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ANALYSIS

# Drivers of heritage value: A meta-analysis of monetary valuation studies of cultural heritage

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ABSTRACT

Decisions about cultural and historical heritage conservation can be contentious. Improved insight into the economic benefits derived from preservation could be achieved through a better understanding of the underlying economics. In response to this challenge, a growing number of studies estimate the economic value of heritage sites. The purpose of this study is to identify common drivers of the economic value of cultural and historical heritage by conducting a meta-analysis of heritage valuation studies. We find that heritage sites in areas with higher population density hold higher value, and conservation that supports adaptive re-use of sites generates higher values then passive protection. Valuation studies of tangible heritage dominate our dataset, but our findings are robust across model specifications. We identify a need for more economic and interdisciplinary research on the value of non-built heritage to improve understanding of the composition and drivers of heritage value.



## 1. Introduction

Whether or not to protect cultural and historic heritage from development interests has long been a matter of debate (McClelland et al., 2013). Heritage sites are now commonly viewed as having characteristics of a capital asset, which can help decision making about its conservation (Licciardi and Amirtahmasebi, 2012; Throsby, 1999, 2007). The economics of intangible and tangible heritage, however, remain little understood. Tangible cultural heritage refers to any specific site or location that is endowed with cultural significance; this may include a particular building or structure, an archaeological site, a natural landscape with cultural significance, or a particular location that is strongly associated with a cultural practice or traditional knowledge (e.g. a traditional fishing ground) (Throsby, 1999). Without understanding the full scope of the value generated by such sites, adverse management actions, including demolition, become much more likely (Bullen and Love, 2010). We therefore seek to identify the drivers of value of tangible heritage sites by conducting a meta-analysis of economic valuation studies of heritage sites.

Throsby (2001, 2010, 2012) developed the Cultural Capital framework to better understand the economics of cultural heritage conservation. This framework adapts the Total Economic Value framework (Pearce and Turner, 1990) from environmental economics to cultural heritage. Cultural value is a multidimensional aspect of the value of a heritage site, and is related to attributes such as its aesthetic quality, spiritual meaning, social function, and historical significance.[1] The characteristics that make up an asset's cultural value are likely to greatly influence its economic value, although a perfect correlation between the two values is not likely. Mason (2002) also proposes that heritage is multivalent and that no single method or discipline can yield a complete assessment of heritage values. Nevertheless, economic and monetary valuation would be expected to capture much of the cultural importance of heritage qualities and cultural value (Throsby, 2012).

Adapting methods from environmental economics is a developing trend within cultural economics nonetheless, and many primary valuation studies use techniques from this field (Mourato and Mazzanti, 2002; Nijkamp, 2012). In their report, eftec (2005b) suggest that the uniqueness and non-substitutability of cultural assets present issues for their economic valuation. Riganti and Nijkamp (2005) note that the validity and reliability of cultural heritage valuation studies can be questioned because values are site-specific and sensitive to the valuation method used.

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[1] The definition of cultural heritage provided in Article 1 of the UNESCO (1972) Convention Concerning the Protection of the World Cultural and Natural Heritage explicitly link structures and landscapes to a number of values. In its preamble, the UNESCO (2003) Convention for the Safeguarding of the Intangible Cultural Heritage recognises "the deep-seated interdependence between the intangible cultural heritage and tangible cultural and natural heritage", and the definitions also present the tangible and intangible as inseparable. In our view, these terms are fluid rather than strictly defined and we have made no attempt to develop strict definitions. Although we attempt to remain consistent in our use of the terms, some inconsistency in usage may be perceived.

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Primary economic valuation studies have nonetheless been conducted for a wide range of tangible heritage sites. The vast majority of studies use contingent valuation methods (CVM), including pioneering studies by Grosclaude and Soguel (1994) and Willis (1994). CVM has been used to estimate the total economic value (TEV) of heritage sites (Morey and Rossmann, 2003), as well as existence values (Whitehead and Finney, 2003), bequest values (Navrud and Strand, 2002), option values (Santagata and Signorello, 2000), tourism values (Kim et al., 2007), aesthetic values (Maddison and Mourato, 2001), and place-related value (Kling et al., 2004). Fewer in number, choice experiment (CE) methods have also been used to estimate a wide range of values. The first choice experiment in this area published in 2003 was a valuation of the TEV of marble monuments in Washington DC by (Morey and Rossmann, 2003). Subsequently, CEs have been used to estimate existence values (Rolfe and Windle, 2003), bequest values (Tuan and Navrud, 2007), tourism (Riganti and Nijkamp, 2004), and place-related values (Alberini et al., 2003). The travel cost method (TCM) has been used solely to estimate the value of tourism (Melstrom, 2014; Poor and Smith, 2004), and the hedonic pricing method has been applied to aesthetic (Leichenko et al., 2001) and place-related (Hicks and Queen, 2007) values.

