Q1 Cigarette Smoking and Public Policy
5 Points

Since the release of the 1964 Surgeon General's report, private and public health officials have waged an aggressive campaign against tobacco use. This campaign has included policies as diverse as restrictions on advertising, antismoking public service announcements, education programs, youth-access restrictions, and smoking bans in public places. In aggregate, these policies appear to have achieved some measure of success. Over the past 20 years, per capita cigarette consumption and the fraction of adult smokers have declined considerably.

One policy instrument that has received a considerable amount of attention in the last two decades is higher excise taxes on cigarettes. For instance, between 1990 and 2003, there were approximately 113 increases in state excise taxes on cigarettes. Over that time, the average state tax on cigarettes has increased from 23 to 73 cents/pack. The interest in trying to reduce smoking through higher taxes is spurred on in part by a large body of economic research showing that cigarette consumption falls after price or tax hikes.

In this homework assignment, you will use cross-section data for all 50 U.S. states to predict the proportion of the population that smokes cigarettes. In particular, we will investigate the claim that higher excise taxes on cigarettes are good predictor of cigarette smoking.

Data

Download the dataset `ARE106_HW2_F2021.RData` from Canvas and open it in R using the following command (make sure the data file is in your working directory)

```
load("ARE106_HW2_F2021.RData")
```

The variables in the dataset are:

1. `state`: U.S. state

2. `smokers` : Proportion of the population that smokes cigarettes (in 2007)
3. `extax` : State excise tax per pack (in 2007)
4. `tax` : Other cigarette taxes per pack (in 2007)
5. `funding` : Tobacco control funding per capita (in 2007)

Models

Consider the linear regression models:

1. $ln(smokers_i) = \beta_0 + \beta_1 ln(extax_i) + u_i$
2. $ln(smokers_i) = \beta_0 + \beta_1 ln(extax_i) + \beta_2 ln(funding_i) + u_i,$

where each observation i represents a state.

Q1.1
0.5 Points

Suppose the population models above are for smokers in all U.S. states in 2020. Do you think assumption CR1 holds? Explain.

Q1.2
0.5 Points

Suppose the errors in Model 1 are correlated across states that are adjacent to one another. Is OLS unbiased in this model? Is it BLUE? Explain.

Q1.3
0.5 Points

Suppose you were to estimate Model 1 using only states along the east coast. Would your estimate of β_1 be unbiased? Explain.

Q1.4
1 Point

What is the mean proportion of the population that smoked cigarettes in 2007 (round to three decimal points)? [0.25 points]

0.203

What is the median (round to three decimal points)? [0.25 points]

0.202

What does the difference (or similarity) between these two statistics tell you about the data? [0.25 points]

0.001

Verify your answer with a graph (upload a file of your graph below). [0.25 points]

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Q1.5
0.5 Points

Before estimating the models, do you expect β_1 to be positive or negative? Explain.

Q1.6

0.5 Points

Estimate regression Model 1.

What is the value of your estimate of β_1 (round to three decimal points)? [0.25 points]

Interpret your estimate of β_1 (Hint: See Discussion 4 and/or Ch. 7 (p. 109) of the textbook).. [0.25 points]

Q1.7

0.5 Points

Does your estimate of β_1 in Model 1 suggest that excise taxes should be used to reduce cigarette smoking? Explain.

Q1.8

0.5 Points

Estimate Model 2.

What is the value of your estimate of β_1 (round to three decimal points)? [0.25 points]

Does the inclusion of $funding$ in your regression affect your estimate of β_1 from Model 1? Why or why not? [0.25 points]

Q1.9
0.5 Points

Consider the regression model

$$ln(smokers_i) = \beta_0 + \beta_1 ln(extax_i) + \beta_2 ln(funding_i) + \beta_3 funding_i + u_i$$

Can this model be estimated by OLS? Explain.

Q1.10 Code
0 Points

Upload any files that correspond to your R code and any outputs/figures associated with your answers above. It's easiest to copy and paste your code and outputs from the RStudio console and paste them into a .txt file. Any figures can be saved and uploaded as .png files. Make sure to organize and label your code so that it is easy to follow which code and output corresponds to a particular question. **Homework assignments that do not include their code and R output will be given a score of zero!**

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Homework 2   ● UNGRADED

STUDENT

Jessica Zheng

TOTAL POINTS

- / 5 pts

QUESTION 1

Cigarette Smoking and Public Policy	5 pts
1.1 (no title)	0.5 pts
1.2 (no title)	0.5 pts
1.3 (no title)	0.5 pts
1.4 (no title)	1 pt
1.5 (no title)	0.5 pts
1.6 (no title)	0.5 pts
1.7 (no title)	0.5 pts
1.8 (no title)	0.5 pts
1.9 (no title)	0.5 pts
1.10 Code	0 pts