

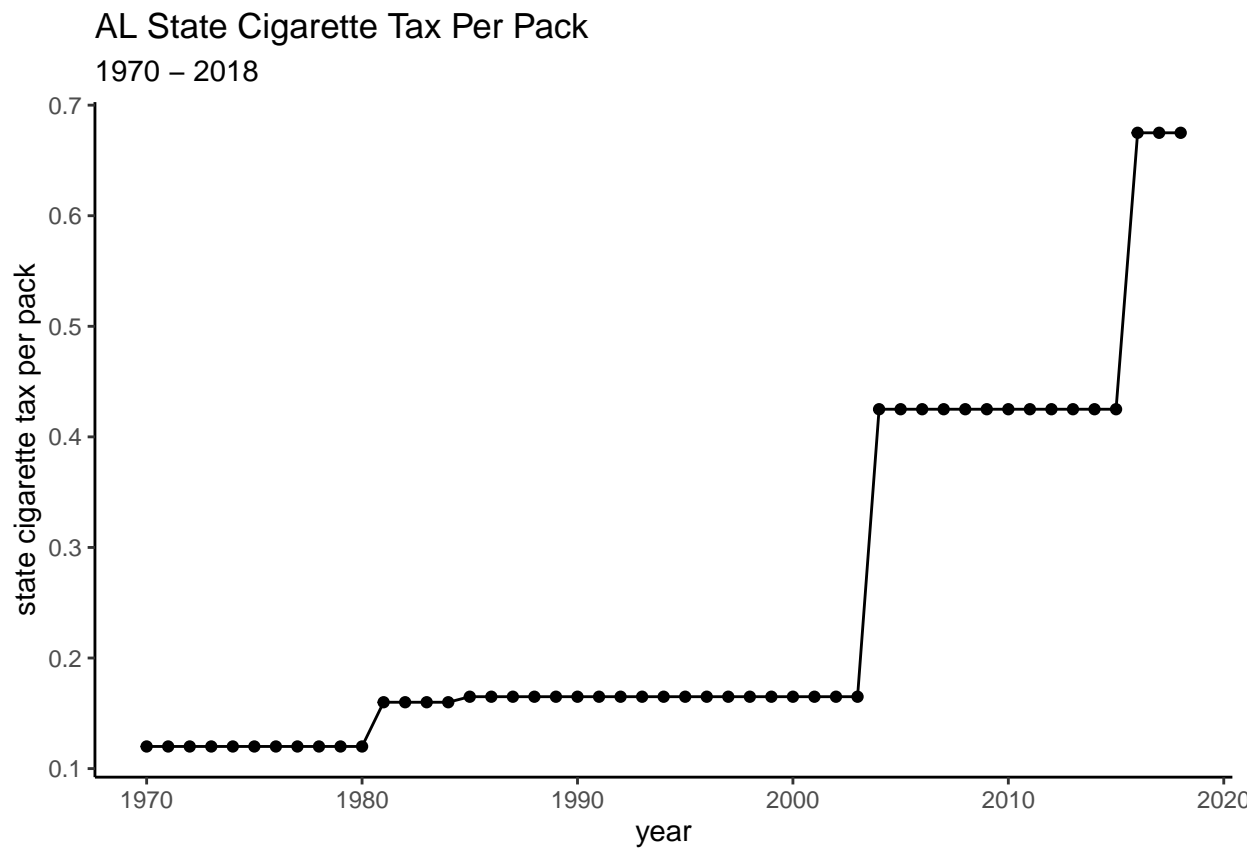
lab_9

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4/21/2022

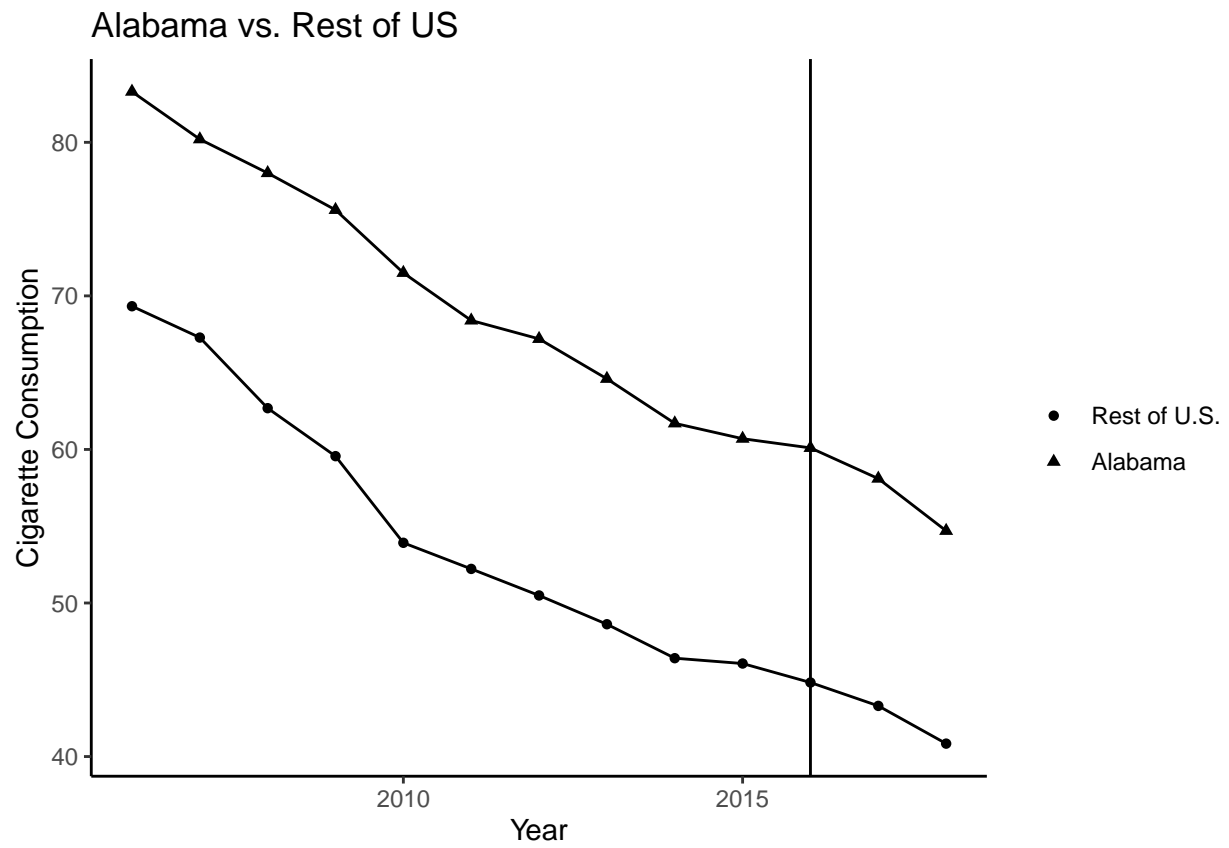
Question 1

I look at Alabama in this graph. There were tax hikes in 1981, 2004, and 2016. The largest of these hikes occurred in 2004, when the tax rose from .165 in 2003 to .425 in 2004. The hike in 2015 was almost as large: the tax from from .425 in 2015 to .675 in 2016.

