

# Food Insecurity Recovery in Houston: A Nonprofit-Based Longitudinal Analysis

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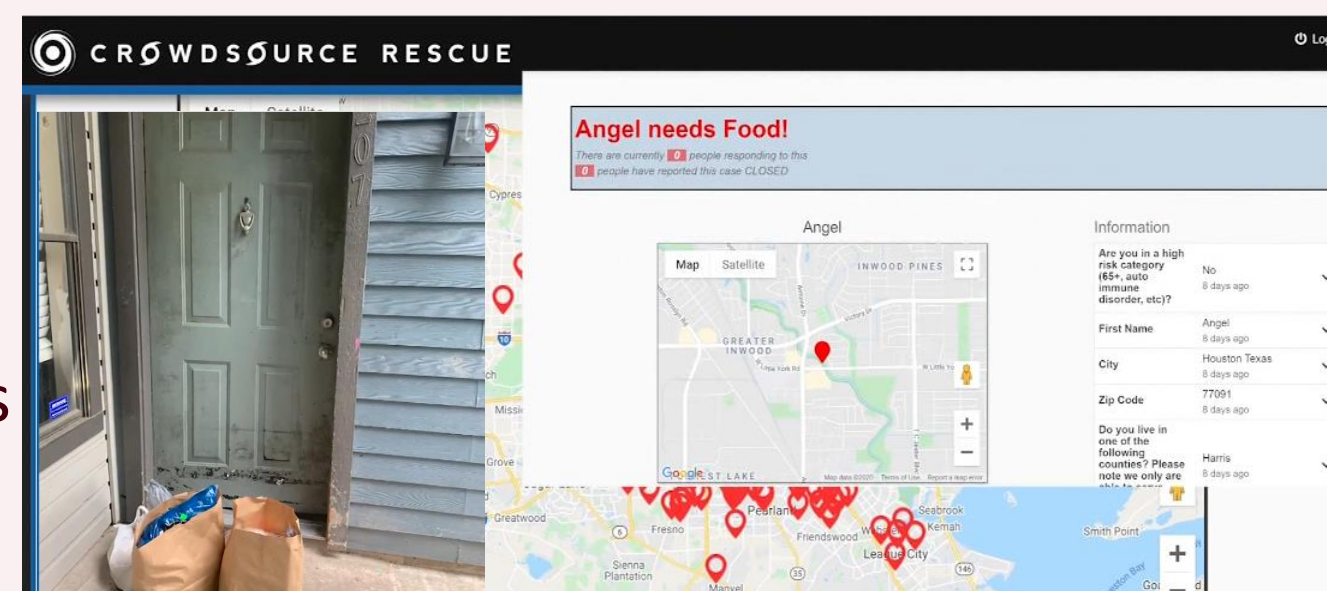
## BACKGROUND

COVID-19 created unprecedented food insecurity — 41% of U.S. participants were newly at risk after outbreak (Lauren et al., 2021).

Food access is embedded in social, economic, and institutional structures. We use social vulnerability to examine food insecurity recovery via CrowdSource Rescue (CSR) in Houston, Texas.

