

Effect of Oyster Farm on Property Value in Rhode Island

Pratheesh O Sudhakaran, Gavino Puggioni,
and Hiro Uchida

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Introduction

- Bivalve shellfish aquaculture
 - Growing steadily in US and all over the world
 - 20% of total seafood production in US
 - More than 1,000 farms in East Coast
 - 60% Clams, 39% Oysters, and 1% Mussels
 - RI- 61% increase in 10 years (CRMC 2012)
 - Increasing trend after year 2000.

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Introduction

- Support for shellfish aquaculture
 - Majority public support
 - Its least environmental degradation
 - Helps in productivity in water
- Recently received opposition
 - Marine Sanctuary at Poppanesset Island, MA
 - Discussion in public meeting in RI

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Introduction

- Devaluing housing value
 - Directly affecting public
- Important to study the effect of farm on housing value
- Outcome- better strategy for leasing aquaculture site

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Site of Study

- Site of Study – Rhode Island
 - Rapid increase in oyster farm after 2000
 - Increased from 2 to 52 farms
 - RI working towards Shellfish Management Plan

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Theoretical Model

Hedonic Price Model

- Housing price-three main characteristics
 - Structural Characteristics (eg: bedrooms, lot size)
 - Neighboring Characteristics (eg: Nearness to grocery, school)
 - Environmental Characteristics (eg: Ocean view, air quality, water quality, water view)
- It can be represented as:

$$P_j = P(Q_j, N_j, E_j)$$

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Model

Difference-in-difference model

- Change in environmental characteristics over time.
- To measure the change we need to consider two time period: before and after the change
- DOD is appropriate

$$Y_{it} = \alpha + \beta T_{i1}t + \rho T_{i1} + \gamma t + \varepsilon_{it}$$

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Empirical Model

- Imply DOD in Hedonic price model
- Distance from farm is the treatment variable
 - More the distant house is, less impact on value
 - Created different distance bands
- Time variable is year of construction

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Empirical Model

$$\ln P_i = \alpha + \beta D_i + \gamma C + \boxed{\delta D_i * C} + \sum_j H_{ij} + \sum_k N_{ik} + \varepsilon_i$$

Difference-in-Difference term

- D_i = Distance band which property is located
- C_i = Year of Construction of nearby Oyster farm
- H_{ij} = Housing Characteristics j of property i
- N_{ik} = Neighboring Characteristic k of property i

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Data

- Housing data
 - Housing sale transaction from 2000 to 2012
 - Selected only houses within 2 .5 km from oyster farm
- Oyster farm data
 - Collected from CRMC
 - Location, year built of the oyster farm

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Result

Summary Statistics of variables considered for the study

| Variables | Bands of distance from Property to oyster farm (km) | | | | | |
|--------------------------|---|--------|--------|----------|---------|-------|
| | <0.75 | 0.75-1 | 1-1.25 | 1.25-1.5 | 1.5-2.5 | Total |
| Price (,000s) | 370.8 | 357.9 | 499.8 | 396.0 | 404.5 | 403.9 |
| Lotsize (Acres) | 0.36 | 0.33 | 0.44 | 0.35 | 0.50 | 0.45 |
| Living Area | 1.57 | 1.59 | 1.81 | 1.77 | 1.84 | 1.78 |
| Bedrooms | 2.66 | 2.72 | 2.81 | 2.72 | 2.95 | 2.86 |
| Full Bathrooms | 1.64 | 1.71 | 1.89 | 1.73 | 1.90 | 1.84 |
| Half Bathrooms | 0.44 | 0.42 | 0.52 | 0.57 | 0.53 | 0.52 |
| Air Conditioner (1= Yes) | 0.23 | 0.26 | 0.41 | 0.47 | 0.34 | 0.35 |
| Dist to coastline(km) | 0.20 | 0.24 | 0.31 | 0.35 | 0.66 | 0.51 |
| Water View (1= Yes) | 0.03 | 0.00 | 0.00 | 0.03 | 0.05 | 0.03 |

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Result

- Construction of farm statistically insignificant influencing housing price
- None of distance band showed- statistical influence on housing price.
- The DOD coefficients- no influence on house price.
- All Structural characteristics were influencing positively
- Luxury house price was also not affected by construction of oyster farm.

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Result

- Repeated Sales Analysis
 - Only houses with more than one transactions
 - Capture time invariant unobserved property attributes
- Result consistent with unrestricted model
 - No statistical significance

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Policy Relevance

- Effect of intensification aqua farm on housing price
 - Differentiated between cities based on intensity of aquaculture Operations.
 - More than 2 farms- Aquaculture intensive city
- No statistical evidence -value of houses decreased after farm construction.

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Conclusion

- Oyster farm in neighborhood- not a factor affecting housing price
- People- consider factor directly linked to their daily life
 - Eg: Crime rate, presence of school.
 - Farm in neighborhood- not directly linked
- Care for environmental amenities sustainable and less harmful
 - Oyster farming is sustainable and help improving water quality.

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**Questions or
Comments???**

Thank You

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