

KING'S COLLEGE LONDON
(University of London)

King's Business School

6SSMN961: APPLIED ECONOMETRICS

2019-20

Problem Set 2

1. A small company sells medical supplies to hospitals. Management wants to assess the efficacy of the company's advertising, and an analyst has produced the following three regressions:

$$sales_i = -516.4 + 2.47advertising_i + 1.86bonus_i + e_i$$

$$sales_i = -516.5 + 2.77advertising_i + e_i$$

$$bonus_i = 193.5 + 0.16advertising_i + e_i$$

where $sales_i$ are sales in region i (in £1,000), $advertising_i$ is spending on advertising (in £100), and $bonus_i$ is the amount of bonuses paid to sales people in the region (in £100).

- a. Why is the coefficient on advertising different in the first two regressions? Show how the coefficient in the second regression relates to the one in the first using the information provided.
 - b. Is either of the regressions likely to provide a good indication of the causal effect of advertising spending on sales? Why or why not?
2. Download the data set `auto.dta` from the course page. This data set contains data on 74 cars sold in the US in 1978 and various of their attributes.
- a. Draw a scatterplot of **price** versus **weight**. Describe in words what you see.
 - b. Run a regression of **price** on **weight**. Report the constant and slope coefficient.
 - c. What is the predicted price of a car weighing 2,500 lb? 4,000 lb?
 - d. Run a regression of **price** on **foreign**. By how much does the average price of imported cars differ from that of domestic cars? Is the difference statistically significant?
 - e. Run a regression of **price** on **foreign** and **weight**. What is the price difference for imported cars now? Is the difference significant?
 - f. Explain why the results in (d) and (e) differ.

- g. Convert the price variable to logs, and repeat your regressions from (d) and (e). How is the interpretation of the price difference for imported cars different in these regressions from the earlier ones?
- h. Run a regression of **price** on **weight**, **foreign** and an interaction of **weight** with **foreign**. What is the interpretation of the coefficient on the interaction term?