Homework 3 - Research in Health Economics

Alexia Witthaus Viñé

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Question 1

Figure **??**fig:table)

Proportion of States with a change in their cigarette tax
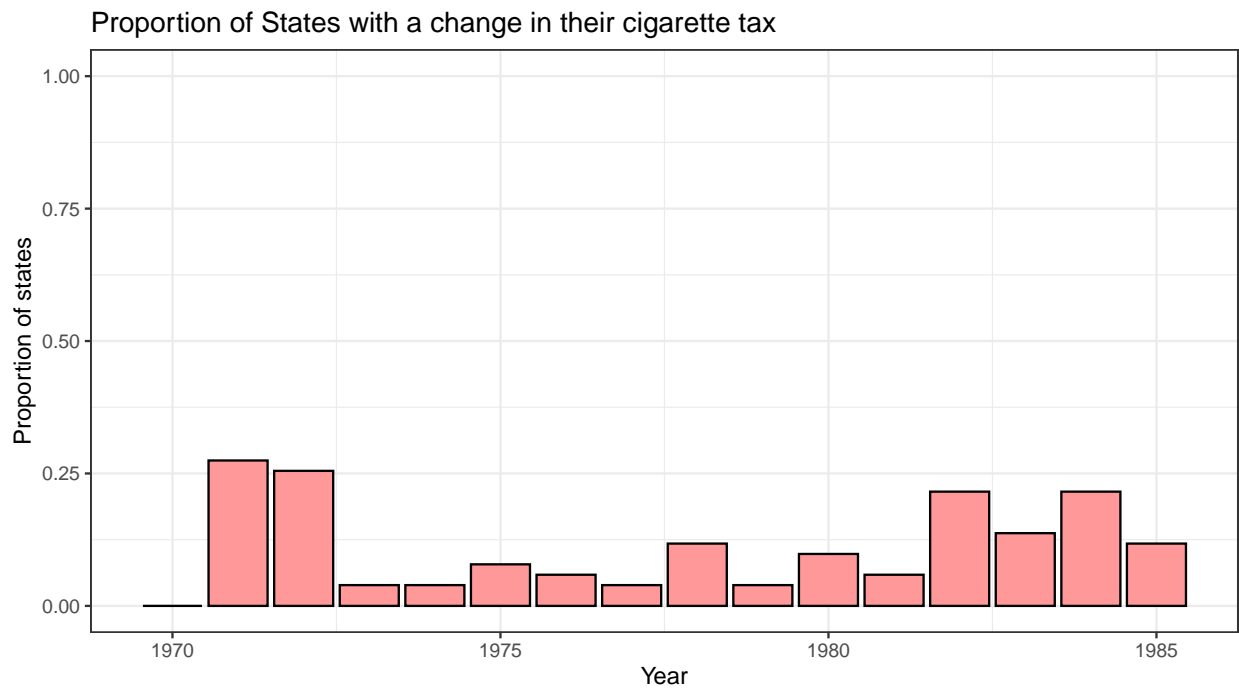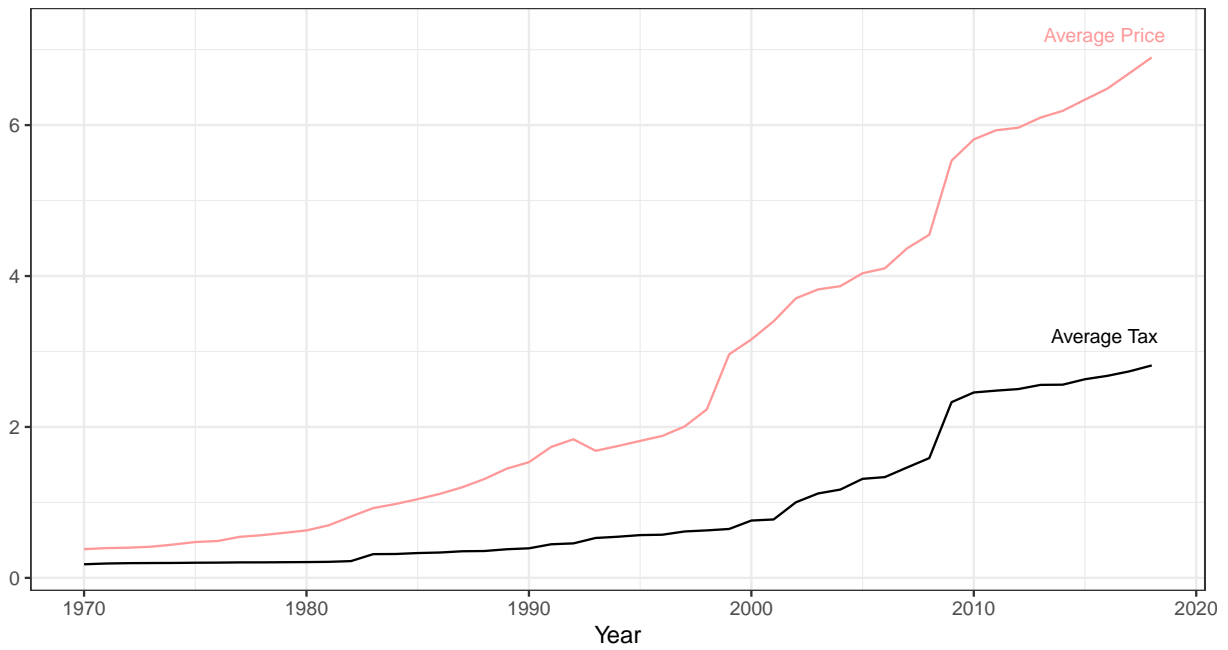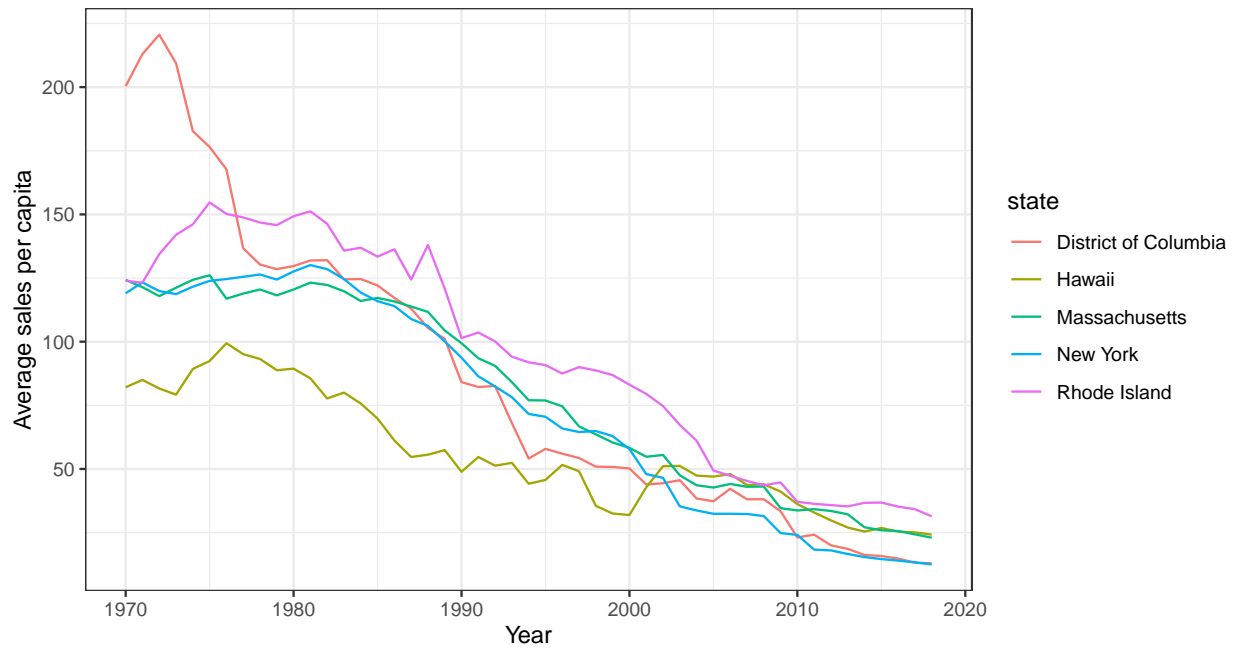
Figure 1: Distribution of Hospital Charges