### About CrowdSource Rescue

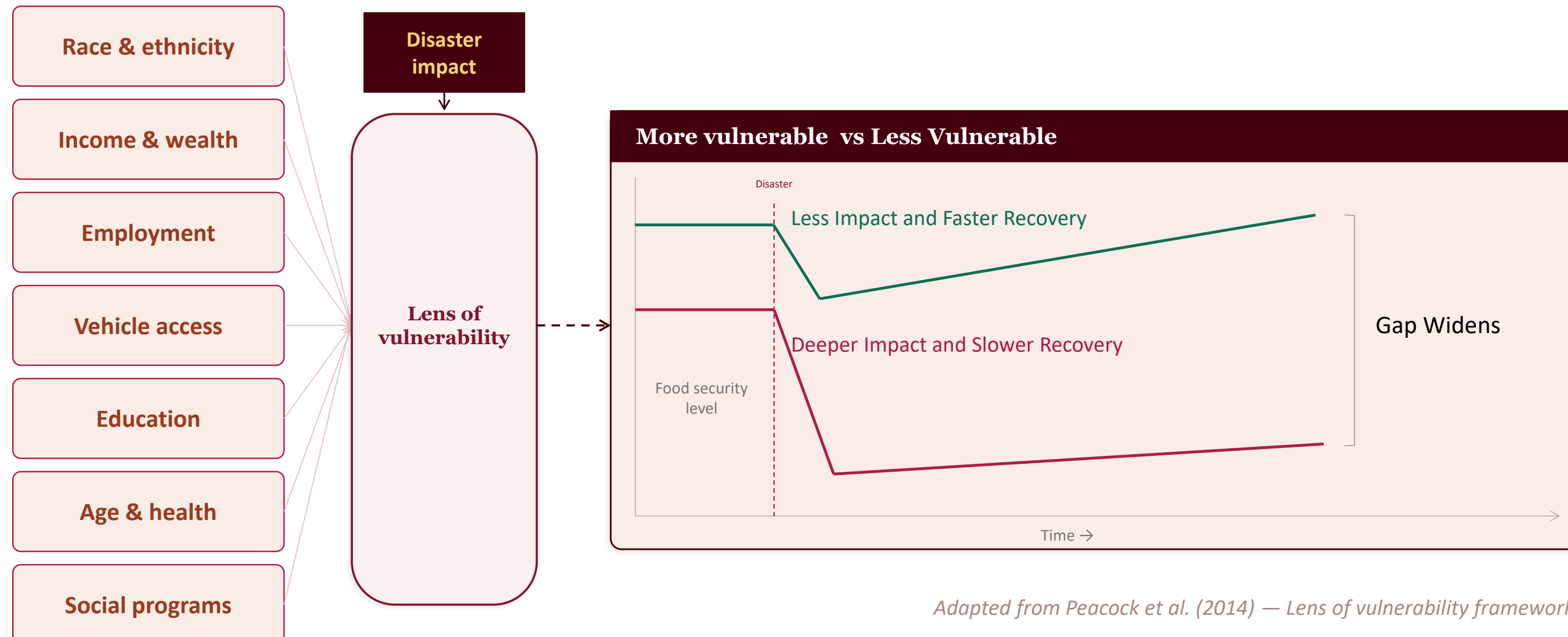
- ✓ A nonprofit food delivery service
- ✓ Volunteer-based delivery + Houston Food Bank
- ✓ Zero-contact; targeted seniors & high-risk groups
- ✓ "We are not the food police. All are welcome to apply."



Source: KHOU-11 (2020)

## THEORETICAL FRAMEWORK

Pre-existing disparities → Lens of Vulnerability → Divergent Recovery Paths



Adapted from Peacock et al. (2014) — Lens of vulnerability framework

Pre-existing disparities (race, income, age, employment) shape how communities absorb disaster impacts and the speed of recovery. Peacock et al. (2014) showed vulnerable groups suffer greater damage and recover more slowly.

