Final Project Report

Kyle Olcott (kto1) and Patricia Hashimoto (pch3)

Tue., Apr. 30

1 Introduction

1.1 Problem Statement

Clearly define the problem statement that your chosen feature aims to address. Explain the significance of this problem in the context of climate risk management.

This project will improve the model's ability to estimate the price to rebuild a home after flooding by accounting for more complex aspects of discount rate and price changes based on scarcity after a flood.

To obtain a more accurate understanding of cost over time, the discount rate will be broken down to have separate discount rates for the net present value calculation, the housing market, and the cost of labor and materials. Including these values will capture the way that different aspects of cost change over time in different ways; for example, perhaps inflation is higher for labor or materials. These factors will affect estimates of the cost to rebuild a house entirely from scratch. The discount rates, which may have different distributions or be constant, will be decided based on the findings of the literature review.

Additionally, the model will be modified to capture how scarcity caused by a flood affects construction cost. Including storm surge rating as a way to estimate the severity of the flood's impact of scarcity of materials and labor will enable the model to estimate the cost of rebuilding a house from scratch given scarcity.

The components added to the model are illustrated in Figure 1.

Figure 1: housing_cost_pipeline

1.2 Selected Feature

Describe the feature you have selected to add to the existing decision-support tool. Discuss how this feature relates to the problem statement and its potential to improve climate risk assessment.

2 Literature Review

Provide a brief overview of the theoretical background related to your chosen feature. Cite at least two relevant journal articles to support your approach (see Quarto docs for help with citations). Explain how these articles contribute to the justification of your selected feature.

3 Methodology

3.1 Implementation

You should make your modifications in either the `HouseElevation` or `ParkingGarage` module. Detail the steps taken to implement the selected feature and integrate it into the decision-support tool. Include code snippets and explanations where necessary to clarify the implementation process.

3.2 Validation

As we have seen in labs, mistakes are inevitable and can lead to misleading results. To minimize the risk of errors making their way into final results, it is essential to validate the implemented feature. Describe the validation techniques used to ensure the accuracy and reliability of your implemented feature. Discuss any challenges faced during the validation process and how they were addressed.

4 Results

Present the results obtained from the enhanced decision-support tool. Use tables, figures, and visualizations to clearly communicate the outcomes. Provide sufficient detail to demonstrate how the implemented feature addresses the problem statement. Use the `#| output: false` and/or `#| echo: false` tags to hide code output and code cells in the final report except where showing the