Summary of Analysis:

Impact of an Operational Gravel Pit on House Values

Delaware County, Ohio

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Based on 2,812 house sales observations within five miles of a gravel pit in Delaware County, Ohio, I conclude that gravel pit operations have a statistically demonstrable negative impact on nearby house prices.

I use a standard hedonic price statistical model that controls for house characteristics; the model results are attached at the end of this summary. The model estimates effects of house price (in 1000s) as a function of different characteristics including distance in miles to a single gravel pit operation. Results of the model are attached.

The coefficient of the estimated model is 0.1252 times the natural logarithm of distance to the gravel pit. Because the mathematical form of the model is complicated, I attach Figure 1 to illustrate the effect of the gravel pit on house prices (Note, the vertical axis is predicted house price).

[1]The findings here reflect my own views, and not those of Auburn University.

I find that the average elasticity ($\frac{\text{\% Change in House Price}}{\text{1\% Change in Distance}}$) is 0.42. This means that for every 1% move in distance from the gravel pit, houses should gain 0.42% in value. Further, average quality-constant house values within 0.5 miles of the gravel pit are 36% lower than those between 0.5 and 5 miles ($126,698 vs $200,788). The negative effect decays, so that when considering houses within 1.5 miles, house values are 25% lower than those between 1.5 and 5 miles ($204,938 vs $152,578).

In the sample, there are 128 houses within a half mile of the gravel pit. Given the difference in house value, there is an approximately $9 million loss in property values within a half mile of the operation. This has a negative impact on property tax collections, which are based on house values.

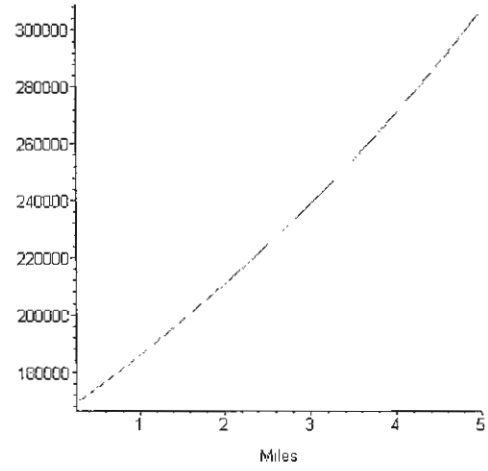

Figure 1: Predicted Price as Function of Distance from Gravel Pit

The MODEL Procedure

Model Summary	
Model Variables	1
Endogenous	1
Parameters	11
ID Variables	1
Equations	1
Number of Statements	1

Model Variables	PRICE
Parameters	a0 a1 a2 a3 a4 a5 a6 a7 a8 a9 a10
Equations	PRICE

The Equation to Estimate is	
PRICE =	F(a0, a1, a2, a3, a4, a6, a7)

NOTE: At OLS Iteration 99 CONVERGE=0.001 Criteria Met.

The MODEL Procedure
OLS Estimation Summary

Data Set Options	
DATA=	GRAVEL5
OUTEST=	PREDICTED

Minimization Summary	
Parameters Estimated	7
HCCME Used	e**2 / (1 - h)**2
Method	Gauss
Iterations	99

Final Convergence Criteria	
R	0.000375
PPC(a4)	0.0082
RPC(a4)	0.054788
Object	6.492E-6
Trace(S)	13058.35
Objective Value	13025.84

Observations Processed	
Read	2812
Solved	2812

The MODEL Procedure

Nonlinear OLS Summary of Residual Errors								
Equation	DF Model	DF Error	SSE	MSE	Root MSE	R-Square	Adj R-Sq	Label
PRICE	7	2805	36628659	13058.3	114.3	0.2542	0.2526	PRICE

Nonlinear OLS Parameter Estimates					
Parameter	Estimate	Approx Std Err	t Value	Approx Pr > |t|	Label
a0	-11.1961	2.2336	-5.01	<.0001	Intercept
a1	0.125175	0.0165	7.59	<.0001	log(Miles from Gravel Pit)
a2	0.000015	2.316E-6	6.57	<.0001	Sale Date
a3	0.03804	0.00623	6.11	<.0001	Distance to Delaware City
a4	-4.61E-6	6.615E-6	-0.70	0.4856	FAR (House Size/Lot Size)
a6	0.273822	0.0353	7.75	<.0001	Total Baths
a7	0.073849	0.0144	5.14	<.0001	Total Rooms

Number of Observations		Statistics for System	
Used	2812	Objective	13026
Missing	0	Objective*N	36628659

The MEANS Procedure

Analysis Variable : pricehat						
Less than 0.5 Miles	N Obs	N	Mean	Std Dev	Minimum	Maximum
0	2684	2684	200.7878420	65.3679348	59.9956394	798.5793045
1	128	128	126.6982672	22.1625919	80.1021051	178.8992598

The MEANS Procedure

Analysis Variable : pricehat						
Less than 1.5 Miles	N Obs	N	Mean	Std Dev	Minimum	Maximum
0	2408	2408	204.9379419	66.0794769	59.9956394	798.5793045
1	404	404	152.5776785	42.8152744	80.1021051	432.0971361