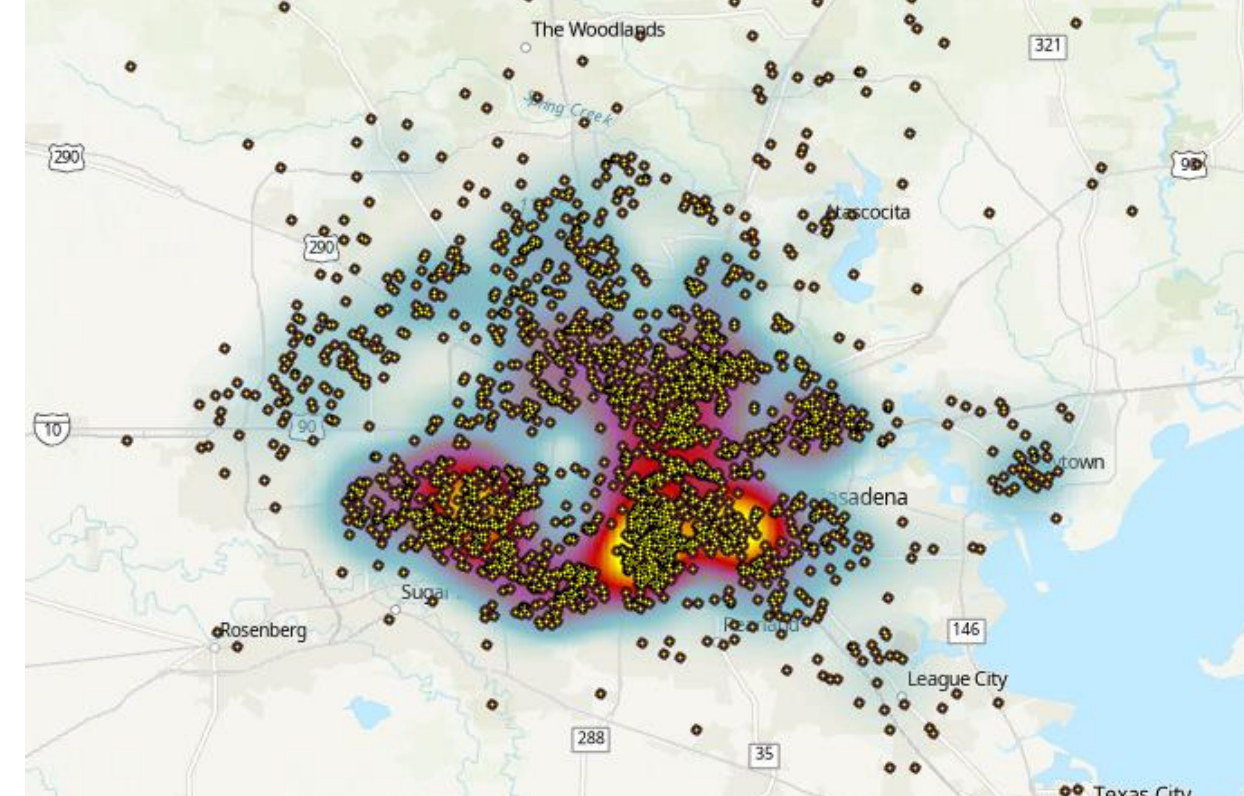
Béné (2020) emphasizes 'resilience per se' — the actual ability to bounce back that is hard but worth measuring.

## RESEARCH QUESTIONS

- RQ1:** Does CSR target socially vulnerable unmet needs? What attributes characterize high-use communities?
- RQ2:** What are different food-insecurity recovery trajectories and their drivers?
- RQ3:** Do 'new vulnerable' populations (non-social-program users) rely on CSR? What are their characteristics?

## DATA

**Study Area:** Houston Metropolitan Area (Harris, Montgomery, Fort Bend, Galveston, Liberty & San Jacinto Counties)  
**Dataset:** 37,555 CSR tickets  
**Period:** March 2020 – December 2023 | Unit of Analysis - Block Group Level (N = 4,148)  
**Social Data:** 2022 HRRC Social Vulnerability Index (SVI)  
**Census Data:** Average Median Income (AMI), Daily-Wage Workers (Construction, Maintenance, and Service)

