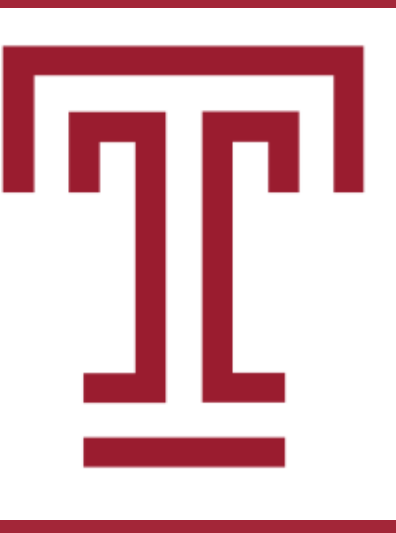


Homeowners' Responses to New Price of Flood Insurance



Who are the most sensitive to the premium change?

1 MOTIVATION

➤ Flood risks are increasing

- **\$70B flood damages** over the past decade (adjusted in 2024\$, NOAA, 2024)
- Up to **60% more flood-related losses** in residential markets in the next 30 years (First Street Foundation, 2021)
- **Only 2% had flood insurance** in the inland counties most affected by Hurricane Helene (The Washington Post, 2024)

✓ Homeowner's insurance does not cover flood

➤ National Flood Insurance Program

- **Primary insurer** of flood insurance since 1968
- Covers **95%** of the residential flood insurance policies
- **Problems of the traditional pricing method**
 - Underpricing risks and insufficient revenue
 - Inequity that caused cross-subsidization of higher-risk properties at the expense of lower-risk properties

➤ New Pricing Approach (Risk Rating 2.0)

- Evaluates comprehensive flood risk at the property level
- New pricing – **risk-based, more accurate pricing**
- From Oct 1, 2021: new policies & renewals with premium decreases
- From April 1, 2022: all remaining renewals



2 METHOD

❖ A balanced panel dataset with 17,022 ZIP codes fiscal years 2019-2023

➤ Event Study-Style Diff-in-Diff Analysis

- Treated group 1: policyholders w prem increase
- Treated group 2: policyholders w prem decrease
- Control group: policyholders w small change
- Reference year: fiscal year 2021

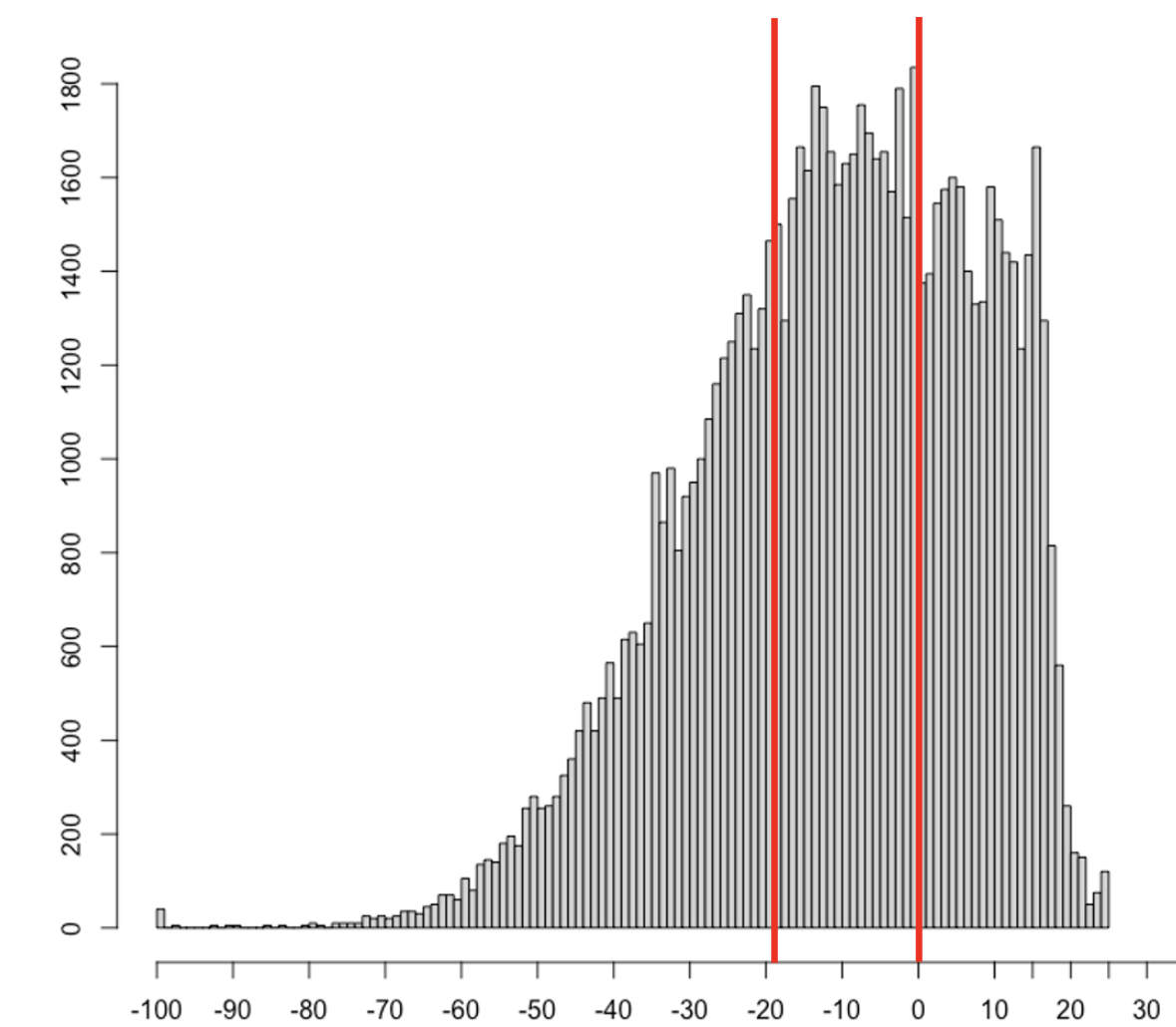
➤ Diff-in-Diff Analysis with Continuous Treatment

