

Appendix C

Additional Information Regarding the Effect of Economic Disamenities on Property Values

Background

To arrive at the conclusions referenced in this report, we drew on the key studies summarized below that analyze the effect of environmental disamenities on residential property values. While the following references do not explicitly address disamenities such as gas processing facilities, the comparable inadequacies of the pair-wise studies are clearly indicated when the entire environment is addressed. The principle is universal: the presence of disamenities has a negative effect on property values when comprehensive, multivariable, statistically valid studies are done.

Hite, Diane, Chern, Wen, Hitzhusen, Fred, and Randall, Alan (2001). Property-Value Impacts of an Environmental Disamenity: The Case of Landfills. *Journal of Real Estate Finance and Economics*, vol. 22, no. 2/3, pp. 185-202.

Primary issues and conclusions:

- Property value impacts of landfills using a hedonic price model were considered
- Statistical model accounts for broad range of characteristics that are neglected in pair-wise studies:
 - Housing structure characteristics (age, number of rooms, bedrooms, baths, porches, number of levels, square footage, garage, and features such as central air conditioning, a fireplace and masonry construction.
 - Neighborhood effects (distance to business district, schools, school district quality, crime rate)
 - Information effects (fraction of out of state buyers)
 - Distances to disamenities and amenities
- The percentage of buyers who moved in from out of state (and presumably had less knowledge about local amenities and disamenities) is positively associated with property value, suggesting that information may play an important role in determining market price. When buyers come from out of state and may not know much about the landfill or have to make quick house buying decisions, housing prices are higher, all other things equal.

Brasington, David M., and Hite, Diane (2003). Demand for Environmental Quality: A Spatial Hedonic Analysis. *LSU Department of Economics Working Paper Series, Working Paper 2005-08.*

Used hedonic price analysis to estimate the average value of a house in the geographic area as a function of a set of explanatory variables.

- Explanatory variables include:
 - House characteristics (lot size, age of house, size of house, number of full and partial bathrooms, number of detached structures on lot)
 - Neighborhood characteristics (distance from central business area, community population growth, neighborhood racial composition, education levels, income levels, and poverty rates)
 - Property tax rates
 - Public school quality (proficiency test scores)

- Distance to the nearest hazard
- Uses small geographic areas such as census block groups as the unit of analysis, with variables that are averages for that geographic area. Thus, no single transaction or characteristic has an unwarranted influence on the overall findings.
- Spatial dependence, that is, the degree to which the price and characteristics of a house affect the price of neighboring houses, is taken into account in the statistical model

Second stage demand model

- Estimates distance to the nearest hazard as a function of the implicit prices derived from the hedonic price analysis and other demand shift variables
- Implicit prices are partial derivatives of average house price from the first equation with respect to distance to hazard, school quality, house size, and lot size. However, these are endogenous, so instruments for these must be found (arts, accessibility, MSA growth, and commute time)
- Demand shift variables are community income, climate, % with a graduate degree, % with children

Findings

- Hedonic price analyses show that environmental hazards have a small negative but statistically significant relationship with average constant-quality house prices. At the mean, moving 10% closer to the nearest hazard decreases average house price by .3%.
- Demand model analyses shows that people with higher income, higher education levels, and people with children demand more environmental quality (larger distance from hazard).
- Taking a house that is slightly more than a mile from the hazard and moving it to half a mile from the hazard results in a loss of \$3,278 (about 6% of the value of the average house).
- In an expert witness report, Diane Hite characterizes the findings by saying that the analysis “confirmed that house values at ¼ mile from a toxic release source...would have their value decreased by 48%, all else constant.”

Erickcek, George A. (2006). An Assessment of the Economic Impact of the Proposed Stoneco Gravel Mine Operation on Richland Township. Report completed at the request of the Richland Township Planning Committee.

- Examined the potential impact of a proposed gravel mine on residential property values and the potential employment impact of the mine on the area’s economy
- Summarizes the literature by saying that studies applying hedonic pricing models generally show that proximity to landfills, hazardous waste sites, and the like has a significant negative effect on the price of a residential property.
- Drew on Hite (2006) study of the effects of distance from a 250-acre gravel mine on the sale price of 2,552 residential properties, controlling for a large set of other factors that influence a house’s price. She found a large, statistically significant effect of proximity to the gravel mine on home sale prices. The closer to the mine, the greater the loss in house value. A residential property located a half mile from the mine experienced a 20% reduction in value. A property one mile from the mine experienced

a 14.5% decline in value. These estimates are similar to estimates of the effects of landfills in the literature.

- The loss in house value is a way to quantify in dollars the loss in quality of life as capitalized in home values.
- Using the model parameters from the Hite study, this study simulated the loss in housing values that would result from the proposed gravel mine. More than 1,400 homes within a 3-mile radius of the mine would have been negatively impacted, with the total loss of values reaching nearly \$32 million.
- The fact that over time housing and commercial developments move closer to and sometimes adjacent to mine operations does not mean that the mine has no effect on housing values. Prices adjust within a short time following establishment of a mine to compensate for the loss in quality of life, and new residents and businesses make decisions based on the new prices.

Hite, Diane, and Jauregui, Andres (2005). Don't Ask, Don't Tell: The Impact of Real Estate Agents on House Prices Near Environmental Disamenities.

- Studied the impact of real estate agents on the price of houses that are located close to landfills using a hedonic price model. The authors hypothesized that real estate agents obtain higher prices than those theoretically expected when the houses are located closer to an environmental disamenity. They attribute this result to differences in information about the presence of the environmental disamenity between buyers, sellers, and their real estate agent, that ultimately have an impact on their bargaining position.
- The analysis is based on 2,967 transactions involving houses located close to four landfills in Franklin County, Ohio, in 1990.
- On average, results suggest that at distances less than 1 mile away from the landfills, the percentage increase in the house price obtained by a real estate agent is greater than the commission rate. For example, the weighted predicted rent for transactions made through a real estate agent at an interval distance of 0.75 miles away from the landfills is \$7,680.37, while the predicted rent for transactions made without an agent is \$6,780.71. The difference between these two predicted house values is 13.27 percent.
- The paper provides evidence that estimating hedonic price models with MLS data can downwardly bias estimated impacts of an environmental disamenity.

Nelson, Jon P. (2004). Meta-Analysis of Airport Noise and Hedonic Property Values. *Journal of Transport Economics and Policy*, vol. 38, no. 1, pp. 1-27.

- Based on meta-analysis of the findings of 33 studies, the author concludes that a property located at 55 dB would sell for about 10-12% less if it was located at 75 dB.

Baranzini, A., Schaerer, C., and Thalmann, P. (2010). "Using measured instead of perceived noise in hedonic models." *Transportation Research Part D: Transport and Environment*, vol. 15, no. 8, pp. 473-482.

- Finds a 23% discount in housing values due to daytime noise levels of 65 dB

Bateman, I. A., Day, B.H., Lake, I.R., and Lovett, A.A. (2001). *The effect of road traffic on residential property values: A literature review and hedonic price study*. Scottish Executive Transport Research Series, The Stationery Office, Edinburgh.

- Finds that noise impacts depend on magnitude, frequency, duration, variability, and time of occurrence.

Larsen, J.E. 2012. "Surface street traffic volume and single-family house price." *Transportation Research Part D: Transport and Environment* 17(4):317-320.

- Additional traffic from a mine that can cause significant congestion has a negative effect on house prices. House values near a street under study lost approximately 2.1% of their value when traffic was doubled.