ECO 4720
Practice SLR

1. Using data from 1988 for houses sold in Andover, Massachusetts, from Kiel and McClain (1995), the following equation relates housing price (*price*) to the distance from a recently built garbage incinerator (*dist*):

$$\log\widehat{(price)} = 9.40 + 0.312\log(dist)$$

(i) Interpret the coefficient on log(*dist*). Please explain the sign and magnitude in terms of *price* and *dist*.

Answer: If distance from an incinerator increases by 1%, housing prices increase by 0.31%.

(ii) What other factors about a house affect its price? Might these be correlated with distance from the incinerator?

Answer: Other factors include size of the house, number of bathrooms, size of the lot, age of the property, and quality of the neighborhood (including school quality). These could be correlated with distance since the city may choose to locate incinerators in areas with low quality houses.

2. The data set in CEOSAL2 contains information on chief executive officers for U.S. corporations. The variable *salary* is annual compensation, in thousands of dollars, and *ceoten* is prior number of years as company CEO.

(i) Find the average salary.

Answer: The average salary is $865,864.

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Variable	Obs	Mean	Std. dev.	Min	Max
salary	177	865.8644	587.5893	100	5299
age	177	56.42938	8.42189	33	86
college	177	.9717514	.1661523	0	1
grad	177	.5310734	.5004492	0	1
comten	177	22.50282	12.29473	2	58
ceoten	177	7.954802	7.150826	0	37
sales	177	3529.463	6088.654	29	51300
profits	177	207.8305	404.4543	-463	2700
mktval	177	3600.316	6442.276	387	45400
lsalary	177	6.582848	.6060594	4.60517	8.575274
lsales	177	7.231025	1.432086	3.367296	10.84545
lmktval	177	7.39941	1.133414	5.958425	10.72327
comtensq	177	656.6836	577.1227	4	3364
ceotensq	177	114.1243	212.566	0	1369
profmarg	177	6.42011	17.86074	-203.0769	47.45763

(ii) How many CEOs are in their first year as CEO (that is, *ceoten* = 0)?

Answer: Five.

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. count if ceoten==0
  5
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(iii) Estimate the simple regression model

$$salary = \beta_0 + \beta_1 ceoten + u.$$

What is the increase in salary for one more year as a CEO?

Answer: The estimated equation is

$$\widehat{salary} = 772.426 + 11.746 ceoten.$$

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. reg salary ceoten
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Source	SS	df	MS		Number of obs	=	177
					F(1, 175)	=	3.65
Model	1241694.06	1	1241694.06		Prob > F	=	0.0577
Residual	59524270.7	175	340138.69		R-squared	=	0.0204
					Adj R-squared	=	0.0148
Total	60765964.7	176	345261.163		Root MSE	=	583.21

salary	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]	
ceoten	11.74613	6.14774	1.91	0.058	-.387127	23.87939
_cons	772.4263	65.67567	11.76	0.000	642.8079	902.0446

One more year as CEO is predicted to increase salary by $11,746.

(iii) Estimate the simple regression model

$$\log(salary) = \beta_0 + \beta_1 ceoten + u.$$

What is the (approximate) percentage increase in salary given one more year as a CEO?

Answer: The estimated equation is

$$\log(\widehat{salary}) = 6.505 + 0.0097 ceoten.$$

. reg lsalary ceoten

Source	SS	df	MS			
Model	.850907024	1	.850907024			
Residual	63.795306	175	.364544606			
Total	64.6462131	176	.367308029			

				Number of obs	=	177
				F(1, 175)	=	2.33
				Prob > F	=	0.1284
				R-squared	=	0.0132
				Adj R-squared	=	0.0075
				Root MSE	=	.60378

lsalary	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]	
ceoten	.0097236	.0063645	1.53	0.128	-.0028374	.0222846
_cons	6.505498	.0679911	95.68	0.000	6.37131	6.639686

One more year as CEO is predicted to increase salary by 100(0.0097)% or 0 .97%.