-known that regions in Italy have very different size in terms of population and display very different scenarios in terms of CH endowment and cultural tourism. In particular, from Figures 1 and 2 (see also Table 3) we can see that regions with the highest value of CH, such as Tuscany, Lazio and Veneto, display also the highest number of cultural visitors; on the other hand, regions as Molise, Liguria and Basilicata where the value of CH is rather low, tend to have also few cultural visitors.



**Fig. 1.** Number of visitors to state cultural sites in Italian regions

<sup>11</sup> For more details, see e.g., Barros et al. (2011); Cuccia et al. (2016).



**Fig. 2.** Monetary value of state movable cultural heritage in Italian regions

<<Table 3 Descriptive statistics by region>>

*4.2 Empirical specification*

In this study we aim to test what factors have a role in explaining the number of visitors to State museums, historical and archaeological sites in Italian regions, with special emphasis on CH quality, expressed in terms of its monetary value.

Since the available measure of CH quality is time-invariant, for the characteristics of our data no attempt is made to establish a causal link among the visitors and the monetary value of CH. Nonetheless, in the following empirical analysis we try to provide a robust evidence of a significant association between them, by controlling for demand factors as well as for other potentially confounding factors.

Therefore, the main specification of the empirical model is:

$$\begin{aligned}
 VISITS_{it} = & \alpha + \beta CULTURAL\ HERITAGE_i + \gamma WHS_{it} + \sum_{d=1}^D \delta_d DEMAND_{it}^d + \\
 & + \sum_{k=1}^K \theta_k X_{it}^k + \mu_t + \varepsilon_{it}
 \end{aligned}
 \tag{1}$$

where the dependent variable (*VISITS*) is the number of visitors to State CH in region  $i$  in year  $t$ , and our main variable of interest (*CULTURAL HERITAGE*) is the monetary value of State movable cultural heritage in region  $i$ . Among the demand factors, we include the number of residents (*RESIDENTS*) and the number of arrivals (*ARRIVALS*) in region  $i$  in year  $t$ , which should represent the potential pool of cultural visitors in the region; we also consider the above mentioned other control variables, such as the number of thefts and robberies (*THEFT*) in region  $i$  in year  $t$  and the kilometers of beaches (*SEA*) in region  $i$ .<sup>12</sup> Finally, we include a vector of year-specific  $\mu_t$  fixed effects or, alternatively, a linear time trend (*TREND*), to take into account the time effects on the number of cultural visitors.<sup>13</sup>

As it will be discussed below, however, some of the variables employed in our empirical analysis and, in particular, the number of cultural visitors and tourist arrivals, if taken as time series (e.g., Cellini and Cuccia, 2013) are generally considered nonstationary stochastic processes integrated of order one  $I(1)$ , implying that the standard statistical inference on the estimated coefficients in [1] cannot be considered valid. Therefore, as a premise to the following empirical analysis, we provide different unit root tests for panel data, to show that these variables in our panel dataset can be consistently treated as stationary processes.

We estimate different versions of our model, both considering our measure of CH, alone and along with the number of WHL cultural sites. Specifically, we use a parsimonious strategy, starting from the baseline OLS model with a limited set of explanatory variables to a more efficient GLS with all explanatory variables in [1], in order to provide the most robust evaluation of the relationship between the value of CH and the number of cultural visitors. Finally, we provide a robustness check concerning the sample used in our estimates, to test further the robustness of our findings.

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<sup>12</sup> We also tried to include some other control variable in our estimates, such as the kilometers of motorways per 1000 square kilometers and the hectares of protected natural areas in the region. Overall, while the latter appears not significant in explaining the number of visitors, the specifications with the former exhibit always markedly larger standard errors. We suspect that this result emerges because of a strong multicollinearity between the number of residents and the number of kilometers of motorways which, in fact, in our dataset display a Pearson correlation of 0.86. For this reason, we preferred to keep them out from our estimates.

<sup>13</sup> Notice that, since our main explanatory variable of interest (*CULTURAL HERITAGE*) is time-invariant, we cannot include fixed effects at the cross-section level, as they clearly would not be identified with the presence of time-invariant regressors. In terms of the specific estimation method, this implies that we cannot estimate model [1] by FE estimator, neither standard time-demeaning nor dummy variable regression.