- Continuous treatment: % change in premium

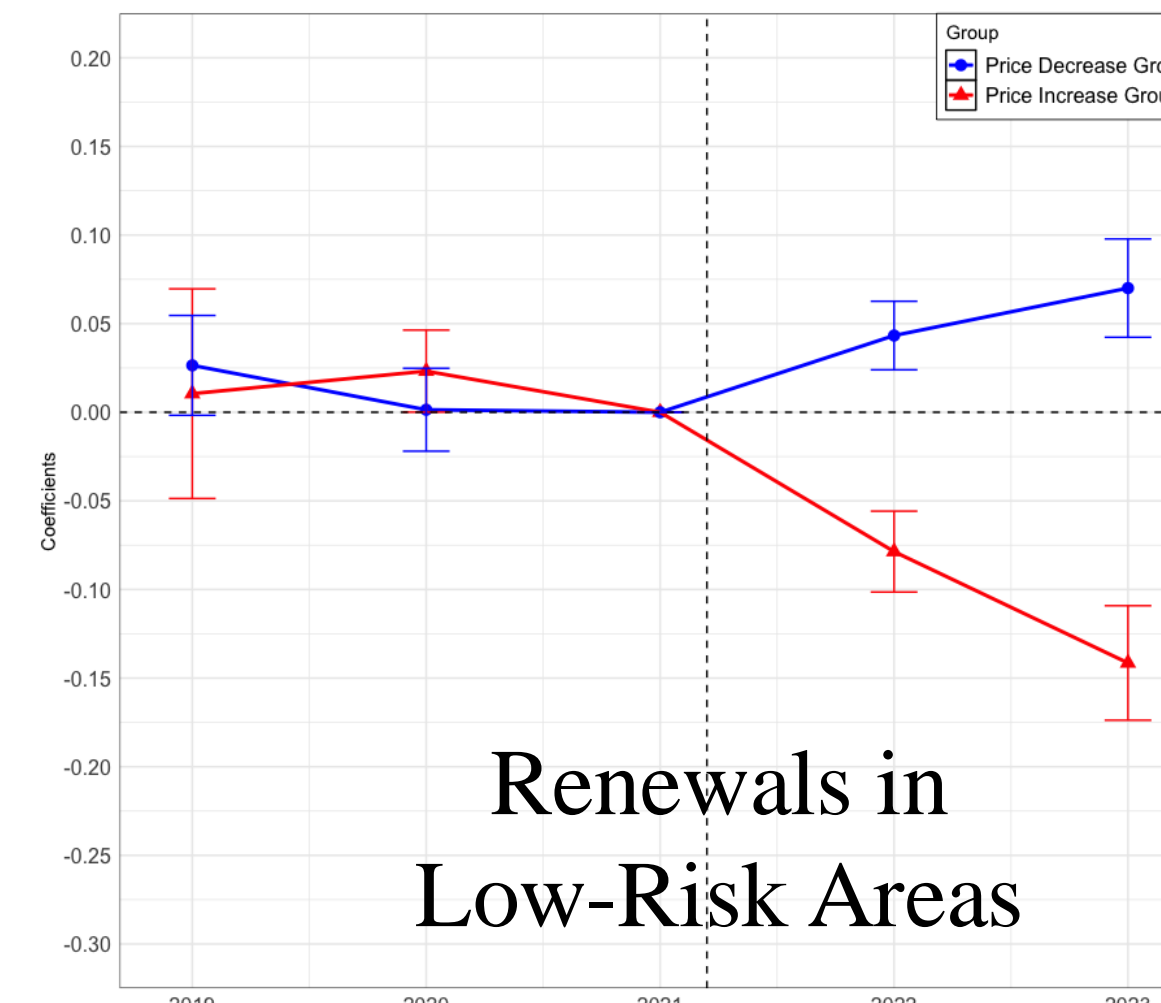