Question 2

Average tax and Average Price of Cigaretts

Question 3

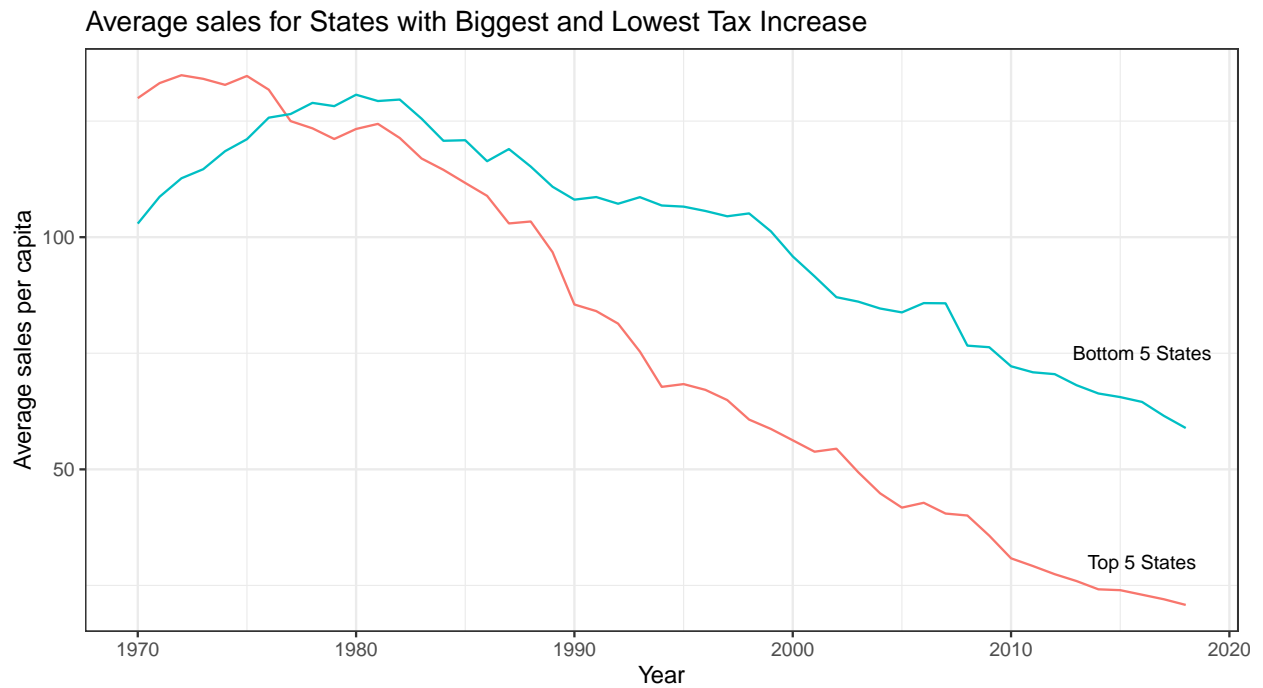**Average sales per capita**

Average sales per capita
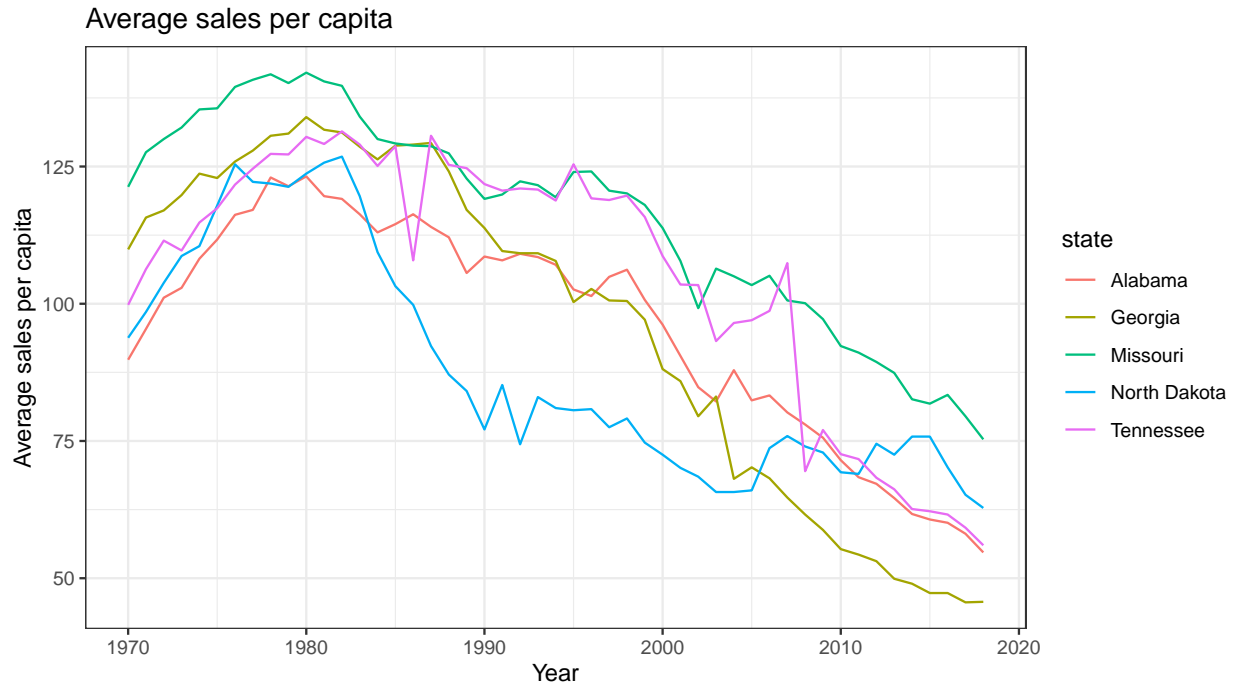
Question 5

Apart from North Carolina, the top 5 higheststates in tax increase seem to start higher, and have a steeper sloper. By 2019, it looks like the sales from the highest taxes are lower than the ones from the lowest taxes.

Average sales for States with Biggest and Lowest Tax Increase

Question 6

	Elasticity with OLS
(Intercept)	(3.172)
	3.172
	(0.285)
log_sales	(−0.733)
	−0.733
	(0.059)
Num.Obs.	1071
R2	0.126
R2 Adj.	0.125
AIC	1262.1
BIC	1272.1
RMSE	0.44
Std.Errors	IID

Question 7

	Elasticity with IV
(Intercept)	(4.715)
	4.715
	(0.009)
fit_log_price	(−0.270)
	−0.270
	(0.017)
Num.Obs.	1071
R2	0.084
R2 Adj.	0.083
AIC	−244.1
BIC	−234.1
RMSE	0.22
Std.Errors	IID

These estimates are different. It is likely that there are variables in our first regression, that are correlated with both, sales and price, thus biasing the results. Using an IV in the second model, we are reducing the variation in price to the variation caused by variation in taxation with time. This would produce an unbiased result of the ATE as long as the relevance and exclusion restriction assumptions are met.

Question 8

Question 9

