Social Learning about Climate Risks

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Climate risk perception formation

- Forming up-to-date climate risk perception is critical
  - Adaptation and mitigation
  - Collective action
- How do people update climate risk perception?
  - Personal disaster experience (Gallagher, 2014; Kousky, 2010)
  - Tail events, slow updating
- Can we learn from peers' disaster experiences?
  - Social learning, more learning opportunities

Previous evidence of social learning

- Social finance (Hirshleifer, 2020; Kuchler & Stroebel, 2021)
  - Bankruptcy decisions (Kleiner et al., 2021)
  - Debt use (Kalda, 2020)
- Product and technology adoption (Mobius & Rosenblat, 2014)
  - Solar panel (Gillingham & Bollinger, 2021)
  - Retirement plan (Duflo & Saez, 2002)
  - Health insurance (Sorensen, 2006)
  - Menstrual cup (Oster & Thornton, 2012)

This paper...

- Social learning from regional floods caused by Hurricanes Harvey and Irma
- Outcome: county-month number of flood insurance policies in force
  - The National Flood Insurance Program (NFIP)
- Network: County-to-county Facebook Social Connectedness Index (SCI)
  - The probability of friendships among users in two counties
  - Conversion to a social network adjacency matrix
- Network difference-in-differences (NDID)
  - Extension of Spatial Difference-in-differences (Delgado & Florax, 2015)
  - Direct treatment effect on affected
  - Indirect effect, i.e., social learning, on both affected and unaffected

The Facebook friendship network

- Importance of social network
  - International trade relationships (Bailey et al., 2021)
  - Housing price information (Bailey et al., 2018)
  - Housing and mortgage choice (Bailey et al., 2019)
  - Earned Income Tax Credit claiming (Wilson, 2020)
- During a crisis such as the COVID-19 pandemic
  - Regions (Charoenwong et al., 2020) and individuals (Bailey et al., 2020) with strong Facebook friendship exposure to COVID-19 outbreaks were more aware of the risk and complied more closely with mobility restrictions.

Network difference-in-differences (NDID)

$$y_{it} = \alpha d_{it} + \beta \sum_{j \neq i} w_{ij} d_{jt} + \kappa_i + \lambda_t + v_{it}$$

- y_{it} is the outcome for county i at month t,
- d_{it} is own post-treatment dummy, d_{jt} is peers' post-treatment dummy,
- w_{ij} the normalized SCI between counties i and j,
  - $\sum_{j \neq i} w_{ij} = 1$, with $w_{ij} = 0$ for i = j.
- In matrix form, W is the network adjacency matrix.
- κ_i is a county fixed effect.
- λ_t is a month-year fixed effect.
- Standard errors clustered at the county level.

