

Problem Set 2
Due Class 5, October 4

PPPA 8022
Fall 2023

Some overall instructions

- Please use a do-file (or its SAS or SPSS or R equivalent) for this work. Do not program interactively. While interactive programming may seem faster at first, inevitably you find mistakes and lose track of edits to the data – and it is slower.
- Turn in a typed up set of answers that answers the questions below. Also turn in a Stata .do file and its associated .log file or the equivalent in whatever software you are using.
- Make formal tables to present your results. Do not present statistical software output.
- I have provided Stata datasets, but you should feel free to do the analysis in whatever software you prefer. If you need to transfer to another format, use StatTransfer or contact me. For loading these data in R, I recommend the `haven` package, with `read_dta()`.
- This problem set uses some large data. For the Census data, I have posted full dataset as well a smaller version; use whichever you prefer. For the CPS, we are using a random sample.
- If the question is insufficiently clear, explain the assumptions you made to reach your final estimates.
- Data are
 - Decennial Census data
 - * Large: [1950](#) and [2010](#)
 - * Small: [1950 and 2010](#)
 - * Be in touch if you would like csv versions of these files
 - Current Population Survey (CPS)
 - * [Stata format](#)
 - * [CSV](#)

1. Interpreting Indicator Variables

For this problem, we'll use Decennial Census/American Community Survey data from IPUMS-USA for 1950 and 2010 (for 2010, the 1-year American Community Survey), linked above.

For purposes of **this problem set only** we will not use any survey-defined weights. This is totally wrong and you should never do it when you really analyze a dataset. We are doing it here so that 1(b) does not become extremely difficult.

The IPUMS website is <https://usa.ipums.org/usa/>, and it provides detailed information on the datasets and variables.

Let's examine the effect of education on wages.

(a) Find the income from wages prime age men (`sex == 1`, ages 25 to 64) in 1950 and 2010. Use the variable `incwage`. I have re-coded top coded values (99999) to missing.

Answer: See Table 1 below.

(b) Use summary statistics (not a regression, but means) and a t-test to test whether the average income from wages from (a) are significantly different in 1950 and 2010. Present your results in a well-labeled table that shows the averages and the t value (feel free to combine tables across steps if that is helpful). Beware of missing values. Write a sentence or two to interpret your table.

Answer: See t-test in Table 1. I can reject that average wages for prime age men in 2010 are significantly different than average wages for the same group in 1950.

(c) Use a regression to do the same test as in (b). Write the regression equation you're estimating. Estimate the equation using software. Report the results in a well-labeled table.

Answer: Here is the regression equation:

$$\text{wage}_{i,t} = \alpha_0 + \alpha_1 1\{\text{year} = 2010\}_{i,t} + \epsilon_{i,t}$$

Here i denotes prime age men, and t denotes year 1950 or 2010. The expression $1\{\text{year} = 2010\}_{i,t}$ is an indicator equal to 1 if the year is 2010 and is zero if the year is 1950 (there are only two years in this dataset). If we can reject $\hat{\alpha} = 0$, then wages in 2010 are statistically different than wages in 1950.

See results in Table 2.

(d) Explain how you can combine estimated regression coefficients from (c) to generate one of the means you found in (a).

Answer: Mean of 1950 wages is $\hat{\alpha}_0$. Mean of 2010 wages is $\hat{\alpha}_0 + \hat{\alpha}_1$.

From the table, we know that 1950 mean income is \$2,182, and 2010 mean income is \$43,244.

(All the “big” sample numbers.)

From the regression results, we know that $\hat{\alpha}_0 = 2,182$, and $\hat{\alpha}_1 = 41,062$ (again, the “big” sample numbers). The coefficient $\hat{\alpha}_0$ is the same as the table’s mean 1950 income. Adding the two coefficients gives us 2010 mean income of $2,182 + 41,062 = 43,244$.

(e) Now re-do the means in (a) using the constant 2022 dollar income (`r1.wage`). Report this income in a well-labeled table.¹

Answer: See Table 1.

(f) Suppose we would like to know whether the average husband earns higher real income from wages than the average wife.

1. Write a regression equation that we could use to test this hypothesis. Let $X_{i,t}$ represent covariates, $H_{i,t}$ to indicate 1 if the person is a husband, and $Y_{i,t}$ represent the outcome.

Answer: The regression equation that tests whether the average husband earns higher real wages is

$$Y_{i,t} = \beta_0 + \beta_1 H_{i,t} + \beta_2 X_{i,t} + \epsilon_{i,t}$$

2. Use Stata to estimate the regression from (f.1) using covariates age and year. Think about what sample you should use to do this, and explain what sample you choose. Report results in a well-labeled table. Make sure you only keep working age people.

Answer: See program for details on the sample. In brief, I kept only those who are married, and those age 25 to 65. I keep only married people so I am comparing

¹For your information, here is how I adjust for inflation:

- Go to the Bureau of Labor Statistics (<http://www.bls.gov/cpi/data.htm>), and choose “all urban consumers” row and the “top picks” column.
- From the following window, choose the “US city average, All items” and choose “retrieve data,” at the bottom.
- Download the data using the xls icon, making sure you’re grabbing the relevant years; see the selection at top.
- Use the December inflation number for each year (this is not exactly correct, but it is sufficient for this example).
- To inflation adjust
 - re-scale the inflation adjustment so that it is 1 in 2022
 - to do this, divide the 2022 value by each year’s value
 - this gives 1 in 2022, numbers > 1 in years before 2022 and numbers < 1 in years after 2022
 - this new ratio is the adjustment factor
 - multiply the adjustment factor by the values (e.g., wage) I make into constant dollars

husbands in 1950 to husbands in 2010.

See Table 3 at end, columns 1 and 5.

3. Modify the regression equation from (f.1.) to allow the relationship between being a husband and earnings to vary between 1950 and 2010.

Answer: The regression equation that tests whether husbands' average real income from wages is also higher in 2010 is

$$Y_{i,t} = \beta_0 + \beta_1 H_{i,t} + \beta_2 H_{i,t} * 1\{\text{year} = 2010\} + \beta_3 1\{\text{year} = 2010\} + \beta_4 X_{i,t} + \epsilon_{i,t}$$

4. Estimate the regression from (f.3), report the results in a well-labeled table and write a sentence that interprets the estimated coefficient that tells us whether the relationship between being a husband and earnings is different in 2010 than in 1950.

Answer: See Table 3 at end, columns 2 and 6. On average, in 1950, husbands earn roughly \$25,000 dollars more than wives. This gap increases by about \$12,000 in 2010, so that the total 2010 gap between husband and wife real income from wages is roughly \$37,000.

Your tables need only include the relevant coefficients; do not report information on all coefficients.

(g) The previous estimation included age linearly. Use the estimation for (f)(1) and use a method that relaxes the linear assumption on age. Report the results in a table. Write a few sentences that interpret the results, comparing with part (f).

Answer: See Table 3 at end. I relax the linearity assumption in two ways. In columns 3 and 7, I include terms for age², age³ and age⁴. In columns 4 and 8, I omit the linear age term and include indicator variables for each age. Coefficients are all expressed relative to average real income from wages at age 25. I don't include all these coefficients for space reasons, however. You can see from the two coefficients I do report that income from wages increases in age.

Regardless of how I specify the estimation, the main results on the relationship between being a husband, and being a husband in 2010 with real income from wages is unchanged.

2. Difference-in-difference

Now let's use the IPUMS-CPS; data are linked above. Documentation for this dataset is available at <https://cps.ipums.org/cps/>. For the purposes of this problem set, treat each

observation with equal weight. This is entirely wrong, and you should absolutely never do such a thing if you are doing a real project. Finally, beware of top-coded data!

(a) Pretend that MI, CA, AZ, NM, MN, OH, VA, KY, WV, MO, MS, GA, IA, NH, MA and ME all adopt a policy aimed at increasing wages that takes effect in 2000. For simplicity, focus only on employed people for this entire question. Use the variable `incwage` for annual wages. Create a figure that examines the parallel pre-trend assumption.

Hints on how to create this figure:

- Sketch yourself what this graph should look like
- Then ask “what summary statistics do I need to make this graph?”
- Create the summary statistics
- Plot the summary statistics

Write a few sentences that interpret the figure.

Answer: See Figure 1 at the end. I don’t see any compelling difference between the two groups pre-treatment (in the pre-2000 era). I’ve added gray bands that show the 95% confidence intervals for the means. This is Stata command `rarea`, and it can be a very helpful way to show a lot of information.

(b) We hypothesize that treatment is random conditional on age and race. Use a regression to test whether the treated and untreated states have similar trends before the treatment is adopted, conditional on covariates. Look at Lecture 4 for our discussion of trends. Report the results in a table, and write a few sentences that interpret the results of your test.

Some hints: You’ll need to limit the sample to only pre-treatment data. You’ll also need to create a time trend variable. Then regress the outcome of interest on this time trend variable interacted with treatment.