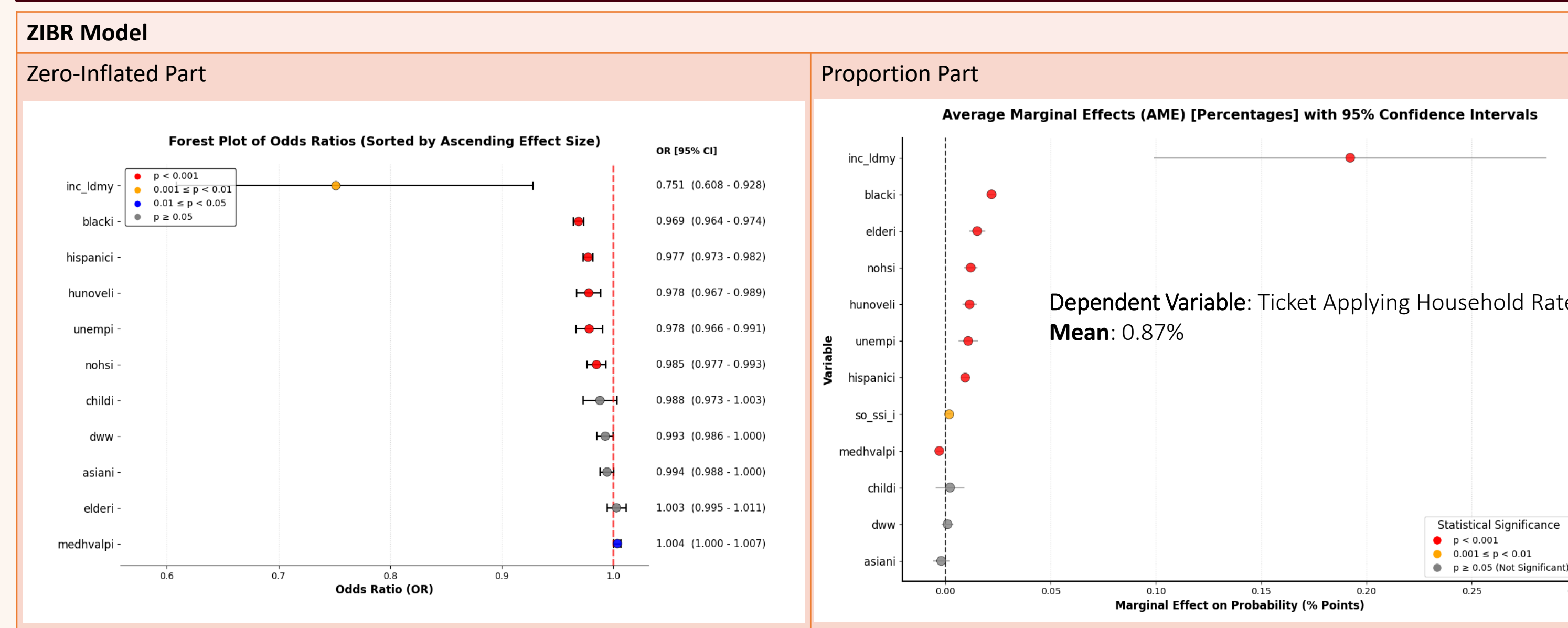


## METHODS



## RESULTS

