

Heterogeneous Treatment Effects of a Voluntary Inclusionary Zoning Program on Housing Prices

PROBLEM

Housing Affordability & IZ: Inclusionary Zoning (IZ) programs aim to boost affordable supply, but the effectiveness of voluntary schemes remains highly debated.

The "Development Tax" Effect: Critics argue IZ acts as a tax, prompting developers to increase prices on market-rate homes to offset affordable housing costs (cross-subsidization).

Research Gap: There is little empirical evidence on the non-linear, heterogeneous effects of voluntary IZ across different price tiers of the housing distribution

GENERAL OBJECTIVE

To empirically evaluate the heterogeneous and distributive impacts of Auckland’s voluntary Special Housing Areas (SHAs) program on housing prices across the entire price distribution, distinguishing effects between new and existing dwellings.

DATA AND METHODS

Dataset: 175,089 transaction sales in Auckland (Sept 2011 – Sept 2016) sourced from Auckland Council.

Framework: Difference-in-Differences (DiD) estimating Quantile Treatment Effects (QTT) across the housing price distribution.

Preferred Estimator: Changes-in-Changes (CIC) model (Athey & Imbens, 2006) to relax the restrictive rank preservation assumption of standard quantile DiD.

Outcome Variables: Examines both log dwelling price (total value) and log price per square meter to isolate changes in property size and density.

Robustness Checks: Employs the Adjusted Interrupted Time Series (AITS) method to control for pre-existing trends and validate the parallel-trends assumption