Answer: To do this, you should use only the pre-treatment data. I tested the equality of trends in two different ways:

$$\text{incwage}_{i,t} = \beta_0 + \beta_1 \text{trend}_t + \beta_2 \text{trend}_t * \text{treatment}_{i,t} + \epsilon \quad (1)$$

$$\text{incwage}_{i,t} = \beta_0 + \beta_1 \text{time}_t + \beta_2 \text{time}_t * \text{treatment}_{i,t} + \epsilon \quad (2)$$

The variable `treatment` is 1 if the state is ever treated. The variable `trendt` is a linear trend variable, e.g., 1960=1. 1961=2, etc., though the exact number for each year is not consequential for the slope, only the intercept. The variable `timet` is a full set of year dummy variables (that is, fixed effects), with one indicator variable for each year (minus one).

We test $H_0 : \beta_2 = 0$. For Equation 2, all we need is a t-test for whether $\beta_2 = 0$. I find a t-value $= 9.9/7.4 = 1.3$, so we cannot reject $\beta_2 = 0$.

If instead we estimated Equation 2, we want to know whether all the β_2 are jointly 0. We do the second with an F test ($H_0 : \beta_{2,1963} = \beta_{2,1964} = \dots = \beta_{2,1999} = 0$). We cannot reject the hypothesis that the $\text{year}_t * \text{treatment}_{i,t}$ coefficients are jointly zero.

```
. local testvals _IyeaXtre_1963;

. forvalues y=1964/1999
> ;
2. local testvals 'testvals' = _IyeaXtre_`y';
3. ;

. test 'testvals' = 0;

( 1) _IyeaXtre_1963 - _IyeaXtre_1964 = 0
( 2) _IyeaXtre_1963 - _IyeaXtre_1965 = 0
( 3) _IyeaXtre_1963 - _IyeaXtre_1966 = 0
( 4) _IyeaXtre_1963 - _IyeaXtre_1967 = 0
( 5) _IyeaXtre_1963 - _IyeaXtre_1968 = 0
( 6) _IyeaXtre_1963 - _IyeaXtre_1969 = 0
( 7) _IyeaXtre_1963 - _IyeaXtre_1970 = 0
( 8) _IyeaXtre_1963 - _IyeaXtre_1971 = 0
( 9) _IyeaXtre_1963 - _IyeaXtre_1972 = 0
(10) _IyeaXtre_1963 - _IyeaXtre_1973 = 0
(11) _IyeaXtre_1963 - _IyeaXtre_1974 = 0
(12) _IyeaXtre_1963 - _IyeaXtre_1975 = 0
(13) _IyeaXtre_1963 - _IyeaXtre_1976 = 0
(14) _IyeaXtre_1963 - _IyeaXtre_1977 = 0
(15) _IyeaXtre_1963 - _IyeaXtre_1978 = 0
(16) _IyeaXtre_1963 - _IyeaXtre_1979 = 0
(17) _IyeaXtre_1963 - _IyeaXtre_1980 = 0
(18) _IyeaXtre_1963 - _IyeaXtre_1981 = 0
(19) _IyeaXtre_1963 - _IyeaXtre_1982 = 0
(20) _IyeaXtre_1963 - _IyeaXtre_1983 = 0
(21) _IyeaXtre_1963 - _IyeaXtre_1984 = 0
(22) _IyeaXtre_1963 - _IyeaXtre_1985 = 0
(23) _IyeaXtre_1963 - _IyeaXtre_1986 = 0
(24) _IyeaXtre_1963 - _IyeaXtre_1987 = 0
(25) _IyeaXtre_1963 - _IyeaXtre_1988 = 0
(26) _IyeaXtre_1963 - _IyeaXtre_1989 = 0
(27) _IyeaXtre_1963 - _IyeaXtre_1990 = 0
(28) _IyeaXtre_1963 - _IyeaXtre_1991 = 0
```

- (29) `_IyeaXtre_1963 - _IyeaXtre_1992 = 0`
- (30) `_IyeaXtre_1963 - _IyeaXtre_1993 = 0`
- (31) `_IyeaXtre_1963 - _IyeaXtre_1994 = 0`
- (32) `_IyeaXtre_1963 - _IyeaXtre_1995 = 0`
- (33) `_IyeaXtre_1963 - _IyeaXtre_1996 = 0`
- (34) `_IyeaXtre_1963 - _IyeaXtre_1997 = 0`
- (35) `_IyeaXtre_1963 - _IyeaXtre_1998 = 0`
- (36) `_IyeaXtre_1963 - _IyeaXtre_1999 = 0`
- (37) `_IyeaXtre_1963 = 0`

F(37,230832) = 0.71
 Prob > F = 0.9093

These regressions each use 231,066 observations – less than the full dataset, since they omit data before 2000.

(c) Do a summary statistics version of a difference-in-difference estimate (no covariates for this question). Create a table with means and standard errors from which you can calculate the single and double differences (don't worry about calculating the errors for these differences).

Answer: See summary statistics in Table 4 below. Income from wages declined by about \$882 in the treated states, relative to the untreated ones, after the treatment.

(d) Do a difference-in-difference regression that parallels the summary statistics in part (c), meaning that it has no covariates. Write the estimating equation you use. You should get the same result as in (c). If you don't get the same result as in (c), you are doing something wrong.

Answer: To do the regression, I estimate the following equation:

$$\text{incwage}_{ist} = \beta_0 + \beta_1 \text{after}_t + \beta_2 \text{treated}_{is} + \beta_3 \text{treated*after}_{ist} + \epsilon_{ist}$$

The key to getting the diff-in-diff regression and the summary stats to match is to use the **exact** same sample.

See results in Table 5

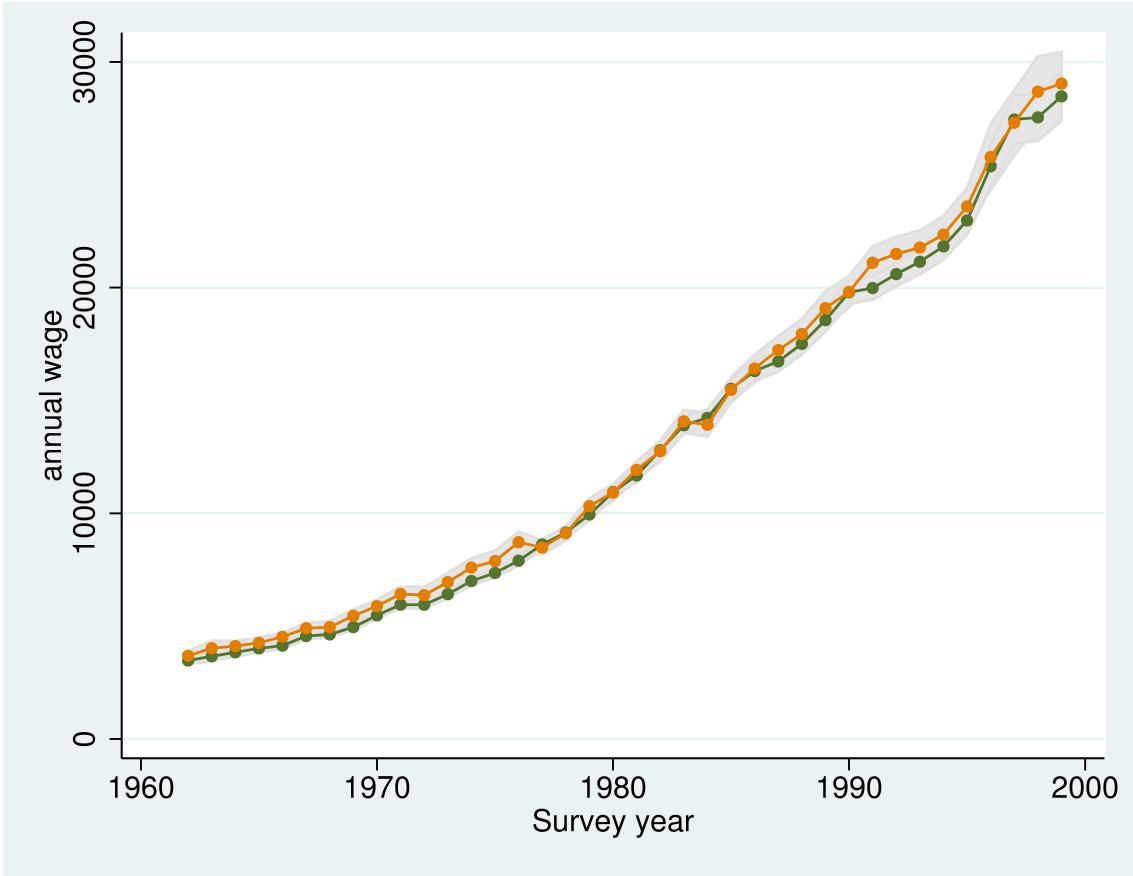


Figure 1: Parallel Pre-Trend Assumption

Table 1: Comparison of Means

	Nominal Wage Income			Real Wage Income		
	1950 (1)	2010 (2)	t test, difference (3)	1950 (4)	2010 (5)	t test, difference (6)
Small Sample						
mean	2,163.3	43,405.5	201.4	25,892.8	58,857.8	93.2
std error of the mean	18.4	204.0		220.2	276.6	
observations	11,334	78,423		11,334	78,423	
Big Sample						
mean	2,182.2	43,243.8	638.4	26,118.7	58,638.6	291.7
std error of the mean	5.8	64.1		69.9	86.9	
observations	111,680	787,469		111,680	787,469	

