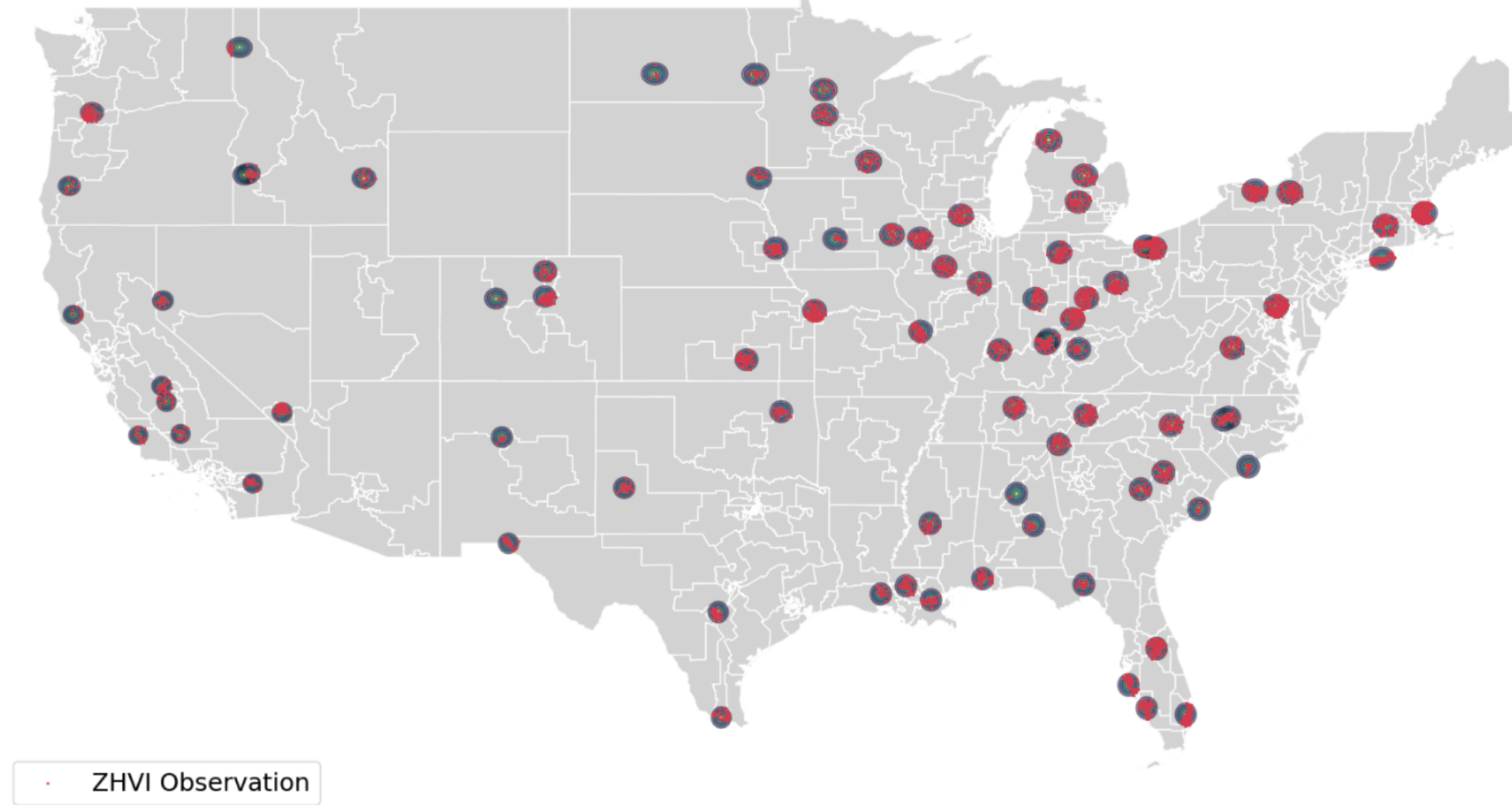


## Introduction & Background

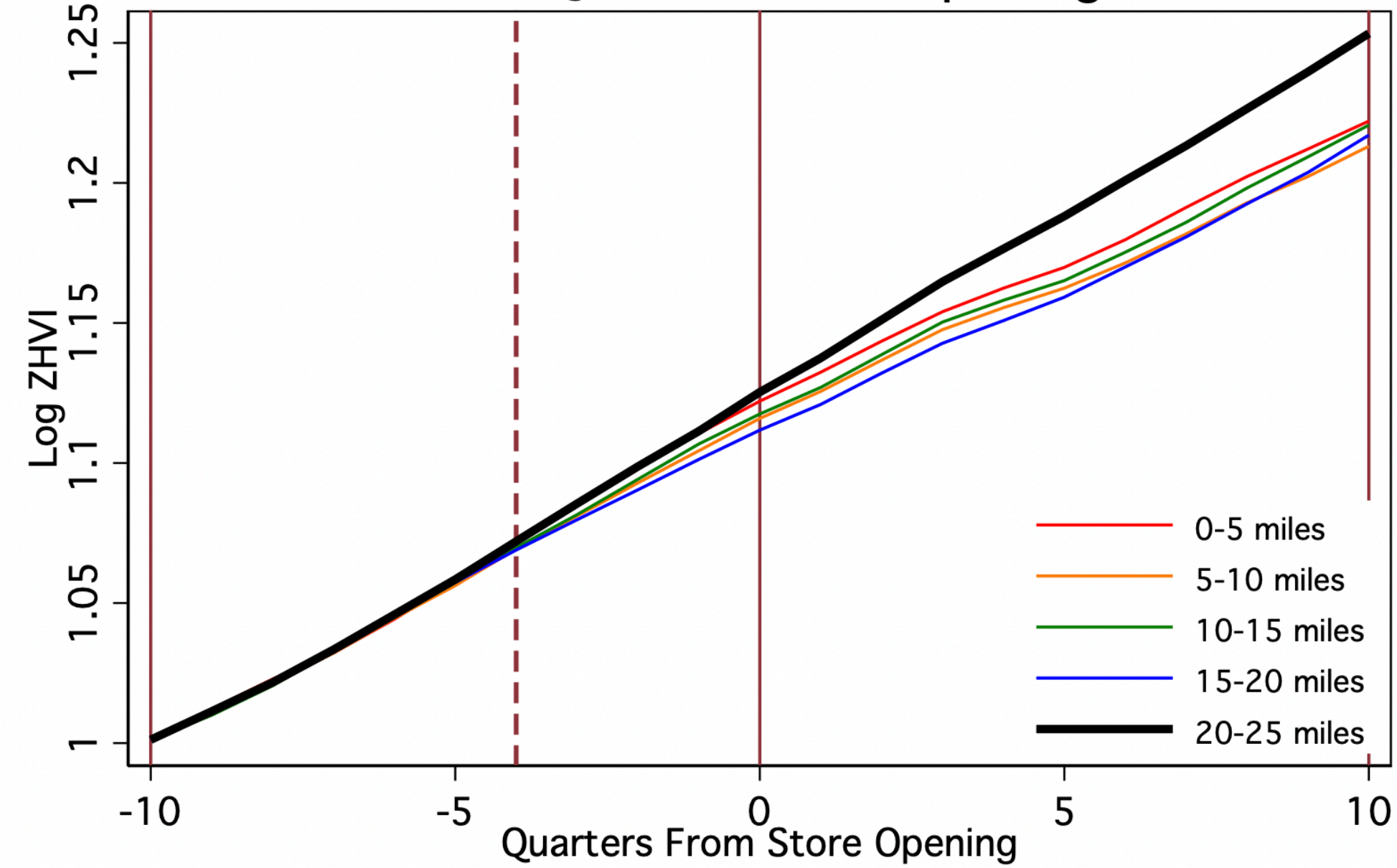
- Other research finds that Walmart and Whole Foods store openings cause increases in property values close to openings which dissipate with distance. Conversely, IKEA openings cause a non-linear increase in nearby property values with the highest increases ~1.25 miles away from store openings (Pope & Pope, 2015; Saengchote, 2020; Dauntfeldt, 2021).
- Costco typically opens in the suburbs, where income levels are somewhat higher than the national average (Testa, 2015).
  - Previous Lit:** No change in property values within 6 miles using only California Costco openings (Lethco, 2023).

