Dynamic Analysis Of Open Space Value Using A Repeat Sales/Hedonic Approach.

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1. Why does open space value matter?
2. Riverside County case study.
3. Econometric issues in open space valuation.
3. Treatment insights into open-space valuation.
4. Matching as data pre-processing.
5. Matching and regression results compared.
6. Next steps.

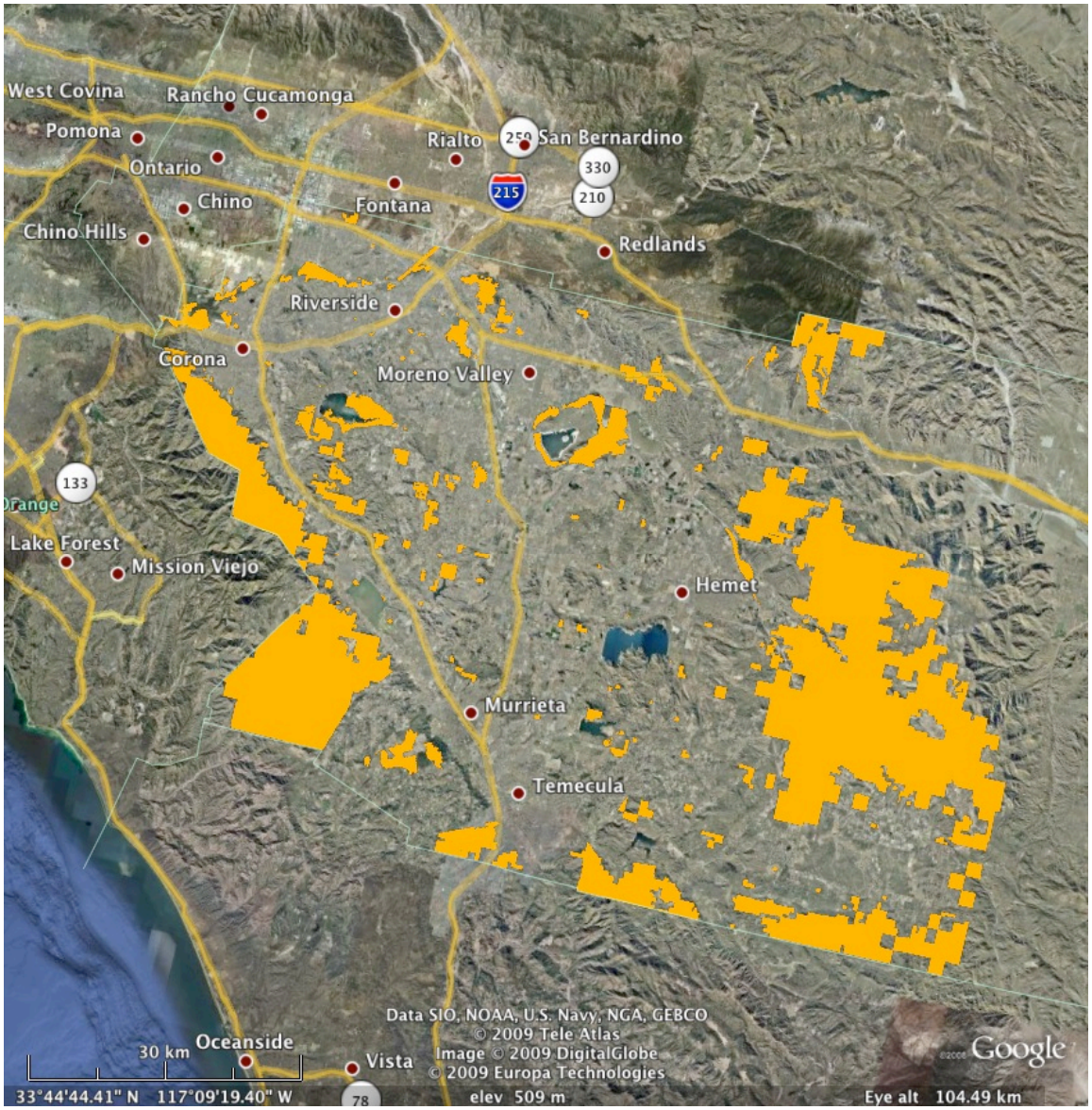
Open Space Is A Key Part of Policy Decisions on Urban Form and Ecological Services.

1. Open space value is often part of a package of ecological services.

2. Policy interest is often when land is set aside from development.

3. What's the value when land moves from temporary to permanent open space?

Riverside County Has Aggressive Plans To Preserve Open Space.



Doubts Remain About the Identification of Open Space Effects.

Cross-Section	• Unobservables associated with open space.
Dynamics	• Changing value over time- Lagged capitalization?
	• Physical changes over time.
Functional Form	• Are the common forms correct?
What Value?	• Temporary vs. permanent.
	• Type of open space.