Subsequently, in a second group of estimates we take advantage of our unique measure of CH to address the other related research question. In particular, we wonder whether, after controlling for the value of State CH in the region, a higher performance of the tourist sector at regional level is significantly associated with more cultural visitors in the region. Indeed, this is quite an important issue from the policy perspective of cultural tourism, as it sheds some light on the question if the number of cultural visitors is affected not only by the value of CH in the region, i.e. its quality, but also by the overall efficiency of the tourism sector. Therefore, in this second group we estimate the following model:

$$VISITS_{it} = \alpha + \beta CULTURAL HERITAGE_i + \gamma WHS_{it} + \varphi REGIONAL PERF_{it} + \varepsilon_{it} \quad [2]$$

where we still include among the explanatory variable the monetary value of movable State cultural heritage (*CULTURAL HERITAGE*) and the number of WHL cultural sites (*WHS*), to control for the value of cultural heritage in the region, but in respect to model [1] we consider also the above mentioned indicator of the regional performance in the management of the tourist sector (*REGIONAL PERF*).

Similar to [1], also for this second group of estimates we use a parsimonious strategy, starting from the baseline OLS to a more efficient GLS; we also provide a robustness check concerning the sample used in the estimates.

As preliminary evidence on the association between cultural visitors and the value of cultural heritage, in Table 4 we report the correlation coefficients between them in our dataset, considering also the number of WHL cultural sites as a further proxy for the value of immovable cultural heritage in Italian regions. Not surprisingly, we can see that the number of visitors are highly correlated with our indicators of cultural heritage, both in terms of absolute values (*Pearson correlation*) and in regional rankings (*Spearman's rank correlation*).

**<<Table 4 Correlation between visitors and cultural heritage>>**

Before proceeding with the estimation, a preliminary point we need to look at concerns the fact that some of the variables employed in our empirical analysis, if taken as time series, might be nonstationary processes, implying that the standard statistical inference cannot be considered valid any more. In particular, Cellini and Cuccia (2013) have shown that, if taken as monthly time series, the number of cultural visitors and tourist arrivals in Italy are nonstationary processes seasonally integrated of order one  $I(1)$ . In our panel dataset, the presence of the cross-section regional level of course smoothes the presence of the unit roots; nonetheless, it may or may not be enough to eliminate the problem in our estimates and, therefore, we need to test the presence of unit roots.



**Fig. 3.** Trend of visitors to state cultural sites in Italian regions in the years 1996-2010

Looking at the behaviour of our dependent variable over time in Figure 3, indeed, one might be tempted to conclude that, apart from Lazio and Veneto, the number of cultural visitors at the regional level does not represent a nonstationary process. However, the same range in the axis could significantly frustrate our visual ability to detect nonstationary processes in Figure 3. Therefore, in Table 5 we provide different standard unit root tests for

panel data. In particular, all three unit root tests are constructed under the null hypothesis that the variable tested contains a unit root (Harris and Tzavalis, 1999; Levin et al., 2002; Im et al., 2003).<sup>14, 15</sup> Overall, all three tests tend to reject the null hypothesis of the presence of a unit root in both the number of cultural visitors and tourist arrivals. Therefore, the results of these tests suggest that these variables in our panel dataset can be consistently treated as stationary processes.

## <<Table 5 Unit root tests>>

### 5. Results

#### 5.1 Monetary value of cultural heritage

In this section we discuss the results of our empirical analysis. As we said before, we use a parsimonious strategy, in order to provide the most robust evaluation of the role of cultural heritage in explaining the number of cultural visitors. More specifically, we start from the baseline OLS with a limited set of explanatory variables; then, since we find, not very surprisingly, evidence of non-normal residuals, we move to a more efficient GLS for panel data with all explanatory variables in [1].