## Data

U.S. Costco Warehouse Openings from 2002 to 2020



Normalized Mean Log ZHVI Values over Quarters from Opening



- 84 Costco openings between 2002 and 2020 are the treatments after stores that open within 50 miles of one another and within 5 years of one another are removed.

## Summary Statistics

Means of Key Variables Pre & Post Costco Openings							
Distance Category	Mean Log ZHVI		p-value for t-test	Mean Household Income		Mean Pop. Density	
	Pre-Open	Post-Open		Pre-Open	Post-Open	Pre-Open	Post-Open
0 to 5 miles	12.08 (0.58)	12.30 (0.63)	0.04	225,506 (158,577)	233,821 (164,847)	0.04 (0.05)	0.04 (0.06)
5 to 10 miles	11.97 (0.65)	12.18 (0.67)	0.00	226,816 (166,368)	234,334 (173,156)	0.04 (0.05)	0.04 (0.05)
10 to 15 miles	12.00 (0.64)	12.22 (0.67)	0.02	230,364 (194,482)	240,477 (206,174)	0.03 (0.04)	0.04 (0.04)
15 to 20 miles	12.05 (0.56)	12.27 (0.60)	0.01	182,828 (185,574)	190,081 (195,174)	0.02 (0.03)	0.03 (0.03)
20 to 25 miles (Control)	12.03 (0.55)	12.29 (0.58)	-	161,817 (180,385)	166,976 (187,113)	0.02 (0.02)	0.02 (0.02)

Source: Zillow Home Value Index (ZHVI) data from 2000 to 2022 for 2.5 years before (Pre-Open) and after opening (Post-Open). Household income and population density data are from the ACS. P-values are from t-tests of difference in differences between pre and post values vs. the control group.

- There are significant differences between the change in the log ZHVI value for each of the treated groups and the change in the control group over time.

