Comment: "The Value and Configuration of Coastal Natural Capital," by Ethan T. Addicott

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Before one can make an economically informed decision about a natural asset like coastal capital, one first must be able to quantify and value the asset. For example, a potential homebuyer might view a property's location and access to the coast as a positively valued amenity and want to know the market valuation of such features when comparing different properties. As another example, introductory economics tells us that a government (or social planner) cannot know whether there is too much natural resource harvesting (e.g., timber, fish) taking place without first knowing the amount and associated (social marginal) dollar value of the resource being harvested. Additionally, placing a value on natural assets is also itself of direct interest, particularly if one is trying to measure the size of an economy taking natural resources into account. This is the rationale for the United Nation's 2021 System of Environmental-Economic Account's (SEEA) Ecosystem Account framework. However, as with all other non-market goods, placing a value on such assets is a challenging exercise. Alternative methods like stated- or revealed-preference must be used in the absence of any direct observations of price.

In this paper Ethan Addicott contributes to a growing empirical literature by valuing coastal capital in the United States using information from sales of nearby homes, decomposing the value of a property into environmental and non-environmental components. Viewing coastal capital as environmental amenities that are bundled with a home purchase (e.g., beach width, distance from home to shore, angle of coast, tidal protections, direct waterway access), the idea is to value the coastal assets by determining how they are capitalized into home prices. This approach has been used before in the real estate and urban economics literatures to study the effects of environmental features like sea-level rise risk (Bernstein Gustafson Lewis 2019) and pollution exposure (Currie Davis Greenstone Walker 2015), as well as also non-environmental features like school quality (Bayer Ferreira McMillan 2007), among many others. Such an approach requires both environmental and non-environmental data. The environmental data used by the paper are not commonly found in this setting; this is one of the first applications of high-resolution laser imaging, detection and ranging (LIDAR) to value coastal environmental characteristics. This is surprising as such data are open access, easily accessible, and available for many regions in the United States, meaning it may be the standard for future work in this space. In contrast, the non-environmental data used by the paper are more commonly found in the literature, including traditional housing characteristics (bedrooms, bathrooms, square footage, age, location, etc.) and date of transaction. These variables are commonly sourced using real estate listings, often from a Multiple Listing Service (MLS) or a similar platform.

After carefully connecting the data sources, the main finding is that there is substantial heterogeneity in the value of coastal capital. Not only are there differences across markets in the

type and number of coastal characteristics, but there is also evidence that coastal characteristics may be valued differently holding the type and number of coastal characteristics fixed. To give an example, consider the fact that dunes are not present in all coastal markets. Even within coastal markets that have dunes, homes are likely to have different dune characteristics; some homes may experience taller dunes that obstruct views of the ocean while others do not. As another example, consider that beach width is likely valued differently depending upon elevation of the home and distance to the beach. The immediate implication of the results is that a one-size-fits-all approach to valuing coastal capital is likely to miscalculate its true value. Care is needed to distinguish the type and amount of capital when making value calculations.

Despite substantial empirical efforts, common challenges remain for hedonic valuation: sorting and unobserved heterogeneity. Various strategies have been developed to address each of these issues (e.g., Bakkensen Ma 2020 and Francke Van de Minne 2021, respectively). Careful attention should be paid to ensure coastal amenities like beach views and healthy coastal ecosystems are disentangled from coastal dis-amenities like flood risk and sea-level rise. For example, are the individuals who purchase homes those that value coastal amenities the most, care about coastal dis-amenities the least, or some combination of the two? Are there other unobserved home characteristics driving home prices which are correlated with coastal characteristics? From a methodological point of view, these are in principle able to be at least partially addressed.

Looking ahead, one avenue for future research could study the effects of sea level rise by asking how the values of characteristics (and the characteristics themselves) change over time. While the current focus is largely on static, long-run effects, documenting market dynamics like these opens a new set of questions. In particular, the interaction between realized climate change, beliefs about climate change, and coastal asset capitalization over time could help inform policy regarding coastal development. Future researchers working in this area can use this paper and others like it as an example of how to answer such an important question as: how should one value a natural asset?

References

Bakkensen, L. A., & Ma, L. (2020). Sorting over flood risk and implications for policy reform. *Journal of Environmental Economics and Management*, *104*, 102362.

Bayer, P., Ferreira, F., & McMillan, R. (2007). A unified framework for measuring preferences for schools and neighborhoods. *Journal of Political Economy*, *115*(4), 588-638.

Bernstein, A., Gustafson, M.T., & Lewis, R. (2019). Disaster on the horizon: The price effect of sea level rise. *Journal of Financial Economics*, 134, 253-272.

Currie, J., Davis, L., Greenstone, M., & Walker, R. (2015). Environmental health risks and housing values: evidence from 1,600 toxic plant openings and closings. *American Economic Review*, *105*(2), 678-709.

Francke, M., & Van de Minne, A. (2021). Modeling unobserved heterogeneity in hedonic price models. *Real Estate Economics*, *49*(4), 1315-1339.