Table 6 shows the estimation results. In column (1) we estimate a simple OLS regression with only our main explanatory variable of interest, along with the constant and the linear time trend. The coefficient of *CULTURAL HERITAGE* is positive and significant, suggesting that, on average, an increase of a million euro in the value of CH is associated with about two thousands more cultural visitors in the region. Even if informative on the direction of the association, clearly, a lot of omitted variable bias is likely to affect the estimate in (1). Therefore, from column (2) on, we add progressively more robustness to

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<sup>14</sup> All three tests are basically an extension in panel data of the standard Augmented Dickey Fuller (ADF) test. The only difference among the three unit root tests is that, while Harris and Tzavalis (1999) and Levin et al. (2002) are slightly more restrictive as they assume that all panels have the same autoregressive parameter, Im et al. (2003) relaxes this assumption and allows each panel to have its own autoregressive parameter.

<sup>15</sup> As recommended by Levin et al. (2002), we have subtracted from each variable tested the cross-sectional mean for each year (the well-known *demeaning operation*) before to conduct the tests, to mitigate the impact of cross-sectional dependence on the results. Nonetheless, we have conducted all tests also without demeaning the variables getting results fully in line with those in Table 5.

our estimate to test whether the significant association between the value of CH and the number of visitors holds, also when controlling for other factors.

### <<Table 6 Determinants of VISITS >>

In particular, in column (2) we add the number of residents (*RESIDENTS*) and tourist arrivals (*ARRIVALS*), which should represent the potential pool of cultural visitors in the region, i.e. the potential demand. Both demand factors are positive and significant, implying that more residents and tourist arrivals are associated with more cultural visitors. Concerning the value of CH, the estimate in (2) confirms the positive and significant association with cultural visitors, even if the magnitude is slightly lower. Then, in column (3) we add our indicator of petty crimes (*THEFT*) and the kilometres of beaches (*SEA*) in the region, along with a full set of year-specific fixed effects. As we can see, the positive and significant coefficient of *CULTURAL HERITAGE* appears robust to the inclusion of these confounding factors.

However, regression diagnostics for the OLS estimated models in Table 6 provide strong evidence of non-normal residuals.<sup>16</sup> Therefore, in the next columns we estimate model [1] with a more efficient GLS estimator for panel data.<sup>17, 18</sup> In particular, in column (4) we estimate the same specification (3) with GLS. Still, the coefficient of *CULTURAL HERITAGE* confirms the finding of a positive and significant association with cultural visitors, as well as with the coefficients of demand factors. In respect to the previous estimates, however, we find that *THEFT* is significant and with the expected sign, saying that a higher level of petty crimes is associated with less cultural visitors in the region; we

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<sup>16</sup> Both the Shapiro-Wilk and Shapiro-Francia tests reject the null hypothesis of normality of the residuals at any level of significance. Similarly, the estimated Kernel shows starkly the non-normality of OLS residuals.

<sup>17</sup> The GLS estimator in Table 6 (Stata command *xtgls*) exploits the OLS residuals heteroskedasticity and autocorrelation AR(1) to transform the model in a FGLS approach, and gets more efficient estimates.

<sup>18</sup> As some authors have argued that the standard errors of FGLS panel data estimator are “anticonservative” (e.g., Beck and Katz, 1995), we have also tried to estimate model [1] with linear regression, but with panel-corrected standard errors (Stata command *xtpcse*) robust to heteroskedasticity and autocorrelation across panels, as suggested by the same Beck and Katz (1995). Very comforting for us, we got results fairly in line with GLS estimates in Table 6, even if the parameters are estimated with slightly less precision.

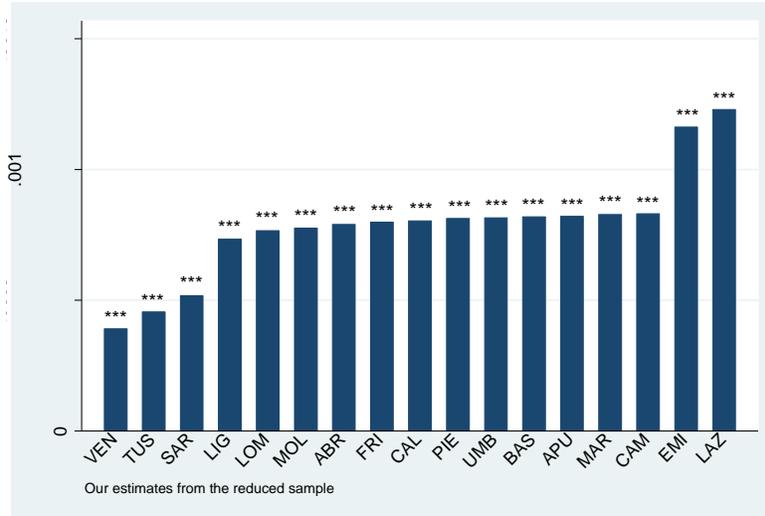
also find that *SEA* is positive and significant, suggesting that alternative tourist attractors might have spillover effect also in the cultural tourism.