# Do Costco Openings Increase Nearby Property Values? Evidence from the U.S.

Author: Silas Kwok

Advisors: Victor Couture and Nicole Fortin

## Research Questions

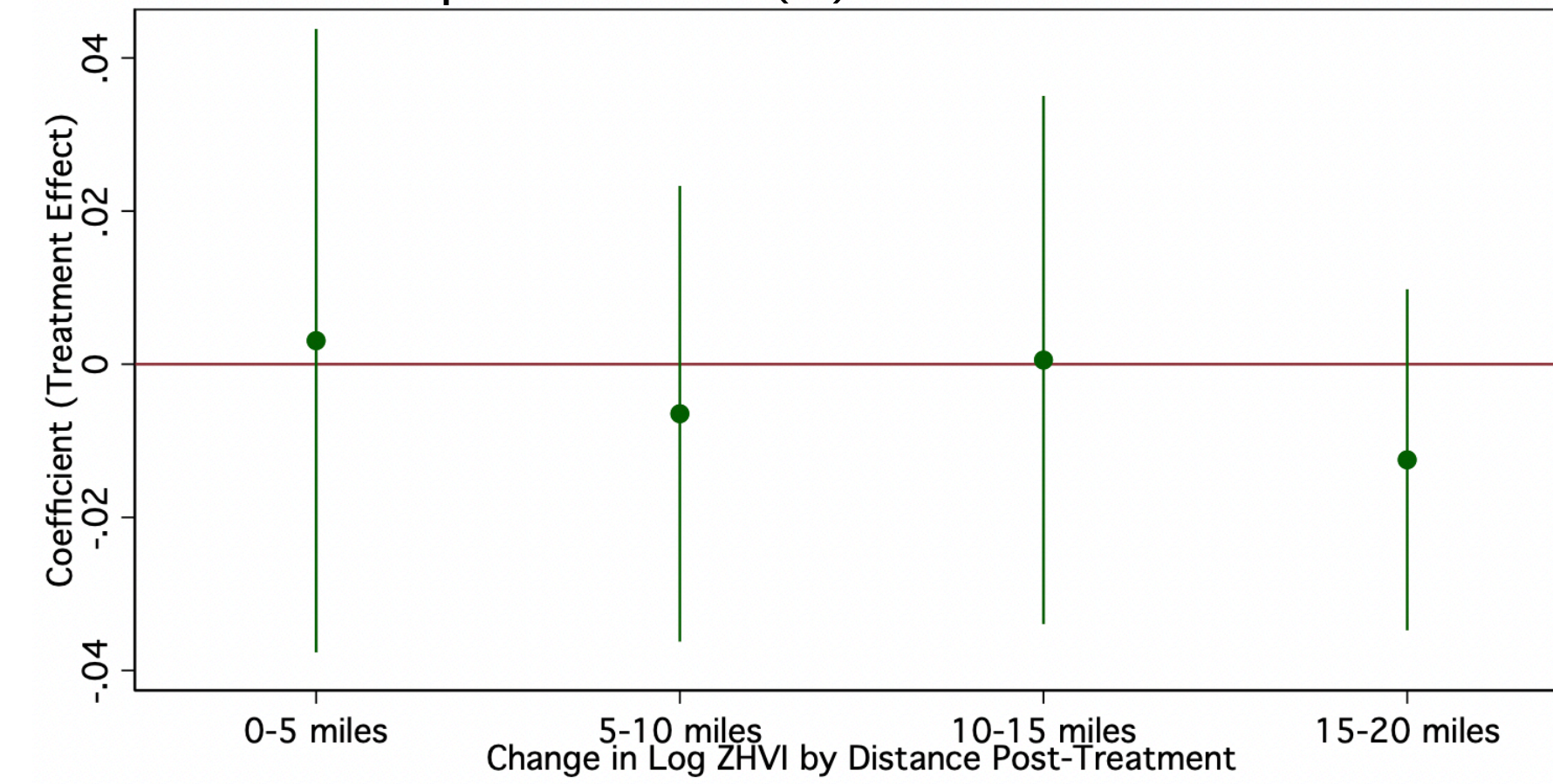
- Does the opening of a Costco warehouse impact nearby property values and does this vary with distance from the Costco? Is this effect non-linear?
- How do the positive and negative externalities of Costco openings differ based on distance?

## Main Results

VARIABLES	Impact of Costco Openings on ZHVI values		
	(1) ln(ZHVI)	(2) ln(ZHVI)	(3) ln(ZHVI)
0 to 5 miles	0.106* (0.0564)	0.115* (0.0683)	0.0379 (0.0925)
5 to 10 miles	-0.0249 (0.0493)	0.00418 (0.0619)	-0.105 (0.0816)
10 to 15 miles	-0.0232 (0.0613)	0.00355 (0.0622)	-0.100 (0.0958)
15 to 20 miles	0.0238 (0.0375)	0.0303 (0.0406)	0.0138 (0.0715)
0 to 5 miles * POST	0.0129 (0.0182)	-0.00260 (0.0172)	0.00308 (0.0208)
5 to 10 miles * POST	0.000311 (0.0129)	-0.00977 (0.0134)	-0.00646 (0.0152)
10 to 15 miles * POST	0.00897 (0.0142)	-0.00226 (0.0153)	0.000547 (0.0176)
15 to 20 miles * POST	-0.00383 (0.01000)	-0.0169* (0.00985)	-0.0125 (0.0114)
Constant	11.20*** (0.320)	12.50*** (3.009)	10.55*** (0.434)
Year FE	✓	✓	✓
Month FE	✓	✓	✓
State FE	✓		
County FE		✓	
City FE			✓
Controls	✓	✓	✓
Observations	5,698	5,698	5,698
R-squared	0.465	0.606	0.756

Standard Errors are clustered at the store level.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Specification (3) Coefficient Plot



- There is **no significant change in property values within 20 miles of a Costco opening relative to the control group.**
- These results are supported by falsification tests where “fake” opening dates are set multiple years earlier for which there are also null results.
- This is surprising since property values typically change in response to nearby amenities and disamenities.

