Testing the effect of new neighboring open space on development

Charles Towe
Department of Agricultural and Resource Economics, University of Connecticut,
charles.towe@uconn.edu

May 26, 2015

Selected Poster prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, San Francisco, CA, July 26-28.

Testing the Effects of New Neighboring Open Space on Development

Charles Towe – University of Connecticut

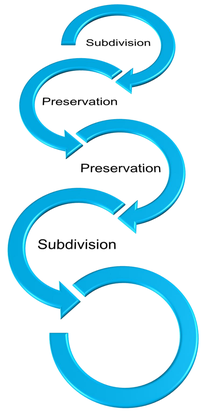
Problem

Governments try to alter the pattern or pace of housing development through localized land use policies.

Land preservation is a popular mechanism for maintaining land use in open space but also creates new amenities because this land is now non-developable. How do these programs impact development activity on surrounding parcels? Do spillovers exist?

Main hypothesis

- Preservation activity increases the likelihood of surrounding land conversion.
  - Neighboring subdivision is an *unintended consequence* that has implications for the evolution of uses in the landscape. [path dependency] and is counter to the goals of the preservation program.
  - Neighboring preservation is indeed a policy goal.



Project Overview

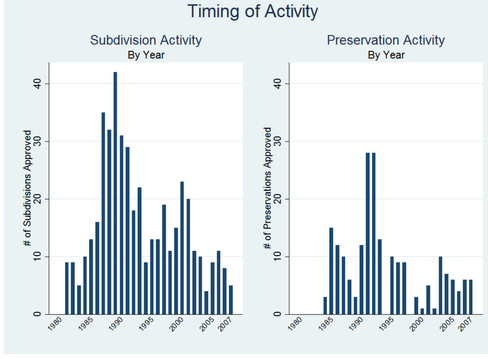
I examine both the short- and long-term effects of newly preserved open space in an exurban landscape. The open space is secured via voluntary perpetual easements that sever the development right from the land. The analysis relies on a unique spatially explicit parcel-level dataset documenting residential development and preservation activity for almost 30 years, the primary objective is to test for the interaction effects among parcels which would be impossible with any other sort of data and the results are robust across models addressing endogeneity concerns.

Policy Description

- To qualify for the county PDR program, a parcel must be at least 100 acres; parcels at least 25 acres qualify if adjacent to at least 50 acres of preserved farmland.
- Eligibility requires 50% of land to be in the best soil classes and 66% in the top four of six land capability classes,
- only parcels not served by public sewer and water are eligible

The data are

- geographically specific meticulously collected,
- time varying and parcel level data,
- and document all conversion activity from 1980-2007..
- and include items:
  - Value of the parcel in development
  - Opportunity costs
  - Infrastructure costs



Econometric Approaches

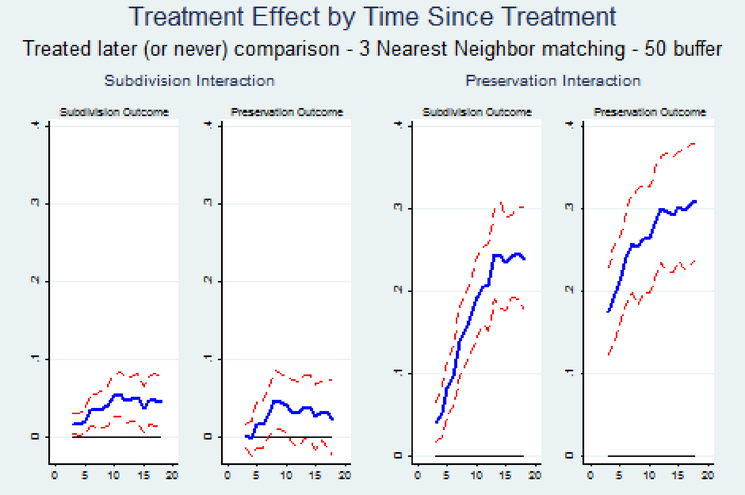
- Hazard model(s)
- In each time period a landowner can
  - Subdivide
  - Preserve (if eligible)
  - Do nothing
- The probability of subdivision for each parcel i depends on
  - parcel characteristics, x_i
  - characteristics of the parcel's community, x_c
  - land use (open space) status of neighbors, m_n

$$\lambda(t, z_i) = \lambda(t, x_i, x_c, m_n) = \lambda_0(t)\exp(\alpha' x_i + \beta' x_c + \phi' m_n)$$

Using Matching

- Propensity Score Matching (PSM) is most useful when you have a possible endogeneity issue but
  - you have no "good" instruments,
  - Cannot plausible satisfy the exclusion restriction or are simply weak
  - and you have a rich data set
  - that adequately describes the **treatment** (preservation in neighborhood)
  - the program is defined based on observables
  - that adequately describes the **outcome**
  - here we rely on a wealth of literature that have used similar data to estimate conversion to development

Results



Conclusion

- Open space spillovers present a particular estimation problem because of issues of time and spatial correlation
- Using a now standard approach modeling conversion timing there appear significant spillovers from new neighborhood open space resulting in new housing and preservations.
- An additional approach accounting for endogeneity of open space and relying on somewhat weak assumption regarding spatially correlated unobservables confirms the presence of such spillovers from newly minted neighborhood open space.