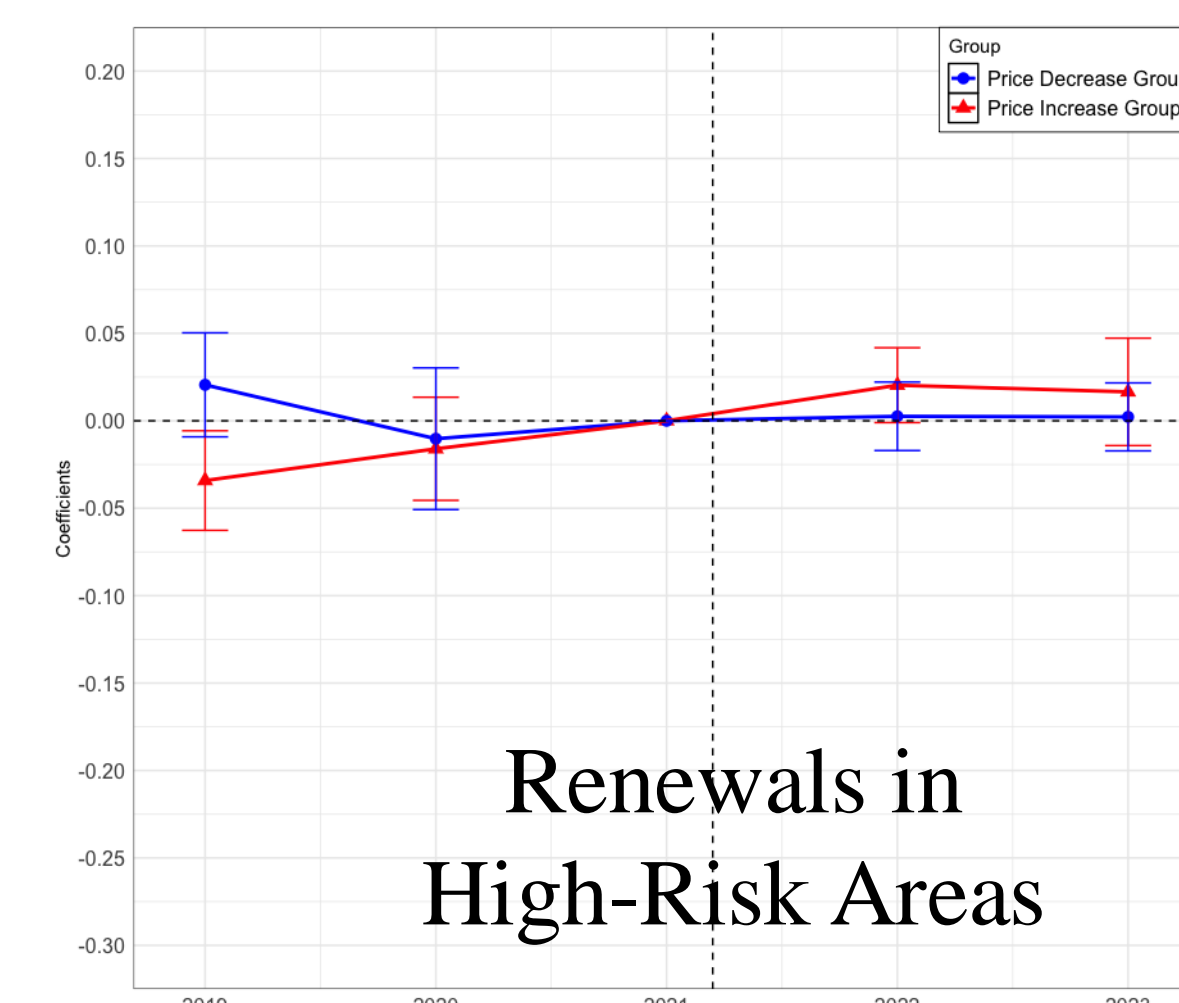
