Highly Disaggregated Land Unavailability

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Land Unavailability Data:
https://github.com/ChandlerLutz/LandUnavailabilityData

February 23, 2026

Abstract

Standard empirical proxies contradict the canonical prediction that supply constraints amplify house price cycles. We resolve this puzzle by constructing the Land Unavailability–Machine Learning (LU-ML) Indices using high-resolution satellite imagery. Unlike existing measures, our indices capture the nonlinear and heterogeneous impacts of physical geography. We document two main facts: (1) physical constraints are a key determinant of cross-sectional price dynamics, driven largely by the intensive margin (steep slopes); and (2) looser supply constraints significantly mitigate the price effects of demand growth, overturning the "null result" in recent literature.

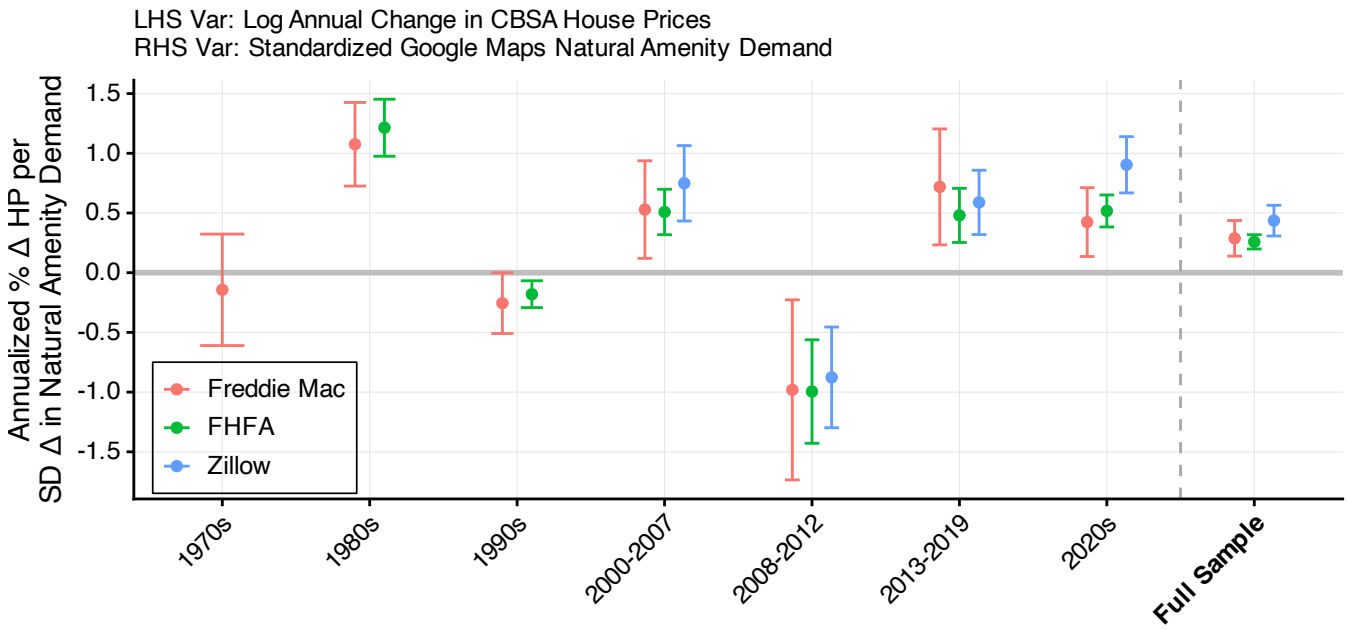
JEL Classification: R30, R31, R20;

Keywords: Land Unavailability, Supply Constraints, House Prices, Entrepreneurship

References

C. Lutz. Natural amenity demand index construction using google places. https://github.com/ChandlerLutz/gmaps-natural-amenities-2025, 2025.

Figure 1: The Natural Amenity Premium in US Housing Markets, 1976–2024



Notes: Regressions of the year-over-year (YoY) log change in CBSA house prices on Google Maps Natural Amenity Demand across housing market cycles and for the full sample by house price dataset. The CBSA-level Google Maps Natural Amenity Demand Index is the sum of the log Google Maps Amenity Demand Indices for "Hiking," "Natural Amenity Recreation," "Water Amenities," and "Viewpoints." See Lutz (2025) for further computational details. We regress the log annual change in house prices for CBSA i on the interaction Google Amenity Demand Index with housing market cycle c using: $\Delta \ln(P_{i,t}) = \alpha_t + \beta_c(\text{Amenity}_i \times \text{Cycle}_{t,c}) + \varepsilon_{i,t}$, where α_t signifies time fixed effects and $\text{Cycle}_{t,c}$ is an indicator equal to 1 if period t falls in cycle c (and 0 otherwise). Housing market cycles span the 1970s, 1980s, 1990s, 2000–2007, 2008–2012, 2013–2019, and the 2020s. The far-right coefficients show the estimates for the full sample using the equation: $\Delta \ln(P_{i,t}) = \alpha_t + \beta\text{Amenity}_i + \varepsilon_{i,t}$. Plotted coefficients are scaled by 100 and can be interpreted as annual percent changes in house prices per one standard deviation increase in Natural Amenity Demand. Confidence intervals are computed using ±2 robust standard errors clustered by CBSA.