A potential drawback of our estimates is that, as we already discussed, our measure of CH considers only the movable assets and, thus, it leaves out the immovable heritage. Therefore, in the last two columns in Table 6 we include the number of WHL cultural sites (*WHS*), which should partially capture the extent of the immovable heritage in Italian regions. More specifically, in (5) we estimate the model with *WHS* in place of *CULTURAL HERITAGE*, instead in (6) we include both heritage indicators. Looking at (6), we can see that both coefficients are positive and significant, suggesting that the two indicators of CH are not substitute in explaining the number of cultural visitors; indeed, this is not very surprising, as the two indicators concern the movable and the immovable CH in Italian regions, respectively.

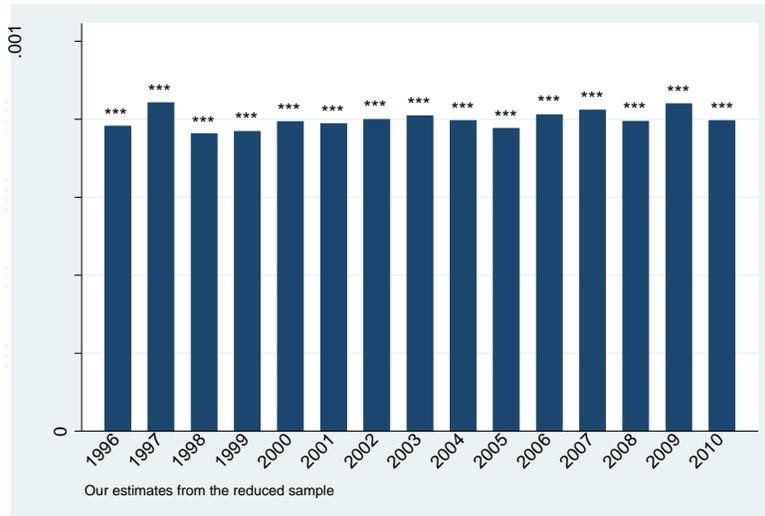
Finally, to check whether our results depend crucially on the inclusion of some regions and years in the sample, we re-estimate model (6) excluding all regions and years one-by-one. Therefore, we run many GLS regressions where in each regression we exclude, firstly, one different region and, then, one different year. Indeed, this further robustness check should be especially relevant for the issue of cultural heritage, since we have already seen in section 3.2 that the value of CH is not homogeneous across Italian regions. In Figure 4 are the GLS coefficients of *CULTURAL HERITAGE*, arranged from the smallest to the greatest, from the regional reduced sample; then, in Figure 5 we report the GLS coefficients from the yearly reduced sample<sup>19</sup>. As Figures 4 and 5 clearly show, however, our estimate do not depend on the sample included in the estimation, as the coefficient of *CULTURAL HERITAGE* is always positive and significant.

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<sup>19</sup> Full regressions are available upon request from the authors.



**Fig. 4.** Coefficients of CULTURAL HERITAGE from the reduced sample (regions)



**Fig. 5.** Coefficients of CULTURAL HERITAGE from the reduced sample (years)

Overall, from our estimates we can conclude that we find evidence of a positive and significant association between the monetary value of cultural heritage and the number of cultural visitors, robust to the inclusion of many confounding factors, the estimation model and the sample included in the estimation. In particular, our estimate suggests that, on average, a million euro more of CH is associated with about one thousand more cultural visitors in the region.

## 5.2 Regional performance in the tourist sector

In this second group of estimates, as described in section 4, we take advantage of our unique measure of CH to investigate whether, after controlling for the value of CH, a higher performance of the regional system in the management of the tourist sector is significantly associated with more cultural visitors in the region. Table 7 reports the estimates of model [2].

