Homework5-1

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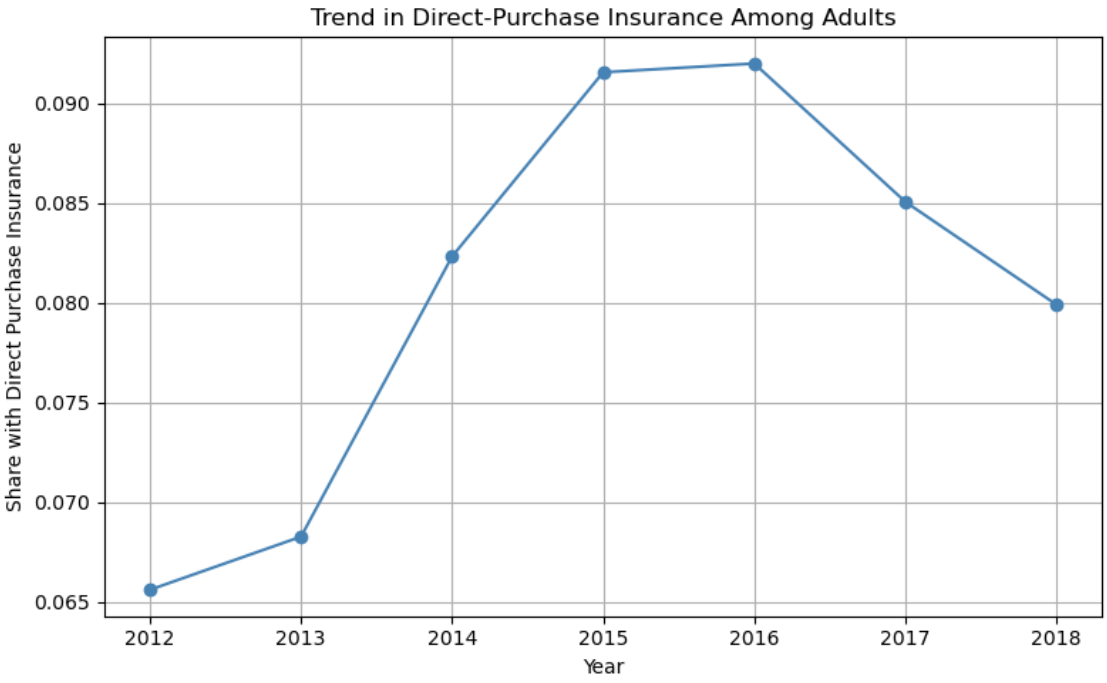
Homework 5-1

In this assignment, you'll recreate the Insurance and Medicaid Expansion data and answer a few questions along the way. As with the prior assignments, the first step is to make sure you have the Insurance Access repository and downloaded all of the raw data sources. Once you have the data downloaded and the code running, answer the following questions.

0.0.1 Summarize the Data

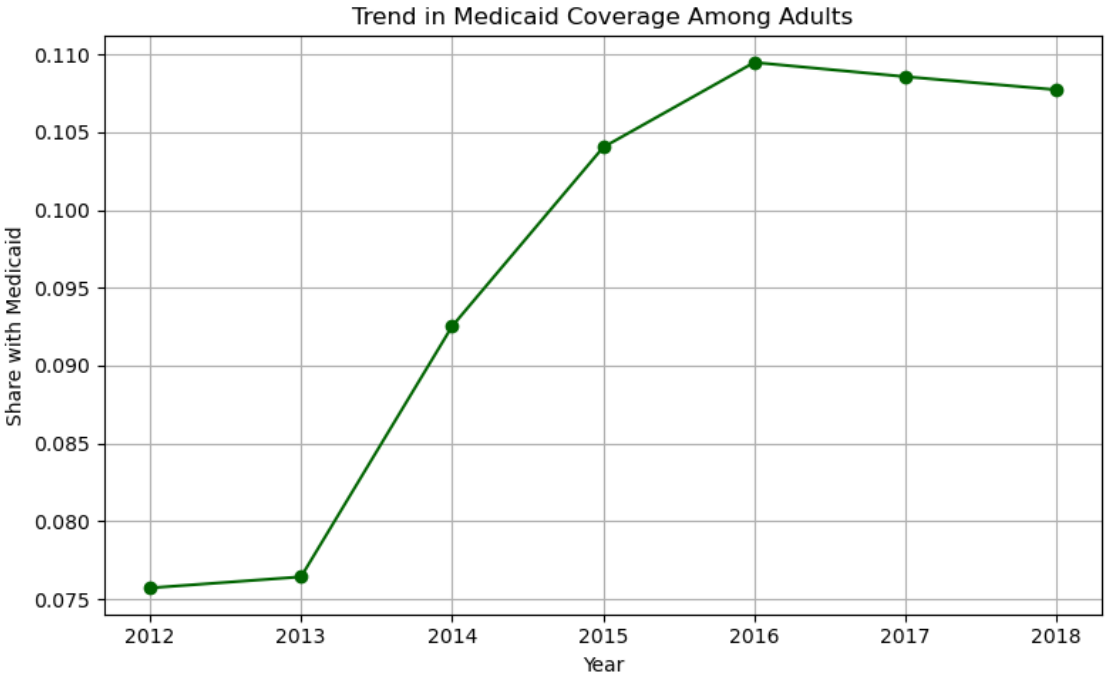
1. Plot the share of the adult population with direct purchase health insurance over time.



