

# Homework 3 - Research in Health Economics

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## Summarise the Data

### Question 1

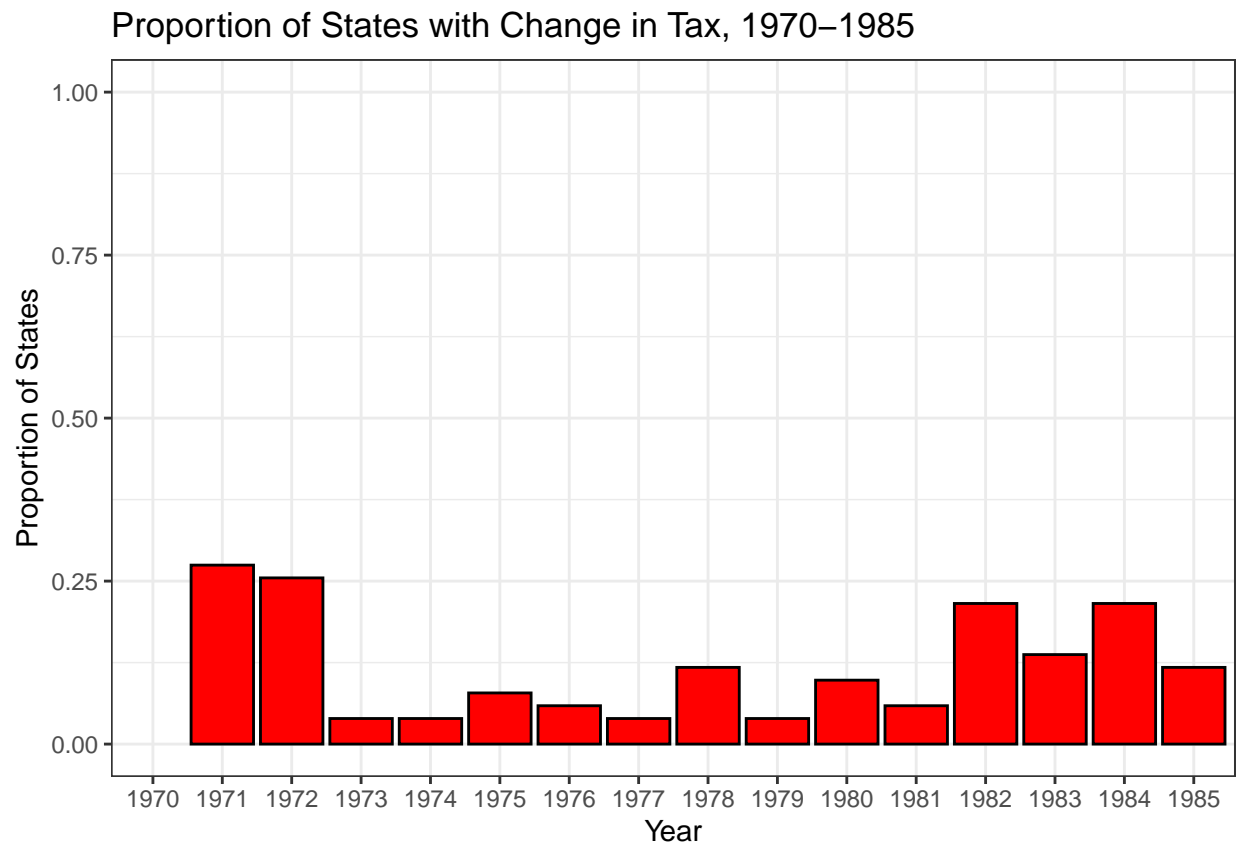
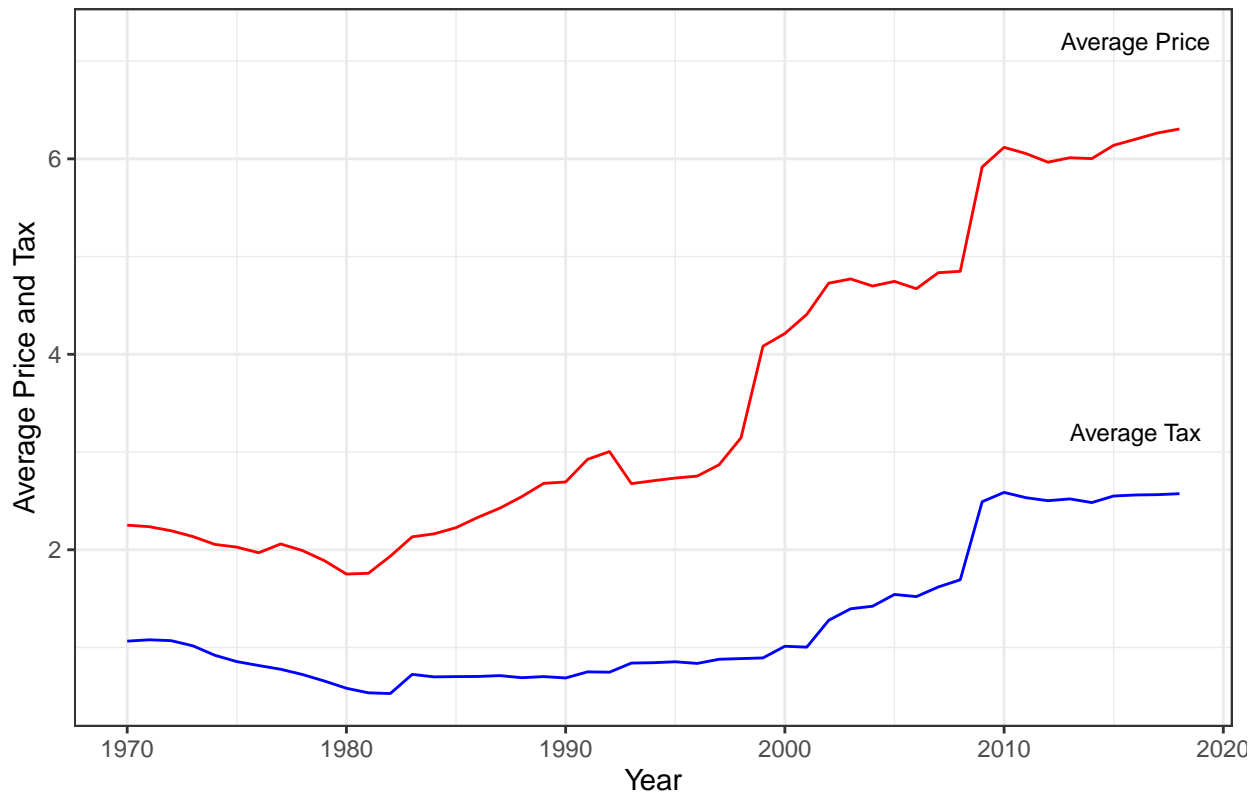


