



Benefits Valuation Method:

HEDONIC VALUATION

Overview

A market where individuals can directly express their monetary preference for environmental features, including coastal projects such as renourishing beaches or dunes, does not exist. However, actual markets that indirectly rely on these features do. Hedonic valuation (often called hedonic pricing) is a type of revealed preference method that examines individual behavior in markets related to ecological services and teases out values from those decisions.

Revealed preference methods simply use actual data from consumer spending, as opposed to asking consumers in a survey how they might anticipate spending their dollars. One most common application for this method uses housing price data. For example, indirect preferences for coastal dunes and beaches—as well as the benefits they provide through mitigating flood risk from sea-level rise—can be teased out using statistics when analyzing home sales data.

Hedonic valuation seeks to exploit relationships between the demand for goods bought and sold in an existing market by accounting for the characteristics making up that good (e.g., a coastal home) and nearby amenities (e.g., the ocean view from a beach or many other possible nearby amenities, such as living adjacent to a resilient beach).

To help explain this concept, we will use a familiar example of purchasing a home. How much a home is worth is a function of the property itself and nearby characteristics, such as the school district or whether it has a beautiful view. Housing sales data offer actual market transactions that help statistically parse out an estimate of the benefits that the nearby ecosystems and amenities provide to residents.

So, buyers' decisions about their most preferred home can reveal information about not only what size of home they want but also how they value nearby environmental amenities such as nearby recreation opportunities or a scenic view. Within the coastal setting, homes may also be vulnerable to coastal hazards such as storm surge or sea-level rise. Those that are situated near more resilient coastal features, such as wide beaches or high dunes, may fetch risk-reduction benefits.

Case Study

Pompe and Rinehart (1995) were one of the first to propose a different methodological approach for valuing the storm damage reduction benefits provided by South Carolina beaches using hedonic valuation.

In this study, the authors analyzed the change in home values as a result of beach nourishment. They reported \$63.8 million in cumulative benefits due to storm damage reduction for homeowners. The estimated benefits were provided not only to immediate coastal infrastructure but to inland property owners as well. They reported an overall benefit-cost ratio of 1.96.

Strengths

One fundamental advantage of this method is that it leverages actual dollar values from real economic decisions, perhaps lending more robustness to the results than a survey where people answer with a perceived value, such as through a willingness-to-pay questionnaire. This method also should be conceptually familiar to most people that have ever considered buying a home.

Challenges

Hedonic models can only capture the value of environmental changes that individual homeowners can readily recognize. The nearby environmental co-benefits need to be easily observable by people and available as a function of living in their particular house.

Tips

- Contract with an economist experienced in environmental economics to correctly analyze the results.
- Hedonic valuation requires data on many property sales transactions over time before and after a nearby notable event (e.g., renourishing a beach). These data allow you to estimate changes in sales values to estimate values for nearby environmental features.
- You need access to a database containing real estate transactions (such as Zillow). The data set would include property-level variables such as sales price, housing characteristics, and the geographic coordinates for each property.

Additional Resources

Getting Help

- Reach out to our team (econguidance@noaa.gov) for specific questions on hedonic valuation studies.
- Hire a private consultant or request support from academic partners. Researchers, graduate students, and academic scholars may be able to provide guidance or work directly on your hedonic valuation analysis.

Other Resources

- Environmental Protection Agency. “Non-Market Methods: Revealed Presence” (Science Advisory Board report excerpt). [yosemite.epa.gov/Sab/Sabproduct.nsf/WebFiles/Non-MarketRevealedPref/\\$File/Nonmarket-revealed-pref-03-09-09.pdf](https://www.epa.gov/yosemite/Sab/Sabproduct.nsf/WebFiles/Non-MarketRevealedPref/$File/Nonmarket-revealed-pref-03-09-09.pdf).
- Champ, P.A., K.J. Boyle and T.C. Brown, editors. 2003. *A Primer on Nonmarket Valuation*. Dordrecht, The Netherlands: Kluwer Academic Press.

- Chao, P.T., J.L. Floyd, and W. Holliday. 1998. *Empirical Studies of the Effect of Flood Risk on Housing Prices*. IWR Report 98-PS-2. U.S. Army Corps of Engineers.
- Landry, C. E., and P. Hindsley. 2011. “Valuing Beach Quality with Hedonic Property Models.” *Land Economics*. Volume 87, Number 1. Pages 92-108.
- Palmquist, R.B. 2005. “Property Value Models.” *In Handbook of Environmental Economics*, vol. 2, Edited by K. Mäler and J. Vincent. Amsterdam: North-Holland.
- Pompe, J.J., and J.R. Rinehart. 1995. “The Value of Beach Nourishment to Property Owners: Storm Damage Reduction Benefits.” *The Review of Regional Studies, Southern Regional Science Association*. Volume 25, Number 3. Pages 271-85.