With such diverse applications and techniques being used, qualitative and quantitative structuring of the literature is needed to develop general insights into economic valuation of tangible heritage. Noonan (2003b) provides an annotated bibliography of contingent valuation studies, while eftec (2005a) provides the same for heritage valuation studies. An early value transfer study by Ulibarri and Ulibarri (2010) obtains an estimate of the heritage value of the Petroglyph National Monument, Albuquerque, New Mexico. Noonan (2003a) conducts a meta-analysis of contingent valuation studies of culture and the arts. His results suggest that a multivariate approach allows for a better description of the patterns in the literature (Noonan, 2003a).

Our study builds on these earlier exercises by updating the literature review with studies from recent years and expanding the meta-analytic method used to generate the results. The meta-analysis presented in this paper assesses a wide range of explanatory variables, including the spatial distribution of several socio-economic variables. We add contextual data to get a richer data set for identifying drivers of value, which are generally found to improve such models (Bateman et al., 2011; Kaul et al., 2013; Johnston et al., 2016) and has been applied in many studies (Brander et al., 2006, 2007; Ghermandi et al., 2010; Hussain et al., 2011; Ghermandi and Nunes, 2013). The meta-analysis in this paper focuses on tangible heritage sites, heritage goods that are situated in specific locations, but also includes intangible heritage. The following sections describe the data set and the results from the meta-analysis. We conclude by placing the results in a wider context in the discussion section.

## 2. Data description

In total, we collected 63 monetary valuation studies of heritage using combinations of the search terms "cultural" and "heritage" with "value", and "valuation" in Thomson Reuters Web of Science and Google Scholar and collecting studies cited in the publications thus found. We removed duplicate studies, benefit transfer studies, and studies whose value estimates could not be standardised to total US$ per year at 2012 price levels. Values reported per visitor or household were converted by multiplying the per person value for the relevant population using information from the study itself or government data. Values given as present value were converted to annual values using a 5% discount rate over 30 years following Whitehead and Finney (2003). Values reported in other currencies or years were converted to US$ at 2012 price levels using purchasing parity adjusted exchange rates and GDP deflators as reported by the World Bank.

We normalised value observations using logs, and further excluded values whose log value was further than two standard deviations away from the mean as outliers. Without excluding outliers, the results were dominated by a number of extreme values and statistical associations were found that were not present in the rest of the sample. We decided to truncate the data to values that were within two standard deviations of the mean. This provided a sample that yields results robust to removing the most extreme values. This left 87 value observations from 48 studies (see Table 1). Studies can produce multiple observations if they present distinctly different value estimations, and these observation characteristics are controlled for in the regressions (see Table 2). The maximum number of values obtained from a single study is 8, while the mean is 1.79. There were a few cases of one author producing multiple studies, but 43 different authors produced the 48 studies in the data set. Authors provided a maximum of 8 value observations with a mean of 2.00. These insights are discussed in more detail below.

Fig. 1 shows the geographic location of the 87 values used in the meta-regressions. Value observations come from 24 countries across 6 continents, but are concentrated in Europe and the United States. To address differences in studies in the regression, we constructed several categorical variables using information about the primary valuation studies. These included the asset type that was valued, the valuation method used, the benefit type that was considered, and the valuation scenario presented in the primary studies.

Asset type defines the nature of the heritage, i.e. built, archaeological, or natural. In addition, the data set includes a number of studies that value traditional knowledge. Built and archaeological sites were differentiated by whether they were constructed more or less recently than 2000 years ago. The dataset generally contains sites that are much younger than this cut-off date and, considering the variation in countries' cultures and historical paths, setting more refined distinctions was deemed to require too much interpretation of the study descriptions. Valuation method indicates which valuation technique was used in each study. Welfare measure indicates whether studies provide value estimates in total value, average value per person or marginal value per person.

For benefit type and scenario, we defined categories based on definitions from the literature. Benefit type defines which (non-) market value was investigated, i.e., tourism, bequest, existence, or aesthetic value. Scenario indicates what service or activity was valued, including conservation, preservation, access, adaptive reuse, renovation/restoration and area conservation planning. We based these scenario categories on definitions suggested by Throsby (2012): preservation (ensuring the continued existence of the asset), conservation (caring for the asset and maintaining it in proper condition according to accepted professional standards), renovation or restoration (returning an asset that has deteriorated to its original condition), adaptive reuse (ensuring continuity of use through minimal changes to the asset), and area conservation planning initiatives (ensure the value of historic buildings and sites to the economic buoyancy of whole areas).

Table 2 summarises the statistical characteristics of the dependent variable in our analysis. The mean value of the 87 value observations is $29,700,000 per year and the median is $2,064,292. This indicates a long right tail in the value distribution even after outliers have been removed from the sample. We therefore take logs to normalise the observations. The mean of the logged value observations is 14.50 and the median is 14.59.