Friendship connection to affected counties

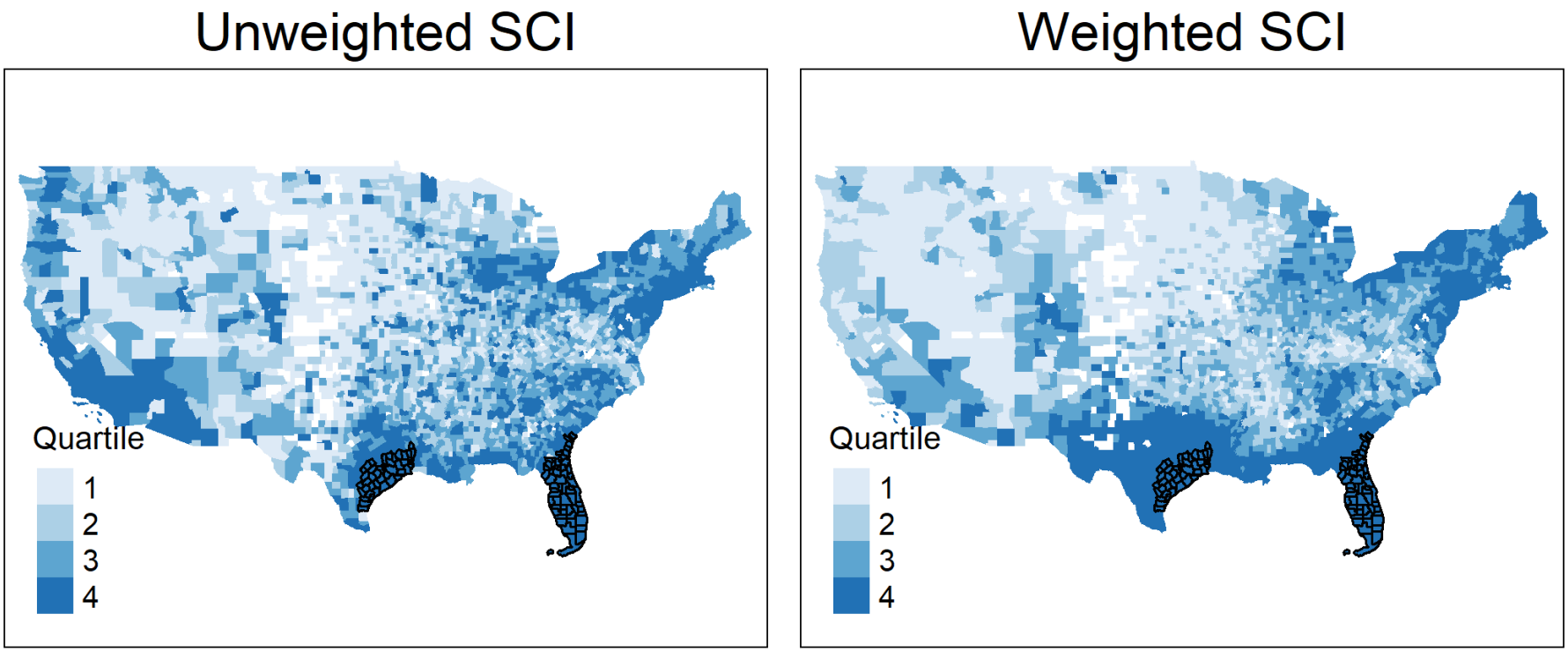
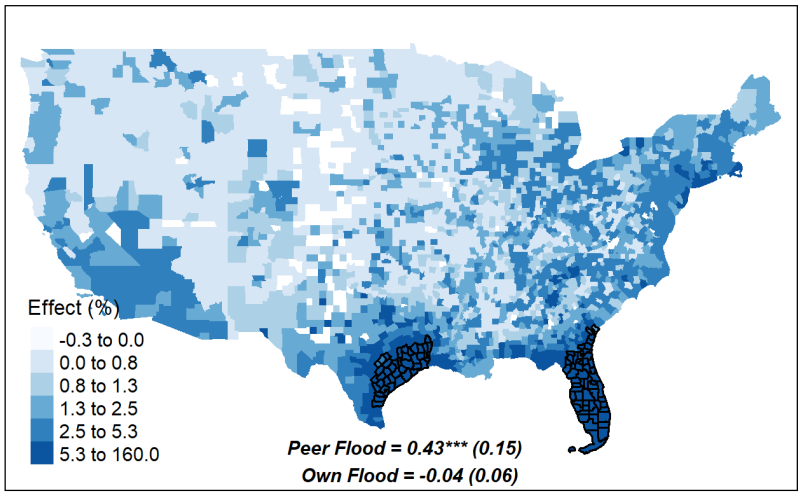