RESULTS

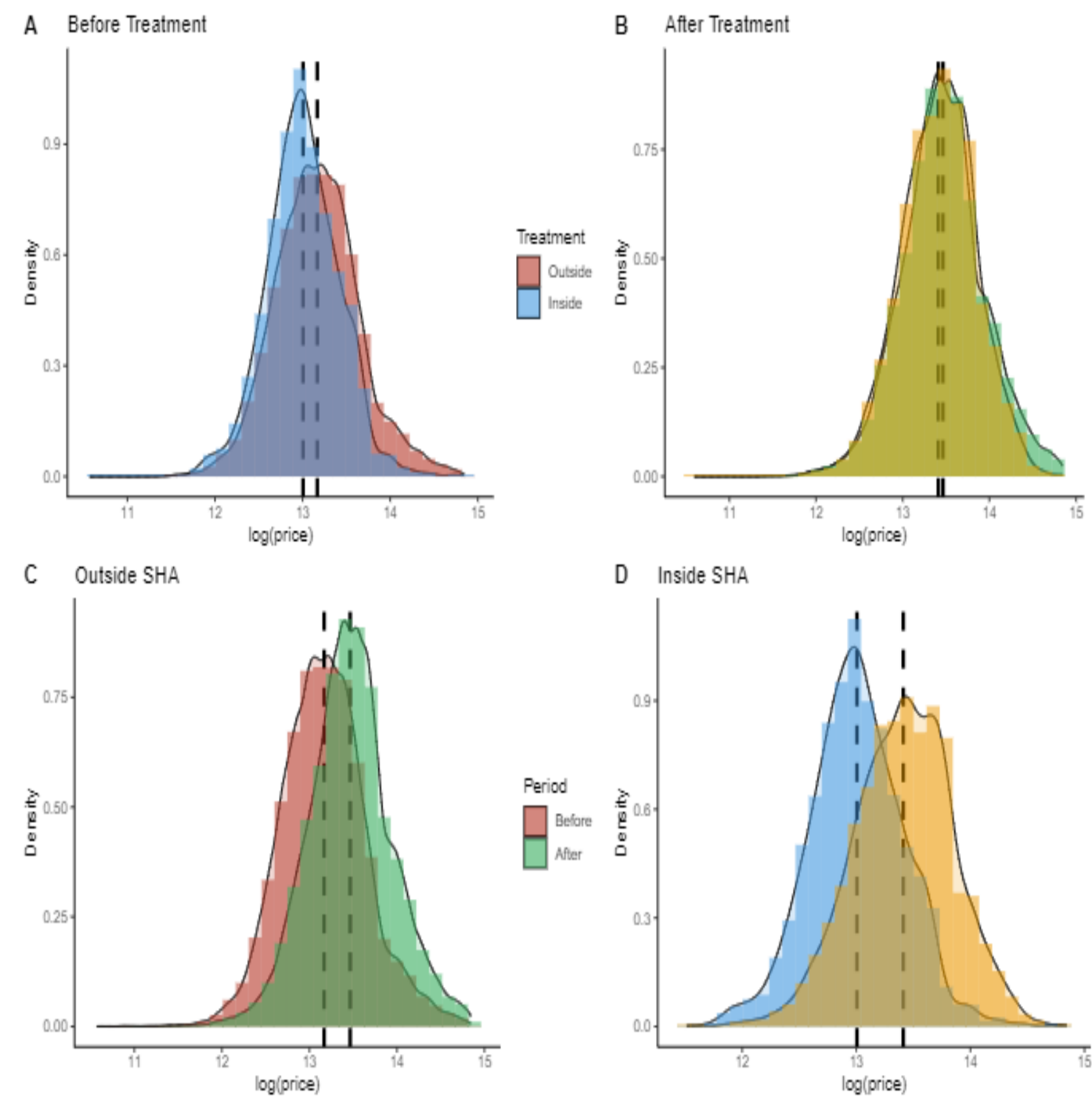


Figure 1: Price Distribution: Treatment/Control and Before/After treatment

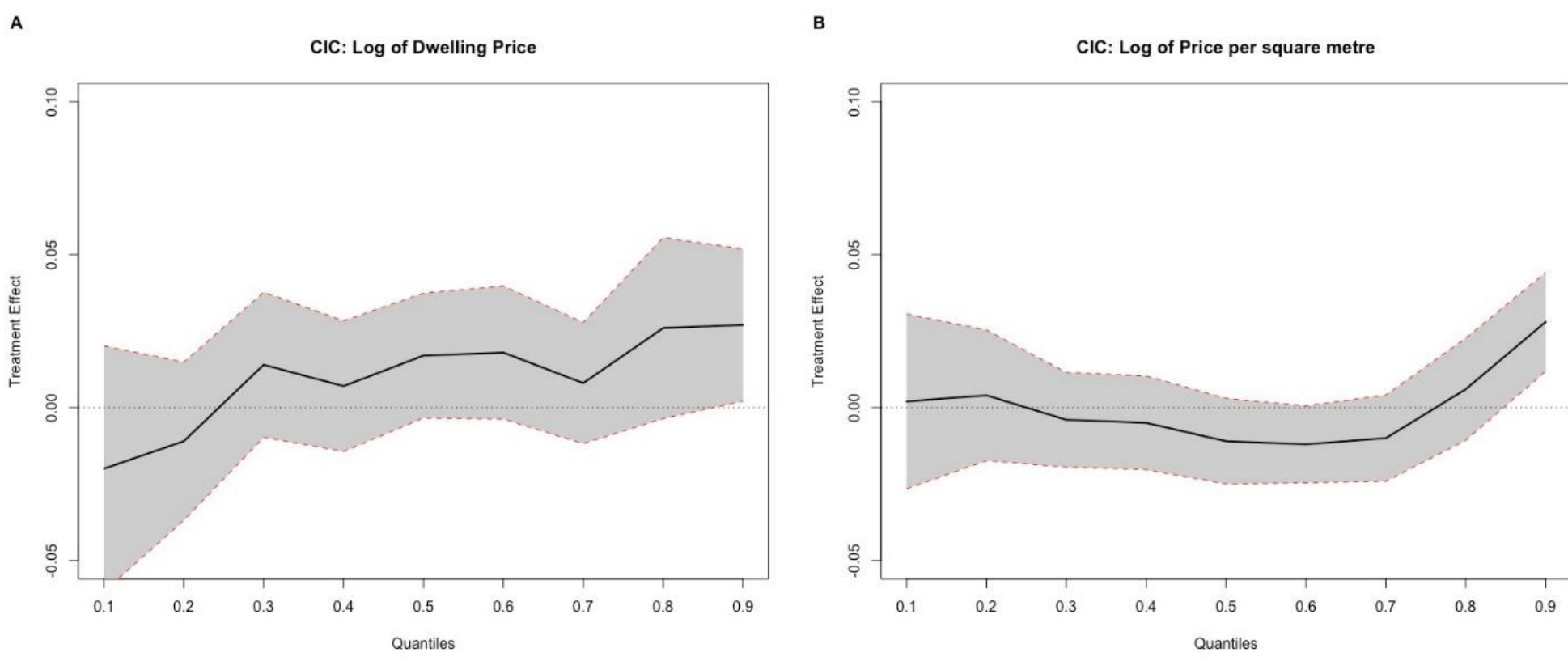


Figure 2. Treatment Effects across the Price Distribution: CIC

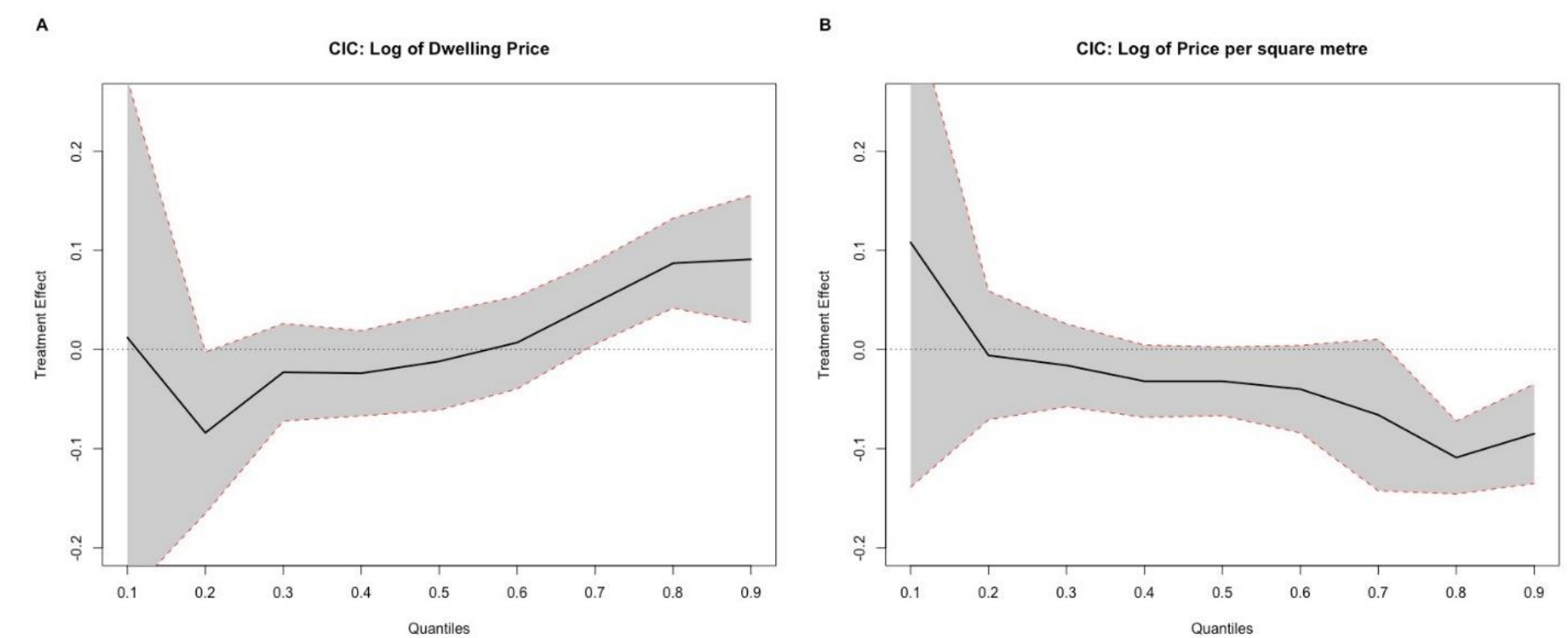


Figure 3. Treatment Effects across the Price Distribution for New Houses: CIC

Table 1: Quantile Treatment Effects of the SHAs on Prices - CIC

	(1)	(2)	(3)	(4)	(5)
q = 0.1	0.0300** (0.0151)	0.0290 (0.0178)	0.0340** (0.0152)	0.0220 (0.0198)	-0.0200 (0.0205)
q = 0.2	0.0420*** (0.0128)	0.0470*** (0.0115)	0.0460*** (0.0111)	0.0350** (0.0142)	-0.0110 (0.0132)
q = 0.3	0.0450*** (0.0120)	0.0550*** (0.0118)	0.0660*** (0.00841)	0.0530*** (0.0130)	0.0140 (0.0121)
q = 0.4	0.0480*** (0.00981)	0.0530*** (0.0102)	0.0580*** (0.0103)	0.0510*** (0.0105)	0.00700 (0.0109)
q = 0.5	0.0490*** (0.0115)	0.0560*** (0.0114)	0.0680*** (0.0103)	0.0610*** (0.0103)	0.0170 (0.0104)
q = 0.6	0.0460*** (0.0104)	0.0520*** (0.0107)	0.0620*** (0.00876)	0.0600*** (0.0103)	0.0180 (0.0111)
q = 0.7	0.0540*** (0.0112)	0.0630*** (0.0101)	0.0580*** (0.00964)	0.0540*** (0.0101)	0.00800 (0.0101)
q = 0.8	0.0720*** (0.0117)	0.0770*** (0.0106)	0.0750*** (0.0134)	0.0700*** (0.0131)	0.0260* (0.0151)
q = 0.9	0.0660*** (0.0102)	0.0570*** (0.0111)	0.0710*** (0.0107)	0.0640*** (0.0121)	0.0270** (0.0127)
Observations	175,089	175,089	171,118	101,275	101,275
