HW9 Patrick Neyland

Patrick Neyland

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## Question 1

### Part i

Take the first derivative with respect to sales, then set that equal to zero. this is when the marginal effect becomes zero.

### Part ii

If alpha is greater than .069, then reject the null hypothesis. I will keep it because it is close to being significant in most cases.

t = .000000007/.000000037 = 70/37

70/37

[1] 1.891892

pt(-1.891892, 29)\*2

[1] 0.06852925

### Part iii

error terms: 0.429, .14, 0.0000037

R^2 = 0.1484

### Part iv

I would prefer the latter model. It is easier to interpret and the stays the same.

## Question 2

I would prefer the second model because it have the highest adjusted

library(wooldridge)  
library(tidyverse)

-- Attaching packages --------------------------------------- tidyverse 1.3.1 --

v ggplot2 3.3.6 v purrr 0.3.4   
v tibble 3.1.1 v dplyr 1.0.5   
v tidyr 1.1.4 v stringr 1.4.0.9000  
v readr 2.0.2 v forcats 0.5.1

-- Conflicts ------------------------------------------ tidyverse\_conflicts() --  
x dplyr::filter() masks stats::filter()  
x dplyr::lag() masks stats::lag()

library(stargazer)

Please cite as:

Hlavac, Marek (2022). stargazer: Well-Formatted Regression and Summary Statistics Tables.

R package version 5.2.3. https://CRAN.R-project.org/package=stargazer

## Question 3

### Part i

I expect it to be positive. As distance from the incinerator increases, price should also increase.

### Part ii

model3\_2 <- lm(log(price)~log(dist)+log(intst)+log(area)+log(land)+rooms+baths+age, data = kielmc)  
stargazer(model3\_2 , type = "text")

===============================================  
 Dependent variable:   
 ---------------------------  
 log(price)   
-----------------------------------------------  
log(dist) 0.028   
 (0.053)   
   
log(intst) -0.044   
 (0.042)   
   
log(area) 0.512\*\*\*   
 (0.070)   
   
log(land) 0.078\*\*   
 (0.034)   
   
rooms 0.050\*\*   
 (0.024)   
   
baths 0.107\*\*\*   
 (0.035)   
   
age -0.004\*\*\*   
 (0.001)   
   
Constant 6.300\*\*\*   
 (0.596)   
   
-----------------------------------------------  
Observations 321   
R2 0.593   
Adjusted R2 0.583   
Residual Std. Error 0.283 (df = 313)   
F Statistic 65.017\*\*\* (df = 7; 313)   
===============================================  
Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The model shows that the distance from the incinerator does not have a significant effect on price.

### Part iii

lintst\_squared <- (log(kielmc$intst))^2  
model3\_3 <- lm(log(price)~log(dist)+log(intst) + lintst\_squared +log(area)+log(land)+rooms+baths+age, data = kielmc)  
stargazer(model3\_3 , type = "text")

===============================================  
 Dependent variable:   
 ---------------------------  
 log(price)   
-----------------------------------------------  
log(dist) 0.190\*\*\*   
 (0.063)   
   
log(intst) 1.902\*\*\*   
 (0.431)   
   
lintst\_squared -0.113\*\*\*   
 (0.025)   
   
log(area) 0.514\*\*\*   
 (0.068)   
   
log(land) 0.107\*\*\*   
 (0.033)   
   
rooms 0.049\*\*   
 (0.023)   
   
baths 0.090\*\*\*   
 (0.034)   
   
age -0.004\*\*\*   
 (0.001)   
   
Constant -3.791\*   
 (2.296)   
   
-----------------------------------------------  
Observations 321   
R2 0.618   
Adjusted R2 0.608   
Residual Std. Error 0.274 (df = 312)   
F Statistic 63.036\*\*\* (df = 8; 312)   
===============================================  
Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The addition corrects the sign of log(dist) and makes all independent variables significant.

### Part iv

Yes

## Question 4

### Part i

The model can be reparameterized:

Accoring to Wooldridge, we can show that

### Part ii

### Part iii

### Part iv