### RQ1: Social Vulnerability Drives Service Use

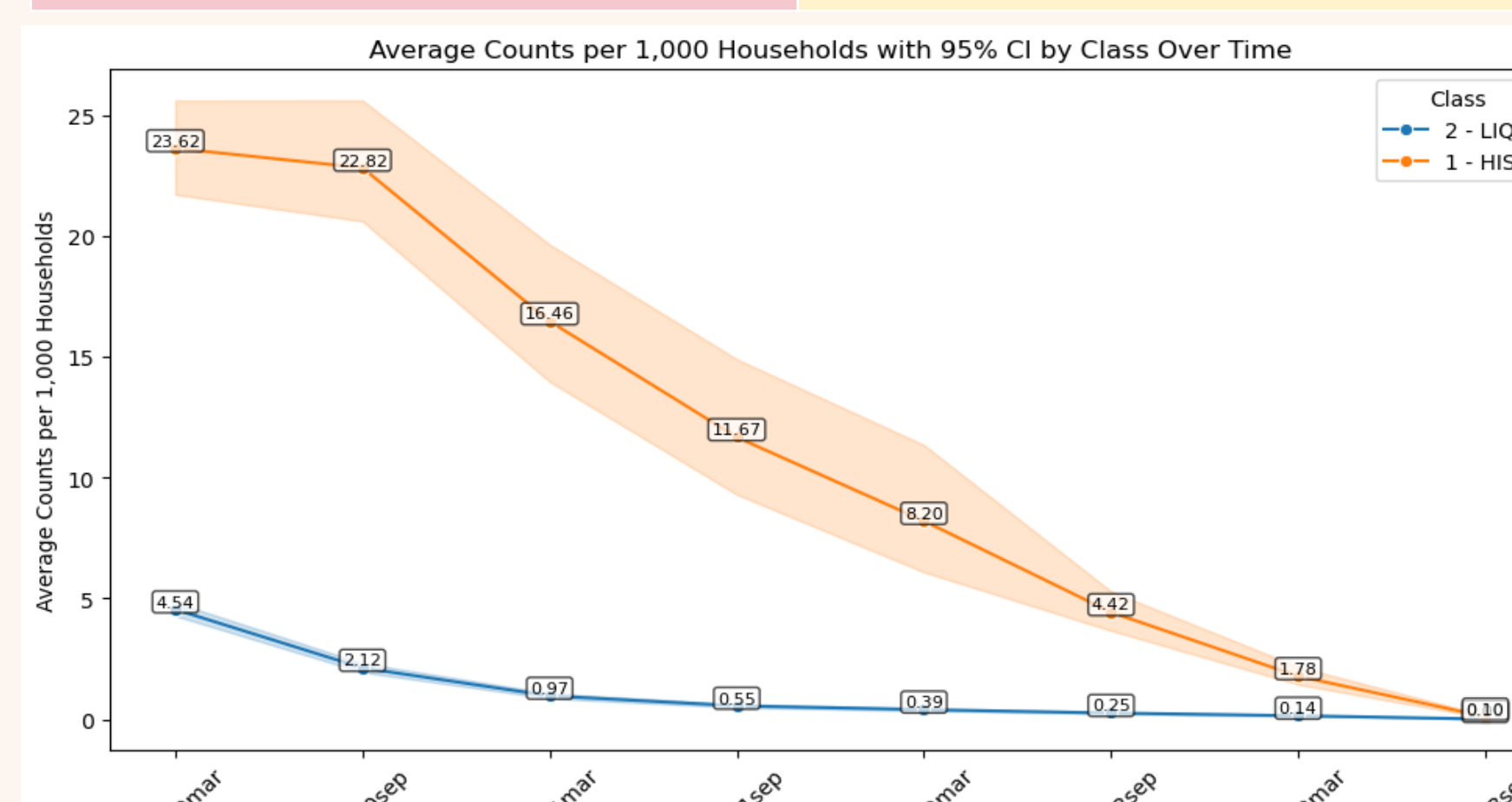
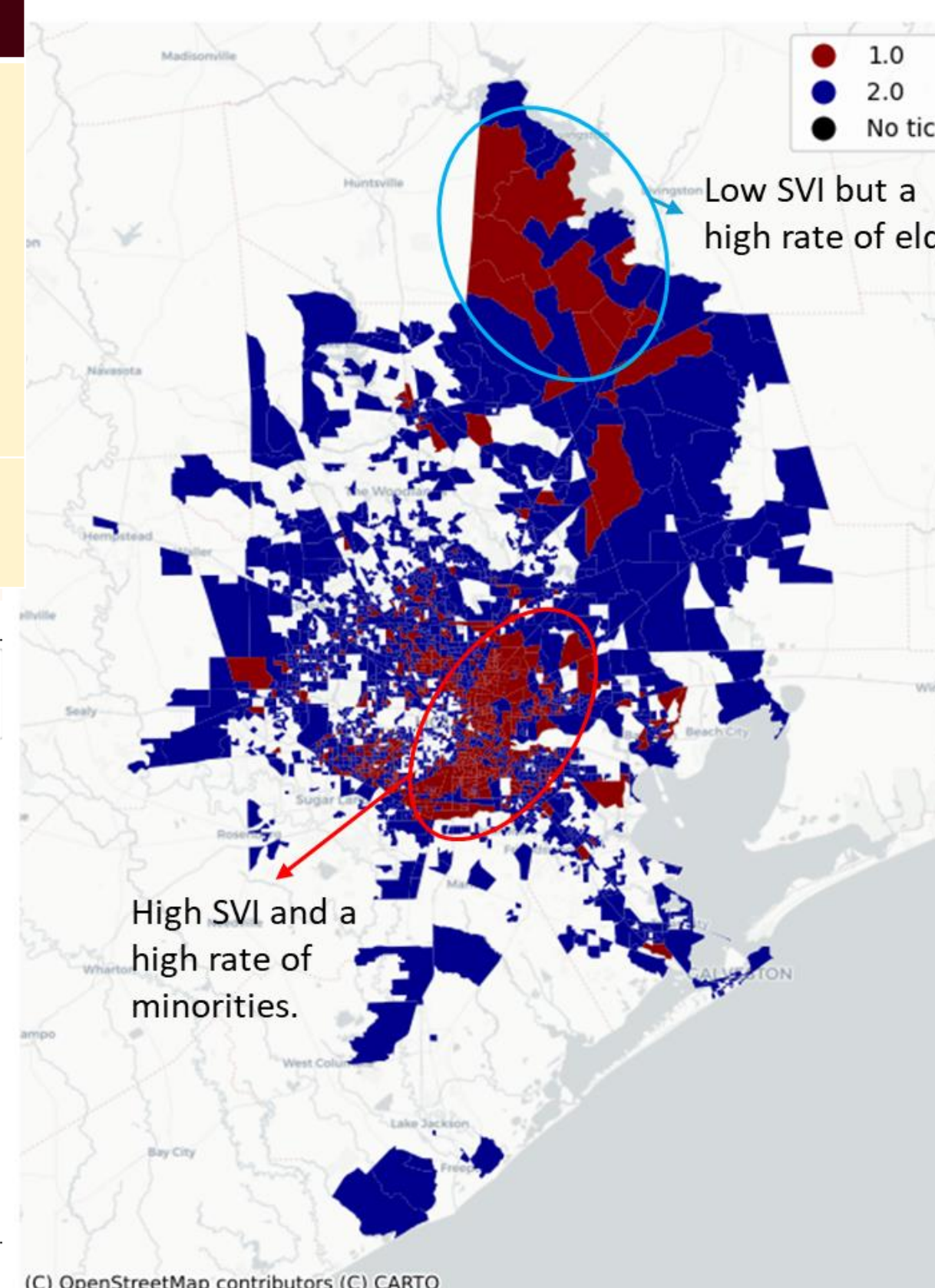