The mean and median of the value observations vary across continent, benefit type, and valuation method (Fig. 2). Of the continents, Africa has the highest mean and median value (see Fig. 2a) with the two statistics approximately equal. All other continents have a mean that is noticeably higher than the median. The variation in value mean and median by benefit type and valuation method is shown in Fig. 2b and c, respectively. The two stated preference valuation methods (CE and CVM) have much higher mean and median values than the two revealed preference methods (TCM and HPM), and overall show a

**Table 1**
Studies included in the meta-analysis.

| Author | N | Country | Low log value | High log value |
|---|---|---|---|---|
| Adamowicz et al. (1995) | 2 | United Kingdom | 8.49 | 8.84 |
| Alberini et al. (2003)* | 1 | United Kingdom | . | . |
| Alberini and Longo (2006)* | 4 | Armenia | . | . |
| Alberini and Longo (2009) | 1 | Armenia | . | 6.19 |
| Apostolakis and Jaffry (2005)* | 1 | Greece | . | . |
| Báez-Montenegro and Herrero (2012) | 2 | Chile | 5.09 | 5.52 |
| Báez-Montenegro et al. (2012) | 1 | Chile | . | 6.73 |
| Barrena et al. (2014) | 1 | Chile | . | 7.61 |
| Bedate et al. (2004)* | 3 | Spain | . | . |
| Bedate-Centeno and Prieto (2000) | 2 | Spain | 4.97 | 5.39 |
| Beltrán and Rojas (1996)* | 12 | Mexico | . | . |
| Oleson et al. (2015) | 2 | Madagascar | 7.60 | 7.97 |
| Bostedt and Lundgren (2010) | 1 | Sweden | . | 7.81 |
| Boxall et al. (2003) | 1 | Canada | . | 4.94 |
| Carson et al. (2002) | 2 | Morocco | 7.18 | 7.80 |
| Chambers et al. (1998) | 1 | United States | . | 7.88 |
| Choi et al. (2010) | 1 | Australia | . | 8.27 |
| Coulson and Leichenko (2001) | 1 | United States | . | 5.52 |
| Del Saz-Salazar and Garcia-Menendez (2003) | 1 | Spain | . | 8.18 |
| Del Saz-Salazar and Guaita-Pradas (2013) | 1 | Spain | . | 7.43 |
| Del Saz-Salazar and Montagud Marques (2005) | 1 | Spain | . | 4.64 |
| Dutta et al. (2007) | 1 | India | . | 7.54 |
| Garrod et al. (1996) | 1 | United Kingdom | . | 6.29 |
| Giannakopoulou et al. (2011) | 1 | Greece | . | 6.20 |
| Gražulevičiūtė-Vileniškė et al. (2011) | 3 | Lithuania | 4.54 | 5.43 |
| Grosclaude and Soguel (1994) | 1 | Switzerland | . | 6.16 |
| Hicks and Queen (2007)* | 1 | United States | . | . |
| Kim et al. (2007) | 1 | South Korea | . | 6.37 |
| Kinghorn and Willis (2008) | 1 | United Kingdom | . | 6.90 |
| Kling et al. (2004) | 1 | United States | . | 5.50 |
| Lakkhanaadisorn (2014) | 2 | Thailand | 6.60 | 7.08 |
| Lazrak et al. (2014) | 1 | Netherlands | . | 6.26 |
| Lazrak et al. (2014)* | 1 | Netherlands | . | . |
| Lee (2015) | 1 | South Korea | . | 8.05 |
| Lee and Han (2002) | 2 | South Korea | 7.05 | 8.42 |
| Leichenko et al. (2001) | 7 | United States | 4.25 | 6.12 |
| Lockwood (1996) | 2 | Australia | 5.85 | 6.92 |
| Maddison and Mourato (2001) | 2 | United Kingdom | 7.19 | 7.63 |
| Maskey et al. (2007) | 1 | United States | . | 3.80 |
| Mazzanti (2003) | 1 | Italy | . | 6.60 |
| Melstrom (2014) | 3 | United States | 5.63 | 6.92 |
| Melstrom (2015) | 1 | United States | . | 6.51 |
| Morey and Rossmann (2003) | 2 | United States | 7.21 | 7.28 |
| Moro et al. (2011)* | 1 | Ireland | . | . |
| Mourato et al. (2002) | 1 | Bulgaria | . | 6.58 |
| Nahuelhual et al. (2014)+ | 1 | Chile | . | 5.05 |
| Navrud and Strand (2002) | 5 | Norway | 6.26 | 7.68 |
| Barnes-Mauthe et al. (2015)* | 1 | Madagascar | . | . |
| Pollicino and Maddison (2001) | 1 | United Kingdom | . | 7.06 |
| Poor and Smith (2004) | 1 | United States | . | 4.99 |
| Powe and Willis (1996) | 8 | United Kingdom | 4.61 | 5.33 |
| Provins et al. (2008)+ | 1 | United Kingdom | . | 4.67 |
| Riganti and Nijkamp (2004)* | 1 | Italy | . | . |
| Riganti and Scarpa (1998)# | 5 | Italy | 11.21 | 11.40 |
| Rolfe and Windle (2003) | 3 | Australia | 3.81 | 5.69 |
| Ruijgrok (2006) | 3 | Netherlands | 4.68 | 7.65 |
| Santagata and Signorello (2000) | 1 | Italy | . | 7.11 |
| Scarpa et al. (1998)# | 1 | Italy | . | 10.40 |
| Seenprachawong (2006) | 2 | Thailand | 6.79 | 7.27 |
| Tuan and Navrud (2007) | 4 | Vietnam | 5.80 | 6.57 |
| Ulibarri and Ulibarri (2010)+ | 1 | United States | . | 7.12 |
| Whitehead and Finney (2003) | 1 | United States | . | 6.34 |
| Willis (1994) | 1 | United Kingdom | . | 7.57 |

