Research Working Papers

Housing Market Impairment from Future Sea-level Rise Inundation

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Sea level rise will pose increased risks to U.S. coastal real estate markets in the coming decades, though the direct economic costs depend on the severity and uncertainty within climate-change scenarios.

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The rate of future global sea-level rise will likely increase due to elevated ocean temperatures and land-ice loss. Coastal properties are expected to become more prone to coastal flooding in coming decades due to relative sea-level rise caused by both global and local factors. Translating sea-level rise projections into lost physical and economic value is critical for companies, governments, and regulators. We use probability distributions of local sea-level rise projections, National Oceanic and Atmospheric Administration (NOAA) coastal digital elevation models, and CoreLogic housing data to estimate the timing of future sea-level rise inundation and a range of housing market impairments in four U.S. coastal cities (Atlantic City, NJ; Miami, FL; Galveston, TX; and Newport - San Pedro, CA) for a series of climate scenarios. We implement a novel methodology, refining estimates for the timing for future inundation, considering both housing properties' elevation above the tidal datum (Mean Higher High Water -- MHHW) and hydrologic connectivity to the ocean -- a critical consideration where natural or human-built features alter the relationship between sea levels and inundation. The unique risk factors in our four cities (housing market, topography, and local sea-level) illustrate how our methods are applicable across geographies and scales of observation. Our results provide an important perspective on the timing of future losses, the associated uncertainty, and highlight positive (high-skewed) asymmetry of risk from sea-level rise inundation. This information can aid planners, policy makers, and investors, in cost-benefit decision-making related to mitigation, adaptation, and remediation at the local and national level.

JEL Classification: Q54, R3, D89

Additional Files

Supplemental Material

Data

Article Citations

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Related Research

- Amante, Christopher J. 2019. "Uncertain seas: probabilistic modeling of future coastal flood zones." *International Journal of Geographical Information Science*, vol. 33, no. 11, pp. 2188–2217.
- Bernstein, Asaf, Matthew T. Gustafson, and Ryan Lewis. 2019. "Disaster on the horizon: The price effect of sea level rise." *Journal of Financial Economics*, vol. 134, no. 2, pp. 253–272.
- Kopp, Robert E., Robert M. DeConto, Daniel A. Bader, Carling C. Hay, Radley M. Horton, Scott Kulp, Michael Oppenheimer, David Pollard, and Benjamin H. Strauss. 2017. "Evolving Understanding of Antarctic Ice-Sheet Physics and Ambiguity in Probabilistic Sea-Level Projections." *Earth's Future*, vol. 5, no. 12, pp. 1217–1233.

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David Rodziewicz is a senior economics specialist at the Denver Branch of the Federal Reserve Bank of Kansas City. His research focuses on energy economics, natural resource economics, climate change, and regional economics. His outreach efforts focus on the Rocky Mountain West region (Colorado, Wyoming, and northern New Mexico). Rodziewicz is also responsible for briefing the Kansas City Fed's president – a member of the Federal Open Market Committee – on regional economic conditions as well as energy related issues.Prior to joining the Economic Research Department at the Bank in 2017, Rodziewicz was as an officer in the National Oceanic and Atmospheric Administration's Commissioned Officer Corps, where he served as a deck watch officer in Alaska and database manager in Boulder. Earlier in his career, he worked in the financial services industry as a stock analyst, covering real estate investment trusts (REITs). Rodziewicz holds a master's degree in Mineral and Energy Economics from Colorado School of Mines and a bachelor's degree in Finance and Economics from University of Illinois.