# Homework 3 - Research in Health Economics

### Ammarah Ahmed

# Summarise the Data

## Question 1

## Proportion of States with Change in Tax, 1970–1985

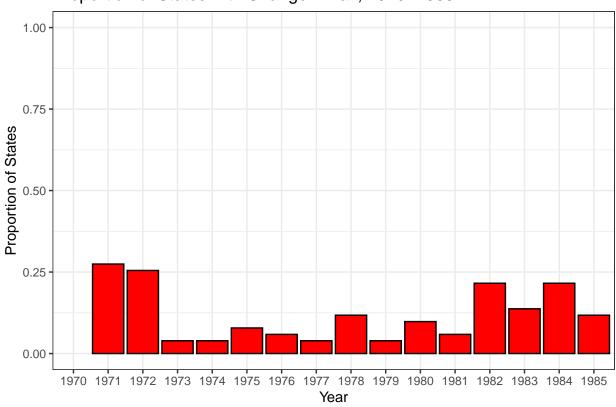
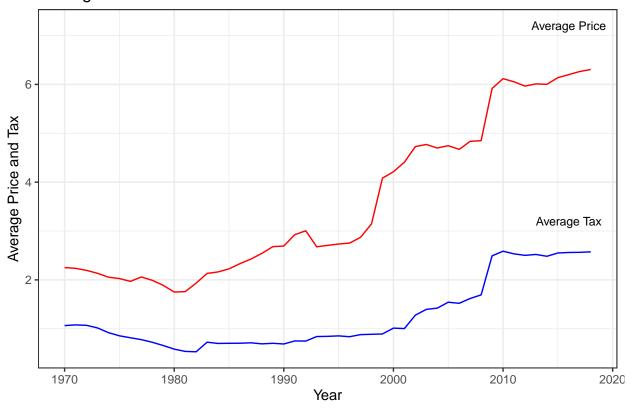


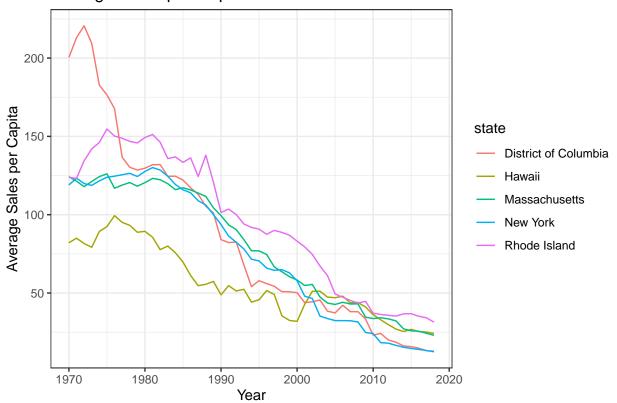
Figure 1: Proportion of States with Change in Tax, 1970-1985

Question 2
Average Price and Tax from 1970–2018



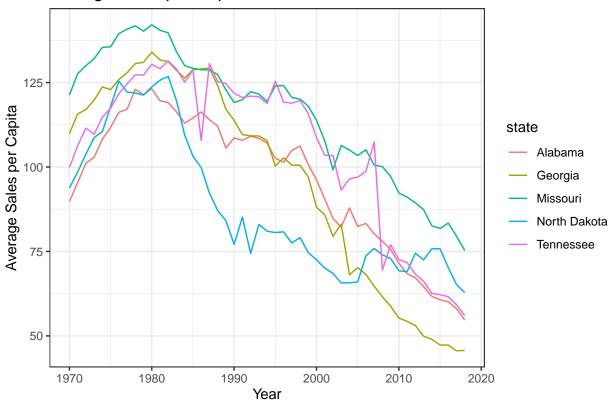
Question 3





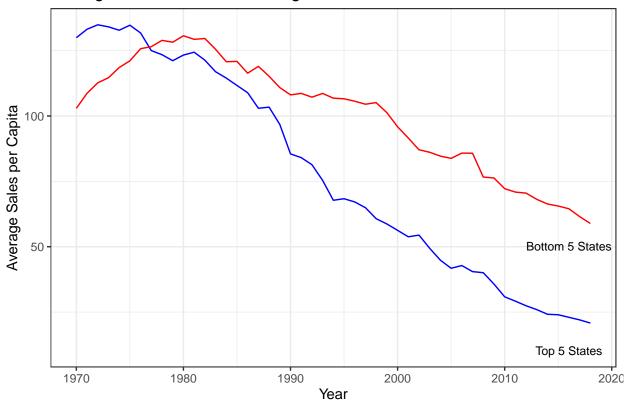
Question 4

# Average Sales per Capita



### 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 shows that cigarette demand has an elasticity of -0.809, which is inelestic, suggesting that cigarette demand is less responsive to changes in price.

#### Question 2

The IV regression shows that cigarette demand has a price elasticity of -0.736 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	-0.241
	(0.017)	(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 R2	$1275 \\ 0.56$	$1275 \\ 0.55$

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

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

#### Question 5

The results from all the ATE questions are presented in the tables below. The results from regression of log sales on log prices from 1991-2015 show an elasticity of -0.997 which is more elastic compared to the results from 1970-1990. The IV regression for 1991-2015 show an elasticity of -1.164 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 R2	1071 0.29	1071 0.29	1275 0.56	$1275 \\ 0.55$

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 R2	1071 0.26	1071 0.06	1275 0.76	1275 0.58