* Values excluded due to lack of data required for aggregation.
+ Values excluded because the studies use value transfer.
# Values excluded as outliers.

much smaller variation in value estimates. The median and mean of the revealed preference methods are more similar than of the stated preference methods, where the mean is higher than the median.

Table 3 shows cross tabulations of the continent variable with valuation method and asset type. Hedonic pricing and travel cost methods have only been used in Europe and North America. Fig. 2 indicates hedonic pricing and travel costs give on average lower values for heritage sites than other valuation methods used in our sample. Therefore their use North America and Europe may partially explain why sites in these two continents have a lower value on average that Asia and Africa. Table 3 also shows that the relatively high number of studies valuing built heritage is consistent across continents.

We also explore the data for authorship effects (Brouwer et al., 1999) whereby the research or personal preferences, or access to sites or funding of a relatively prolific author can produce a systematic bias in the data. Fig. 3 plots the log value by the first author of the study with first authors ordered alphabetically. The value estimates from each author have a low variance compared with the variance of the entire sample. Since authorship correlates with country and continent, this visual inspection of the data motivates our use of multilevel mixed-effects models and identifies candidates for the random effect specification.

Table 2 also summarises the continuous independent variables that we used to enrich technical information about the studies with information about the socio-economic context of the studies. We collected multiple socioeconomic indicators for the country of each heritage site in the year of valuation from the World Bank, UNESCO, and other indicators such as the road network (FAO, 1998), population density (CIESIN et al., 2011), and urbanisation (Schneider et al., 2009) in the vicinity of each heritage site. With these variables, we intended to capture drivers of value such as, respectively, the accessibility of tangible heritage sites, the number of potential beneficiaries, and the location of the sites.

Logs of all continuous variables were taken to improve distribution characteristics. Progressive model optimisation through backward selection caused many of the collected variables to be excluded from the optimised models. Only those variables that were included in the final model specification were included in table two.

## 3. Results

We use meta-regression to obtain marginal effects and relative importance of factors that may influence the total annual value of tangible heritage sites and intangible heritage. The dependent variable is the log of total annual value, standardised to US$ at 2012 price levels.

Multilevel mixed-effects linear regression (MLM) is used to estimate the meta-regression model (Bateman and Jones, 2003; Brander et al., 2007; Brouwer et al., 1999). MLM can handle variation from groups within the data sample that is not taken into account using standard statistical techniques. Based on our data exploration, we included a random intercept term at the country level. Specifications with other grouping variables, such as benefit type, valuation method and continent, were experimented with but rejected for their poorer fit.

Given the dominance of tangible (built) heritage sites in the sample, we estimate a full-sample model ‘model 1’ for all heritage value observations and a reduced-sample ‘model 2’ for tangible (built) heritage only. To assess whether MLM modelling yielded significantly different results, we also compared the results from our MLM specification with generalised linear models that included the grouping variables as dummy variables. The linear models generally had issues with the error terms, and a Shapiro-Wilk test for normality of the residuals rejected the null hypothesis that residuals are normally distributed ($p < 0.01$).

Table 4 shows the regression results for models 1 and 2 with country used as the random parameter. Both models include the continuous variables (log) population density in a 10 km radius and (log) GDP per capita in the site country, as well as a dummy variable for the valuation scenario. Additionally, model 1 includes dummies for heritage type. The coefficients for the (log) continuous variables are interpreted as elasticities, and measure the percentage change in annual heritage