Table 2: Comparison via Regression

	Dependent Variable is Income from Wages	
	Sample is	
	Small	Big
	(1)	(2)
Year = 2010}	41,242	41,062
	(536.61)	(170.11)
Constant	2,163	2,182
	(501.59)	(159.19)
R-squared	0.062	0.061
Observations	89,757	899,149

Table 3: Comparing Husbands' Wages

Dependent variable is Income from Wages in 2022 Dollars								
Sample is								
	Small				Big			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1{person is male}	35210.2*** (384.3)	24727.8*** (991.4)	24117.0*** (982.2)	24114.0*** (982.3)	34948.3*** (120.9)	24831.0*** (313.5)	24398.3*** (310.8)	24399.3*** (310.8)
Age	-285.9*** (17.8)	-284.2*** (17.7)	15590.6** (5315.5)		-266.4*** (5.6)	-264.4*** (5.6)	16305.9*** (1681.7)	
1{year = 2010}	39343.7*** (545.0)	33199.4*** (764.0)	31767.4*** (757.5)	31752.8*** (757.8)	39134.2*** (172.1)	33259.6*** (240.5)	31928.3*** (238.6)	31940.0*** (238.7)
1{year = 2010} * 1{person is male}		12329.2*** (1075.0)	12793.8*** (1064.9)	12808.4*** (1065.1)		11878.1*** (339.6)	12239.5*** (336.7)	12240.9*** (336.7)
Age ²			-498.5** (184.90)				-522.9*** (58.40)	
Age ³			8.0** (2.80)				8.3*** (0.90)	
Age ⁴			-0.1*** (0)				-0.1*** (0)	
1{age = 26}				807.7 (2411.80)				1720.0* (772.50)
1{age = 27}				3903.3 (2338.90)				3305.4*** (745.50)
... and many more I omit for space, through age 65								
Constant	10499.2*** (910.9)	15661.5*** (1015.6)	-192508.8*** (55715.2)	-8780.0*** (1835.8)	9837.4*** (286.9)	14758.2*** (319.4)	-199265.3*** (17641.9)	-8687.7*** (592.8)
R-squared	0.104	0.105	0.122	0.122	0.104	0.105	0.12	0.12
Obs	115,171	115,171	115,171	115,171	1,152,661	1,152,661	1,152,661	1,152,661

Table 4: Answer for 2(c)

			Differences	
	Before	After	Single	Double
	(1)	(2)	(3)	(4)
Treated				
mean	14910	37944	23034	
sd	68	225		
obs	73884	45534		
Untreated				
mean	13662	37578	23916	-882
sd	45	163		
obs	157170	87780		

Table 5: Regressions, Problem 2

	DD
	(1)
1{treatment}	1247.9*** (145.3)
1{after}	23916.1*** (137.3)
1{treatment}*1{after}	-881.1*** (237.7)
Observations	364368

```

# delimit;

*****

this is the stata file that makes the answers for problem set 2

january 28, 2014
january 30, 2014
january 31, 2014
february 6, 2014
february 7, 2014
february 10, 2014 ** fixing prime age male to be males
february 18, 2014 ** fixing inflation correction
january 31, 2018 ** adding an initial table
february 1, 2018 ** checking final stuff
january 30, 2019 ** updating for new year
february 7, 2019 ** fixing frans errors
september 19, 2023 ** building in inflation adjustment so students dont have to do it
september 20, 2023 ** still updating
october 5, 2023 ** fixing summary stats table

ps2v15.do

*****;

capture log close;
log using ps2v15.log, replace;

*****

***** 1. ipums-usa data *****

*****;

***** A. get ready *****;

*** A.1. start up things ***;

clear all;
pause on;
set more off;

* set todays date;
* this makes a local macro with todays date *;
adopath ++ /home/lfbrooks/home/bleah/ado;
dateo;

*** A.2. load data ***;

* switch for which sample we use *;
local sample big;
*local sample small;

* load the big sample *;
if "`sample'" == "big"
{;

    * 1950 *;
    * program that creates these data is
      /groups/brooksgrp/pppa6022/2023/problem_sets/ps2/load1950v02.do
    old:
/home/lfbrooks/home/bleah/pppa6022/2014/stataprg/problem_set_1/load1950v01.do;

```

```

use
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/20230920_ipums_195
0;

* 2010 *;
* program that creates these data is
  /groups/brooksgrp/pppa6022/2023/problem_sets/ps2/load2010v02.do
  old
/home/lfbrooks/home/bleah/pppa6022/2014/stataprg/problem_set_1/load2010v01.do;
append using
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/20230920_ipums_201
0;

* code making the smaller sample *;
* take a smaller random sample *;
*gen double rand_samp = runiform();
*keep if rand_samp > 0.9;

* save this for students who need a small dataset *;
*save
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/${date}_small_ipum
s, replace;
};

* load the small sample *;
if "`sample'" == "small"
{;
  * created in step above *;
  use
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/${date}_small_ipum
s;
};

***** Q 1(a) and (b) and (e): mean wages in 1950 and 2010 *****;

**** prepare data ****;

*** marker for prime-age males ***;
gen prime_age_male = 0;
replace prime_age_male = 1 if (age >= 25 & age < 65) & sex == 1;

* make a 2010 dummy *;
gen y2010 = 0;
replace y2010 = 1 if year == 2010;

**** take means ****;

* save the data for later use *;
preserve;

*** make a small table with mean and sd of mean of wage *;
sort year prime_age_male;
collapse (mean) incwage=incwage (sem) incwage_se=incwage (count) inc_obs=incwage
          (mean) rl_wage=rl_wage (sem) rl_wage_se=rl_wage, by(year prime_age_male);

* keep only obs of interest *;
keep if prime_age_male == 1;

* make the dataset wide so I can do t-tests *;
* this next line is a programming trick to get the reshape to behave *;
gen marker = 1;
reshape wide incwage incwage_se rl_wage rl_wage_se inc_obs, i(marker) j(year);

```

```

* make the t values *;
gen t_nominal = abs((incwage2010-
incwage1950)/sqrt(incwage_se2010^2+incwage_se1950^2));
gen t_real = abs((rl_wage2010-rl_wage1950)/sqrt(rl_wage_se2010^2+rl_wage_se1950^2));

* output the dataset *;
export delimited
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/${date}_qlabe_`sample'.txt,
replace;

***** Q 1(c) and (d): regression to repeat this test *****;

* get data back *;
restore;

* make a regression that looks at average wages for men *;
regress incwage y2010 if prime_age_male == 1;
estimates store r1;
estout r1 using

/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/${date}_qlcd_`sample'.txt,
    replace label varwidth(12)
    cells(b(fmt(%9.3f)) se(par fmt(%9.3f)))
    stats(r2 N,
    fmt(%9.3f %9.0g )
    labels("R-squared" "Obs" ));
estimates clear;

***** Q 1(f) and (g): husband vs wife wages
*****;

* subset to married couples *;

* keep if married, spouse present *;
keep if marst == 1;
* keep if head of household or spouse *;
keep if relate == 1 | relate == 2;

* make male dummy *;
gen male = 0;
replace male = 1 if sex == 1;

* make 2010*male *;
gen y2010_male = y2010*male;

* keep only 65 or younger *;
keep if age <= 65 & age >= 25;

* make age squared, cubed, to the fourth power *;
gen age2 = age*age;
gen age3 = age2*age;
gen age4 = age3*age;

* make a hh serial number by year (thanks, Drew! for catching this) *;
sort year;
by year: summ serial;
gen serialyr = 1950*1000000+serial if year == 1950;
replace serialyr = 2010*1000000+serial if year == 2010;

* check this sample *;
summ age male incwage;

