

A Spatial Hedonic Model with Time-Varying Parameters: A New Method Using Flexible Least Squares

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July 28, 2008
AAEA Annual Meeting, Orlando, FL

- Hedonic price models
- Spatial autocorrelation in housing prices
- Spatial crossregressive flexible least squares (SXR-FLS)
- Empirical example
- Results

Hedonic price method

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- The price of a house is a function of its structural, environmental, and locational characteristics
- Used to estimate the value of “non-priced” goods

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 - ⇒ Misspecified functional form
 - ⇒ Measurement error

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Spatial crossregressive flexible least squares

$$y_t - x_t\beta_t - W_t z_t \gamma_t \approx 0, \quad t = 1, \dots, T \quad (1)$$

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- Allows for dynamic parameter movement over time
- Includes spatial crossregressive terms to account for neighborhood similarities

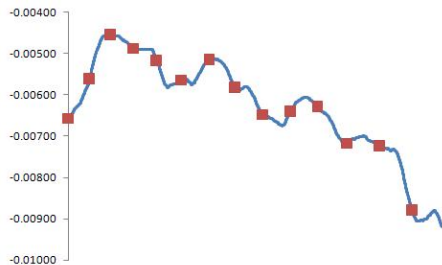
An illustration using distance to the nearest CAFO

Confined animal feeding operation (CAFO)

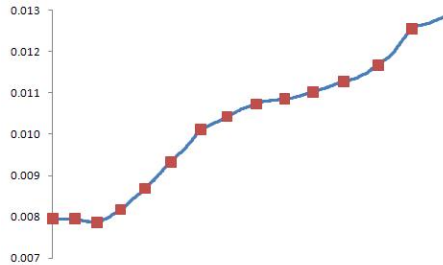
All registered swine, chicken, turkey, beef and dairy operations with large enough number of animals to require registration with the Indiana Department of Environmental Management, Office of Land Quality.

- There have been a number of studies that examine the price effects of CAFOs on residential property values (see Milla et al., 2005)
- 21,115 single-family residential real estate transactions in Tippecanoe County, Indiana between January 1994 and December 2006 obtained from local MLS
- Data include a number of structural and location attributes

The marginal value of age (years)

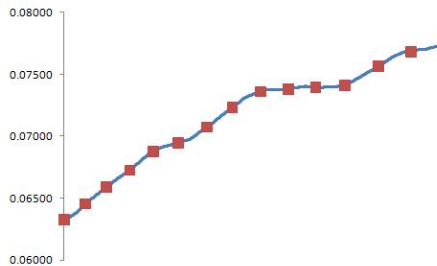


Age

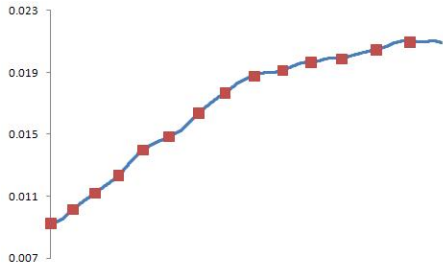


Spatial lag of age

The marginal value of lot size (acres)

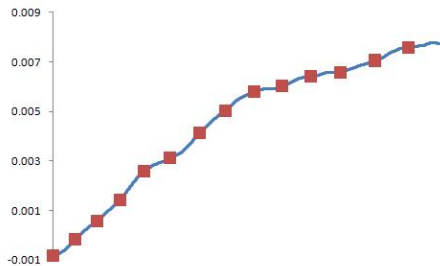


Lot size

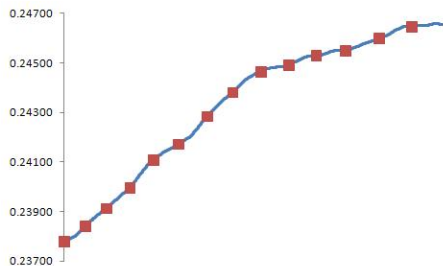


Spatial lag of lot size

The marginal value of finished square footage

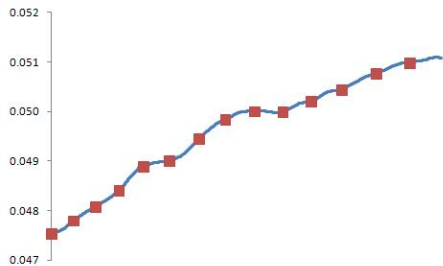


Square footage

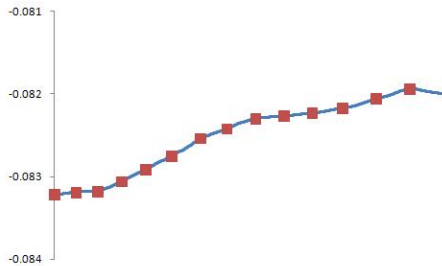


Spatial lag of square footage

The marginal value of bedrooms

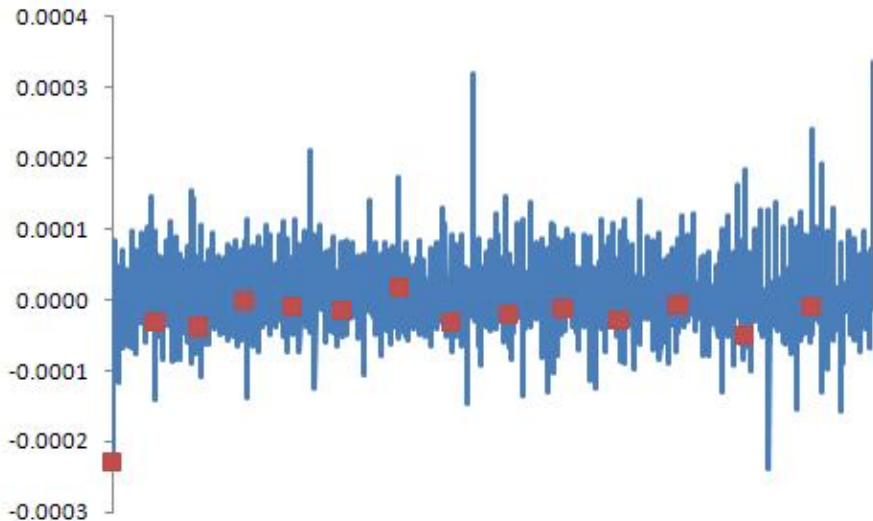


Bedrooms



Spatial lag of bedrooms

The marginal value of distance to CAFO



Distance to nearest CAFO

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 - ⇒ Spatial autocorrelation in the observed prices
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- Our example points to potential problems in cross-sectional estimation of environmental valuation

Any questions?

Thank you for your time.

References

- Basu, S. and T. Thibodeau (1998). Analysis of spatial autocorrelation in house prices. *Journal of Real Estate Finance and Economics* 17(1), 61–85.
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