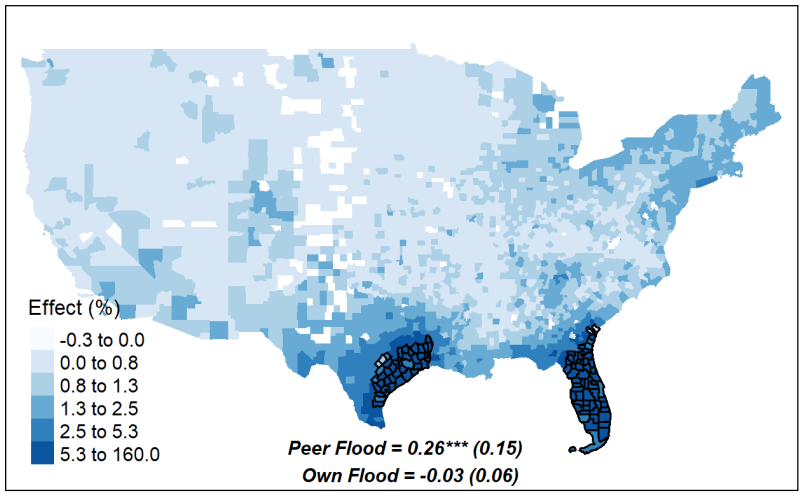
Figure: Unweighted and Weighted Average SCI to Affected Counties