Figure 1: Proportion of States with Change in Tax, 1970-1985

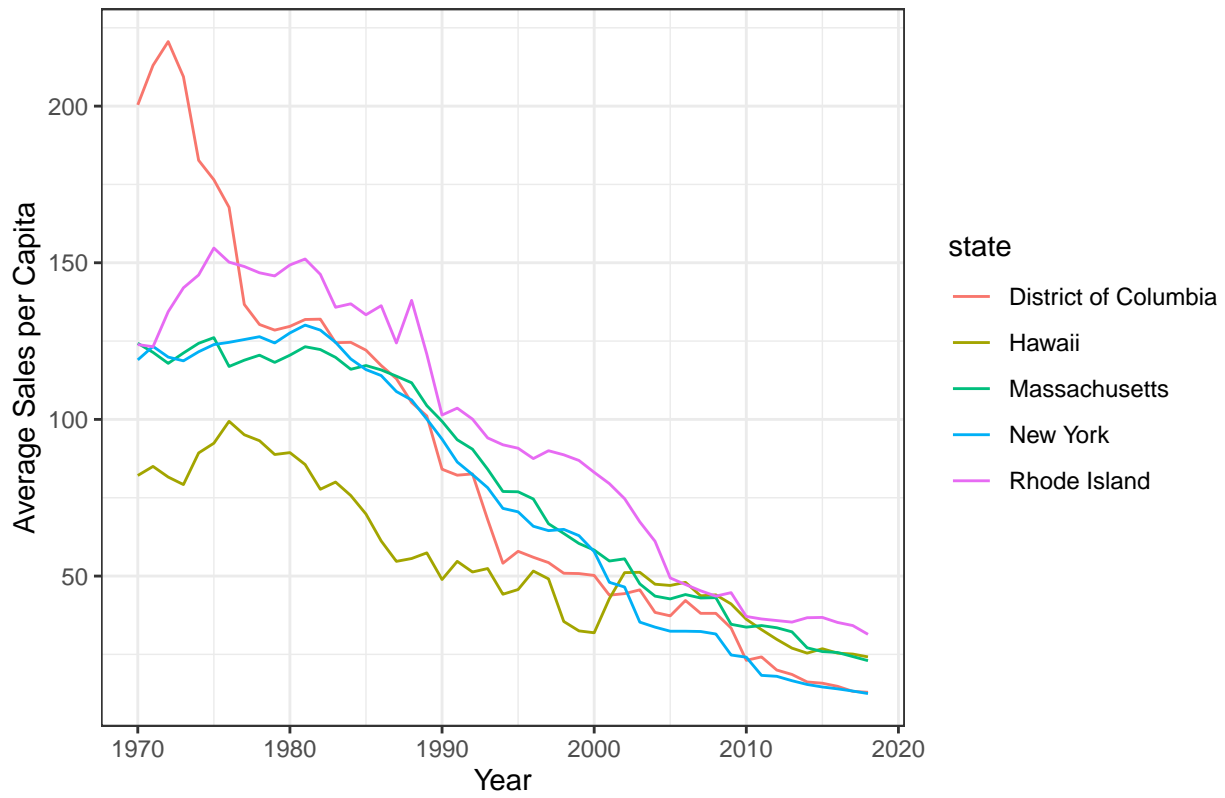
## Question 2

Average Price and Tax from 1970–2018

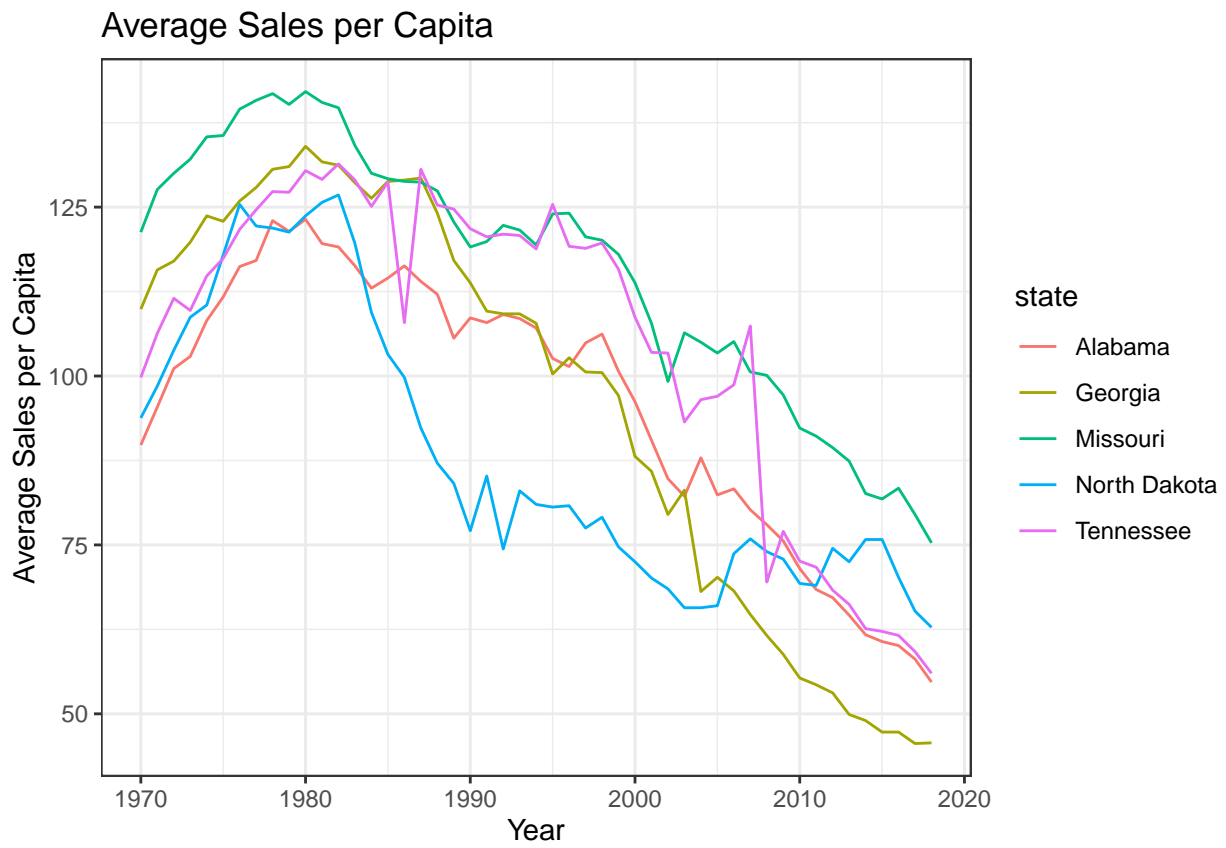


### Question 3

Average Sales per Capita

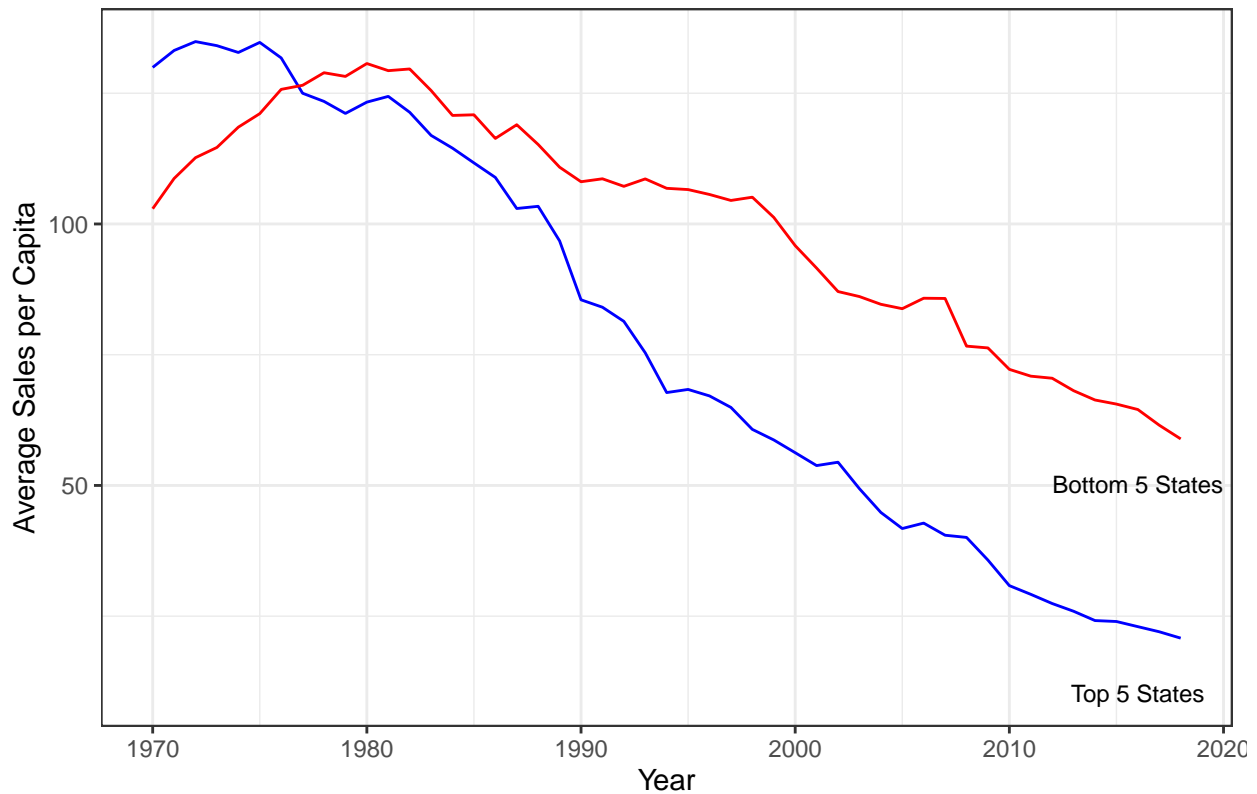


#### Question 4



## Question 5

### Average Sales in States with Highest and Lowest Tax Increase



## Estimate ATEs

### Question 1

Table 1: Elasticity Estimates 1970-1990

	OLS
Log Price	-0.809 (0.038)
N	1071
R2	0.29

The regression from Table @ref(tab:reg6table) shows that cigarette demand has an elasticity of  $-0.809$ , which is inelastic, suggesting that cigarette demand is less responsive to changes in price.

### Question 2

The IV regression from Table @ref(tab:iv7table) shows that cigarette demand has a price elasticity of  $-0.45$ , which