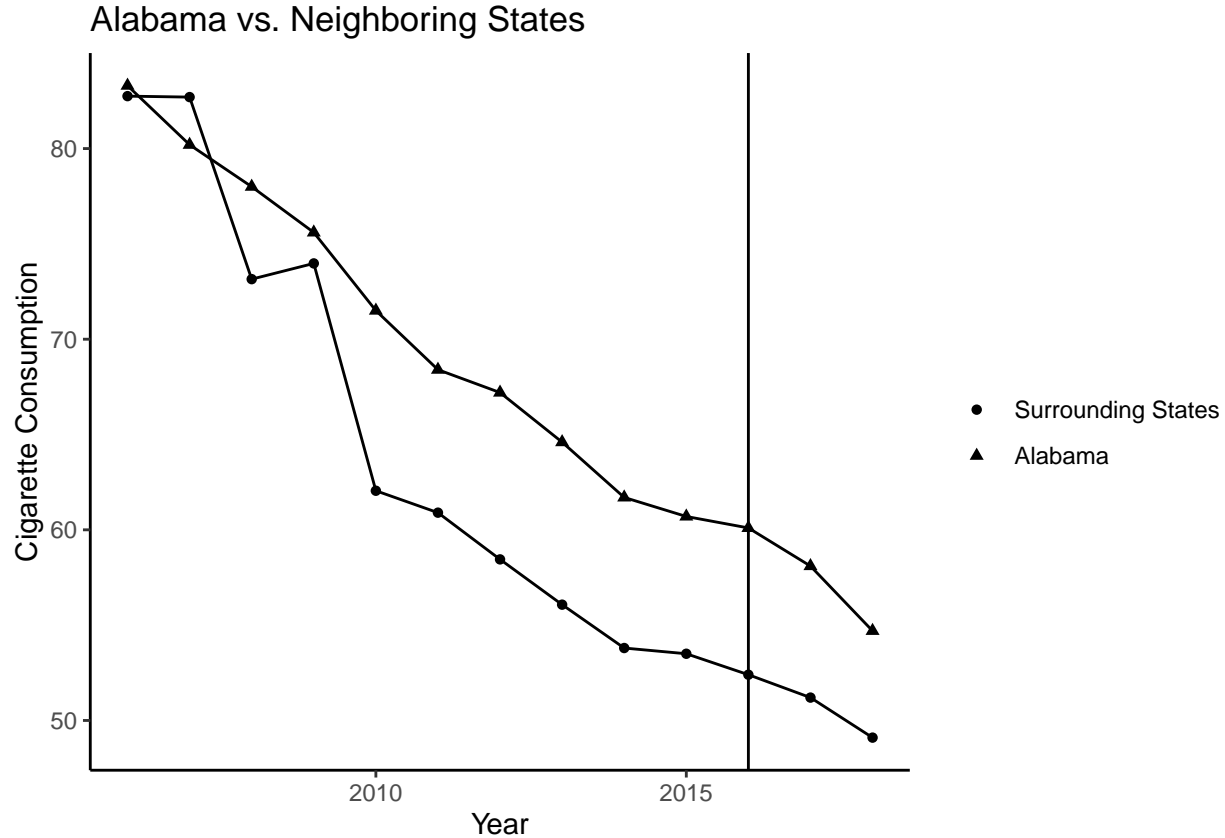


Question 2

Part a



Part b



Part c

The parallel trends assumption looks plausible for part a, but the trends in the surrounding states look like they have some strange spikes that Alabama doesn't have.

Question 3

Based on the previous question, I am going to use the entirety of the US as my control group. See the table below for the statistics on the effect of the 2016 tax hike in Alabama vs. the Rest of the U.S.. Using the difference in differences calculation, I calculate that the impact of the cigarette tax policy change = $6.88 - 5.77 = 1.11$. In context, this implies that the 2016 policy results in a decrease of 1.11 in consumption in Alabama.

group	mean_consumption_before_2016	mean_consumption_after_2016	difference
Alabama	64.520	57.63333	6.88667
Rest of U.S.	48.758	42.98800	5.770000

Question 4

The coefficient for dd (11.11) is the same as what I calculated above.

% Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac at gmail.com % Date and time: Thu, Apr 21, 2022 - 13:42:03

	<i>Dependent variable:</i>
	pack_sales
post	-5.770*** (2.023)
al	15.762* (8.846)
dd	-1.117 (14.445)
Constant	48.758*** (1.239)
Observations	408
R ²	0.032
Adjusted R ²	0.024
Residual Std. Error	19.585 (df = 404)
F Statistic	4.394*** (df = 3; 404)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

t test of coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	48.7580	1.2938	37.6847	< 2.2e-16
post	-5.7700	1.9941	-2.8936	0.004015
al	15.7620	1.8664	8.4453	5.516e-16
dd	-1.1167	2.7310	-0.4089	0.682840

— Signif. codes: 0 ‘**0.001**’ ‘**0.01**’ ‘0.05’ ‘0.1’ ‘1’