## Empirical Strategy

### Spatial Diff-in-Diff Model

$$\log(P_{ijym}) = \beta_0 D_{ij}^5 + \theta_0 D_{ij}^{10} + \phi_0 D_{ij}^{15} + \psi_0 D_{ij}^{20} + (\beta_1 D_{ij}^5 + \theta_1 D_{ij}^{10} + \phi_1 D_{ij}^{15} + \psi_1 D_{ij}^{20}) * Post_{ijym} + \alpha_y + \delta_m + \sigma_c + \gamma_{yc} + \varepsilon_{ijym}$$

$\log(P_{ijym})$ : log Zillow Home Value Index (ZHVI), which represents the typical value of a single-family home in the 35th and 65th percentile range for a given ZIP code.

$D_{ij}^5, D_{ij}^{10}, D_{ij}^{15}, D_{ij}^{20}$ : dummy variables taking 1 if the ZIP code is 0-5 miles, 5-10 miles, 10-15 miles, or 15-20 miles from a Costco opening.

$Post_{ijym}$ : dummy taking a value of 1 if a ZIP code is within 25 miles of a newly opened Costco.

- $\alpha_y$ : year fixed effect.
- $\delta_m$ : month fixed effect.
- $\sigma_c$ : location fixed effect. (e.g. State, County, City)
- $\gamma_{yc}$ : vector of control variables for household income & population density.

