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Economics and Quantitative Methods PhD Seminar Series

«Inferring beliefs on climate risk from a data-driven agent-based model of the housing market»

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Abstract

Climate change has a negative effect on housing prices as properties are exposed to a growing risk of natural hazards. Losses in property value occur both through direct damages and through awareness by buyers who increasingly believe that climate change is happening and adjust their demand avoiding the most at-risk properties. Yet, econometric work shows that climate risks are only partially incorporated in housing prices, and in a very uneven way across socio-demographic groups. Theoretical work based on general equilibrium models sheds light into the channels that drive prices down, but displays limited agent heterogeneity and is lightly calibrated on real data. Here, we develop an agent-based model that simulates the buying and selling decisions of a realistic synthetic population in Miami-Dade County, Florida, where Sea Level Rise (SLR) is an existential risk. In the model, buyers are less likely to buy at-risk properties the more they believe in climate risk, and this drives prices down as sellers of these properties must reduce their asking prices. The model is initialized from the universe of real-estate properties, transactions and mortgages between 2000 and 2019. We show that the model reproduces key patterns of the Miami housing market through the 2008 crisis, and then use the model to infer agents' beliefs towards climate risk. We find that increasing awareness explains the 2015-2019 stagnation in prices in at-risk, affluent areas such as Miami Beach, mirrored by the rapid increase in prices in relatively safe, working-class areas such as Little Haiti, suggesting processes of climate gentrification.

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