**Table 2**
Summary statistics of variables considered for meta-regressions.

| Variable | Variable definition | N | Mean | Standard deviation |
|---|---|---|---|---|
| Site value | US$/year; 2012 prices | 87 | 2.968e + 07 | 8.89e + 07 |
| Site value | US$/year; 2012 prices (ln) | 87 | 14.50 | 2.78 |
| Population density | Persons per square kilometre within a 10 km radius (ln) | 87 | 3.82 | 2.29 |
| GDP per capita | GDP per capita in site country (US$; ln) | 87 | 9.57 | 1.27 |
| Archaeological | Dummy variable for archaeological asset type | 87 | 0.08 | 0.27 |
| Built | Dummy variable for built asset type | 87 | 0.80 | 0.40 |
| Natural | Dummy variable for natural asset type | 87 | 0.08 | 0.27 |
| Traditional Knowledge | Dummy variable for traditional knowledge asset type | 87 | 0.03 | 0.18 |
| Aesthetic | Dummy variable for aesthetic value type | 87 | 0.10 | 0.31 |
| Bequest | Dummy variable for bequest value type | 87 | 0.30 | 0.46 |
| Existence | Dummy variable for existence value type | 87 | 0.16 | 0.37 |
| Option | Dummy variable for option value type | 87 | 0.06 | 0.23 |
| Sense of Place | Dummy variable for sense of place value type | 87 | 0.07 | 0.25 |
| TEV | Dummy variable for total economic value type | 87 | 0.02 | 0.15 |
| Tourism | Dummy variable for tourism value type | 87 | 0.29 | 0.46 |
| Access | Dummy variable for access scenario | 87 | 0.06 | 0.23 |
| Adaptive reuse | Dummy variable for adaptive reuse scenario | 87 | 0.02 | 0.15 |
| Area conservation planning | Dummy variable for area conservation planning scenario | 87 | 0.02 | 0.15 |
| Conservation | Dummy variable for conservation scenario | 87 | 0.28 | 0.45 |
| Preservation | Dummy variable for preservation scenario | 87 | 0.40 | 0.49 |
| Renovation / restoration | Dummy variable for renovation / restoration scenario | 87 | 0.22 | 0.42 |
| Africa | Dummy variable for site located in Africa | 87 | 0.05 | 0.21 |
| Asia | Dummy variable for site located in Asia | 87 | 0.15 | 0.36 |
| Europe | Dummy variable for site located in Europe | 87 | 0.46 | 0.50 |
| North America | Dummy variable for site located in North America | 87 | 0.23 | 0.42 |
| Oceania | Dummy variable for site located in Oceania | 87 | 0.07 | 0.25 |
| South America | Dummy variable for site located in South America | 87 | 0.05 | 0.21 |
| Choice experiment | Dummy variable for choice experiment | 87 | 0.13 | 0.33 |
| Contingent valuation | Dummy variable for contingent valuation | 87 | 0.67 | 0.47 |
| Hedonic pricing | Dummy variable for hedonic pricing | 87 | 0.11 | 0.32 |
| Travel costs | Dummy variable for travel cost | 87 | 0.09 | 0.29 |

value for a 1% increase in the independent variable. The coefficients on the categorical dummies measure the percentage change in value when a categorical variable is true.

The log likelihood values indicate that model 2 has a better fit (log likelihood = −159.9) compared to model 1 (log likelihood = −194.4). 194.4). Likelihood-ratio tests comparing the models with one-level ordinary linear regression show the random effects to be significant at the 95% level for model 1 and significant at the 90% level for model 2.

Fig. 4 and b show Q-Q plots of the residuals for models 1 and 2, respectively. This visual inspection indicates that the distribution of the residuals is normal for a large share of the observations. We applied the Shapiro-Wilkes test for normality of the residuals, which did not reject the null-hypothesis of a normal distribution for either model ($p = 0.19$ and $p = 0.33$ for models 1 and 2, respectively). In Fig. 5 and b, we show the distribution of the residuals per continent for models 1 and 2, respectively. Studies from Africa are consistently positive in both models. This is in line with insights from our data exploration. In model 2, there is only one observation from Oceania.

Both models have a large and significant intercept, which is likely to be caused by the base levels of the categorical variables 'scenario' and 'asset type'. The implications and interpretation of this result are discussed in more detail below.

In both models, the population density within a 10-km radius of a site has a positive and significant effect on value. Considering that the data set displays high variation in local population density, this is a strong signal that demand for heritage is higher in areas with higher local population densities. This result was found in other studies as well: Brander et al. (2006, 2012), for instance, find it in their meta-analyses for wetland and mangrove values.

Income per capita for the sites was retained as a regressor in the models even though income appears to have no significant effect on the valuation of heritage sites. Higher affluence was expected to be associated with stronger preferences for heritage via a mechanism of, for instance, education. The absence of a significant relationship could indicate that international heritage tourism is an important driver of economic value, but available data on tourism numbers was too