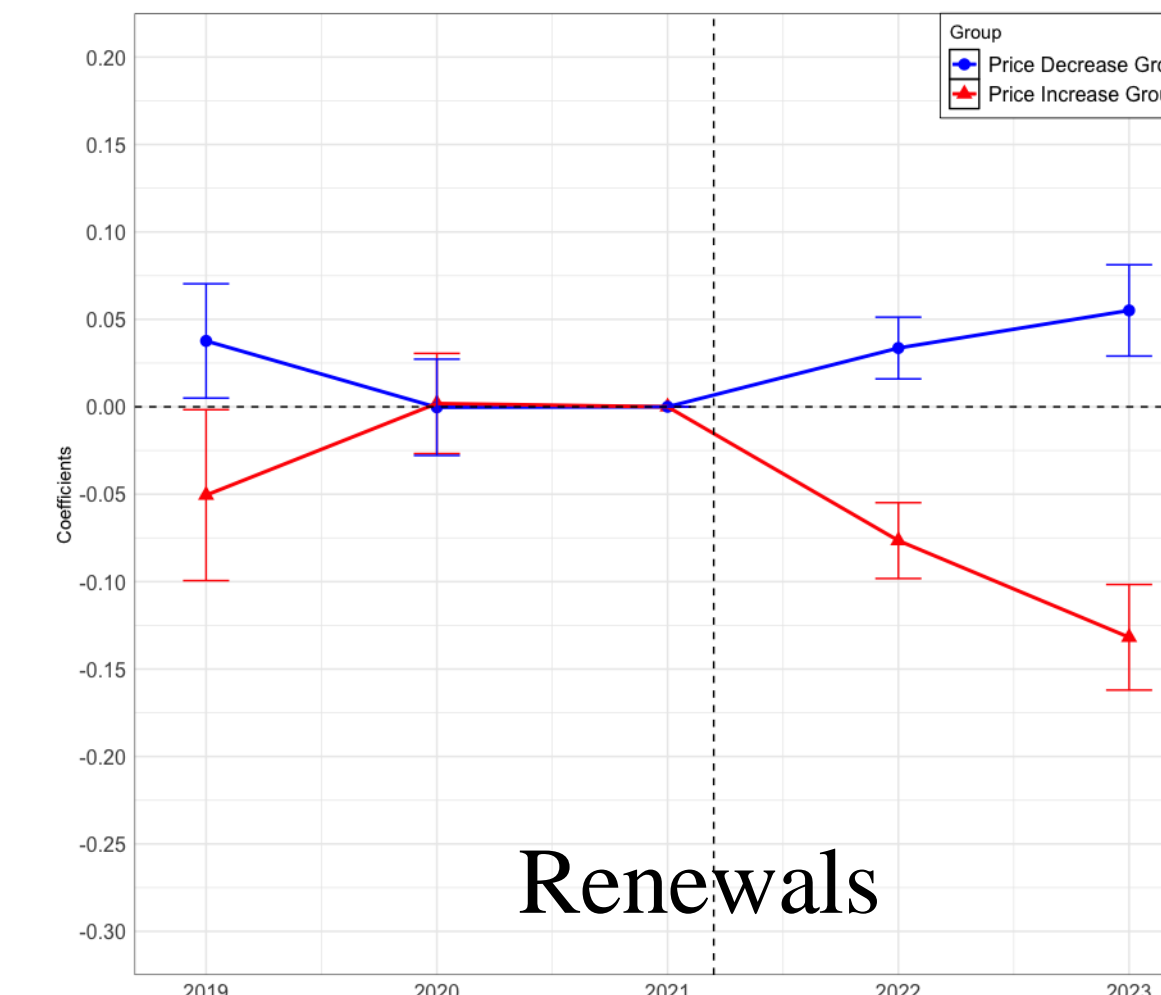
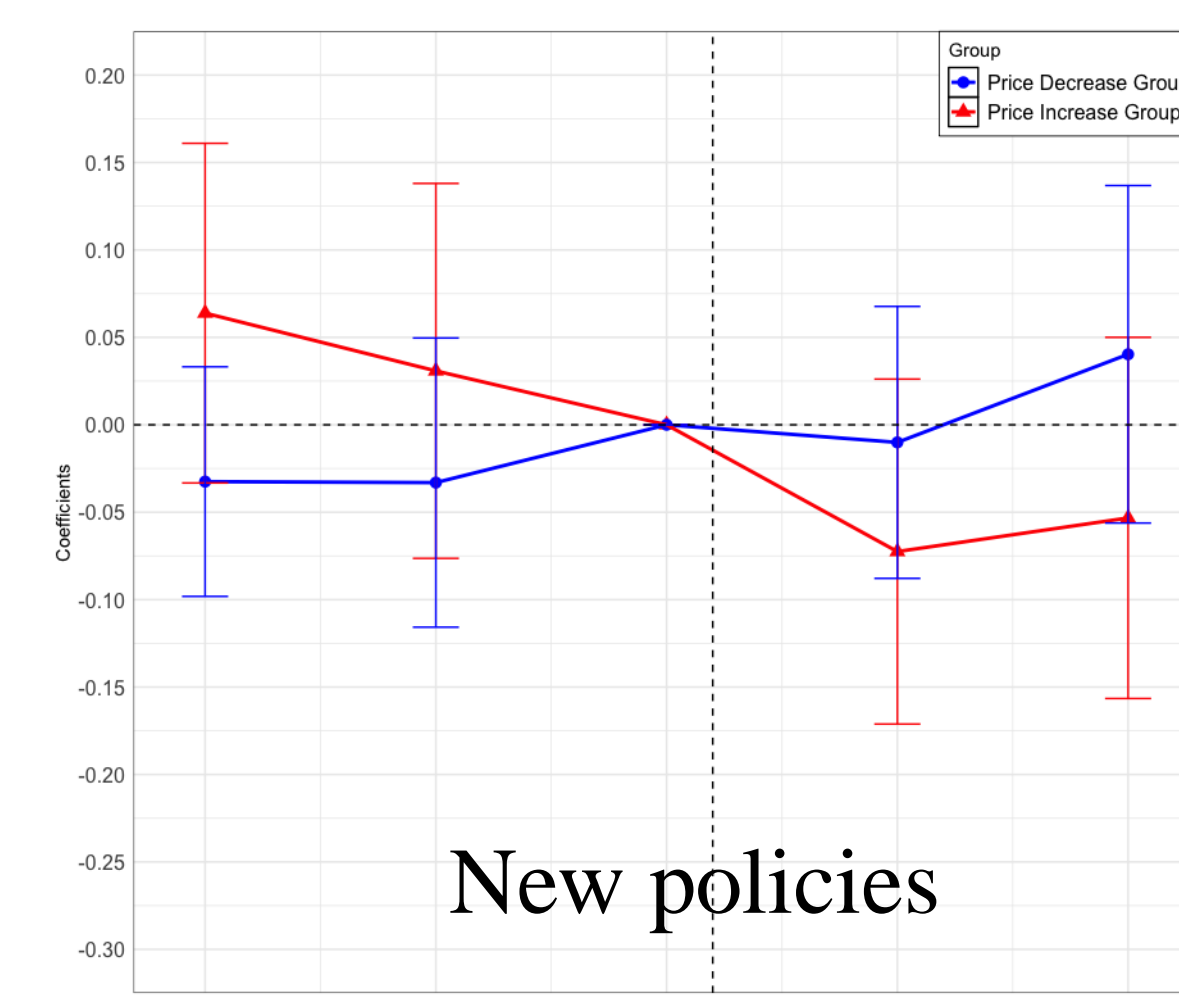
