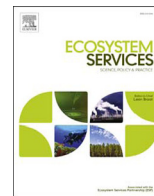




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Marine recreational ecosystem service value estimation: A meta-analysis with cultural considerations

Stephen Hynes^{a,*}, Andrea Ghermandi^b, Daniel Norton^a, Heidi Williams^c

^a SEMRU, Whitaker Institute, National University of Ireland, Galway, Ireland

^b Department of Natural Resources & Environmental Management, Faculty of Management, University of Haifa, Mount Carmel, Haifa 3498838, Israel

^c The Center for the Blue Economy, Middlebury Institute of International Studies, Monterey, CA, United States

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ABSTRACT

Marine and coastal ecosystems provide a wide variety of recreational opportunities that are highly valued by society. For the purposes of conducting a meta-analysis we build an extensive global dataset of marine recreational ecosystem service values from the literature. Using this database we developed a number of meta-regression specifications with the objective of evaluating the study specific effects of location, ecosystem, valuation methodology and statistical estimation methods on the reported value estimates. Furthermore, the paper investigates if cultural differences between studies are an important determinant that should be considered in international (meta-analytical) value transfer. This was achieved by including a number of cultural parameters from previous societal studies and surveys into our meta-regression models. We found that accounting for differences in cultural dimensions across recreation valuation studies had a significant influence on value estimates. While a multi-level modelling approach that controls for study effects, proved to be a better fit than a standard one level specification, we found that the absolute in-sample transfer errors associated with the standard OLS model were slightly less on average based on the differences between the actual and predicted values in our meta-database.

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1. Introduction

The coastal and marine environments provide a wide variety of opportunities for recreational activities such as swimming, angling, diving, sailing, and kayaking and have been shown to generate substantial cultural ecosystem service benefits. Indeed, a review of studies that have attempted to evaluate the cultural ecosystem services provided within a country's jurisdiction more often than not highlight recreation as one of the most valuable cultural ecosystem services provided (Beaumont et al., 2008; UNEP, 2006; Hansen and Malmaeus, 2016). Recreation is one of the services that are more directly linked to human well-being and thus may play an important role in motivating public support for restoration and protection efforts (Brancalion et al., 2014; Daniel et al., 2012). Recreation is also one of the most often valued of the different ecosystem service categories in the literature (de Groot et al., 2012). It could be argued however that recreation is the cultural service with easiest monetary translation due to the existence of market and non-market valuation methods. Other cultural services such as aesthetic, inspirational and cultural heritage are highly val-

ued but are often not monetarized due to the lack of available data and/or methods.

In this paper we investigate the relationship between the valuation of marine and coastal recreation service benefits and the cultural context of the beneficiaries using a meta-analysis. Meta-analysis also allows us to investigate the influence that other study characteristics such as the choice of method, the model used and the type of ecosystem where the recreation takes place, have on recreational value estimate variation in previous studies. The meta-analysis facilitates the statistical analysis of the summary findings of prior empirical recreation valuation studies. As Bateman and Jones (2003) point out, the method "offers a transparent structure with which to understand underlying patterns of assumptions, relations and causalities, so permitting the derivation of useful generalizations".

Although cultural factors have been considered from a theoretical perspective as having an influence on an individual's preferences and on their valuation of environmental goods (Pouta, 2004; Ojea and Loureiro, 2007; Hynes et al., 2013; Kountouris and Remoundou, 2016) there is limited empirical evidence of the relationship between cultural identity and valuation. In a review of the literature related to how cultural factors may co-determine preferences and values, Hynes et al. (2013) demonstrate how numerous studies have shown that economic values reflect

* Corresponding author.

E-mail address: stephen.hynes@nuigalway.ie (S. Hynes).

the culturally constructed realities, worldviews, mind sets and belief systems of particular societies and/or subsets of society. The authors also show how it has been argued that preferences are not exogenous. Rather, they are shaped by social interactions as well as political and power relations operating within a system of local, regional, and global interdependencies (Dietz et al., 2005; Hoyos et al., 2009; Wilk and Cligget, 2006; Hornborg et al., 2007).

Cultural identity has been shown to influence recreational preferences and values. Cultural identities are comprised of shared language, symbols, customs, values, attitudes, and expectations (DeSensi, 1994). Early work by Allison (1979) suggested that ethnic groups choose to participate in certain activities due to cultural traditions, practices and group characteristics such as language or religion. Philips (2007) points out that one of the main reasons leading to differences in recreation and leisure participation rates across countries results from differences between different racial or ethnic groups in their attitudes, values, systems and norms. In an early study, Shultz et al. (1998) suggested that cultural influences may also affect respondents' stated preferences for environmental goods in developing countries.

