D I S S E R T A T I O N P R O P O S A L

Caroline Hopkins

"Essays on the Economics of Flood Risk"

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Climate change will cause heightened flood risk due to sea level rise and increased significant storms. While prior literature has estimated flood damages, it is difficult to measure how agents will respond to an increase in flood risk. Furthermore, it is important to understand how policymakers can minimize these risks by investing in flood hazard protections. My dissertation studies the problem of how to value the cost of flood risk and the role of policymakers to attenuate the cost of flood risk. In the first chapter, I measure the cost of increased flood risk on housing markets. As the most direct measure of flood risk will be in the value of a home, this is the best way to understand the relationship between flood risk and the housing market. In chapters 2 and 3, I study why policymakers invest in flood hazard reduction. A greater understanding of which factors influence policymakers to invest in flood hazard protection at the local level will be important for the federal government to account for when it redesigns the National Flood Insurance Program.

My first chapter (joint with Nicholas Z. Muller) provides evidence that well-informed homeowners of coastal real estate respond to flood risk. Our innovations in this paper are two-fold. First, we parse homeowners according to the quality of information they possess about their flood risk, and second, we disentangle flood risk from property damage. Prior literature has found evidence that homeowners respond to flooding shocks, however these papers focused only on local flood shocks. As such, it is difficult to separate the cost of localized flood damages from the effect of this new information about risk. Our paper circumvents this identification issue by testing whether non-local flooding events affect housing prices in coastal markets. Utilizing a difference-in-differences methodology, we test whether homeowners in high flood risk areas along the coast of New Jersey respond to non-local flooding events. We use several well publicized hurricanes and tropical storms that did not strike the Atlantic seaboard as non-local shocks. We find that home prices in areas of high flood risk do not decrease after a storm, but rather increase. The literature has shown current and prospective homeowners do not always know their flood risk, so we further test if informed homeowners respond differently. We use participation in Community Rating System (CRS) public awareness activities as an instrument for homeowner's information. The CRS is a component of the National Flood Insurance Program (NFIP) that incentivizes local jurisdictions to undertake flood hazard mitigation activities in exchange for flood insurance discounts for their constituents. We find that homeowners in high risk towns that are in the top ten percent of public awareness activities respond after a non-local shock, with a 5 to 10 percent decrease in price relative to comparable homes in towns that do not participate in CRS public awareness activities.

For my second chapter I study the local government's decision to participate in CRS. CRS was designed to motivate local jurisdictions to exceed federal regulations for flood risk mitigation. In this chapter I study the decisions of the local government to participate in CRS from a static perspective. I present a representative agent model of the local government's decision to participate in CRS and show how homeowner wealth and the size of the local government's taxable base (as measured through housing values and population) in addition to flood risk can influence the government's decision to participate in CRS. I then provide empirical results that are consistent with the indications of the model. Finally, I show that some factors associated with a percentage change in CRS participation that do not have the same

relationship with a change in high levels of CRS participation. This results leads me to ask what the dynamics at play are when governments decide to participate in CRS.

My third chapter further explores the decision of local governments to participate in CRS. As motivated by my second chapter, dynamics are important when considering what factors might drive the government's decision. I will model the government's decision to invest in CRS as a dynamic discrete choice model. In each period the government must decide whether or not to increase their participation in CRS. I will assume the objective of the local government is to maximize the utility of the residents of the municipality. This is consistent with my static model presented in chapter 2, but allows for the government to think dynamically about the future value of CRS investment in the current period. I will focus on coastal communities whose homeowners consist of both primary residents and non-residents, with their tax revenues coming primarily from home values. The utility of residents thus will depend on their ability to extract revenue from non-residents net of the costs of flood protection. From my model, I will be able to back out the local government's costs of implementing CRS. The costs of CRS at different levels of participation may provide interesting implications for policymakers. After estimating my dynamic discrete choice model, I will consider three counterfactuals. The first counterfactual will assume a large flood shock occurs (such as a hurricane) and will test whether CRS investment increases both overall and in what categories. The second counterfactual will consider a federal policy change to flood insurance rates. Finally, the third counterfactual will consider a change to the costs of implementing CRS.