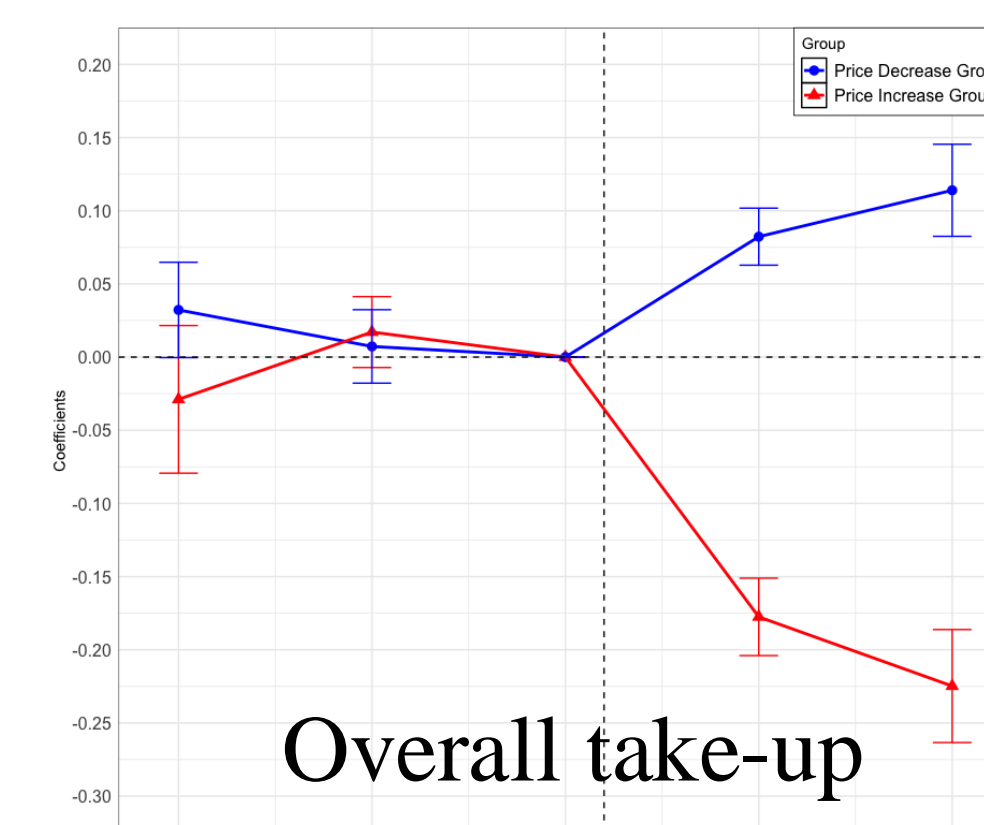
