Homework 3

Research in Health Economics, Spring 2025

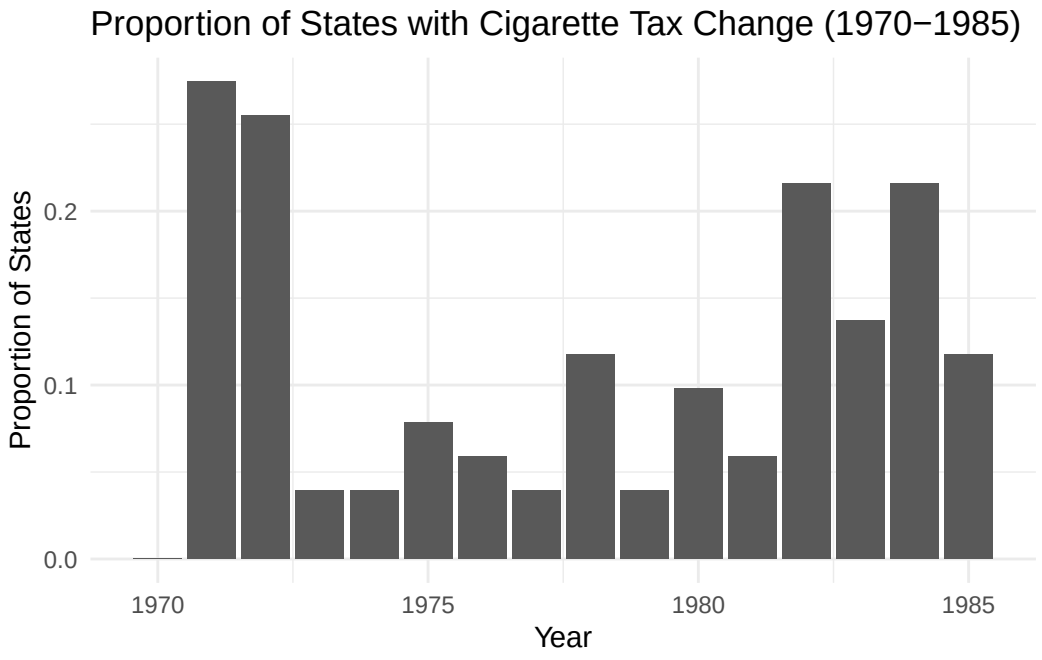
Megan Zheng

My answers in the following file blah blah blah. Check out my repository slayyyy.

Summarize the Data

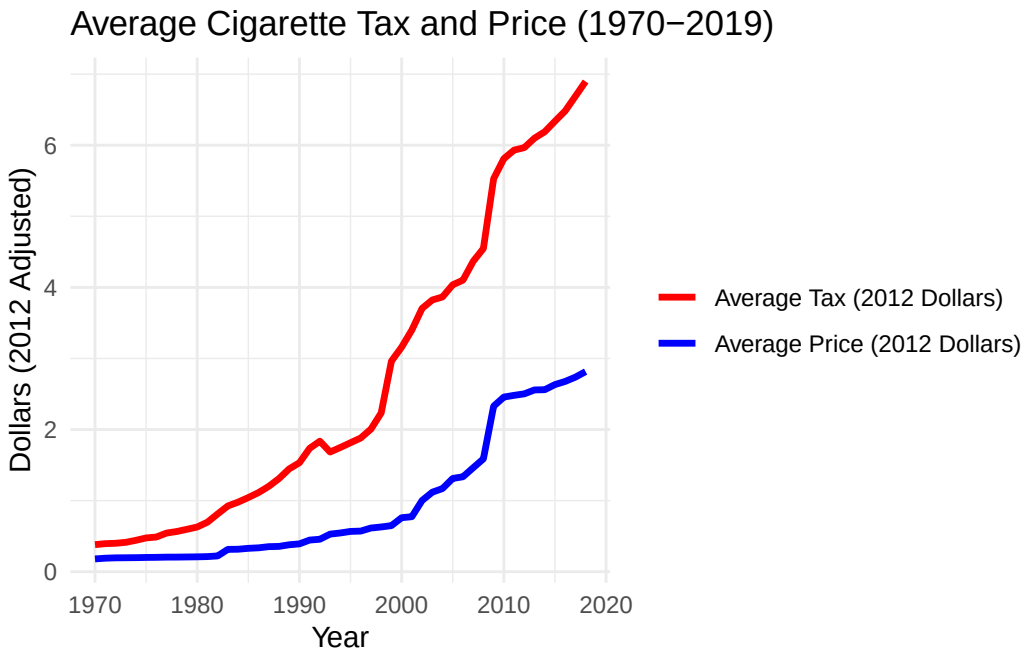
Question 1

Present a bar graph showing the proportion of states with a change in their cigarette tax in each year from 1970 to 1985.