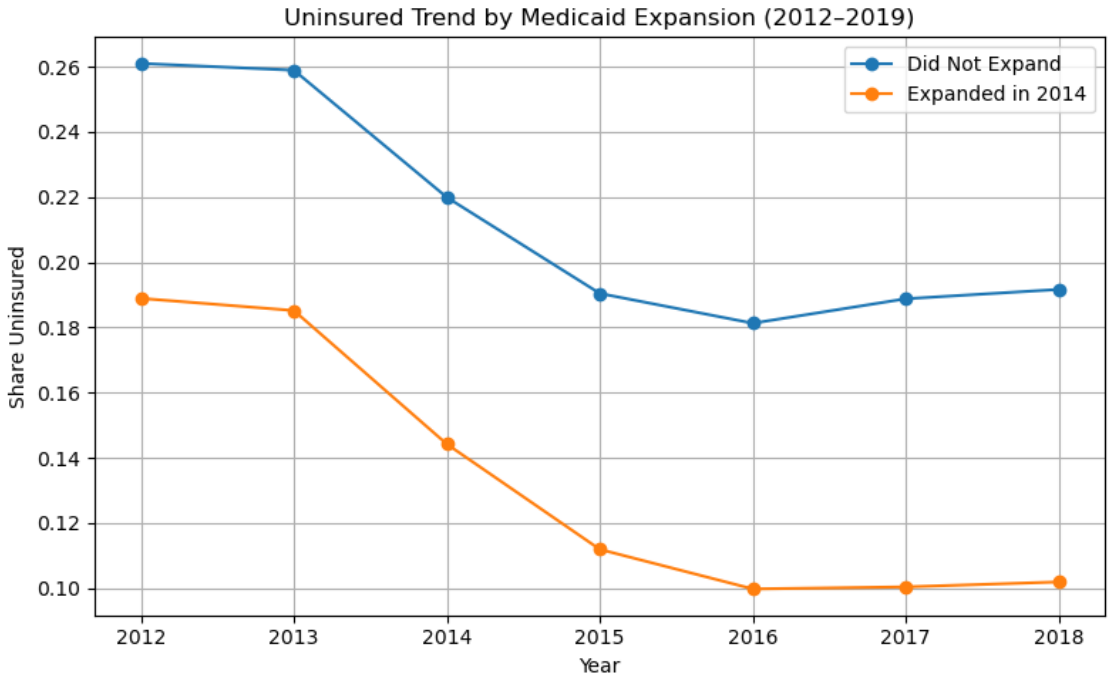
2. Discuss the reduction in direct purchase health insurance in later years. Can you list a couple of policies that might have affected the success of the direct purchase insurance market?

In later years, the share of adults with direct-purchase health insurance declined. This reduction likely reflects decreased affordability, market instability, and reduced incentives to buy plans individually. A couple of key policy changes that likely contributed to this trend include: Repeal of the Individual Mandate (2019): The penalty for not having health insurance was reduced to $0 under the Tax Cuts and Jobs Act, removing a major incentive to buy coverage individually. Expansion of Short-Term Plans: The Trump administration expanded access to short-term, limited-duration insurance plans, which are cheaper but offer fewer protections. These may have diverted healthier individuals away from ACA-compliant direct-purchase plans, increasing risk pools and premiums.