```



```

*** regressions ***;

*** 1(f) ***;

* estimate wages as a function of age, year, and being the husband *;
regress rl_wage age male y2010;
eststo c1;
* re-estimate, allowing the main effect to vary by year*;
regress rl_wage age male y2010 y2010_male;
eststo c2;

*** 1(g): different treatments of age ***;

* parametric non-linear effects of age *;
regress rl_wage age age2 age3 age4 male y2010 y2010_male;
eststo c3;
* non-parametric non-linear effects of age *;
xi: regress rl_wage i.age male y2010 y2010_male;
eststo c4;

*** output results ***;
estout *
using
"/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/${date}_qlfg_`sample'.txt",
replace
varwidth(12) varlabels(_cons Constant)
cells(b(star fmt(%12.1f)) se(par fmt(%12.1f)))
stats(r2 N, fmt(%9.3f %9.0g %9.3f) labels("R-squared" "Obs"));

*****
***** 2. ipums-cps data *****
*****;

***** A. prep stuff *****;

clear all;

* set todays date;
adopath ++ /home/lfbrooks/home/bleah/ado;
dateo;

***** B. load data *****;

* switch for which sample we use *;
local sample big;
*local sample small;

* load the big sample *;
if "`sample'" == "big"
{;

* load cps data, keeping only variables that are of interest *;
use
/groups/brooksgrp/containerization/current_population_survey/input_201401/20140107_cp
sinput;

* take a smaller random sample *;
gen double rand_samp = runiform();
keep if rand_samp > 0.9;

```

```

* save this as a junk dataset to load *;
save /groups/brooksgrp/junk/ipumscps, replace;
};

if "`sample'" == "small"
{
* bring in the smaller data *;
use /groups/brooksgrp/junk/ipumscps;
};

***** C. set up data *****;

** fix topcodes **;
* not in universe *;
replace incwage = . if incwage == 9999999;
* missing *;
replace incwage = . if incwage == 9999998;
* top-coded -- starts in 2011.. i think at 1,000,000 *;
replace incwage = 1000000 if incwage == 9999997;

* marker for employed guys *;
gen emp = 0;
replace emp = 1 if empstat == 10 | empstat == 12 | empstat ==13;

** make fake treatment **;
* make a list of all treated states *;
local trts 26 6 4 35 27 39 51 21 54 29 28 13 19 33 25 23;
* make a treatment variable *;
gen treat=0;
* fix it for the affected states *;
foreach j in
`trts'
{
replace treat=1 if statefip == `j';
label variable treat "1 if ever in a treated state";
};

* make a linear trend *;
gen trend = year - 1979;

* make an after variable *;
gen after=0;
replace after=1 if year >= 2000;

* make a trend*treatment interaction *;
gen trend_treat = 0;
replace trend_treat = trend * treat * after;
gen trend_treat_before = 0;
replace trend_treat_before = trend if treat == 1;

* make a treated*after variable *;
gen treat_after = treat*after;
label variable treat_after "1 if after the treatment in a treated state";

* make a treated*after*male variable *;
gen male = 0;
replace male = 1 if sex==1;
label variable male "1 if male (from sex)";
gen treat_after_male = treat*after*male;

```

```

label variable treat_after_male "1 if after the treatment in a treated state and obs
is male";

* make other interactions that we need *;
gen male_after = male*after;
gen male_treat = male*treat;

***** C. no c now *****;

***** D. pictures *****;

* keep the data around for later *;
preserve;

* command for making graphs i like *;
graph set eps orientation landscape;

*** D.1. set up data for the picture ***;

* get annual mean wages for treated and untreated states, and also the std error *;
sort year treat;
collapse (mean) incwage (sem) incwage_sd = incwage if emp == 1 & year < 2000, by(year
treat);

* reshape to make it wider *;
reshape wide incwage incwage_sd, i(year) j(treat);

* calculate confidence bands *;
foreach j in
  0 1
  {;
  gen cihj`j' = incwage`j' + 1.96*incwage_sd`j';
  label variable cihj`j' "upper confidence bound for incwage when treatment = `j'";
  gen cilj`j' = incwage`j' - 1.96*incwage_sd`j';
  label variable cilj`j' "lower confidence bound for incwage when treatment = `j'";
  };

* check this *;
list;

*** D.2. make the average wage over time picture ***;

graph twoway
  (rarea cil01 cih11 year, bcolor(gs14))
  (rarea cil00 cih10 year, bcolor(gs14))
  (connected incwage0 year, msymbol(o))
  (connected incwage1 year, msymbol(o)),
  ytitle("annual wage")
  legend(off)
  xsize(11) ysize(8.5);
graph export "output/${date}_mean_wage_wandwo_treatment_`sample'.eps", replace;

***** E. regressions and summary stats
*****;

* bring back the data *;
restore;

*** E.1. test the parallel pre-trend assumption with a regression (2(a)) ***;

```

```

* could have a linear trend, and an interaction term for the treated guys *;
xi: regress incwage trend trend_treat_before i.age i.race i.statefip if emp == 1 &
year < 2000;
eststo t1;

* could test whether year effects are equal before *;
xi: regress incwage i.year*treat i.race i.age i.statefip if emp == 1 & year < 2000;
local testvals _IyeaXtre_1963;
forvalues y=1964/1999
{
    local testvals `testvals' = _IyeaXtre_`y';
}
test `testvals' = 0;
eststo t2;

*** E.2. diff-in-diff regression ****;

* regression to paralell diff in diff summary stats *;
regress incwage treat_after treat after if emp == 1;
eststo r0;

* make a marker for the regression sample *;
gen r0emp = e(sample);

*** E.3. summary tables for diff-in-diff ***;

* save the data for later *;
preserve;

sort treat after;
collapse (mean) incwage (sem) incwage_sd = incwage (count) incwage_obs=incwage
if r0emp == 1, by(treat after);

* output to excel *;
outsheet using output/${date}_prob2c_ttests_`sample'.txt, replace;

*** E.4. output regression results ***;
estout *
using "output/${date}_prob2_regs_`sample'.txt",
replace
varwidth(12) varlabels(_cons Constant)
cells(b(star fmt(%12.1f)) se(par fmt(%12.1f)))
stats(r2 N, fmt(%9.3f %9.0g %9.3f) labels("R-squared" "Observations"));

log close;

```

```

-----
name: <unnamed>
log: /groups/brooksgrp/pppa6022/2023_fall/problem_sets/ps2/ps2v15.log
log type: text
opened on: 6 Oct 2023, 00:02:33

. *****
>
> ***** 1. ipums-usa data *****
>
>
*****;
. ***** A. get ready
*****;
. *** A.1. start up things ***;
. clear all;

. pause on;

. set more off;

. * set todays date;
. * this makes a local macro with todays date *;
. adopath ++ /home/lfbrooks/home/bleah/ado;
[1] "/home/lfbrooks/home/bleah/ado"
[2] (BASE) "/usr/local/stata16/ado/base/"
[3] (SITE) "/usr/local/ado/"
[4] "."
[5] (PERSONAL) "~/ado/personal/"
[6] (PLUS) "~/ado/plus/"
[7] (OLDPLACE) "~/ado/"

. dateo;

. *** A.2. load data ***;
. * switch for which sample we use *;
. local sample big;

. *local sample small;
. * load the big sample *;
. if "`sample'" == "big"
> {;
. * 1950 *;
. * program that creates these data is
> /groups/brooksgrp/pppa6022/2023/problem_sets/ps2/load1950v02.do
> old:
/home/lfbrooks/home/bleah/pppa6022/2014/stataprg/problem_set_1/load1950v01.do;
. use
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/20230920_ipums_195
0;
. * 2010 *;
. * program that creates these data is
> /groups/brooksgrp/pppa6022/2023/problem_sets/ps2/load2010v02.do
> old
/home/lfbrooks/home/bleah/pppa6022/2014/stataprg/problem_set_1/load2010v01.do;
. append using
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/20230920_ipums_201
0;
(label poverty_lbl already defined)
(label incother_lbl already defined)
(label incwage_lbl already defined)
(label inctot_lbl already defined)

```

```

(label wkswrk2_lbl already defined)
(label classwkrd_lbl already defined)
(label classwkr_lbl already defined)
(label ind1990_lbl already defined)
(label ind1950_lbl already defined)
(label ind_lbl already defined)
(label occ1990_lbl already defined)
(label occ1950_lbl already defined)
(label occ_lbl already defined)
(label labforce_lbl already defined)
(label empstatd_lbl already defined)
(label empstat_lbl already defined)
(label educd_lbl already defined)
(label educ_lbl already defined)
(label school_lbl already defined)
(label racesingd_lbl already defined)
(label racesing_lbl already defined)
(label hispand_lbl already defined)
(label hispan_lbl already defined)
(label citizen_lbl already defined)
(label bpld_lbl already defined)
(label bpl_lbl already defined)
(label raced_lbl already defined)
(label race_lbl already defined)
(label marrno_lbl already defined)
(label birthyr_lbl already defined)
(label birthqtr_lbl already defined)
(label marst_lbl already defined)
(label sex_lbl already defined)
(label age_lbl already defined)
(label related_lbl already defined)
(label relate_lbl already defined)
(label farm_lbl already defined)
(label gq_lbl already defined)
(label cntry_lbl already defined)
(label appald_lbl already defined)
(label appal_lbl already defined)
(label citypop_lbl already defined)
(label city_lbl already defined)
(label metaread_lbl already defined)
(label metarea_lbl already defined)
(label metro_lbl already defined)
(label county_lbl already defined)
(label statefip_lbl already defined)
(label stateicp_lbl already defined)
(label region_lbl already defined)
(label hhtype_lbl already defined)
(label subsamp_lbl already defined)
(label numprec_lbl already defined)
(label year_lbl already defined)
. * code making the smaller sample *;
. * take a smaller random sample *;
. *gen double rand_samp = runiform();
. *keep if rand_samp > 0.9;
. * save this for students who need a small dataset *;
. *save
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/${date}_small_ipum
s, replace;
. };

. * load the small sample *;
. if "`sample'" == "small"
> {;