**Fig. 1.** Geographic distribution of the studies used for this meta-analysis.

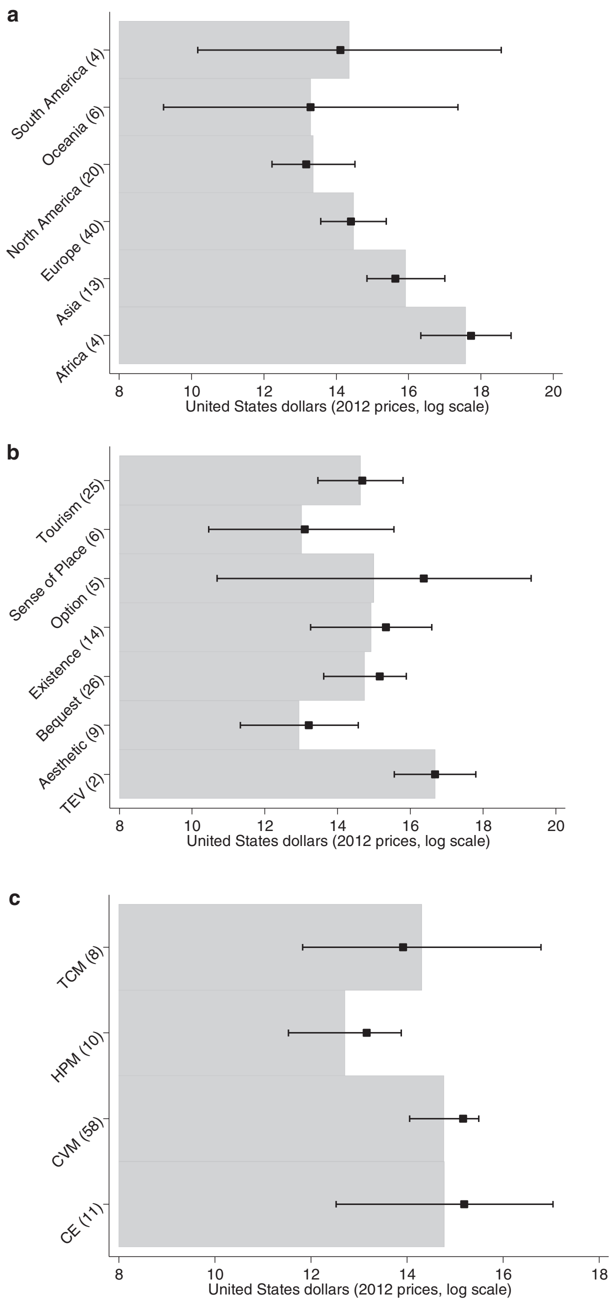


**Fig. 2.** Heritage site values by continent (a), benefit type (b), and valuation method (c). Values are given in log scale. The bars show the mean value, the dots the median and the error bars the standard error of the mean estimate. The number of observations in each category are given in brackets.

**Table 3**
Cross tabulation of the number of observations by valuation method and asset time across continents.

| | Africa | Asia | Europe | North America | Oceania | South America |
|---|---|---|---|---|---|---|
| CE | 2 | 2 | 2 | 1 | 4 | 0 |
| CVM | 2 | 11 | 33 | 6 | 2 | 4 |
| HPM | 0 | 0 | 2 | 8 | 0 | 0 |
| TCM | 0 | 0 | 3 | 5 | 0 | 0 |
| Archaeological | 0 | 0 | 3 | 1 | 3 | 0 |
| Built | 2 | 13 | 36 | 15 | 1 | 3 |
| Natural | 2 | 0 | 0 | 4 | 1 | 0 |
| Traditional Knowledge | 0 | 0 | 1 | 0 | 1 | 1 |

inconsistent for inclusion in the regressions. In model 1, the scenarios adaptive reuse, conservation, and renovation/restoration are all significant and positive relative to the base scenario, access. In model 2, only the adaptive reuse and conservation coefficients are positive and significant. Adaptive reuse may capture both use and non-use values simultaneously, therefore leading to higher value estimates. Neither the conservation scenario nor the renovation/restoration scenario guarantees that the current state of the site is to be maintained or improved, which may be expressed in lower valuations in the primary studies. Use values, particularly those that can be captured in markets, can be expected to lead to higher valuations. In the case of heritage buildings, moreover, these values may overlap non-use values or non-market values (for a related argument, see Horowitz and McConnell, 2002).

## 4. Discussion

Developments in heritage management increasingly consider economic as well as cultural values, and the number of primary valuation studies of cultural heritage sites has been growing rapidly in recent years. These studies apply to only one site, however, and are conducted in diverse contexts. Consequently, relatively little is known about common drivers of the economic value of cultural heritage. Our study identified common drivers of value by conducting a meta-analysis of primary valuation studies of tangible and intangible heritage.

The meta-analysis identified three key results. First, population density in the immediate area around heritage sites correlates with their value. Secondly, studies that consider conservation to actively maintain a heritage site (adaptive re-use and conservation) generate higher valuation estimates than those that assess only passive site protection (protection and access). In particular, adaptive reuse of sites is highly valued, possibly because the economic and cultural values are reinforced or experienced more frequently when a community can experience a site as a part of daily life. Thirdly, country grouping effects are found to be significant across studies suggesting that preferences and drivers for the conservation of heritage sites are structurally different between countries.

These results were found across a range of model specifications and thus suggest two economic arguments for targeting heritage conservation investments. First, it appears that cost-effective conservation policies would prioritise heritage sites in urban areas over sites in areas with low population densities. This approach maximises the number of people that can experience and value a site for a given budget. Secondly, if conservation is undertaken with the purpose of giving a heritage site an active role within its community, i.e. conservation for adaptive re-use, the value derived from the heritage investment will be much higher than when the site is, for instance, simply conserved.