Spatial Distribution of Marginal Effects

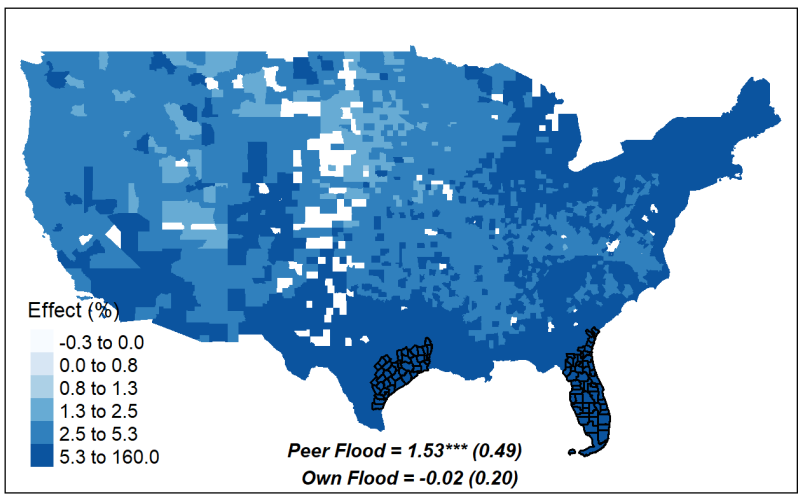
Policies



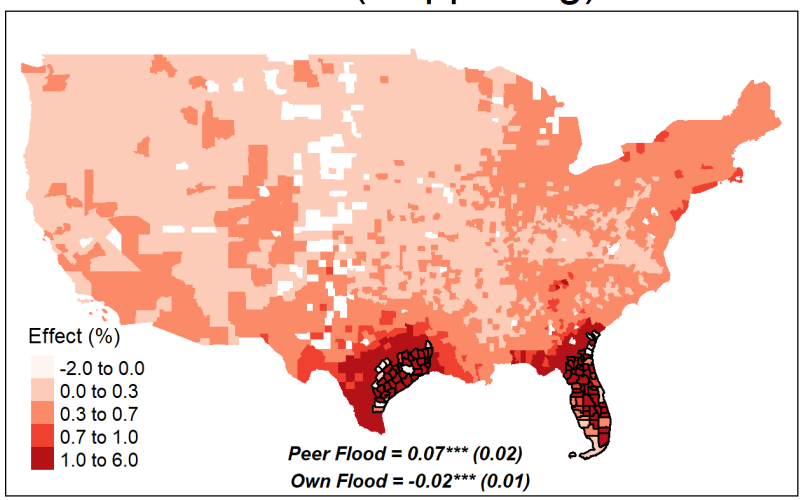
Renewals



New Policies



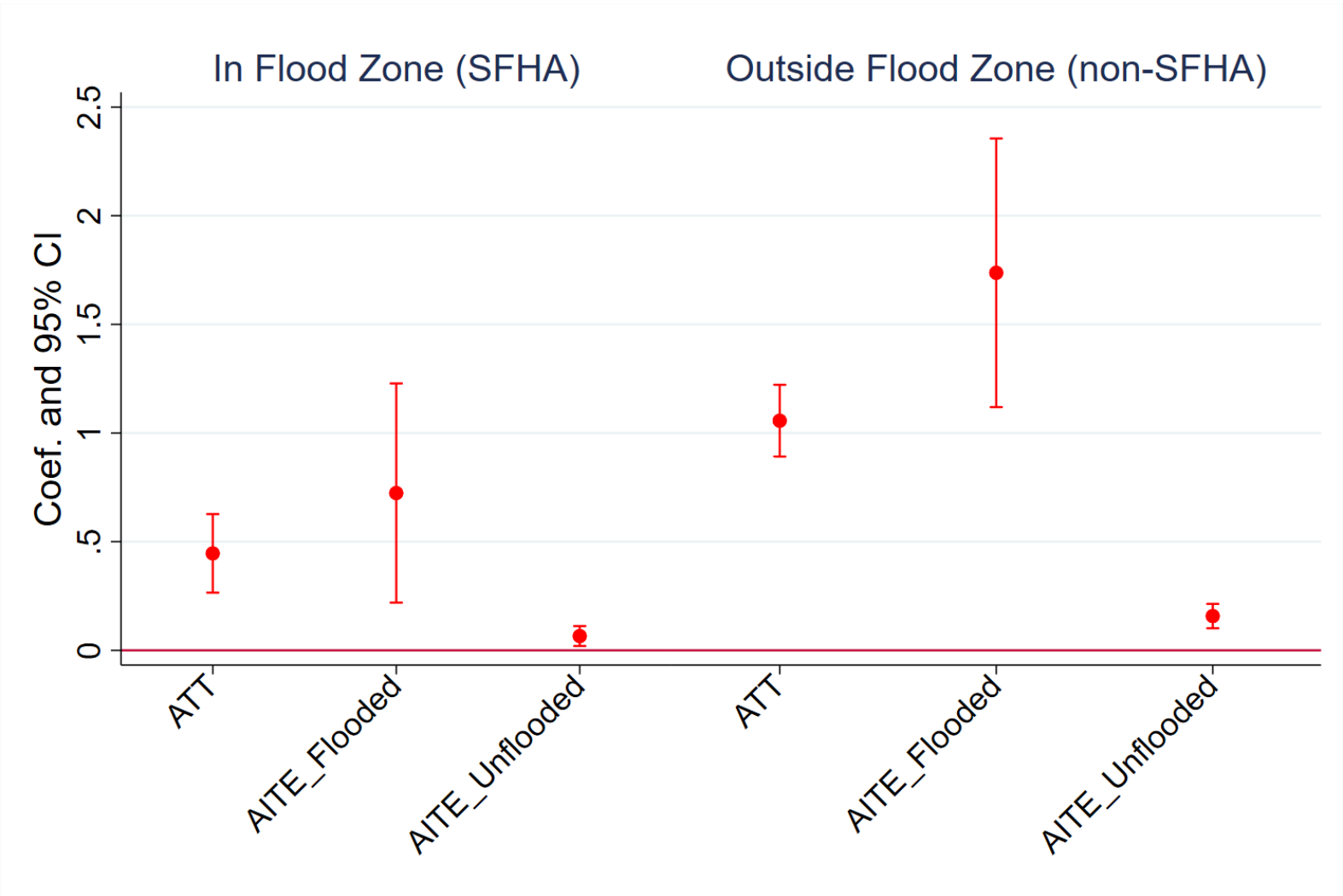
Beliefs (Happening)



Conditional Weights to Treated Area: $E[WD_t] = 0.056$, $E[WD_t|D_t = 1] = 0.461$, $E[WD_t|D_t = 0] = 0.042$