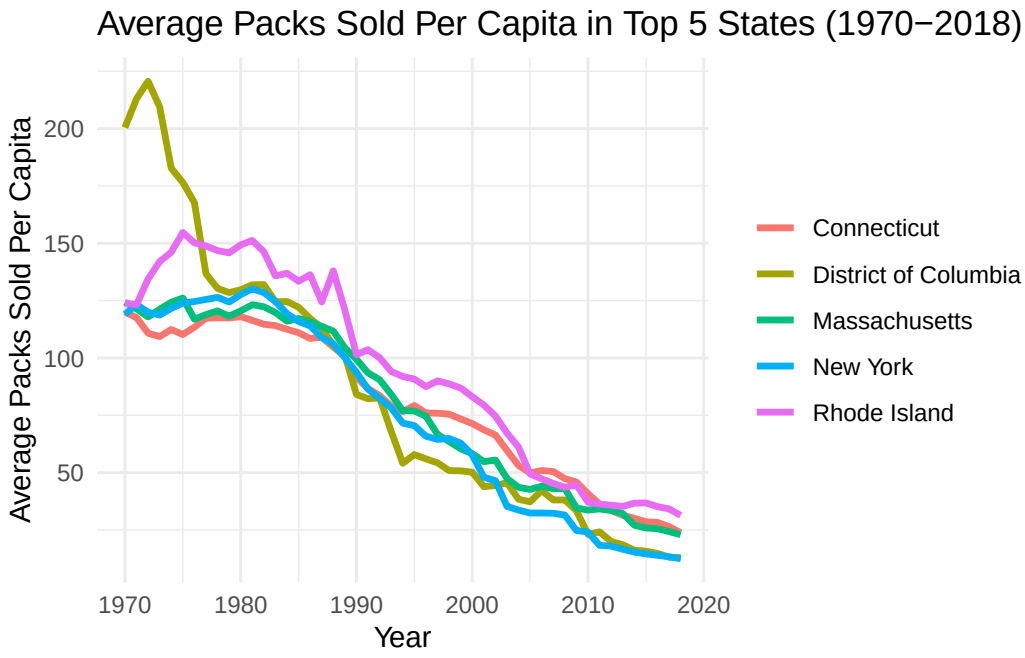
Question 2

Plot on a single graph the average tax (in 2012 dollars) on cigarettes and the average price of a pack of cigarettes from 1970 to 2018.



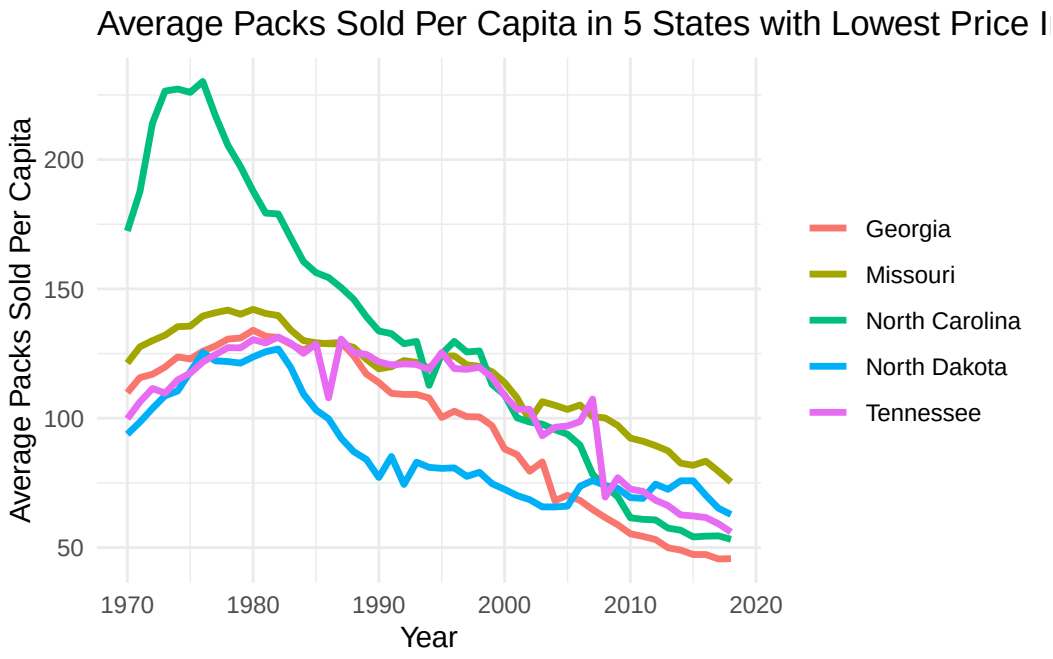
Question 3

Identify the 5 states with the highest increases in cigarette prices (in dollars) over the time period. Plot the average number of packs sold per capita for those states from 1970 to 2018.



Question 4

Identify the 5 states with the lowest increases in cigarette prices over the time period. Plot the average number of packs sold per capita for those states from 1970 to 2018.



Question 5

Compare the trends in sales from the 5 states with the highest price increases to those with the lowest price increases.

blah blh blah anwer

Estimate ATEs

Question 6

Focusing only on the time period from 1970 to 1990, regress log sales on log prices to estimate the price elasticity of demand over that period. Interpret your results.

```
OLS estimation, Dep. Var.: ln_sales
Observations: 1,071
Fixed-effects: state: 51,  Year: 21
Standard-errors: Clustered (state)
          Estimate Std. Error  t value   Pr(>|t|)
ln_price -0.74166   0.131926 -5.62181 8.4191e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
RMSE: 0.062859     Adj. R2: 0.916544
                 Within R2: 0.220887
```

Question 7

Again limiting to 1970 to 1990, regress log sales on log prices using the total (federal and state) cigarette tax (in dollars) as an instrument for log prices. Interpret your results and compare your estimates to those without an instrument. Are they different? If so, why?

```
TSLS estimation - Dep. Var.: ln_sales
                  Endo.    : ln_price
                  Instr.   : tax_dollar
Second stage: Dep. Var.: ln_sales
Observations: 1,071
Fixed-effects: state: 51,  Year: 21
Standard-errors: Clustered (state)
              Estimate Std. Error  t value   Pr(>|t|)
fit_ln_price -0.832286   0.201542 -4.12959 0.00013787 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
RMSE: 0.062992     Adj. R2: 0.916191
                 Within R2: 0.217589
F-test (1st stage), ln_price: stat = 502.7    , p < 2.2e-16 , on 1 and 1,049 DoF.
                  Wu-Hausman: stat =   2.02852, p = 0.154684, on 1 and 998 DoF.
```