Predictor	Direction	Significance
Black / Hispanic Population %	↑ Higher use	p < .001
Low Income (< 100% AMI)	↑ Higher use	p < .001
Unemployment Rate	↑ Higher use	p < .001
No Vehicle Households	↑ Higher use	p < .001
No High School Diploma	↑ Higher use	p < .001
Elderly Population %	↑ Intensity (once enrolled)	p < .001
Higher Home Value	↓ Likelihood / ↑ Intensity (burden)	p < .05

### RQ2: Two Distinct Recovery Trajectories (GMM)

Class 1: HISR (High Impact, Slow Recovery)	Class 2: LIQR (Low Impact, Quick Recovery)
n=692	n=1,852
↓ Lower income	↑ Higher income
↑ Black/Hispanic%	↑ Home values
↑ No vehicle	↓ Minority%
↑ Elderly	↓ Unemployment
↑ Unemployment	↓ SSI dependence
↑ SSI dependence	
⌚ ~30 months to 80% recovery	⌚ ~12 months to 80% recovery

Spatial Distribution of Class 1 and Class 2 with Cities Basemap



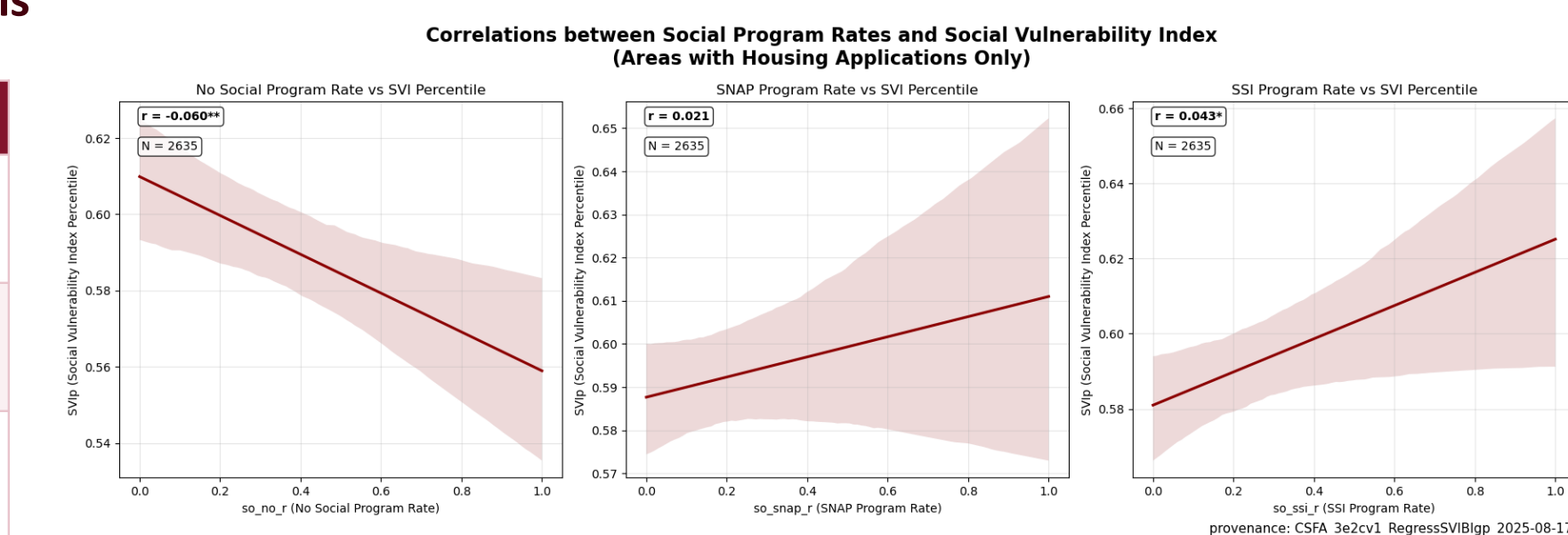
### RQ3: 'New Vulnerability' Phenomenon

36.07% of requesters had NO social program enrollment

These 'newly vulnerable' households submitted requests at similar rates and volume to traditional safety-net users — yet they fall outside SNAP/Medicaid coverage and standard SVI metrics (r = -0.06, not aligned with traditional vulnerability).

### Social Program Indicators Across Models

Program	Key Finding
No Program (New Vuln.)	Nonsignificant — similar use to enrolled users
SSI	Strongest predictor across ALL models (p<.001)
SNAP	Mostly nonsignificant; negative in frequency model



## DISCUSSIONS

### CSR Effectively Targeted Unmet Needs

Spatial patterns closely match SVI — vulnerable areas show higher household application rates, duplicate use, and frequency.

### Elderly Access Is a Platform Issue

Older adults use service at lower rates overall but rely on it intensively once enrolled. Online-only platforms create digital access barriers.

### Daily-Wage Workers: An Underexplored Risk

DWW (p= 0.0547) status was a marginally significant predictor of whether communities use the service — confirming Singh et al.'s (2021) qualitative findings for the neglected employed group.

### Divergent Recovery Trajectories: HISR Aggregates in High SVI Areas

HISR's recovery is 2.5 times longer than LIQR's. The two groups on the map show a clear segregation in terms of social characteristics, which confirms the lens of vulnerability.

## POLICY IMPLICATIONS

1. Integrate Adaptive Nonprofits — Formally embed CSR-type organizations in emergency plans with dedicated funding.
2. Long-Term Recovery Frameworks — Design multi-year food aid programs; HISR groups need sustained support, not short-term relief.
3. Broaden Emergency Aid Eligibility — Move beyond SNAP enrollment as the sole eligibility criterion; include newly vulnerable households.
4. Proactively Support SSI Recipients — Automatically enroll SSI recipients in food delivery services during emergencies given their physical limitations.

### CONCLUSION

Recovery from food insecurity is not uniform — it is deeply stratified by social and economic fault lines. Adaptive nonprofits like CSR are essential bridges for populations that fall through the cracks of existing safety nets.

### Acknowledge

We would like to express our sincere gratitude to CRS for providing the essential data. Their contribution was instrumental in the successful completion of this research.