```

```

. * created in step above *;
. use
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/data_for_students/{date}_small_ipum
s;
. };

. ***** Q 1(a) and (b) and (e): mean wages in 1950 and 2010 *****;
. **** prepare data ****;
. *** marker for prime-age males ***;
. gen prime_age_male = 0;

. replace prime_age_male = 1 if (age >= 25 & age < 65) & sex == 1;
(1,213,439 real changes made)

. * make a 2010 dummy *;
. gen y2010 = 0;

. replace y2010 = 1 if year == 2010;
(3,061,692 real changes made)

. **** take means ****;
. * save the data for later use *;
. preserve;

. *** make a small table with mean and sd of mean of wage *;
. sort year prime_age_male;

. collapse (mean) incwage=incwage (sem) incwage_se=incwage (count) inc_obs=incwage
> (mean) rl_wage=rl_wage (sem) rl_wage_se=rl_wage, by(year prime_age_male);

. * keep only obs of interest *;
. keep if prime_age_male == 1;
(2 observations deleted)

. * make the dataset wide so I can do t-tests *;
. * this next line is a programming trick to get the reshape to behave *;
. gen marker = 1;

. reshape wide incwage incwage_se rl_wage rl_wage_se inc_obs, i(marker) j(year);
(note: j = 1950 2010)

Data                                long   ->   wide
-----
Number of obs.                       2     ->    1
Number of variables                   8     ->   12
j variable (2 values)                 year  -> (dropped)
xij variables:
      incwage   ->  incwage1950 incwage2010
      incwage_se ->  incwage_se1950 incwage_se2010
      rl_wage   ->  rl_wage1950  rl_wage2010
      rl_wage_se ->  rl_wage_se1950 rl_wage_se2010
      inc_obs   ->  inc_obs1950  inc_obs2010
-----

. * make the t values *;
. gen t_nominal = abs((incwage2010-
incwage1950)/sqrt(incwage_se2010^2+incwage_se1950^2));

. gen t_real = abs((rl_wage2010-
rl_wage1950)/sqrt(rl_wage_se2010^2+rl_wage_se1950^2));

. * output the dataset *;

```

```
. export delimited
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/${date}_qlabe_`sample'.txt,
replace;
(note: file
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/20231006_qlabe_big.txt not
found)
file /groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/20231006_qlabe_big.txt
saved
```

```
. ***** Q 1(c) and (d): regression to repeat this test *****;
. * get data back *;
. restore;

. * make a regression that looks at average wages for men *;
. regress incwage y2010 if prime_age_male == 1;
```

Source	SS	df	MS	Number of obs	=	899,149
Model	1.6491e+14	1	1.6491e+14	F(1, 899147)	=	58269.18
Residual	2.5447e+15	899,147	2.8302e+09	Prob > F	=	0.0000
				R-squared	=	0.0609
				Adj R-squared	=	0.0609
Total	2.7096e+15	899,148	3.0136e+09	Root MSE	=	53199

incwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
y2010	41061.6	170.1047	241.39	0.000	40728.2	41395
_cons	2182.192	159.1906	13.71	0.000	1870.184	2494.2

```
. estimates store r1;

. estout r1 using
>
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/${date}_qlcd_`sample'.txt,
> replace label varwidth(12)
> cells(b(fmt(%9.3f)) se(par fmt(%9.3f)))
> stats(r2 N,
> fmt(%9.3f %9.0g )
> labels("R-squared" "Obs" ));
(note: file
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/20231006_qlcd_big.txt not
found)
(output written to
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/20231006_qlcd_big.txt)
```

```
. estimates clear;
```

```
. ***** Q 1(f) and (g): husband vs wife wages
*****;
```

```
. * subset to married couples *;
. * keep if married, spouse present *;
. keep if marst == 1;
(2,899,210 observations deleted)
```

```
. * keep if head of household or spouse *;
. keep if relate == 1 | relate == 2;
(93,274 observations deleted)
```

```
. * make male dummy *;
. gen male = 0;
```

```
. replace male = 1 if sex == 1;
```


(995,703 real changes made)

```
. * make 2010*male *;
. gen y2010_male = y2010*male;

. * keep only 65 or younger *;
. keep if age <= 65 & age >= 25;
(350,905 observations deleted)

. * make age squared, cubed, to the fourth power *;
. gen age2 = age*age;

. gen age3 = age2*age;

. gen age4 = age3*age;

. * make a hh serial number by year (thanks, Drew! for catching this) *;
. sort year;

. by year: summ serial;
```


-> year = 1950

Variable	Obs	Mean	Std. Dev.	Min	Max
serial	658,814	230386.6	133207.7	1	461130

-> year = 2010

Variable	Obs	Mean	Std. Dev.	Min	Max
serial	981,687	707365.2	405925.4	2	1397788

```
. gen serialyr = 1950*1000000+serial if year == 1950;
(981,687 missing values generated)

. replace serialyr = 2010*1000000+serial if year == 2010;
(981,687 real changes made)

. * check this sample *;
. summ age male incwage;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
age	1,640,501	44.79893	11.02515	25	65
male	1,640,501	.4946099	.4999711	0	1
incwage	1,152,661	33762.2	50969.28	0	569000