In column (1) we estimate a simple OLS regression with the value of CH and the regional performance indicator, while in (2) we include also the number of WHL cultural sites to control for the immovable heritage. Then, in the next columns we estimate the same model with GLS. As can be seen from the coefficients of *REGIONAL PERF*, all specifications in Table 7 suggest that a higher regional performance in the management of tourist sector is significantly associated with more cultural visitors in the region, even after controlling for the value of CH.<sup>20</sup>

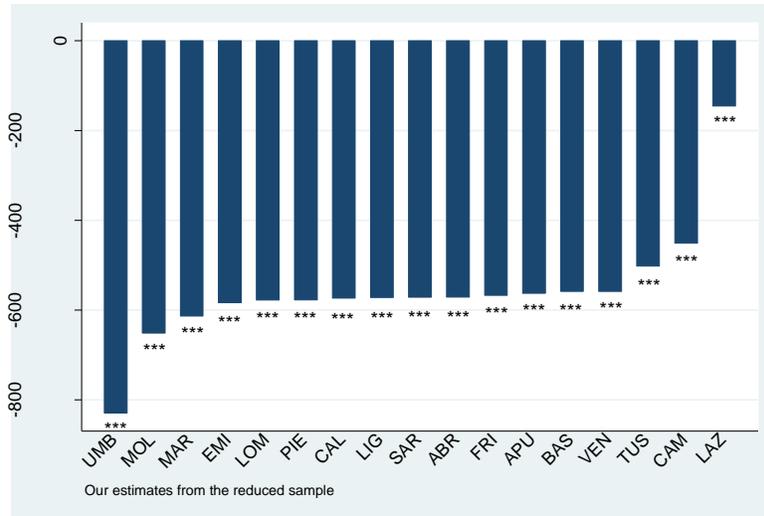
### <<Table 7 Determinants of VISITS >>

Finally, as we did for the first group of estimates, we re-estimate model (4) excluding all regions and years one-by-one. In Figure 6 are the GLS coefficients of *REGIONAL PERF*, arranged from the smallest to the greatest, from the regional reduced sample; then, in Figure 7 we report the GLS coefficients from the yearly reduced sample<sup>21</sup>. As Figures 6 and 7 show, however, our findings do not depend much on the sample included in the estimation, as the coefficient of *REGIONAL PERF* is always negative and significant.

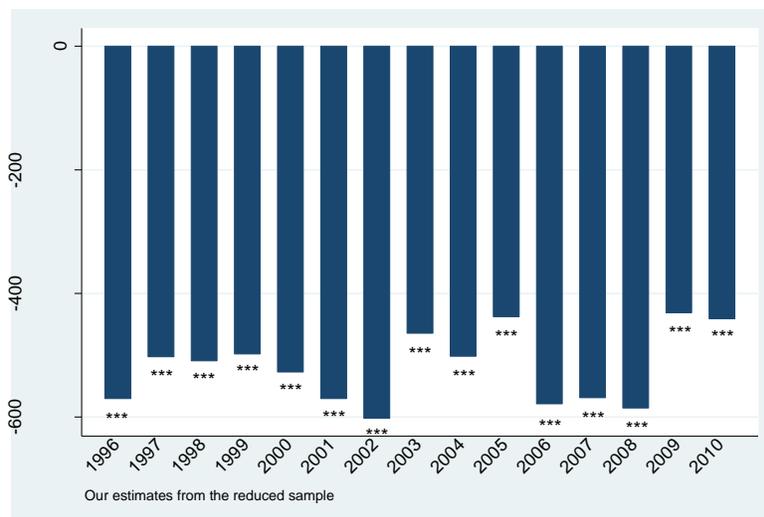
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<sup>20</sup> Recall that *REGIONAL PERF* is the reciprocal of the bias-corrected DEA efficiency score, therefore, a higher value of our indicator means a lower regional performance, implying that the sign of the coefficient in Table 7 has to be interpreted accordingly.

<sup>21</sup> Full regressions are available upon request from the authors.



**Fig. 6.** Coefficients of REGIONAL PERF from the reduced sample (regions)



**Fig. 7.** Coefficients of REGIONAL PERF from the reduced sample (years)

Therefore, we can conclude that we find a robust evidence of a significant association between the regional performance in the management of the tourist sector and the number of cultural visitors, even after controlling for the value of cultural heritage in the region. From the policy perspective of cultural tourism, the evidence provided would seem quite important as it underlines that cultural visitors are not exclusively due to the value of cultural heritage in the region but, indeed, there is a significant role for the efficiency of the regional organization in boosting cultural visitors.