Loomis et al. (2006) examined the influence of ethnicity and language on Willingness to Pay (WTP) and concluded that language rather than ethnicity may influence WTP responses. More recently, Hoyos et al. (2009) show that cultural identity may have considerable influence on the WTP to protect natural resources. They find that the WTP to protect the environmental attributes of a protected site in the Basque region of Spain is approximately 28–33% higher if the cultural identity of the respondent is Basque. Elsewhere, Pemberton et al. (2010) find significant differences in stated WTP between social groups in a contingent valuation study of a forest reserve threatened by copper mining which they attribute to some social group's historical aggressiveness towards strangers and their belief that they have rights over the natural resource.

In the only previous study to explicitly incorporate cultural identity factors into a value transfer (VT) exercise, Hynes et al. (2013) investigated if cultural differences influence the validity of value transfer estimates. Using information from a study that ranked 62 societies with respect to nine attributes of their cultures (House et al., 2004), the authors developed an index that was then used to re-weight multiple coastal ecosystem service value estimates. The study then examined whether these culturally-adjusted VT estimates were statistically different than simply transferring the income-adjusted mean transfer estimates for each coastal ecosystem service from international study sites to the policy site. The study concluded that using cultural indicators could lead to an improvement in the reliability of the ecosystem service valuation approach and ultimately in its use as a tool for the sustainable management of natural coastal ecosystems and the services they provide.

Away from a valuation setting but of relevance to this paper Kountouris and Remoundou (2016) investigate national culture's influence on preferences and attitudes for environmental quality. The cultural diversity of immigrants in European countries was used by the authors to isolate the effect of culture from the confounding effect of the economic and institutional environment. The results of the study suggest that culture is a significant determinant of migrants' individual environmental preferences and attitudes. Elsewhere, Berkes (2004) points out that conservation and environmental policy often operates within highly complex socio-ecological systems in which relationships between society and natural systems are dynamic and multi-scale.

While cultural factors can influence the value placed on recreation, Taylor (2001) also points out that recreation itself can "provide people the space for emancipation, opportunities to challenge stereotypes and pathways to resist social construction of marginalised ethnic identities".

Floyd (2007) contends that many leisure studies fail to control for factors such as race relation, class mobility and accepted leisure behaviour in explaining leisure participation. Mbuthia and Maingi (2010) also highlight the fact that there are few attempts in the literature to isolate and measure the various dimensions of marginality, and ethnicity that may influence travel for tourism and participation in recreation and leisure. Hynes et al. (2013) also suggested that further research was needed to examine the best way of making adjustments for cultural differences in international VT.

Ghermandi and Nunes (2013) point out that from an economic perspective, sustainable management strategies for marine-based tourism and recreation need to be founded on a thorough assessment of their value in the relevant policy context. Such recreational values are generally obtained from primary revealed preference valuation studies (e.g. travel cost studies) that report the economic measure of direct-use access value for recreation sites and activities, or stated preference studies (e.g. contingent valuation or site choice experiments) that estimate both use and non-use values associated with a change in recreational opportunities.

In this paper we build an extensive global dataset of non-market marine recreational ecosystem service values from stated and revealed preference studies with over 350 distinct value observations. Using this database we develop a number of meta-regression specifications with the objective of examining how study-specific effects such as valuation methodology and statistical estimation approach used, influence reported recreation benefit value estimate variation. The second objective of this study is analytical as we detail alternate approaches to the construction of the meta-analysis models using both conventional Ordinary Least Squares (OLS) regression techniques and generalised multi-level linear modelling methods. The final key objective of the study is to examine whether cultural identity has a statistically significant impact on reported recreation benefit value estimate variation.

We therefore add to the literature by exploring how cultural factors and other study specific characteristics influence the variation in recreation value estimates observed in previous studies using a meta-regression. We test if accounting for measurable differences in cultural attitudes towards the environment in a meta-analysis of recreational values from the recreation valuation literature improves model fit and researchers' ability to predict values from VT models that incorporate information from international studies. The valuation method, model specifications and the data used in the meta-analysis are presented in the following section.

2. Materials and methods

Meta-analyses have been conducted for recreation values in a number of different contexts; early applications being Smith and Kaoru (1990), Rosenberger and Loomis (2000), Shrestha and Loomis (2001) and more recently De Salvo and Signorello (2015). Previous meta-analyses of marine and coastal ecosystem values have also been carried out for coral reefs by Brander et al. (2007) and for multiple marine ecosystem types by Liu and Stern (2008) and Rao et al. (2015). There have also been a number of meta-analyses carried out on the recreational pursuit of angling where a large literature of primary valuation studies can be relied upon (Johnston et al., 2006; Moeltner et al., 2007). In perhaps the most comprehensive meta-analysis of marine and coastal recreation to date (comprehensive in terms of number of value observations, valuation types included and global coverage), Ghermandi and Nunes (2013), developed a meta-analytical framework built upon a Geographic Information System (GIS). This allowed for the exploration of the spatial dimension of the valued ecosystems, including

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