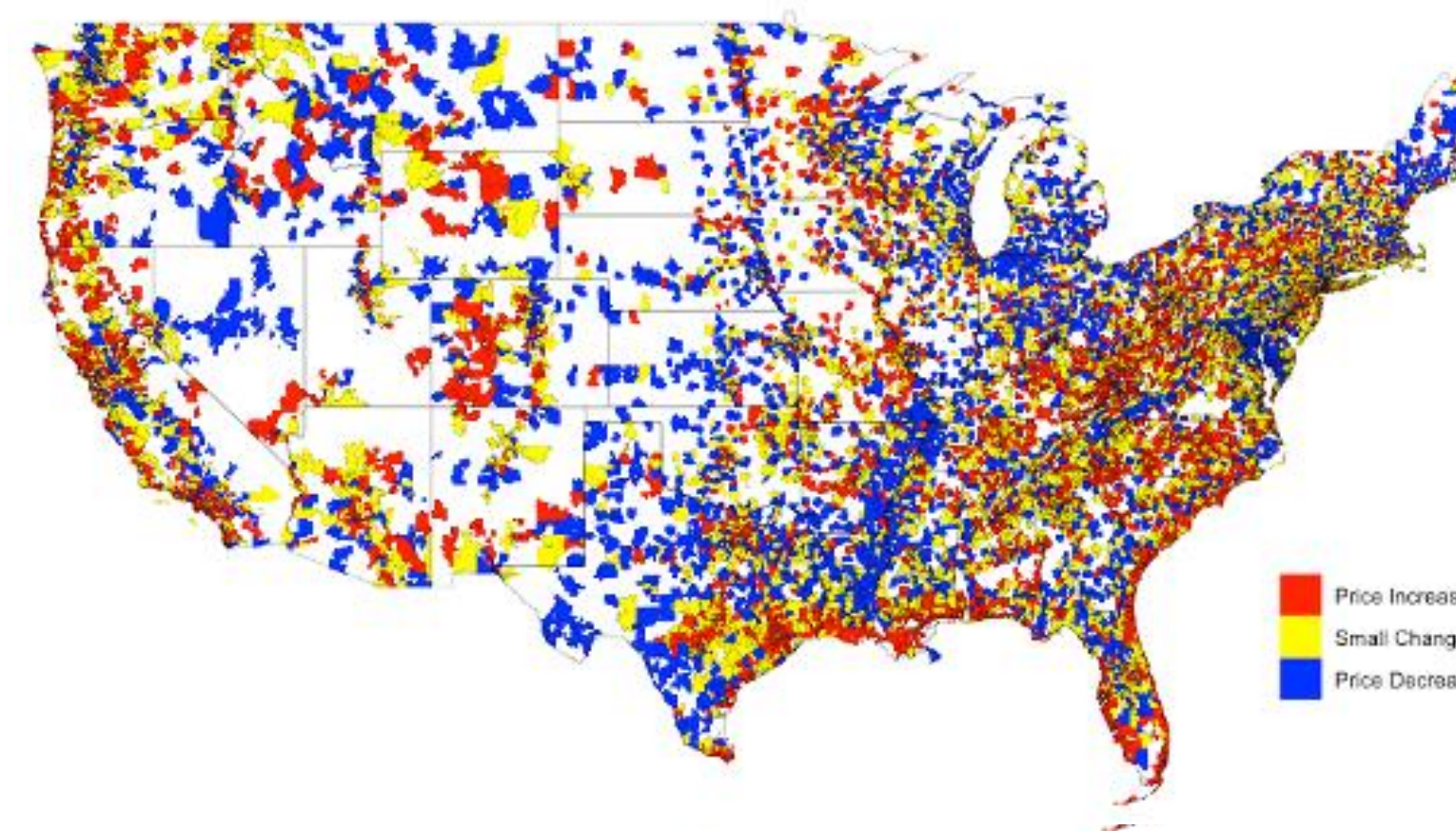
➤ Price Elasticity of Demand for Insurance