## Heterogeneity Analysis

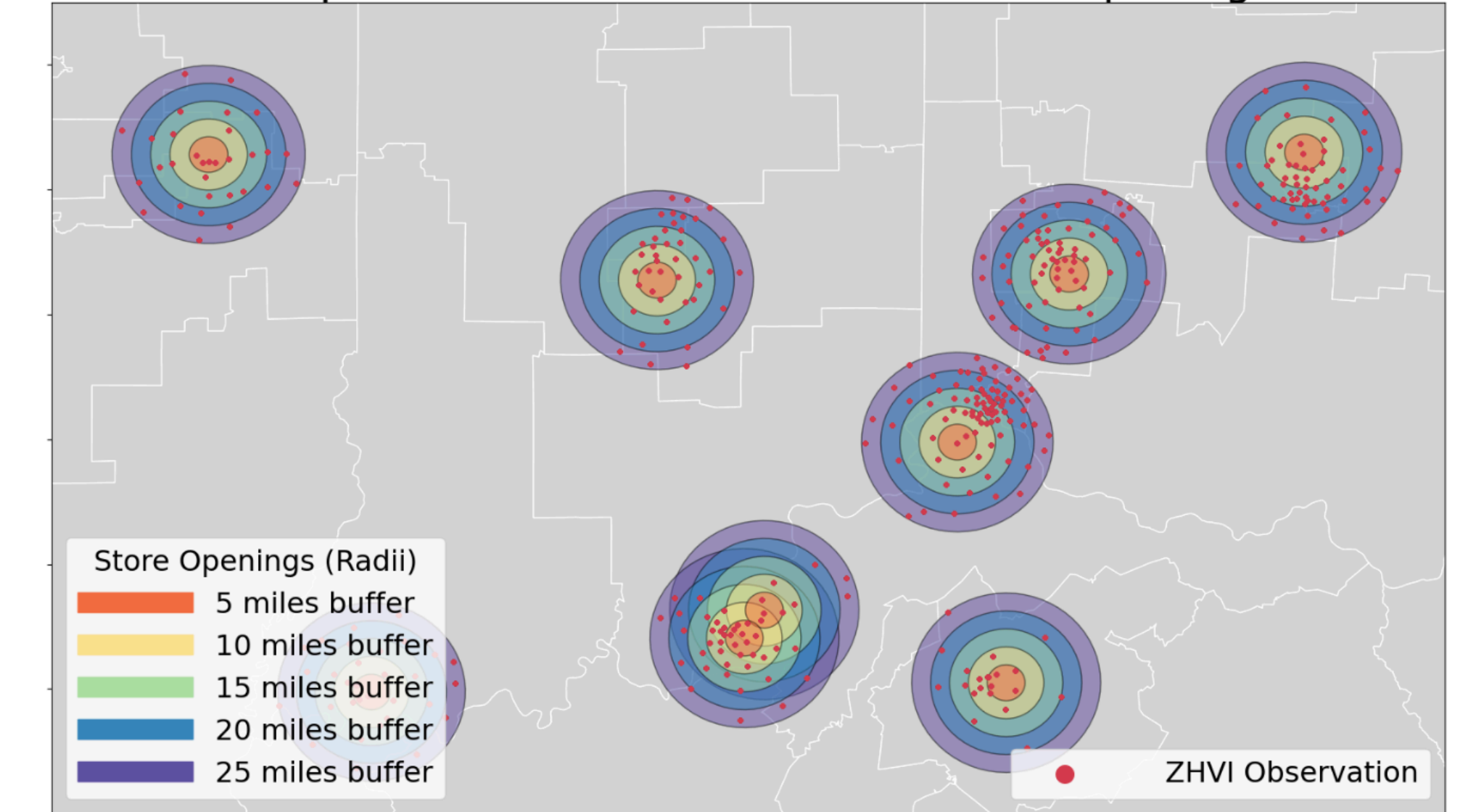
Sample Split Type	Costco Heterogeneity Analysis		
	(1) > Avg. Pop. Density	(2) > Avg. Income	(3) > Avg. White
0 to 5 miles	0.0665 (0.157)	0.0911 (0.130)	0.0739 (0.134)
5 to 10 miles	-0.102 (0.160)	-0.0134 (0.116)	0.00842 (0.122)
10 to 15 miles	-0.177 (0.161)	-0.108 (0.131)	-0.0775 (0.136)
15 to 20 miles	-0.0566 (0.116)	0.00990 (0.0933)	-0.00598 (0.102)
0 to 5 miles * POST	<b>0.0790*</b> (0.0410)	<b>0.0523*</b> (0.0293)	0.0373 (0.0278)
5 to 10 miles * POST	0.0463 (0.0386)	0.0350 (0.0234)	0.0260 (0.0216)
10 to 15 miles * POST	0.0434 (0.0412)	0.0204 (0.0235)	0.0271 (0.0241)
15 to 20 miles * POST	0.000251 (0.0262)	-0.0221 (0.0164)	-0.00950 (0.0176)
Constant	9.544*** (1.361)	5.857*** (1.585)	15.48*** (0.918)
Year FE	✓	✓	✓
Month FE	✓	✓	✓
County FE	✓	✓	✓
Controls	✓	✓	✓
Observations	2,208	2,218	2,132
R-squared	0.600	0.583	0.608

Standard Errors are clustered at the store level.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

- There is a **7.9% increase in property values** within 5 miles of a Costco opening for ZIP codes with **above-average population density**, and a **5.2% increase** within 5 miles for areas with **above-average household income**.