## **6. Concluding remarks**

A widespread issue in the literature on cultural tourism concerns the effectiveness of the quality of heritage in attracting visitors in the related cultural sites. Exploiting the availability of an ‘objective’ indicator of CH monetary value in the Italian regions, in this paper we have tried to empirically investigate whether the quality of the CH has a role in stimulating the visits. Indeed, this is a peculiar feature of our empirical investigation, as such an ‘objective’ measure of CH is quite uncommon in this analysis. Moreover, the Italian context is particularly well-suited to address this question as, on the one hand, Italian CH is among the most remarkable in the world, on the other hand, there is much heterogeneity across Italian regions in terms of CH endowment and cultural tourism. Then, in the same spirit, we have addressed the related question whether the number of cultural visitors is affected not only by the quality of CH in the region, but also by the overall performance of the tourism sector.

From our empirical analysis we find that, after controlling for demand and other confounding factors, a million euro more of CH is associated with about one thousand more cultural visitors in the region, robust to the estimation model and the sample included in the estimation. Concerning the second research question, our estimates also provide evidence of a significant relationship between the regional performance in the management of the tourist sector and the number of cultural visitors, saying that regions with a higher performance of the tourism sector are also those ones with more cultural visitors, even after controlling for the value of CH in the region.

Even if not conclusive, our study offers an important contribution to the literature on cultural tourism. In particular, the use of an ‘objective’ measure of the value of CH in our analysis, instead of an indirect measure based upon the ‘subjective’ valuation of visitors themselves (e.g., Luksetich and Partridge), is certainly a more reliable way to test the attractive power of CH, as it is not affected by the bias of the visitors’ subjective experience. In this respect, the results provided in our paper appear to complement and strengthen the previous evidence on the relationship between cultural heritage and cultural tourism. On the other hand, our findings on the role of the regional performance of the tourism sector seems quite important from the policy perspective, suggesting that the number of cultural visitors is not exclusively due to the value of CH in the region but,

indeed, there is a significant role for the efficiency of the regional organization in boosting cultural visitors.

To conclude, we believe that in this study we have provided a more reliable and robust evidence of the relation between the quality of CH and cultural visitors, especially thanks to the use of our ‘objective’ measure of CH in the Italian regions. Unfortunately, we are not able to establish a causal link and, thus, caution on the interpretation of our estimates is needed. Nonetheless, we think that our analysis is hopeful also towards this direction and, in particular, when the time-variant ‘objective’ measure of CH will be available, more sophisticated econometric approaches look promising in establishing a causal effect of the value of CH in attracting cultural visitors. Due to data availability, this is left for further research.

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## TABLES

**Table 1.** Variables description

Variable	Description	Source
VISITS	Number of visitors to state museums, historical and archeological sites in the region (in thousands)	MBACT, Ministero dei beni e delle attività culturali e del turismo
CULTURAL HERITAGE	Monetary value of state movable cultural heritage in the region (in thousands euro)	MEF, Ministero dell'Economia e delle Finanze
RESIDENTS	Number of residents in the region (in thousands)	ISTAT, Istituto nazionale di statistica
ARRIVALS	Number of arrivals in the region (in thousands)	ISTAT, Istituto nazionale di statistica
THEFT	Thefts and robberies per thousand inhabitants in the region	ISTAT, Istituto nazionale di statistica
SEA	Number of kilometres of beaches in the region	ISTAT, Istituto nazionale di statistica
TREND	Yearly trend	Our elaboration
WHS	Number of WHL cultural sites in the region	UNESCO
REGIONAL PERF	DEA efficiency scores on the management of tourist sector in the region (reciprocal)	Cuccia et al. (2016)

