



WISCONSIN
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Do Water Quality and Lake Amenities Affect Residential Choices?

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Research Questions

- Estimate benefits of water quality improvement from different mechanisms.
 - Amenity benefits: lakefront homeowners.
 - Recreational benefits: visitors.
- Estimate household preferences for water quality and amenities at different spatial scales
 - Local area: within certain distance of the nearest lakes.
 - Large region: a large area including multiple lakes.
- Use residential sorting model to estimate household preferences.
 - Explore this problem in the context of Wisconsin.

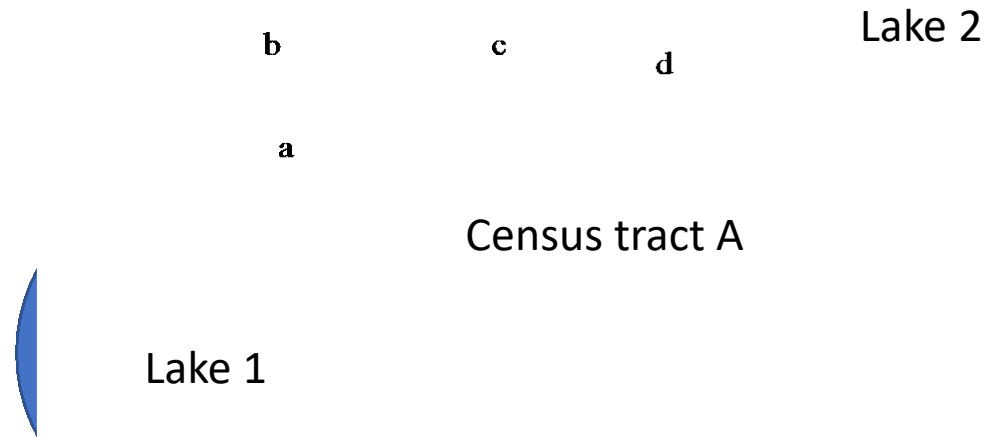


Data

- ZTRAX -- Property Transaction Data
 - Nationwide records of housing transactions from 1990 to 2016.
- Home Mortgage Disclosure Act data
 - Records loan-level information like income levels and races
 - Merged with transaction data with matching algorithm.
- Water quality data – Department of Natural Resource
 - Records the Secchi depth values in WI lakes from 2006 to 2019.
- Land use data – Department of Naturel Resource
 - Merge with water quality data to estimate the missing water quality data using machine learning algorithm.



Choice Sets



- The choice sets are exclusively defined by census tract, lakes, and lakefront dummies.

Ex:

- Region a: lakefront area of lake1 in census tract A.
- Region c: non-lakefront area of lake 2 in census tract A.



Sorting – Models

$$V_{lbcj}^i = \beta_i q_l \cdot D_b + \theta_i r_c + \dots$$

$$r_c = \sum_l^L q_l \cdot \frac{s_l}{d_l}$$

- V_{lbcj}^i -- the utility of individual i purchasing a house in the census tract c of county j .
- q_l -- water quality of lake l .
- D_b -- the indicator of lakefront properties within 1km of their nearest lakes.
- r_c -- the recreation index in the recreation area of census tract c .



Sorting – Preliminary Results

Table 1: First Stage Estimation Results

Variables (Neighborhood-X-Houshold)	Estimate	Std Err	T-Stat
Secchi By Lakefront-X-Income	0.0054	0.0009	6.1190
Secchi By Lakefront-X-White	0.0249	0.0052	4.7932
Index-X-Income	-0.6705	0.0322	-20.8119
Index-X-White	2.3626	0.3755	6.2913

Table 2: Second Stage Estimation Results

Variables	Estimate	Std Err	T-Stat
Price Index	-0.0362	0.0176	-2.0529
Secchi Depth	-0.1028	0.0087	-12.5595
Index	-0.4847	1.7617	-1.7454

Income – measured in \$10,000

Price index – measured in \$100,000.



Thank you!!!