Panel data are needed to solve these problems.

Case (2006) Details a Repeat Sale Approach to Estimating Environmental Effects.

log price ratio:

$$\frac{P_i}{\quad} = \frac{\gamma e^{\beta_1 X_i + \tau_1 T_{i1} + \ldots + \tau_n T_{in}}}{\quad}$$

Basic Model:

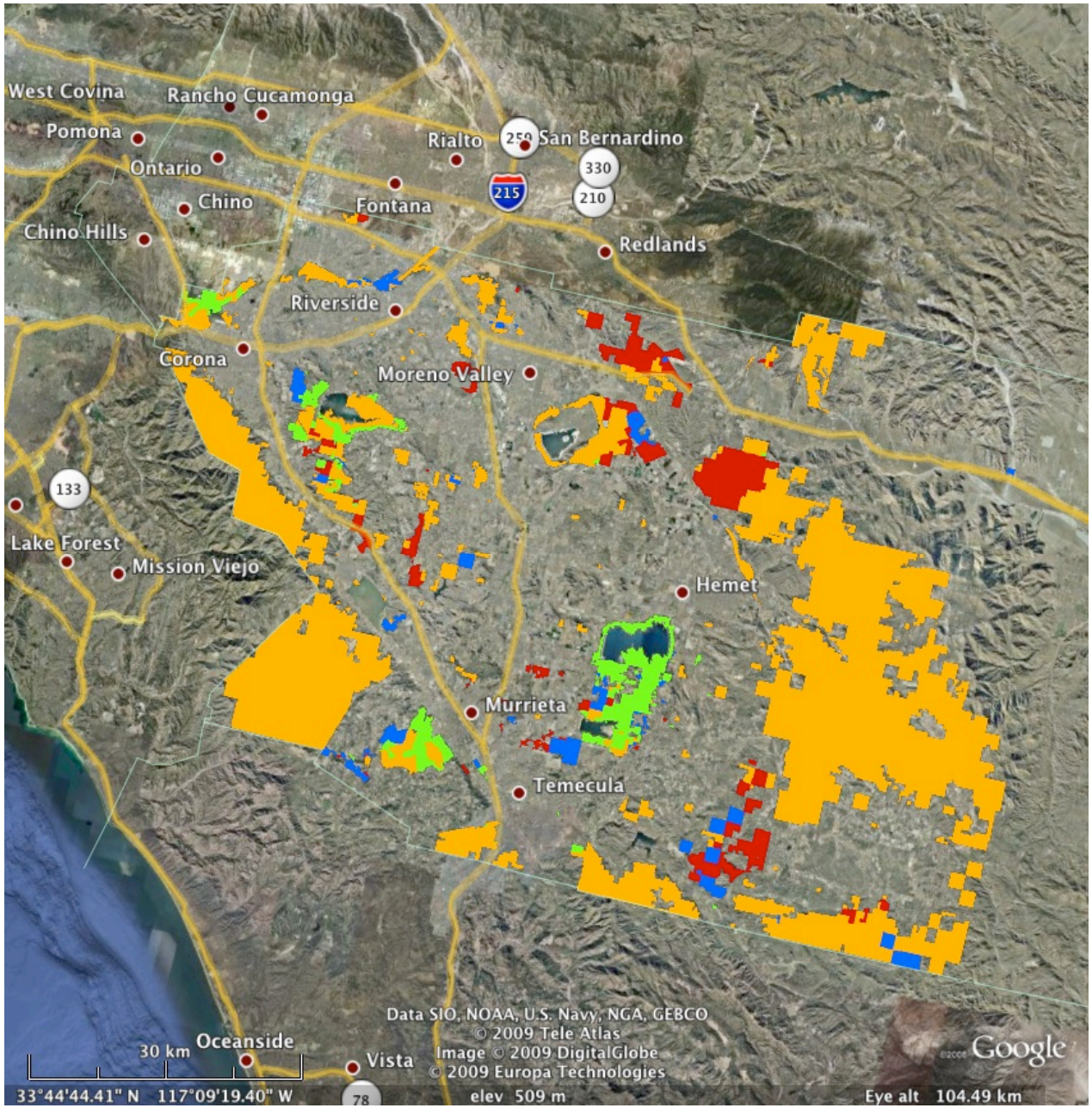
$$\ln \frac{P_i}{\tilde{P}_i} = \tau_1 (T_{i1} - \tilde{T}_{i1}) + \ldots + \tau_n (T_{in} - \tilde{T}_{in}) - \beta_1 distchange$$

Problem:

May need to include a lot of characteristics in X

Need to control for possible change in coefficients or attributes.

Preservation Is Clustered in Specific Areas.



Large Differences Between Control And Treatment Groups.