These recommendations are very utilitarian and do not do full justice to the Cultural Capital framework, which proposes that economic, or monetisable, valuation may capture part, but not all, of their cultural values. Our results seem to support that conclusion, when we compare the full model with the model for built heritage. The former includes sites that are less easily adapted for active use. In this model restoration, which does not focus on use-related values, is a strong driver of value. Our results indicate that there are facets of heritage value that our models do not capture very well. Tourism highlights are bound to attract higher visitor numbers from the country and abroad and so generate high values, for instance. Compiling consistent tourism data may help to identify that mechanism. Elements of cultural value and intangible heritage may offer further avenues to explore what drives heritage value. The relevance of sites to local, regional or national identity is one such consideration. Another could be the approaches that national heritage organisations use to determine the cultural value of heritage sites. Retrospectively producing data about such variables, however, presents a significant challenge. Future studies could be designed as

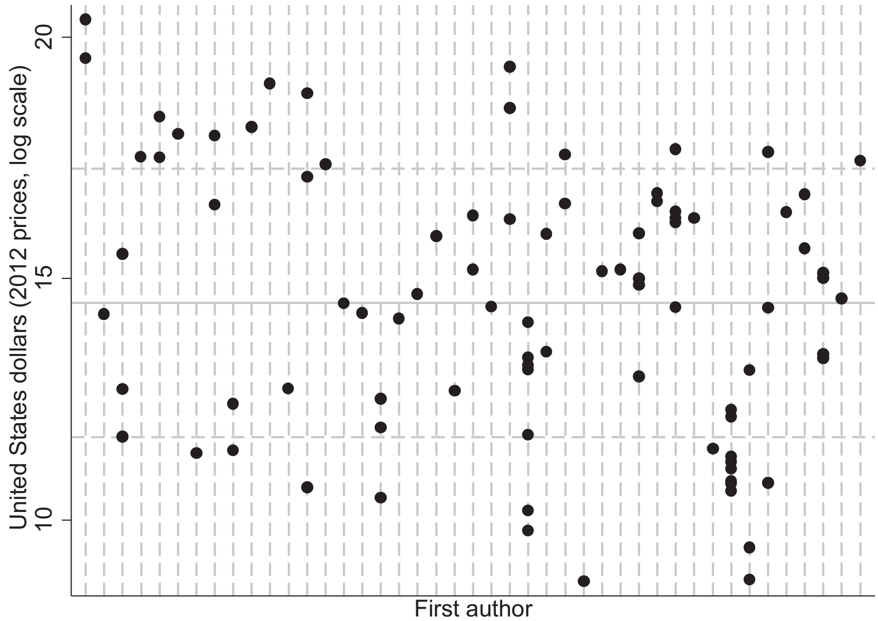


**Fig. 3.** Authorship effects. Each dot represents a value observation, given in 2012 United States dollars (log scale). Each vertical dashed line represents a first author and dots located on that line are observations from studies by that author. The solid horizontal line represents the mean of the value observations and the two dashed horizontal lines are located one standard deviation from the mean.

collaborations between heritage experts and economists, and integrate elements of cultural value explicitly into study design.

With these considerations in mind, the implications we draw from our results are intentionally kept general. Compared with meta-analyses of certain environmental resources, such as coral reefs, the evidence base for cultural heritage is relatively small, for instance.

**Table 4**
Meta-regression results.

| Variables | | All asset types | Built heritage only |
|---|---|---|---|
| Constant | | 13.98*** | 14.03*** |
| | | (2.964) | (3.319) |
| Log population density in 10 km radius | | 0.336*** | 0.286* |
| | | (0.128) | (0.155) |
| Log GDP per capita | | -0.309 | -0.277 |
| | | (0.251) | (0.313) |
| Asset Type | | | |
| | Built | -0.150 | |
| | | (1.092) | |
| | Natural | 2.002 | |
| | | (1.347) | |
| | Traditional knowledge | 3.419** | |
| | | (1.627) | |
| Scenario | | | |
| | Adaptive reuse | 7.990*** | 7.215*** |
| | | (1.928) | (2.050) |
| | Area conservation planning | 3.512* | 2.855 |
| | | (2.068) | (2.905) |
| | Conservation | 2.666** | 2.520** |
| | | (1.139) | (1.219) |
| | Preservation | 1.471 | 1.505 |
| | | (1.167) | (1.231) |
| | Renovation/restoration | 2.283* | 1.784 |
| | | (1.187) | (1.271) |
| Country variance | | 0.764*** | 0.817*** |
| | | (0.0867) | (0.0965) |
| Observations | | 87 | 70 |