Evidence of Salience Effect

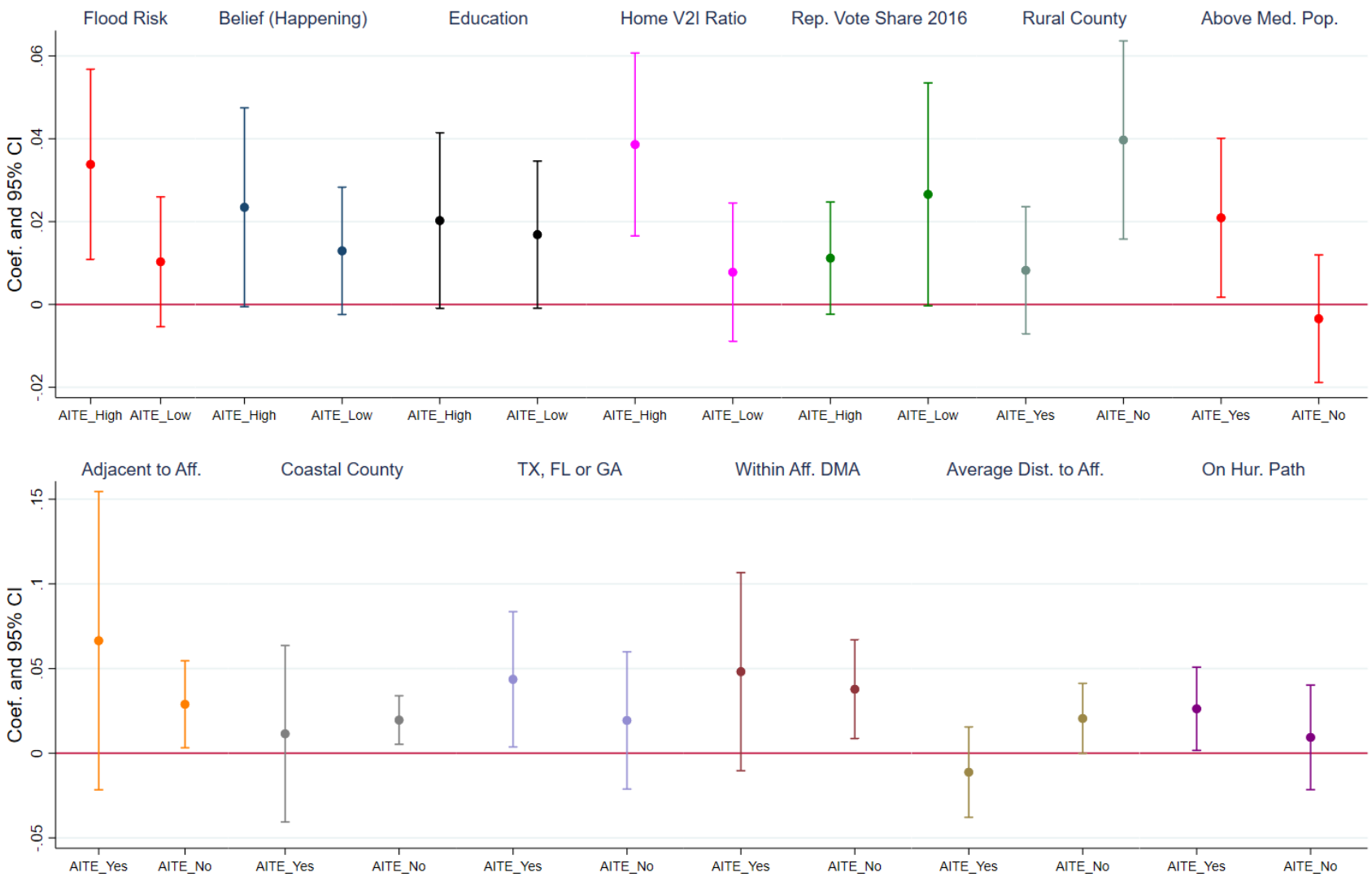
Figure: New Policies, SFHA vs. Non-SFHA



Addressing Some Concerns

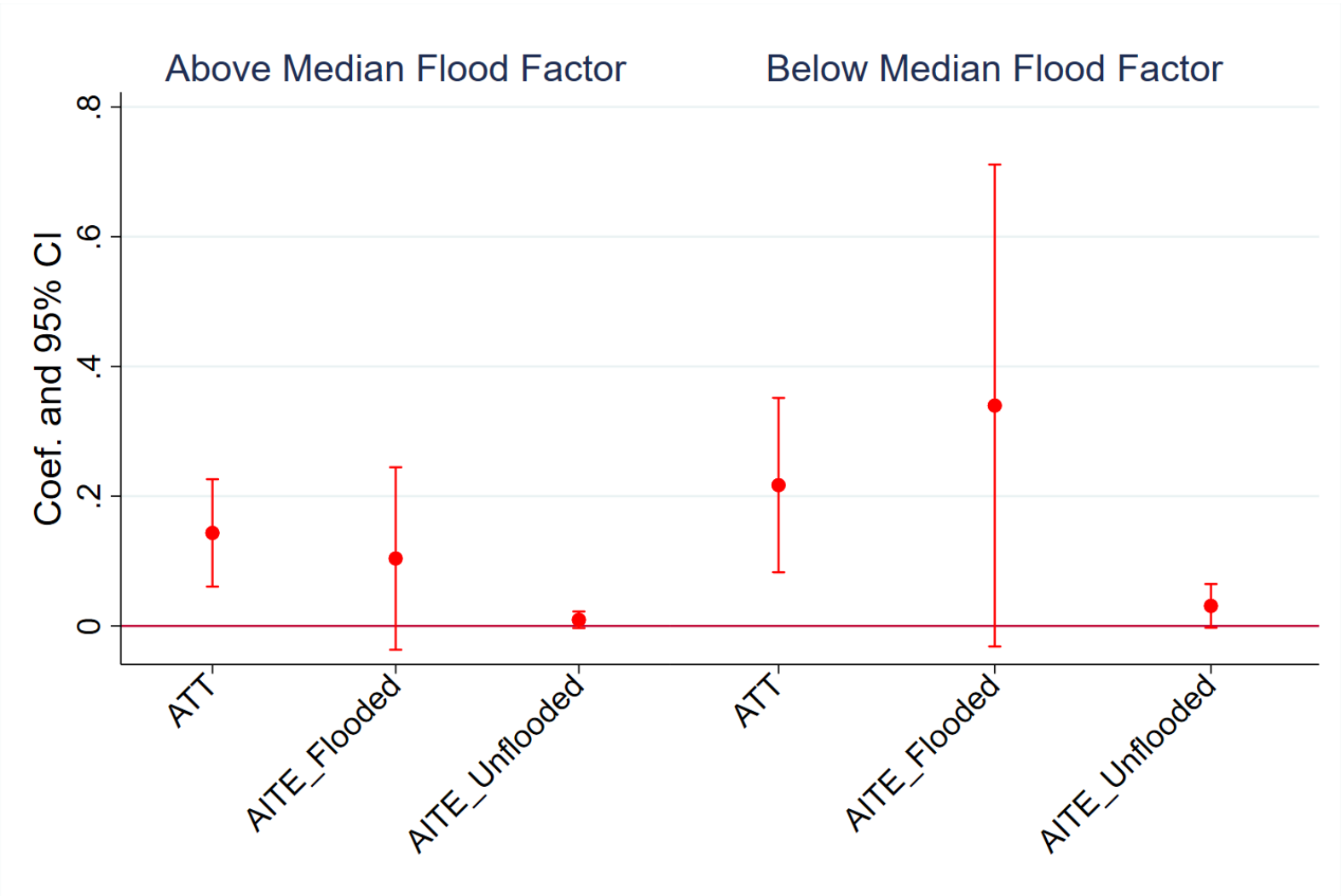
- Identification Concerns
  - Homopily
  - Geographic proximity
- Efficiency/social welfare concerns
  - Adverse selection
  - Over-insurance