Treatment= Change between pair of sales > 3/4 mile

	Mean		%bias
Variable	Treated	Control	
bedrooms	3.47	3.23	29.1
bathrooms	2.28	2.04	41.0
Structure Square Feet	1826.40	1629.00	32.0
Lot Acreage	0.29	0.27	3.3
Initial Distance	2.53	1.28	154.9
Corona Driving Distance	56.90	46.00	57.2
Median Income	53.51	47.69	44.9

Any regression approach would entail significant extrapolation.

The Treatment Effects Framework Offers Insight to Estimating Open Space Value.

Mean Causal Effect:

$$\mathrm{E}[Y_i(1) - Y_i(0)]$$

Problem:

- Treatment and control units are different (selection.)

Solution

- Match on pretreatment characteristics.

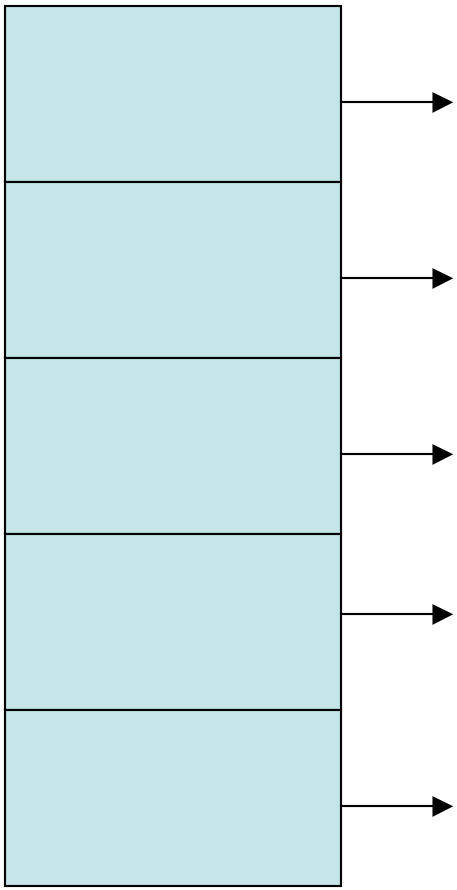
Unconfoundedness.

- Treatment random given pretreatment covariates Z.
- Treatment not based on outcome.

Matching as Data Pre-Processing.

1. Propensity Score Matching:	• Estimate treatment probability
	• Matching control and treatment observations removes bias.
Issue:	• Binary Treatments.
2. Parametric Model	• Repeat sales framework.
3. Strata Estimation	• Estimate parametric model within each strata (Imbens and Wooldridge 2008.)

Propensity Score
(from Logit)



Repeat sale
within strata

Average treatment effect

Standard Regression Approach and Matching Regression Results Are Similar.

	Treatment Indicator	(1) Regression	(2) Matching Estimator
		Model: General Linear model.	
		Dependent Variable:	Ln(PriceRatio)
> 1 mile to < 1 mile			
	EdgChDum	0.0299***	0.0285**
		[0.0015]	[0.035]
and change>.05 miles	EdgChDum2	0.0289***	0.0237*
		[0.0022]	[0.073]
and change>.1 miles	EdgChDum3	0.0286***	0.0220*
		[0.0026]	[0.094]
Distance Changes > than:			
.25 miles	AlEdgChDum25	0.0003	-0.0079
		[0.9586]	[0.407]
.5 miles	AlEdgChDum50	-0.0018	0.0018
		[0.7864]	[0.861]
.75 miles	AlEdgChDum75	0.0102	0.0481***
		[0.1805]	[0.003]
1 mile	AlEdgChDum100	0.0261***	0.0496**
		[0.0034]	[0.03]
	Observations	121854	

Robust p values with clustering at the property l
*** p<0.01, ** p<0.05, * p<0.1
Year controls not shown.

Continuous Results Suggest Significant Open Space Values

		Base Specification	+False Treatment Dummy	Time Period Effects
Variable Defintion	Dependent Variable: Log of Price Ratio Model: General Linear model with log link.			
	Pseudo R2	0.3958	0.3958	0.3959
Distance Change	AlEdgChVa	0.0119** [0.0208]	0.0117** [0.0230]	
False Treatment	AlFlseTrtDum		-0.0082 [0.2521]	
Time Period Coefficients				
1988-1998	RCIP0_edge			0.0129** [0.0127]
1999-2001	RCIP1_edge			0.0097* [0.0797]
2001-	RCIP2_edge			0.0014 [0.7931]
	Constant	0.1269*** [0.0000]	0.1274*** [0.0000]	0.1263*** [0.0000]
	Observations	121853	121853	121853

Robust p values with clustering at the property level in brackets
*** p<0.01, ** p<0.05, * p<0.1
Year controls not shown.

Next Steps.

1. Include more information on changing neighborhood attributes.
2. Combine continuous specification and matching.
3. In-depth analysis of lagged capitalization.
4. Comparison with cross-section estimates.