is inelastic. However, it is more inelastic compared to the previous regression without an instrument, suggesting that demand is even less responsive to price changes.

Table 2: Elasticity Estimates 1970-1990

	IV
Log Price	-0.736 (0.075)
N	1071
R2	0.29

**Question 3**

Table 3: First Stage and Reduced Form Estimates 1970-1990

	First Stage	Reduced Form
Log Tax	0.327 (0.017)	-0.241 (0.028)
N	1071	1071
R2	0.26	0.06

**Question 4**

Table 4: Elasticity Estimates 1991-2015

	OLS	IV
Log Price	-0.997 (0.025)	-1.164 (0.029)
N	1275	1275
R2	0.56	0.55

Table 5: First Stage and Reduced Form Estimates 1991-2015

	First Stage	Reduced Form
Log Tax	0.308 (0.005)	-0.358 (0.008)
N	1275	1275
R2	0.76	0.58

**Question 5**

The results from all the ATE questions are presented in Table @ref(tab:coeftable) and @ref(tab:coeftab2). The results from regression of log sales on log prices from 1991-2015 show an elasticity of which is more elastic compared to the results from 1970-1990. The IV regression for 1991-2015 show an elasticity of which is elastic. These results indicate that the overall demand for cigarettes have become more elastic in 1991 to 2015 compared to in 1970-1990, indicating a greater responsiveness in quantity demanded due to a change in price.

Table 6: Elasticity Estimates

	1970 - 1990		1991 - 2015	
	OLS	IV	OLS	IV
Log Price	-0.809 (0.038)	-0.736 (0.075)	-0.997 (0.025)	-1.164 (0.029)
N	1071	1071	1275	1275
R2	0.29	0.29	0.56	0.55

Table 7: First Stage and Reduced Form Estimates

	1970 - 1990		1991 - 2015	
	First Stage	Reduced Form	First Stage	Reduced Form
Log Tax	0.327 (0.017)	-0.241 (0.028)	0.308 (0.005)	-0.358 (0.008)
N	1071	1071	1275	1275
R2	0.26	0.06	0.76	0.58