```
. *** regressions ***;
. *** l(f) ***;
. * estimate wages as a function of age, year, and being the husband *;
. regress rl_wage age male y2010;
```

Source	SS	df	MS	Number of obs	=	1,152,661
				F(3, 1152657)	=	44520.76
Model	5.6123e+14	3	1.8708e+14	Prob > F	=	0.0000
Residual	4.8434e+15	1,152,657	4.2020e+09	R-squared	=	0.1038
				Adj R-squared	=	0.1038

Total | 5.4047e+15 1,152,660 4.6889e+09 Root MSE = 64823

rl_wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	-266.4016	5.587092	-47.68	0.000	-277.3522	-255.4511
male	34948.33	120.9124	289.04	0.000	34711.35	35185.32
y2010	39134.22	172.1462	227.33	0.000	38796.82	39471.63
_cons	9837.429	286.8615	34.29	0.000	9275.19	10399.67

. eststo c1;

. * re-estimate, allowing the main effect to vary by year*;
 . regress rl_wage age male y2010 y2010_male;

Source	SS	df	MS	Number of obs	=	1,152,661
Model	5.6636e+14	4	1.4159e+14	F(4, 1152656)	=	33731.79
Residual	4.8383e+15	1,152,656	4.1975e+09	Prob > F	=	0.0000
				R-squared	=	0.1048
				Adj R-squared	=	0.1048
Total	5.4047e+15	1,152,660	4.6889e+09	Root MSE	=	64788

rl_wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	-264.3538	5.584439	-47.34	0.000	-275.2992	-253.4085
male	24830.99	313.5032	79.20	0.000	24216.54	25445.45
y2010	33259.56	240.4502	138.32	0.000	32788.28	33730.83
y2010_male	11878.1	339.6184	34.97	0.000	11212.46	12543.74
_cons	14758.23	319.3706	46.21	0.000	14132.28	15384.19

. eststo c2;

. *** 1(g): different treatments of age ***;
 . * parametric non-linear effects of age *;
 . regress rl_wage age age2 age3 age4 male y2010 y2010_male;

Source	SS	df	MS	Number of obs	=	1,152,661
Model	6.4913e+14	7	9.2733e+13	F(7, 1152653)	=	22476.75
Residual	4.7555e+15	1,152,653	4.1257e+09	Prob > F	=	0.0000
				R-squared	=	0.1201
				Adj R-squared	=	0.1201
Total	5.4047e+15	1,152,660	4.6889e+09	Root MSE	=	64232

rl_wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	16305.94	1681.676	9.70	0.000	13009.91	19601.97
age2	-522.9258	58.43653	-8.95	0.000	-637.4595	-408.3922
age3	8.277334	.8790426	9.42	0.000	6.55444	10.00023
age4	-.0531857	.0048396	-10.99	0.000	-.0626711	-.0437003
male	24398.34	310.8482	78.49	0.000	23789.09	25007.6
y2010	31928.34	238.6259	133.80	0.000	31460.64	32396.03
y2010_male	12239.5	336.7175	36.35	0.000	11579.54	12899.45
_cons	-199265.3	17641.92	-11.29	0.000	-233842.9	-164687.7

. eststo c3;

. * non-parametric non-linear effects of age *;
 . xi: regress rl_wage i.age male y2010 y2010_male;

i.age _Iage_25-65 (naturally coded; _Iage_25 omitted)

Source	SS	df	MS	Number of obs	=	1,152,661
Model	6.4969e+14	43	1.5109e+13	F(43, 1152617)	=	3662.49
Residual	4.7550e+15	1,152,617	4.1254e+09	Prob > F	=	0.0000
				R-squared	=	0.1202
				Adj R-squared	=	0.1202
Total	5.4047e+15	1,152,660	4.6889e+09	Root MSE	=	64229

rl_wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_Iage_26	1720.044	772.5289	2.23	0.026	205.913	3234.174
_Iage_27	3305.396	745.4848	4.43	0.000	1844.271	4766.521
_Iage_28	4836.02	728.1945	6.64	0.000	3408.784	6263.257
_Iage_29	6265.913	716.3788	8.75	0.000	4861.835	7669.991
_Iage_30	7359.357	702.8467	10.47	0.000	5981.802	8736.913
_Iage_31	8656.093	704.9488	12.28	0.000	7274.417	10037.77
_Iage_32	10949.83	698.8752	15.67	0.000	9580.054	12319.6
_Iage_33	12337.75	696.444	17.72	0.000	10972.74	13702.76
_Iage_34	12526.32	692.7503	18.08	0.000	11168.55	13884.08
_Iage_35	15145.67	688.0038	22.01	0.000	13797.21	16494.13
_Iage_36	16084.15	689.1867	23.34	0.000	14733.36	17434.93
_Iage_37	17241.27	685.7402	25.14	0.000	15897.24	18585.3
_Iage_38	17679.81	679.5817	26.02	0.000	16347.86	19011.77
_Iage_39	19199.57	673.6315	28.50	0.000	17879.28	20519.87
_Iage_40	18657.8	669.9952	27.85	0.000	17344.63	19970.97
_Iage_41	19765.08	677.894	29.16	0.000	18436.43	21093.73
_Iage_42	19538.87	676.0785	28.90	0.000	18213.78	20863.97
_Iage_43	19826.9	676.7869	29.30	0.000	18500.42	21153.38
_Iage_44	20521.08	676.4977	30.33	0.000	19195.17	21846.99
_Iage_45	20200.42	668.0053	30.24	0.000	18891.15	21509.69
_Iage_46	20810.42	667.9476	31.16	0.000	19501.27	22119.58
_Iage_47	20059.17	666.8232	30.08	0.000	18752.22	21366.12
_Iage_48	19922.71	667.2526	29.86	0.000	18614.92	21230.5
_Iage_49	19756.6	664.6511	29.72	0.000	18453.9	21059.29
_Iage_50	17320.81	660.5317	26.22	0.000	16026.19	18615.43
_Iage_51	19037.75	667.0007	28.54	0.000	17730.45	20345.04
_Iage_52	18589.11	664.927	27.96	0.000	17285.88	19892.35
_Iage_53	17578.1	665.5493	26.41	0.000	16273.64	18882.55
_Iage_54	16555.55	667.4148	24.81	0.000	15247.44	17863.66
_Iage_55	14816.46	666.1607	22.24	0.000	13510.81	16122.11
_Iage_56	13185.23	670.2589	19.67	0.000	11871.54	14498.91
_Iage_57	11801.56	671.2427	17.58	0.000	10485.95	13117.17
_Iage_58	10019.99	673.9026	14.87	0.000	8699.164	11340.82
_Iage_59	7327.841	677.23	10.82	0.000	6000.494	8655.189
_Iage_60	4373.466	675.8381	6.47	0.000	3048.847	5698.086
_Iage_61	1054.418	681.7956	1.55	0.122	-281.8784	2390.714
_Iage_62	-3566.63	679.3208	-5.25	0.000	-4898.076	-2235.184
_Iage_63	-8214.471	679.0888	-12.10	0.000	-9545.461	-6883.48
_Iage_64	-11457.05	703.7792	-16.28	0.000	-12836.43	-10077.67
_Iage_65	-15814.88	707.5032	-22.35	0.000	-17201.56	-14428.2
male	24399.33	310.8397	78.49	0.000	23790.09	25008.56
y2010	31940.05	238.6503	133.84	0.000	31472.3	32407.79
y2010_male	12240.86	336.7094	36.35	0.000	11580.92	12900.79
_cons	-8687.736	592.8447	-14.65	0.000	-9849.691	-7525.78

```
. eststo c4;
. *** output results ***;
. estout *
```

```

> using
"/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/${date}_qlfg_`sample'.txt",
> replace
> varwidth(12) varlabels(_cons Constant)
> cells(b(star fmt(%12.1f)) se(par fmt(%12.1f)))
> stats(r2 N, fmt(%9.3f %9.0g %9.3f) labels("R-squared" "Obs"));
(note: file
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/20231006_qlfg_big.txt not
found)
(output written to
/groups/brooksgrp/pppa6022/2023/problem_sets/ps2/output/20231006_qlfg_big.txt)

. *****
>
> ***** 2. ipums-cps data *****
>
>
*****;
. ***** A. prep stuff *****;
. clear all;

. * set todays date;
. adopath ++ /home/lfbrooks/home/bleah/ado;
[1]          "/home/lfbrooks/home/bleah/ado"
[2] (BASE)    "/usr/local/statal6/ado/base/"
[3] (SITE)   "/usr/local/ado/"
[4]          "."
[5] (PERSONAL) "~/ado/personal/"
[6] (PLUS)   "~/ado/plus/"
[7] (OLDPLACE) "~/ado/"

. dateo;

. ***** B. load data *****;
. * switch for which sample we use *;
. local sample big;

. *local sample small;
. * load the big sample *;
. if "`sample'" == "big"
> {;
. * load cps data, keeping only variables that are of interest *;
. use
/groups/brooksgrp/containerization/current_population_survey/input_201401/20140107_cp
sinput;
. * take a smaller random sample *;
. gen double rand_samp = runiform();
. keep if rand_samp > 0.9;
(7,282,099 observations deleted)
. * save this as a junk dataset to load *;
. save /groups/brooksgrp/junk/ipumscps, replace;
file /groups/brooksgrp/junk/ipumscps.dta saved
. };

. if "`sample'" == "small"
> {;
. * bring in the smaller data *;
. use /groups/brooksgrp/junk/ipumscps;
. };

. ***** C. set up data *****;
. ** fix topcodes **;
. * not in universe *;

```

```

. replace incwage = . if incwage == 9999999;
(190,346 real changes made, 190,346 to missing)

. * missing *;
. replace incwage = . if incwage == 9999998;
(153 real changes made, 153 to missing)

. * top-coded -- starts in 2011.. i think at 1,000,000 *;
. replace incwage = 1000000 if incwage == 9999997;
(0 real changes made)

. * marker for employed guys *;
. gen emp = 0;

. replace emp = 1 if empstat == 10 | empstat == 12 | empstat ==13;
(368,179 real changes made)

. ** make fake treatment **;
. * make a list of all treated states *;
. local trts 26 6 4 35 27 39 51 21 54 29 28 13 19 33 25 23;

. * make a treatment variable *;
. gen treat=0;

. * fix it for the affected states *;
. foreach j in
> `trts'
> {;
2.   replace treat=1 if statefip == `j';
3.   label variable treat "1 if ever in a treated state";
4.   };
(21,915 real changes made)
(75,162 real changes made)
(9,172 real changes made)
(9,204 real changes made)
(11,528 real changes made)
(31,123 real changes made)
(12,025 real changes made)
(9,973 real changes made)
(8,469 real changes made)
(12,143 real changes made)
(8,054 real changes made)
(13,307 real changes made)
(10,273 real changes made)
(8,345 real changes made)
(17,794 real changes made)
(8,386 real changes made)

. * make a linear trend *;
. gen trend = year - 1979;

. * make an after variable *;
. gen after=0;

. replace after=1 if year >= 2000;
(286,463 real changes made)

. * make a trend*treatment interaction *;
. gen trend_treat = 0;

. replace trend_treat = trend * treat * after;
(98,568 real changes made)

```

```

. gen trend_treat_before = 0;

. replace trend_treat_before = trend if treat == 1;
(261,280 real changes made)

. * make a treated*after variable *;
. gen treat_after = treat*after;

. label variable treat_after "1 if after the treatment in a treated state";

. * make a treated*after*male variable *;
. gen male = 0;

. replace male = 1 if sex==1;
(391,451 real changes made)

. label variable male "1 if male (from sex)";

. gen treat_after_male = treat*after*male;

. label variable treat_after_male "1 if after the treatment in a treated state and
obs is male";

. * make other interactions that we need *;
. gen male_after = male*after;

. gen male_treat = male*treat;

. ***** C. no c now *****;
. ***** D. pictures *****;
. * keep the data around for later *;
. preserve;

. * command for making graphs i like *;
. graph set eps orientation landscape;