3. Plot the share of the adult population with Medicaid over time.



4. Plot the share of uninsured over time, separately by states that expanded Medicaid in 2014 versus those that did not. Drop all states that expanded after 2014.



0.0.2 Estimate ATEs

For the rest of the assignment, we're going to apply the difference-in-differences estimator to the question of Medicaid expansion and uninsurance.

5. Calculate the average percent of uninsured individuals in 2012 and 2015, separately for expansion and non-expansion states. Present your results in a basic 2x2 DD table.

```
Q5: Difference-in-Differences Table (Uninsurance Rates)
year            2012    2015  Change
group
Expanded      0.1889  0.1119 -0.0770
Not Expanded  0.2610  0.1904 -0.0706

Estimated ATE (Difference-in-Differences): -0.0064
```

6. Estimate the effect of Medicaid expansion on the uninsurance rate using a standard DD regression estimator, again focusing only on states that expanded in 2014 versus those that never expanded.

```
                            OLS Regression Results
==============================================================================
Dep. Variable:         uninsured_rate   R-squared:                       0.388
Model:                            OLS   Adj. R-squared:                  0.383
Method:                 Least Squares   F-statistic:                     73.07
Date:                Mon, 21 Apr 2025   Prob (F-statistic):           1.24e-36
```

```
Time:                        17:36:06   Log-Likelihood:                591.67
No. Observations:                 350   AIC:                           -1175.
Df Residuals:                     346   BIC:                           -1160.
Df Model:                           3
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept       0.2255      0.011     21.311      0.000       0.205       0.246
treatment      -0.0440      0.012     -3.767      0.000      -0.067      -0.021
post           -0.0581      0.013     -4.645      0.000      -0.083      -0.034
interaction    -0.0092      0.014     -0.668      0.504      -0.036       0.018
==============================================================================
Omnibus:                        1.617   Durbin-Watson:                   1.776
Prob(Omnibus):                  0.445   Jarque-Bera (JB):                1.539
Skew:                           0.072   Prob(JB):                        0.463
Kurtosis:                       2.708   Cond. No.                         15.8
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly
specified.

Estimated ATE (DiD Regression across all years): -0.0092
```

7. Include state and year fixed effects in your estimates. Try using the lfe or fixest package to estimate this instead of directly including the fixed effects.

```
Q7: DiD Regression with State and Year Fixed Effects
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:         uninsured_rate   R-squared:                        0.0134
Estimator:                   PanelOLS   R-squared (Between):             -0.0662
No. Observations:                 350   R-squared (Within):               0.1597
Date:                Mon, Apr 21 2025   R-squared (Overall):             -0.0546
Time:                        17:36:35   Log-likelihood                    1004.0
Cov. Estimator:            Unadjusted
                                        F-statistic:                      3.9892
Entities:                          50   P-value                           0.0467
Avg Obs:                       7.0000   Distribution:                  F(1,293)
Min Obs:                       7.0000
Max Obs:                       7.0000   F-statistic (robust):             3.9892
                                        P-value                           0.0467
Time periods:                       7   Distribution:                  F(1,293)
Avg Obs:                       50.000
Min Obs:                       50.000
Max Obs:                       50.000
```

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
interaction	-0.0092	0.0046	-1.9973	0.0467	-0.0183	-0.0001

F-test for Poolability: 54.395
P-value: 0.0000
Distribution: F(55,293)

Included effects: Entity, Time

Estimated ATE (w/ FE, all years): -0.0092

8. Repeat the analysis in question 7 but include all states (even those that expanded after 2014). Are your results different? If so, why?