	First stage
(Intercept)	(−1.429)
	−1.429***
	(0.023)
tax_dollar	(4.169)
	4.169***
	(0.085)
Num.Obs.	1071
R2	0.695
R2 Adj.	0.694
AIC	136.1
BIC	146.0
RMSE	0.26
Std.Errors	IID

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

	Reduced Form
(Intercept)	(5.101)
	5.101***
	(0.018)
tax_dollar	(−1.127)
	−1.127***
	(0.065)
Num.Obs.	1071
R2	0.217
R2 Adj.	0.216
AIC	−411.9
BIC	−401.9
RMSE	0.20
Std.Errors	IID

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

	Elasticity with OLS
(Intercept)	(4.602)
	4.602
	(0.089)
log_sales	(−0.800)
	−0.800
	(0.021)
Num.Obs.	1275
R2	0.533
R2 Adj.	0.532
AIC	831.9
BIC	842.2
RMSE	0.33
Std.Errors	IID

	Elasticity with IV
(Intercept)	(5.207)
	5.207***
	(0.027)
fit_log_price	(−0.803)
	−0.803***
	(0.021)
Num.Obs.	1275
R2	0.510
R2 Adj.	0.510
AIC	657.7
BIC	668.0
RMSE	0.31
Std.Errors	IID

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

	First stage
(Intercept)	(0.659)
	0.659***
	(0.011)
tax_dollar	(0.422)
	0.422***
	(0.007)
Num.Obs.	1275
R2	0.755
R2 Adj.	0.755
AIC	9.1
BIC	19.4
RMSE	0.24
Std.Errors	IID

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

	Reduced Form
(Intercept)	(4.677)
	4.677***
	(0.013)
tax_dollar	(−0.339)
	−0.339***
	(0.008)
Num.Obs.	1275
R2	0.586
R2 Adj.	0.585
AIC	443.4
BIC	453.7
RMSE	0.29
Std.Errors	IID

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001