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REAL PROPERTY MARKET RESPONSES TO COASTAL FLOODING

by

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And approved by

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# ABSTRACT OF THE DISSERTATION

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The high development pressure in coastal areas overlaps with significant natural hazards, such as storm surge related to flooding caused by hurricanes. Because of this, coastal zone management (CZM) becomes more important. Through CZM programs, the federal government has assisted state governments in improving local coastal planning and management. Studies in the implementation and practice of CZM in the United States include: protection of beaches, estuaries; and redevelopment of urban ports and waterfronts. The Federal Emergency Management Agency (FEMA) has developed land use regulations and technical guidelines as part of the coastal management efforts. Another important program to protect real property owners from severe flood damages on their properties is the National Flood Insurance Program (NFIP).

Therefore, this dissertation investigates the effects of coastal flooding on the dynamics of real property markets. Within the dynamics of real property markets, stakeholders respond to flooding differently based on their roles and interests. Real property market stakeholders' adaptive behavior in response to coastal flooding is the interest of this dissertation.

The complexity of these socio-economic phenomena interacting with ecological

phenomena requires research methodologies that are able to analyze both at the aggregate level and at the micro level. Thus, this dissertation employs spatial hedonic regression pricing models that have been used traditionally in property appraisals, and agent-based modeling (ABM) that has recently gotten into attention among researchers as a tool to explore behaviors and emergences. By using a case study of real estate markets in Monmouth County, New Jersey, this dissertation investigates how these markets respond to coastal flooding caused by Hurricane Sandy that made landfall on October 30, 2012.

The resulting hedonic regression analyses find that flood risks are capitalized in real property prices. FEMA floodplain maps are found to inform the prices as suggested in lower prices among floodplain properties than similar properties located outside the floodplain. The findings also suggest that flooding affects real properties based on tenureship. Flooding has more impacts on owner-occupied properties than absentee-owner properties. In an analysis of the flood insurance market, the findings suggest that communities are not well-prepared for flooding, particularly coastal flooding caused by Hurricane Sandy. The ABM modeling outputs explore the non-marginal changes in property prices, which include the stakeholders' flood adaptation behaviors and the emergence of urban disinvestment and population decline caused by the capitalization of flood risks into real property prices.

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## List of Abbreviations

ABM	Agent-based model
ACS	American Community Survey
AIC	Akaike Info Criterion
APPAM	The Association for Public Policy Analysis
CAMA	Computer Assisted Mass-Appraisal
CHI	Community Hardship Index
CRS	Community Rating System
CZM	Coastal Zone Management
DD	Difference-in-differences
DRA	Disaster Relief Act of 1974
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
GSE	Government-sponsored enterprise
HFIAA	Homeowner Flood Insurance Affordability Act of 2014
HHI	Household Hardship Index
HMGP	Hazard Mitigation Grant Program
IPCC	Intergovernmental Panel on Climate Change
NFIP	National Flood Insurance Program
NGO	Non-governmental agency
NJDCA	The New Jersey Department of Community Affairs
NJDEP	The New Jersey Department of Environmental Protection
NJDOT	The New Jersey Department of Transportation
NJGIN	The New Jersey Geographic Information Network
NJMLS	New Jersey Multiple Listing Service
NOAA	The National Oceanic Atmospheric Administration
NOS	National Ocean Service
OPRSS	Open Public Records Search System
QGIS	Previously called Quantum GIS
SBA	Small Business Administration
SFHA	Special Flood Hazard Area