**Table 2.** Descriptive statistics

Variable	Mean	St. Dev.	Min	Max
VISITS	864.94	1,484.85	7.47	6,015.99
CULTURAL HERITAGE	261,047.2	527,138.9	4,940.36	2,145,578
RESIDENTS	3,031.99	2,281.75	315.54	9,600.95
ARRIVALS	4,245.87	3,790.59	150.01	14,583.51
THEFT	21.49	8.53	6.08	41.94
SEA	346.54	431.58	0	1,731.10
TREND	8	4.33	1	15
WHS	1.94	1.78	0	7
REGIONAL PERF	1.41	0.25	1	2.08

**Table 3.** Descriptive statistics by region (average values)

Region	VISITS	CULTURAL HERITAGE	ARRIVALS
Abruzzo	46.35	43,601.05	1,351.49
Basilicata	39.57	18,191.96	394.82
Calabria	83.01	29,979.76	1,245.12
Campania	3,082.22	89,958.77	4,423.43
Emilia-Romagna	302.47	984,488.8	7,742.86
Friuli-Venezia Giulia	153.99	22,008.66	1,744.82
Lazio	4,762.54	341,880.3	9,311.21
Liguria	33.38	9,364.75	3,470.27
Lombardy	758.36	67,724.66	9,179.20
Marche	204.27	115,033.4	1,990.66
Molise	10.17	4,940.36	183.93
Piedmont	343.71	26,066.22	2,955.77
Apulia	159.73	146,232.3	2,258.38
Sardinia	102.70	38,992.32	1,926.11
Tuscany	3,938.87	2,145,578	10,038.59
Umbria	112.67	5,952.26	1,887.86
Veneto	570.03	347,809.1	12,075.27

**Table 4.** Correlation between visitors and cultural heritage

	Pearson correlation	Spearman's rank correlation
CULTURAL HERITAGE	0.5383***	0.7501***
WHL	0.6793***	0.8054***

Note. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 5.** Unit root tests

	HT <sup>a</sup>	LLC <sup>b</sup>	IPS <sup>c</sup>
VISITS	0.416 (0.013)	-7.670 (0.000)	-4.452 (0.000)
ARRIVALS	0.442 (0.035)	-10.308 (0.000)	-6.928 (0.000)

Note. All three unit root tests have as the null hypothesis H0 that all panels contain a unit root. Therefore, the *p-values* in brackets are the probability that the specific variable has a unit root. <sup>a</sup> Harris and Tzavalis (1999). <sup>b</sup> Levin et al. (2002). <sup>c</sup> Im et al. (2003).

**Table 6.** Determinants of VISITS

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	GLS	GLS	GLS
CONSTANT	356.589 (169.897)**	-254.239 (177.705)				
CULTURAL HERITAGE	0.002 (0.000)***	0.001 (0.000)***	0.001 (0.000)***	0.001 (0.000)***		0.001 (0.000)***
TREND	14.064 (18.187)	5.102 (16.843)				
RESIDENTS		0.170 (0.048)***	0.145 (0.051)***	0.125 (0.003)***	0.161 (0.005)***	0.073 (0.005)***
ARRIVALS		0.065 (0.030)**	0.077 (0.039)**	0.086 (0.003)***	0.154 (0.003)***	0.078 (0.002)***
THEFT			0.477 (1.304)	-8.183 (0.861)***	-3.592 (0.213)***	-5.338 (0.351)***
SEA			0.265 (0.170)	0.194 (0.007)***	0.361 (0.010)***	0.220 (0.008)***
WHS					161.225 (3.307)***	107.298 (4.086)***
YEAR DUMMIES	NO	NO	YES	YES	YES	YES
Observations	255	255	255	255	255	255
R-squared	0.285	0.417	0.541	-	-	-

Robust standard errors in brackets. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 7.** Determinants of VISITS

	(1)	(2)	(3)	(4)
	OLS	OLS	GLS	GLS
CONSTANT	1,986.237 (451.878)***	1,054.490 (333.853)***	1,153.388 (28.888)***	1,075.372 (45.258)***
CULTURAL HERITAGE	0.002 (0.000)***	0.001 (0.000)***	0.001 (0.000)***	0.001 (0.000)***
REGIONAL PERF	-1,078.156 (277.653)***	-870.015 (221.368)***	-490.254 (19.470)***	-549.390 (15.936)***
WHS		453.672 (60.374)***		93.370 (3.158)***
Observations	255	255	255	255
R-squared	0.322	0.508	-	-

Robust standard errors in brackets. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.