. *** D.1. set up data for the picture ***;
. * get annual mean wages for treated and untreated states, and also the std error *;
. sort year treat;

. collapse (mean) incwage (sem) incwage_sd = incwage if emp == 1 & year < 2000,
by(year treat);

. * reshape to make it wider *;
. reshape wide incwage incwage_sd, i(year) j(treat);
(note: j = 0 1)

Data                                long   ->   wide
-----
Number of obs.                       76   ->    38
Number of variables                   4   ->    5
j variable (2 values)                 treat -> (dropped)
xij variables:
                                incwage   ->   incwage0 incwage1
                                incwage_sd ->   incwage_sd0 incwage_sd1
-----

. * calculate confidence bands *;
. foreach j in
>   0 1
>   {;
2.   gen cihi`j' = incwage`j' + 1.96*incwage_sd`j';

```

```

3. label variable cihj`j' "upper confidence bound for incwage when treatment =
`j'";
4. gen cilo`j' = incwage`j' - 1.96*incwage_sd`j';
5. label variable cilo`j' "lower confidence bound for incwage when treatment =
`j'";
6. };

. * check this *;
. list;

```

	year	incwage0	incwage_sd0	incwage1	incwage_sd1	cihi0
cilo0	cihi1	cilo1				

-----+-----						

1.	1962	3488.726801	90.37106178	3599.447927	116.9333095	3665.854
3311.6	3828.637	3370.259				
2.	1963	3510.650485	93.3998764	3606.122333	127.163879	3693.714
3327.587	3855.364	3356.881				
3.	1964	3709.272067	87.09248885	4064.811031	138.3090466	3879.973
3538.571	4335.897	3793.725				
4.	1965	4156.32	94.96580584	4158.422072	129.5612555	4342.453
3970.187	4412.362	3904.482				
5.	1966	4032.444685	61.01883199	4394.391266	87.49745929	4152.042
3912.848	4565.886	4222.896				

6.	1967	4494.722594	86.70202169	4612.71028	116.099795	4664.659
4324.787	4840.266	4385.155				
7.	1968	4594.673589	63.83185757	5071.785937	132.5184651	4719.784
4469.563	5331.522	4812.05				
8.	1969	4927.623893	66.06521668	5378.908762	132.2097958	5057.112
4798.136	5638.04	5119.777				
9.	1970	5683.795243	78.00463569	5769.535654	153.258028	5836.685
5530.906	6069.921	5469.15				
10.	1971	6057.928396	83.90905401	6240.394458	167.8891473	6222.39
5893.467	6569.457	5911.332				

11.	1972	6181.6962	86.52724787	6269.057526	160.9389904	6351.29
6012.103	6584.498	5953.617				
12.	1973	6426.358915	88.66438436	7381.617731	212.2891514	6600.141
6252.577	7797.705	6965.531				
13.	1974	6947.318742	95.03802406	7640.543323	210.3934829	7133.593
6761.044	8052.915	7228.172				
14.	1975	7495.510588	103.9384367	7893.524823	233.0185656	7699.23
7291.791	8350.241	7436.809				
15.	1976	7985.598623	108.5141236	9076.182426	242.5263355	8198.286
7772.911	9551.534	8600.831				

16.	1977	8222.816288	115.3951966	8170.973673	151.6480878	8448.991
7996.642	8468.204	7873.744				
17.	1978	9146.293871	129.0950076	9338.16241	173.5485891	9399.32
8893.268	9678.317	8998.007				
18.	1979	9797.485975	135.2214121	9945.065847	177.9870414	10062.52
9532.452	10293.92	9596.211				
19.	1980	10920.35409	138.6957037	10862.30014	180.5577174	11192.2
10648.51	11216.19	10508.41				
20.	1981	11691.20712	142.0454523	11920.53583	198.3079201	11969.62
11412.8	12309.22	11531.85				

21.	1982	12721.52574	173.3944002	13451.372	247.0383624	13061.38
12381.67		13935.57	12967.18			
22.	1983	13540.21997	186.2468799	14233.84269	260.5029731	13905.26
13175.18		14744.43	13723.26			
23.	1984	13949.4669	195.4333028	14775.07623	268.0979365	14332.52
13566.42		15300.55	14249.6			
24.	1985	15329.11462	211.1602616	15721.13659	289.1030915	15742.99
14915.24		16287.78	15154.49			
25.	1986	15957.31159	221.5348388	16566.04028	310.6661418	16391.52
15523.1		17174.95	15957.13			
26.	1987	16506.42711	222.6455449	17289.852	319.98596	16942.81
16070.04		17917.03	16662.68			
27.	1988	17791.3334	242.8144851	18435.76561	341.2545937	18267.25
17315.42		19104.63	17766.91			
28.	1989	18347.16019	245.4002345	19184.54537	377.6299325	18828.14
17866.18		19924.7	18444.39			
29.	1990	19366.22116	259.5333128	19513.10081	345.8090185	19874.91
18857.54		20190.89	18835.31			
30.	1991	19603.65385	254.8610618	21012.85384	382.3647445	20103.18
19104.13		21762.29	20263.42			
31.	1992	20758.66104	274.6561995	21155.98534	381.7966046	21296.99
20220.33		21904.31	20407.66			
32.	1993	21182.36609	287.8277337	22102.65437	398.37453	21746.51
20618.22		22883.47	21321.84			
33.	1994	22218.46129	294.4226623	22224.77471	422.0755967	22795.53
21641.39		23052.04	21397.51			
34.	1995	23097.83859	317.8879622	23124.63429	425.5648989	23720.9
22474.78		23958.74	22290.53			
35.	1996	25181.70613	487.4327685	26107.22981	702.4264126	26137.07
24226.34		27483.99	24730.47			
36.	1997	26906.30596	557.2945621	28051.26854	790.0894449	27998.6
25814.01		29599.84	26502.69			
37.	1998	27545.25089	506.5027743	26539.17301	716.5244819	28538
26552.51		27943.56	25134.79			
38.	1999	28843.95846	536.0743463	29646.41378	722.5388153	29894.66
27793.25		31062.59	28230.24			

```

. *** D.2. make the average wage over time picture ***;
. graph twoway
> (rarea cilol1 cihil year, bcolor(gs14))
> (rarea cilol0 cihil0 year, bcolor(gs14))
> (connected incwage0 year, msymbol(o))
> (connected incwage1 year, msymbol(o)),
> ytitle("annual wage")
> legend(off)
> xsize(11) ysize(8.5);

. graph export "output/${date}_mean_wage_wandwo_treatment_`sample'.eps", replace;
(note: file output/20231006_mean_wage_wandwo_treatment_big.eps not found)
(file output/20231006_mean_wage_wandwo_treatment_big.eps written in EPS format)

. ***** E. regressions and summary stats
*****;

```



```

. * bring back the data *;
. restore;