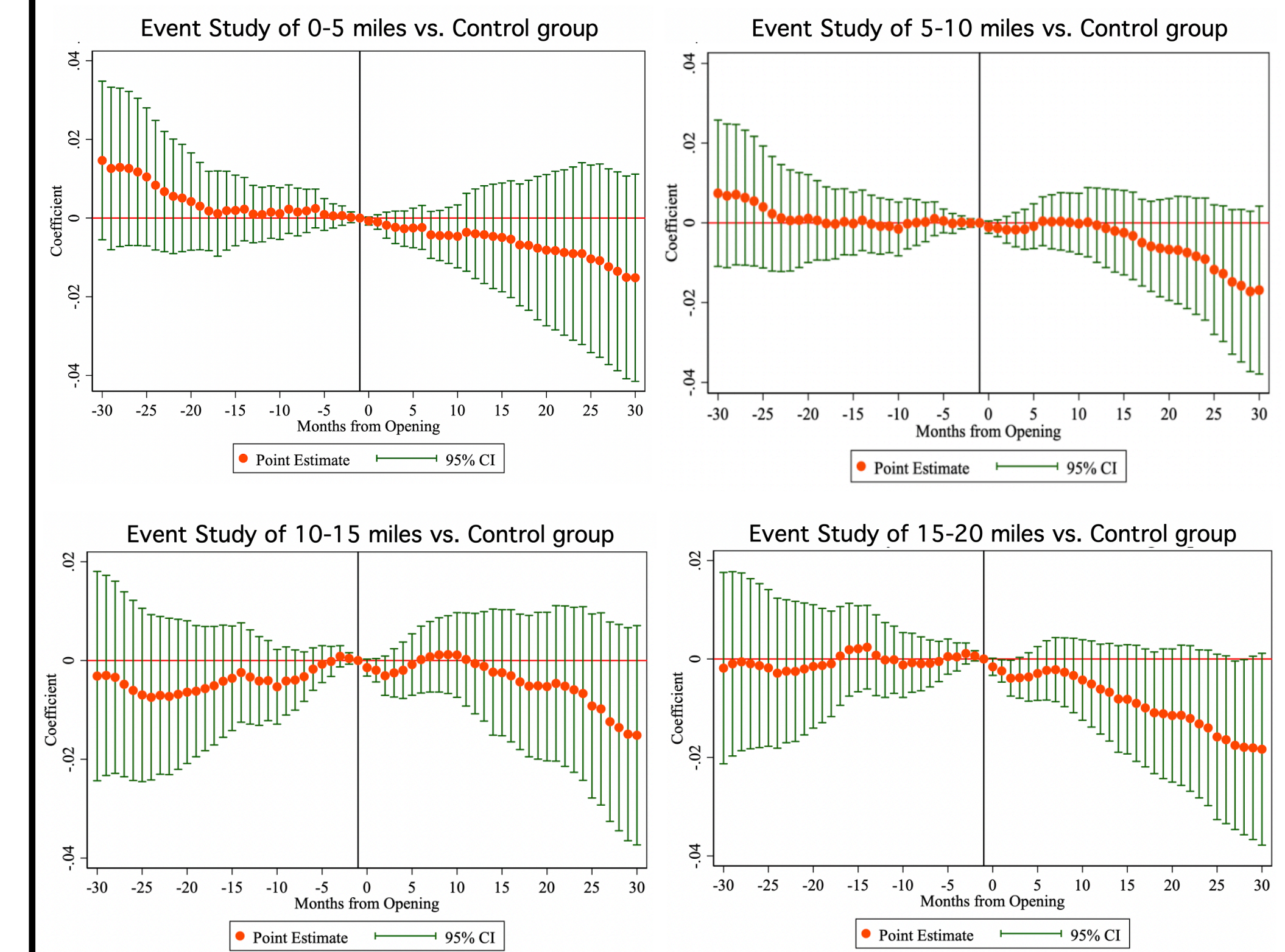
## Concentric Ring ID Strategy

Sample of Midwest Costco Warehouse Openings



- A **control group** of ZHVI values 20-25 miles from Costco openings was chosen.
- A 27-minute drive is the average high for a Costco customer to travel (Testa, 2015). At 45 mph, this is equivalent to ~20 miles.

## Event Study Results



- I find no significant dynamic effects of Costco openings on nearby property values within 20 miles of Costco openings.
- Property values generally decrease (not significantly) within 20 miles of the Costco after it opens relative to the outer-ring control group.

## Conclusions and Future Research

- I find that Costco has no effect on nearby property values on average, which is a surprising result considering Costco is typically seen as an amenity.
- However, there are appreciating effects within 5 miles of Costco openings for properties in counties with above-average population density or above-average household income.
- Costco consumers are wealthier than average so it makes sense that Costco has an impact on property values when they enter a richer area.
- It is possible the controls do not capture the disamenities of neighbourhoods where Costco chooses to enter, explaining the null result for the full dataset.
- Future Research:** Find counterfactual Costco opening locations using machine learning with ACS data and use these openings as a control group (Pollman, 2020).