AU & Month-by-year FE	YES	YES	YES	YES	YES
Quarter-by-year					
* District FE	NO	YES	YES	YES	YES
Age	NO	NO	YES	YES	YES
Distance SHA < 1km	NO	NO	NO	YES	YES
Trend	NO	NO	NO	NO	YES

Note: This table shows the results for the 5 specifications tested using CIC model. The parameter q represents the q-th quantile or 100 x q-th percentile of the distribution of the outcome. Each row represents the treatment effect for q-th quantile (quantile treatment effect) of the price distribution. The dependent variable for each column is the log of price. Bootstrapped Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

CONCLUSIONS

Affordability Failure: The voluntary SHA program failed to lower overall housing prices, demonstrating that voluntary inclusionary zoning is insufficient to improve market-wide affordability.

Size Compensation (Cross-Subsidization): While the program reduced prices at the lower end for new dwellings (-8.4%), developers offset this by building larger, premium houses at the upper end, resulting in a price increase (+8.7% to +9.1%).

Regulatory Loophole: Streamlined resource consenting without mandatory, enforceable affordability requirements incentivizes developers to prioritize upscale, high-margin projects.

Policy Lesson: Successful housing policies require permanent, mandatory frameworks with explicit enforcement mechanisms rather than temporary, voluntary incentives.