3 RESULTS

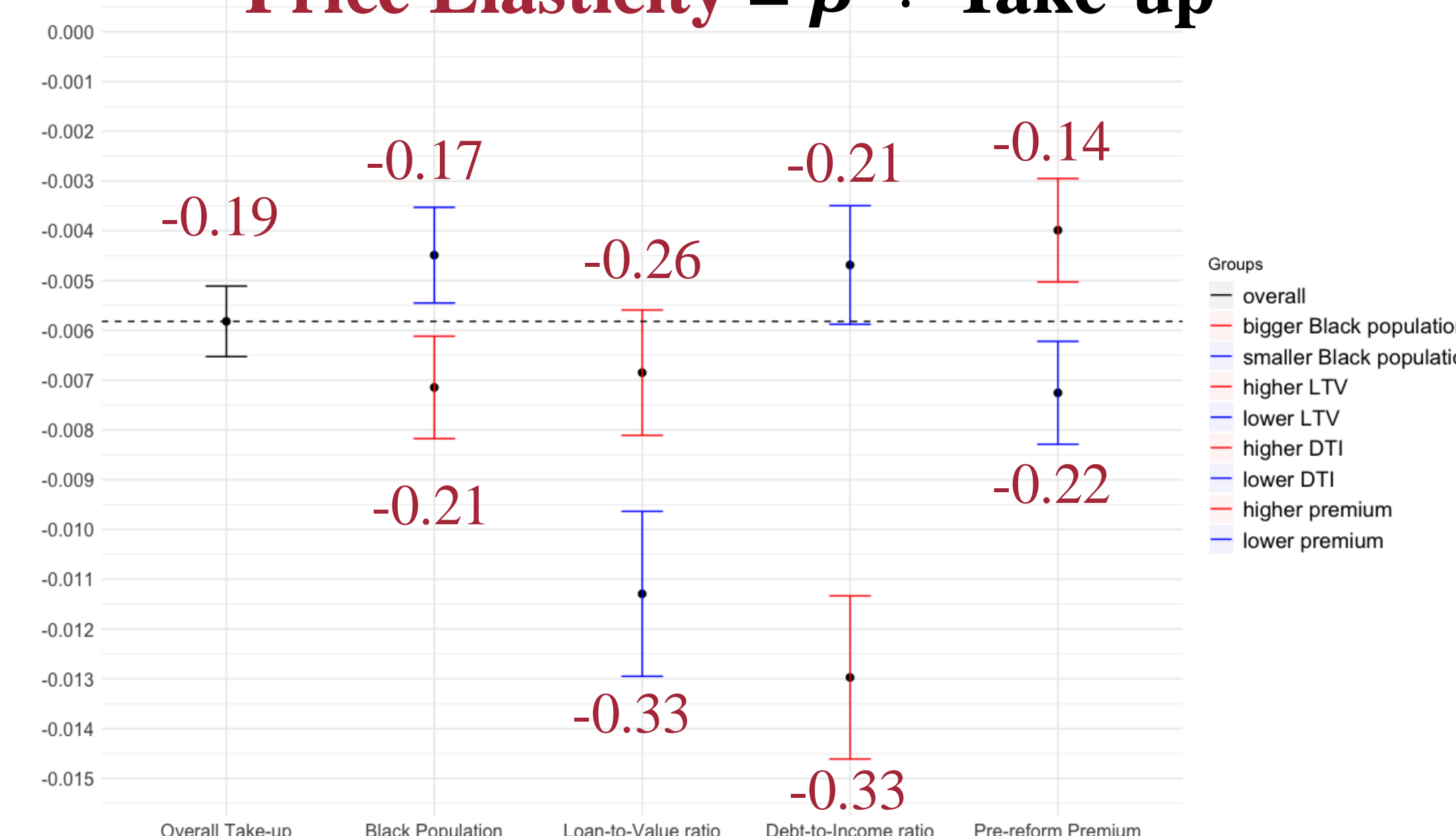
% Premium Change



Geographic distribution



Price Elasticity = $\beta \div \text{Take-up}$



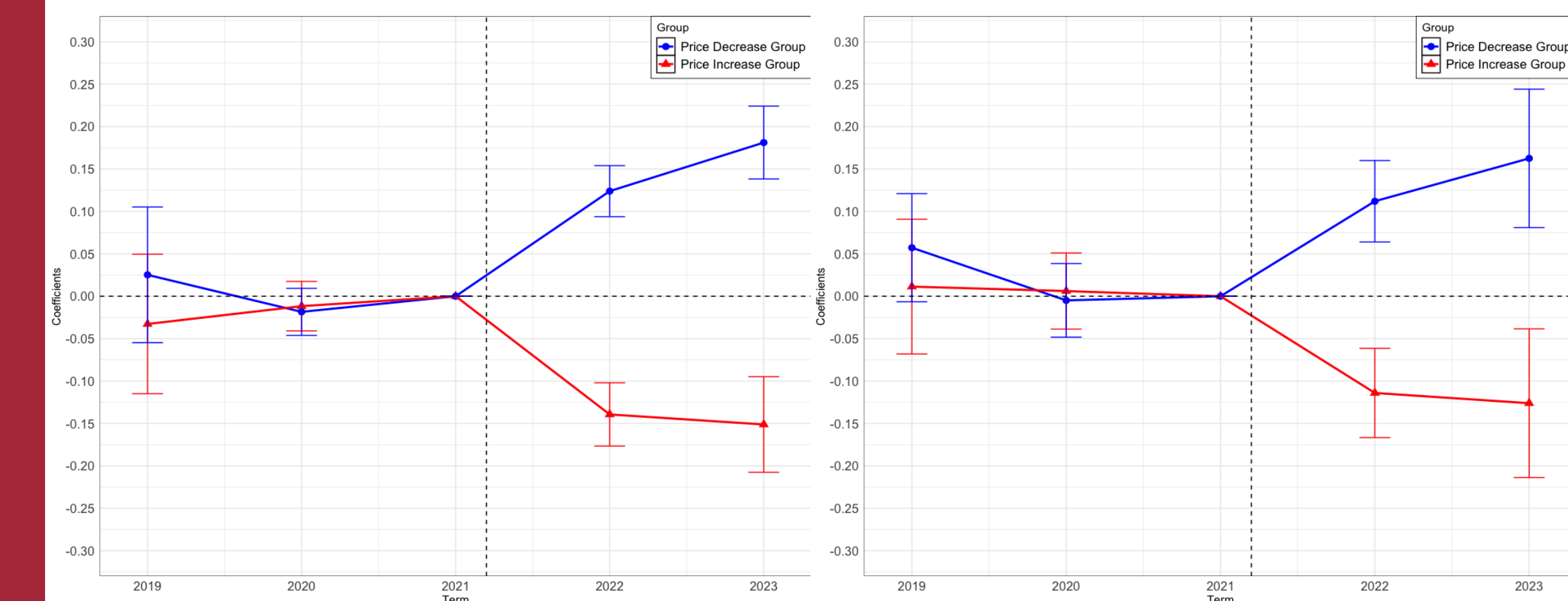
4 CONCLUSIONS

- This study helps understand the effect of risk-based insurance pricing on insurance demand.
- On average, a **10% increase in premium reduces flood insurance demand by 2%**.
- Renewing policyholders in **low-risk areas are more responsive** to their premium change than those in high-risk areas.
 - Still rely on flood risk info on the flood maps, which is not a pricing factor under the new pricing approach
- HO with tighter budget constraints (higher DTI) are the most price-sensitive.
 - Limited financial flexibility → can't bear higher prem
- HO with easier access to credit (lower LTV) are the most price-sensitive.
 - Tend to cancel their policies and retain risk

5 ROBUSTNESS CHECKS

➤ Different treated and control groups

Control group: $\pm 5\%$ Control group: $\pm 0.5\%$



➤ Without FL (largest customer)

➤ Without highest risk states (FL, TX, LA, CA, NJ)

For any questions or comments

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