Q8: DiD Regression with All States and Years Included (w/ FE)
PanelOLS Estimation Summary

Dep. Variable:	uninsured_rate	R-squared:	0.0206
Estimator:	PanelOLS	R-squared (Between):	-0.0767
No. Observations:	350	R-squared (Within):	0.1843
Date:	Mon, Apr 21 2025	R-squared (Overall):	-0.0633
Time:	17:41:14	Log-likelihood	1005.3
Cov. Estimator:	Unadjusted		
		F-statistic:	6.1670
Entities:	50	P-value	0.0136
Avg Obs:	7.0000	Distribution:	F(1,293)
Min Obs:	7.0000		
Max Obs:	7.0000	F-statistic (robust):	6.1670
		P-value	0.0136
Time periods:	7	Distribution:	F(1,293)
Avg Obs:	50.000		
Min Obs:	50.000		
Max Obs:	50.000		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
interaction	-0.0110	0.0044	-2.4833	0.0136	-0.0197	-0.0023

F-test for Poolability: 54.468
P-value: 0.0000
Distribution: F(55,293)

```
Included effects: Entity, Time

Estimated ATE (All States, w/ FE): -0.0110

/var/folders/8p/wmnjrdd55rx2pn76f5j7m2tw0000gn/T/ipykernel_20776/857791235.py:2:
FutureWarning: Downcasting object dtype arrays on .fillna, .ffill, .bfill is
deprecated and will change in a future version. Call
result.infer_objects(copy=False) instead. To opt-in to the future behavior, set
`pd.set_option('future.no_silent_downcasting', True)`
  df_all['treatment'] = df_all['expand_ever'].fillna(False).astype(int)
```

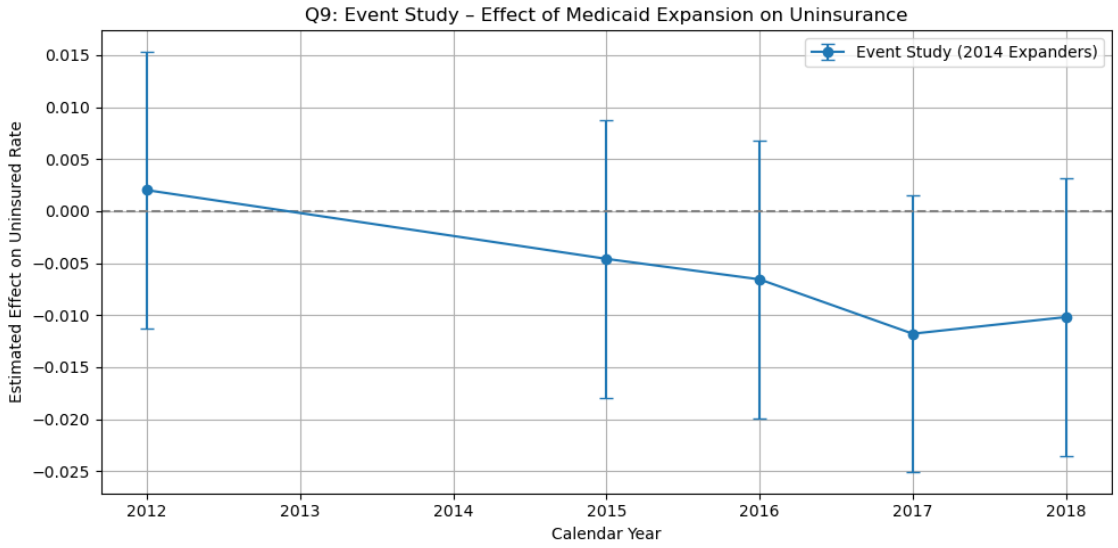
Including all states weakens the estimate because late expanders weren't actually treated by 2015, diluting the treatment effect.

9. Provide an "event study" graph showing the effects of Medicaid expansion in each year. Use the specification that includes state and year fixed effects, limited to states that expanded in 2014 or never expanded.

```
/var/folders/8p/wmnjrdd55rx2pn76f5j7m2tw0000gn/T/ipykernel_20776/3032532614.py:1
8: AbsorbingEffectWarning:
Variables have been fully absorbed and have removed from the regression:

event_m3

  event_model = PanelOLS.from_formula(formula, data=event_df, check_rank=False,
drop_absorbed=True).fit()
```



10. Repeat part 9 but again include states that expanded after 2014. Note: this is tricky…you need to put all states onto "event time" to create this graph.

```
/var/folders/8p/wmnjrdd55rx2pn76f5j7m2tw0000gn/T/ipykernel_20776/1071218890.py:1
```

```
8: AbsorbingEffectWarning:
Variables have been fully absorbed and have removed from the regression:

event_m3
```

```
  event_model_q10 = PanelOLS.from_formula(formula_q10, data=event_df_q10,
check_rank=False, drop_absorbed=True).fit()
```