Standard errors in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

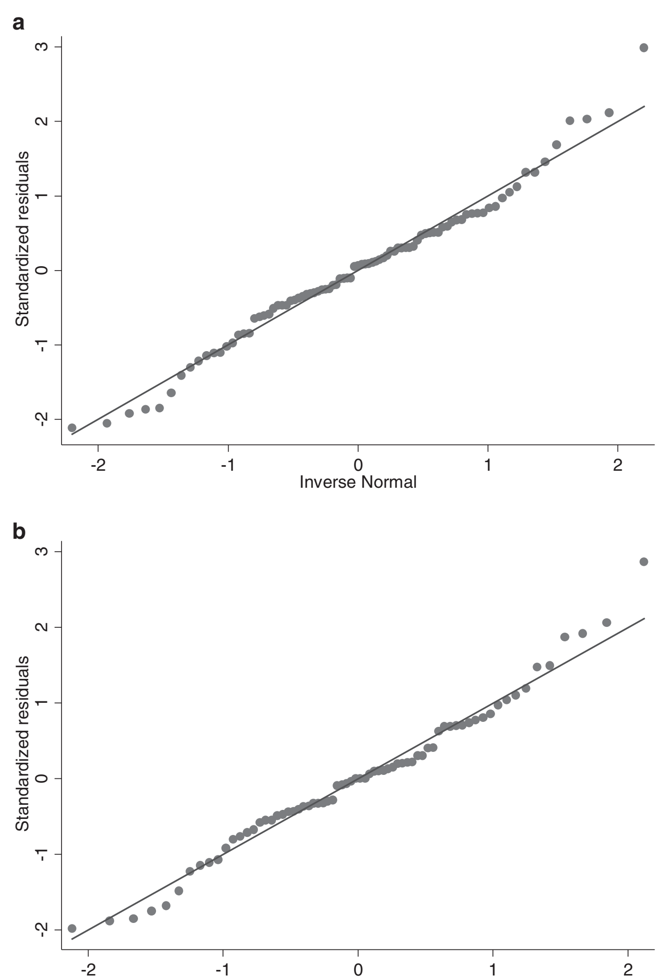


**Fig. 4.** a QQ plot of residuals for model 1. b QQ plot of residuals for model 2.

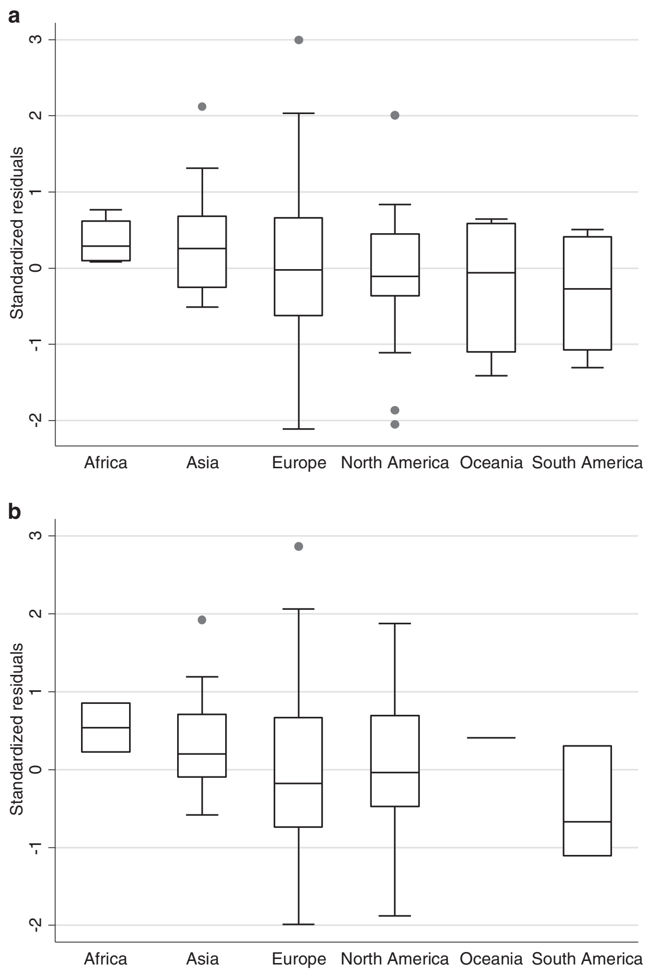


**Fig. 5.** a Boxplot of residuals per continent for model 1. b Boxplot of residuals per continent for model 2.

Moreover, the context-specificity of heritage values remains a concern, even though in this respect a meta-analysis of cultural heritage is not fundamentally different from one for environmental resources. The quality of the primary studies is an important factor for the insights that meta-analysis can provide, and it is possible that existing valuation studies have not aligned well with elements of cultural value. The small number of effects we report proved to be robust across a wide range of model specifications, but do not constitute a model that can be used to predict the value of heritage sites.

One of the main reasons for our care in extrapolating policy implications from our statistical analysis is that a large share of the observations in the sample relates to built heritage sites. The cultural value of archaeological sites, landscapes and traditional knowledge is studied much less frequently. Consequently, our understanding of the drivers of different types of cultural and historical heritage remains limited. In order to make headway on this front, more valuation studies of cultural heritage, ideally developed through collaborations between economists and heritage experts, are needed.

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