Question 5

The difference in difference estimate is -1.11. This implies that Alabama's tax policy resulted on average in a 1.11 unit decrease in cigarette consumption, holding all else constant.

```
##
## t test of coefficients:
##
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)      67.99020    0.57174 118.9177 < 2.2e-16 ***
## dd               -1.11667    0.57285  -1.9493 0.0520581 .
## factor(year)2012  -1.71961    0.66412  -2.5893 0.0100194 *
## factor(year)2013  -3.60784    0.62701  -5.7540 1.908e-08 ***
## factor(year)2014  -5.83137    0.59125  -9.8627 < 2.2e-16 ***
## factor(year)2015  -6.19216    0.65224  -9.4936 < 2.2e-16 ***
## factor(year)2016  -7.39379    0.65010 -11.3733 < 2.2e-16 ***
## factor(year)2017  -8.92516    0.66002 -13.5225 < 2.2e-16 ***
## factor(year)2018 -11.40163    0.73750 -15.4599 < 2.2e-16 ***
## factor(state_fips)2 -25.34375    0.40323 -62.8514 < 2.2e-16 ***
## factor(state_fips)4 -38.61875    0.86619 -44.5847 < 2.2e-16 ***
## factor(state_fips)5  -6.81875    0.43597 -15.6404 < 2.2e-16 ***
## factor(state_fips)6 -39.95625    0.55572 -71.9006 < 2.2e-16 ***
## factor(state_fips)8 -25.49375    0.49379 -51.6291 < 2.2e-16 ***
## factor(state_fips)9 -32.54375    0.40102 -81.1518 < 2.2e-16 ***
## factor(state_fips)10 12.11875    1.78659   6.7832 5.044e-11 ***
## factor(state_fips)11 -45.39375    0.51374 -88.3599 < 2.2e-16 ***
## factor(state_fips)12 -19.26875    0.47466 -40.5947 < 2.2e-16 ***
## factor(state_fips)13 -13.33125    0.53550 -24.8950 < 2.2e-16 ***
## factor(state_fips)15 -35.28125    0.67630 -52.1678 < 2.2e-16 ***
## factor(state_fips)16 -20.96875    0.58923 -35.5869 < 2.2e-16 ***
## factor(state_fips)17 -27.23125    1.50743 -18.0647 < 2.2e-16 ***
## factor(state_fips)18   1.48125    0.47165   3.1406 0.0018300 **
## factor(state_fips)19 -15.41875    0.81087 -19.0151 < 2.2e-16 ***
## factor(state_fips)20 -23.83125    0.61434 -38.7917 < 2.2e-16 ***
## factor(state_fips)21  28.26875    1.63498  17.2900 < 2.2e-16 ***
## factor(state_fips)22   3.90625    2.33069   1.6760 0.0946328 .
## factor(state_fips)23 -14.01875    1.08665 -12.9009 < 2.2e-16 ***
## factor(state_fips)24 -31.00625    0.60990 -50.8380 < 2.2e-16 ***
## factor(state_fips)25 -34.13125    0.57945 -58.9031 < 2.2e-16 ***
## factor(state_fips)26 -17.44375    0.98295 -17.7464 < 2.2e-16 ***
## factor(state_fips)27 -27.55625    2.04207 -13.4943 < 2.2e-16 ***
## factor(state_fips)28  -0.23125    0.43928  -0.5264 0.5989282
## factor(state_fips)29  21.45625    0.71991  29.8040 < 2.2e-16 ***
## factor(state_fips)30 -19.73125    0.62246 -31.6990 < 2.2e-16 ***
## factor(state_fips)31 -14.33125    0.48219 -29.7210 < 2.2e-16 ***
## factor(state_fips)32 -22.50625    1.48386 -15.1674 < 2.2e-16 ***
## factor(state_fips)33  27.49375    0.76843  35.7792 < 2.2e-16 ***
## factor(state_fips)34 -33.16875    0.65098 -50.9518 < 2.2e-16 ***
## factor(state_fips)35 -36.98125    0.95647 -38.6645 < 2.2e-16 ***
## factor(state_fips)36 -47.01875    0.69636 -67.5205 < 2.2e-16 ***
## factor(state_fips)37  -5.85625    0.61826  -9.4721 < 2.2e-16 ***
## factor(state_fips)38   8.36875    1.56587   5.3445 1.641e-07 ***
## factor(state_fips)39  -9.69375    0.46626 -20.7904 < 2.2e-16 ***
## factor(state_fips)40   2.16875    0.63024   3.4411 0.0006495 ***
```

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## factor(state_fips)41 -20.80625    0.42625 -48.8119 < 2.2e-16 ***
## factor(state_fips)42 -13.60625    1.18610 -11.4714 < 2.2e-16 ***
## factor(state_fips)44 -27.14375    1.06906 -25.3902 < 2.2e-16 ***
## factor(state_fips)45  -3.01875    0.87750  -3.4402 0.0006518 ***
## factor(state_fips)46 -20.01875    1.17458 -17.0433 < 2.2e-16 ***
## factor(state_fips)47   1.11875    0.60402   1.8522 0.0648435 .
## factor(state_fips)48 -28.24375    0.46635 -60.5629 < 2.2e-16 ***
## factor(state_fips)49 -42.33125    0.74983 -56.4544 < 2.2e-16 ***
## factor(state_fips)50 -21.88125    0.63347 -34.5421 < 2.2e-16 ***
## factor(state_fips)51   2.90625    1.02889   2.8247 0.0050052 **
## factor(state_fips)53 -43.60625    0.79675 -54.7305 < 2.2e-16 ***
## factor(state_fips)54  33.15625    2.75656  12.0281 < 2.2e-16 ***
## factor(state_fips)55 -22.50625    0.90588 -24.8446 < 2.2e-16 ***
## factor(state_fips)56  -4.20625    1.13148  -3.7175 0.0002343 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```