No Heterogeneous Learning Effects across Deompgraphics or Geographics



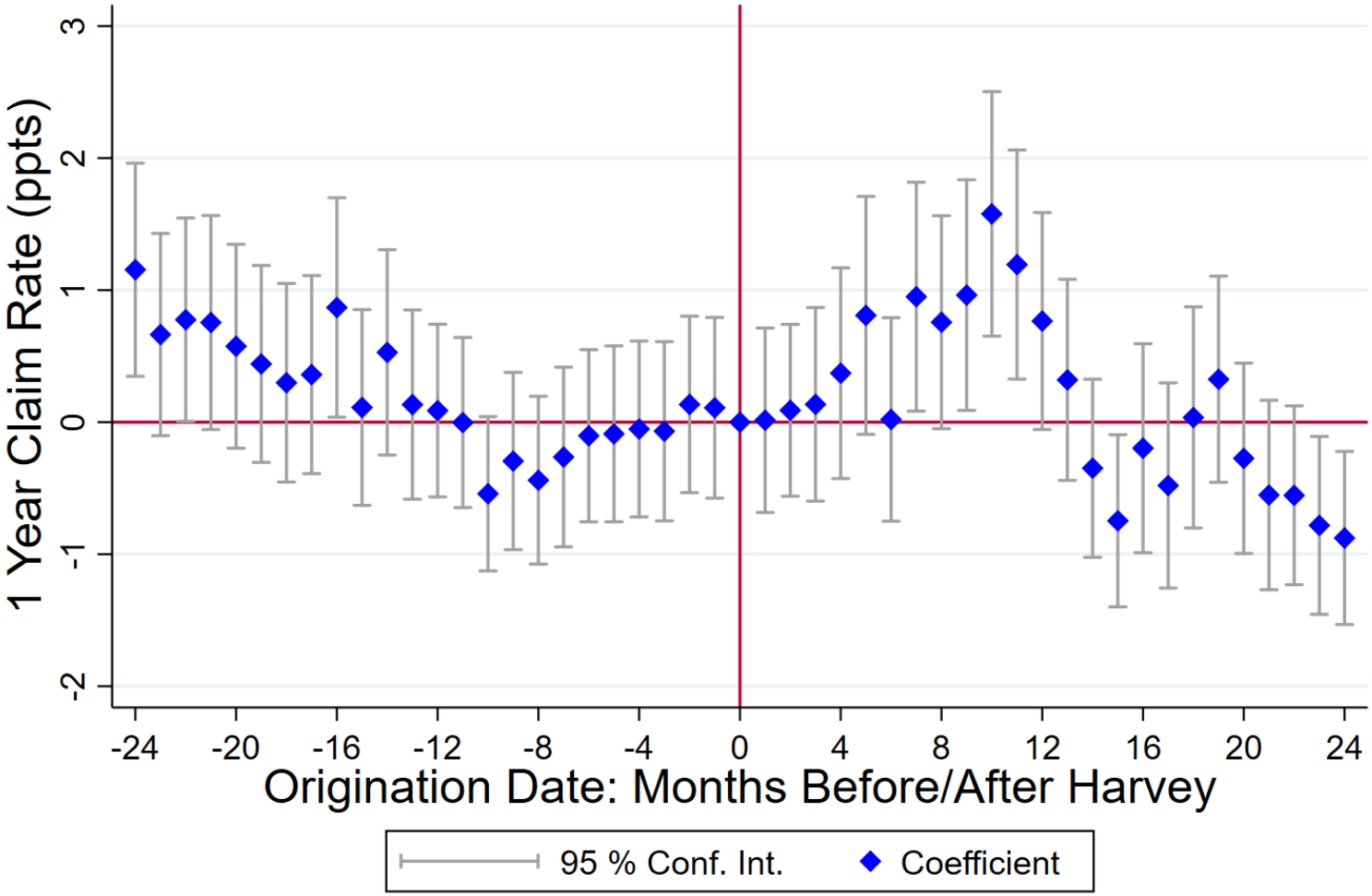
No Evidence of Adverse Selection

Figure: Policies in Force in Non-SFHA Areas by Flood Factor



No Evidence of Over-insurance

Figure: Claim Rates of New Polices by Origination Date



Discussion

- Implications:
  - Improve disaster insurance efficiency
  - Injection point of social intervention
  - Impact evaluation of natural disasters
- Directions for future work
  - Panel of floods
  - Multiple disaster types
  - Direct measure of information exchange