. *** E.1. test the parallel pre-trend assumption with a regression (2(a)) ***;
. * could have a linear trend, and an interaction term for the treated guys *;
. xi: regress incwage trend trend_treat_before i.age i.race i.statefip if emp == 1 &
year < 2000;
i.age          _Iage_0-99          (naturally coded; _Iage_0 omitted)
i.race         _Irace_100-830      (naturally coded; _Irace_100 omitted)
i.statefip    _Istatefip_1-99     (naturally coded; _Istatefip_1 omitted)
note: _Iage_1 omitted because of collinearity
note: _Iage_2 omitted because of collinearity
note: _Iage_3 omitted because of collinearity
note: _Iage_4 omitted because of collinearity
note: _Iage_5 omitted because of collinearity
note: _Iage_6 omitted because of collinearity
note: _Iage_7 omitted because of collinearity
note: _Iage_8 omitted because of collinearity
note: _Iage_9 omitted because of collinearity
note: _Iage_10 omitted because of collinearity
note: _Iage_11 omitted because of collinearity
note: _Iage_12 omitted because of collinearity
note: _Iage_13 omitted because of collinearity
note: _Iage_95 omitted because of collinearity
note: _Iage_96 omitted because of collinearity
note: _Iage_97 omitted because of collinearity
note: _Iage_98 omitted because of collinearity
note: _Iage_99 omitted because of collinearity
note: _Irace_651 omitted because of collinearity
note: _Irace_652 omitted because of collinearity
note: _Irace_801 omitted because of collinearity
note: _Irace_802 omitted because of collinearity
note: _Irace_803 omitted because of collinearity
note: _Irace_804 omitted because of collinearity
note: _Irace_805 omitted because of collinearity
note: _Irace_806 omitted because of collinearity
note: _Irace_807 omitted because of collinearity
note: _Irace_808 omitted because of collinearity
note: _Irace_809 omitted because of collinearity
note: _Irace_810 omitted because of collinearity
note: _Irace_811 omitted because of collinearity
note: _Irace_812 omitted because of collinearity
note: _Irace_813 omitted because of collinearity
note: _Irace_814 omitted because of collinearity
note: _Irace_817 omitted because of collinearity
note: _Irace_818 omitted because of collinearity
note: _Irace_820 omitted because of collinearity
note: _Irace_830 omitted because of collinearity

```

Source	SS	df	MS	Number of obs	=	232,099
Model	1.7498e+13	161	1.0869e+11	F(161, 231937)	=	438.69
Residual	5.7462e+13	231,937	247749149	Prob > F	=	0.0000
Total	7.4961e+13	232,098	322969247	R-squared	=	0.2334
				Adj R-squared	=	0.2329
				Root MSE	=	15740

incwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
trend	714.5073	4.410046	162.02	0.000	705.8637	723.1509
trend_treat_before	-14.68071	7.312928	-2.01	0.045	-29.01386	-.3475626
_Iage_1	0	(omitted)				
_Iage_2	0	(omitted)				

_Iage_3	0	(omitted)					
_Iage_4	0	(omitted)					
_Iage_5	0	(omitted)					
_Iage_6	0	(omitted)					
_Iage_7	0	(omitted)					
_Iage_8	0	(omitted)					
_Iage_9	0	(omitted)					
_Iage_10	0	(omitted)					
_Iage_11	0	(omitted)					
_Iage_12	0	(omitted)					
_Iage_13	0	(omitted)					
_Iage_14	-11337.7	15757.24	-0.72	0.472	-42221.49	19546.08	
_Iage_15	-16179.95	15750.47	-1.03	0.304	-47050.47	14690.57	
_Iage_16	-16703.34	15747.87	-1.06	0.289	-47568.76	14162.08	
_Iage_17	-16296.18	15746.65	-1.03	0.301	-47159.21	14566.84	
_Iage_18	-15150.91	15746.33	-0.96	0.336	-46013.31	15711.49	
_Iage_19	-13792.38	15746.16	-0.88	0.381	-44654.45	17069.69	
_Iage_20	-12639.78	15746.06	-0.80	0.422	-43501.65	18222.1	
_Iage_21	-11600.32	15746	-0.74	0.461	-42462.08	19261.43	
_Iage_22	-10972.19	15745.89	-0.70	0.486	-41833.72	19889.35	
_Iage_23	-9876.35	15745.85	-0.63	0.531	-40737.81	20985.11	
_Iage_24	-8747.714	15745.79	-0.56	0.579	-39609.06	22113.63	
_Iage_25	-7176.511	15745.79	-0.46	0.649	-38037.85	23684.82	
_Iage_26	-6717.766	15745.76	-0.43	0.670	-37579.05	24143.52	
_Iage_27	-5800.692	15745.78	-0.37	0.713	-36662.01	25060.62	
_Iage_28	-5542.695	15745.76	-0.35	0.725	-36403.98	25318.59	
_Iage_29	-5035.413	15745.79	-0.32	0.749	-35896.76	25825.93	
_Iage_30	-3999.315	15745.77	-0.25	0.800	-34860.61	26861.98	
_Iage_31	-4135.761	15745.78	-0.26	0.793	-34997.08	26725.56	
_Iage_32	-3713.418	15745.78	-0.24	0.814	-34574.75	27147.91	
_Iage_33	-3650.662	15745.8	-0.23	0.817	-34512.02	27210.7	
_Iage_34	-3272.118	15745.84	-0.21	0.835	-34133.56	27589.33	
_Iage_35	-2303.004	15745.83	-0.15	0.884	-33164.43	28558.42	
_Iage_36	-2267.219	15745.86	-0.14	0.886	-33128.71	28594.27	
_Iage_37	-2068.893	15745.86	-0.13	0.895	-32930.38	28792.6	
_Iage_38	-1899.566	15745.9	-0.12	0.904	-32761.13	28962	
_Iage_39	-1587.141	15745.92	-0.10	0.920	-32448.73	29274.45	
_Iage_40	-1753.07	15745.9	-0.11	0.911	-32614.63	29108.49	
_Iage_41	-1276.694	15745.93	-0.08	0.935	-32138.3	29584.92	
_Iage_42	-1447.38	15745.97	-0.09	0.927	-32309.07	29414.31	
_Iage_43	-945.8378	15745.99	-0.06	0.952	-31807.56	29915.89	
_Iage_44	-1101.257	15746.07	-0.07	0.944	-31963.15	29760.63	
_Iage_45	-1176.723	15746.06	-0.07	0.940	-32038.6	29685.15	
_Iage_46	-933.6323	15746.14	-0.06	0.953	-31795.66	29928.4	
_Iage_47	-1324.826	15746.13	-0.08	0.933	-32186.84	29537.19	
_Iage_48	-996.2869	15746.22	-0.06	0.950	-31858.48	29865.91	
_Iage_49	-1201.365	15746.23	-0.08	0.939	-32063.57	29660.84	
_Iage_50	-1579.251	15746.19	-0.10	0.920	-32441.37	29282.87	
_Iage_51	-1596.409	15746.38	-0.10	0.919	-32458.91	29266.09	
_Iage_52	-1852.463	15746.42	-0.12	0.906	-32715.04	29010.12	
_Iage_53	-2075.492	15746.52	-0.13	0.895	-32938.26	28787.27	
_Iage_54	-2186.33	15746.61	-0.14	0.890	-33049.27	28676.61	
_Iage_55	-2323.98	15746.66	-0.15	0.883	-33187.02	28539.06	
_Iage_56	-2860.913	15746.74	-0.18	0.856	-33724.13	28002.3	
_Iage_57	-3068.174	15746.92	-0.19	0.846	-33931.74	27795.39	
_Iage_58	-2707.885	15747.12	-0.17	0.863	-33571.83	28156.06	
_Iage_59	-3290.393	15747.13	-0.21	0.834	-34154.37	27573.58	
_Iage_60	-3414.797	15747.19	-0.22	0.828	-34278.89	27449.3	
_Iage_61	-3475.769	15747.57	-0.22	0.825	-34340.61	27389.07	
_Iage_62	-4773.502	15748.23	-0.30	0.762	-35639.62	26092.61	
_Iage_63	-5894.772	15748.64	-0.37	0.708	-36761.71	24972.16	
_Iage_64	-5480.576	15749.71	-0.35	0.728	-36349.6	25388.45	
_Iage_65	-8131.596	15750.96	-0.52	0.606	-39003.07	22739.88	

_Iage_66		-8579.361	15752.81	-0.54	0.586	-39454.47	22295.75
_Iage_67		-9685.14	15753.94	-0.61	0.539	-40562.46	21192.18
_Iage_68		-9089.998	15755.31	-0.58	0.564	-39970.01	21790.01
_Iage_69		-9428.931	15757.21	-0.60	0.550	-40312.66	21454.79
_Iage_70		-11088.38	15758.82	-0.70	0.482	-41975.26	19798.5
_Iage_71		-11418.23	15760.75	-0.72	0.469	-42308.9	19472.43
_Iage_72		-11088.35	15764.38	-0.70	0.482	-41986.12	19809.43
_Iage_73		-12621.12	15767.23	-0.80	0.423	-43524.5	18282.25
_Iage_74		-11776.77	15770.54	-0.75	0.455	-42686.62	19133.09
_Iage_75		-12518.82	15778.35	-0.79	0.428	-43443.98	18406.35
_Iage_76		-12346.24	15781.24	-0.78	0.434	-43277.06	18584.58
_Iage_77		-11264.68	15792.67	-0.71	0.476	-42217.9	19688.54
_Iage_78		-11951.17	15810.91	-0.76	0.450	-42940.15	19037.8
_Iage_79		-13814.92	15816.31	-0.87	0.382	-44814.47	17184.64
_Iage_80		-14126.81	15845.09	-0.89	0.373	-45182.78	16929.15
_Iage_81		-12820.57	15857.9	-0.81	0.419	-43901.65	18260.52
_Iage_82		-13298.24	15961.63	-0.83	0.405	-44582.63	17986.15
_Iage_83		-12971.88	15967.79	-0.81	0.417	-44268.33	18324.57
_Iage_84		-10967.2	16013.3	-0.68	0.493	-42352.86	20418.46
_Iage_85		-7054.943	16153.37	-0.44	0.662	-38715.13	24605.25
_Iage_86		7788.713	16338.69	0.48	0.634	-24234.7	39812.12
_Iage_87		-9237.787	16228.94	-0.57	0.569	-41046.1	22570.52
_Iage_88		-15400.63	16338.65	-0.94	0.346	-47423.97	16622.7
_Iage_89		-5797.579	17602.75	-0.33	0.742	-40298.51	28703.35
_Iage_90		-10011.72	16175.88	-0.62	0.536	-41716.03	21692.59
_Iage_91		-21387.89	19282.03	-1.11	0.267	-59180.17	16404.39
_Iage_92		-8605.467	19282.15	-0.45	0.655	-46397.99	29187.06
_Iage_93		-4680.338	22264.18	-0.21	0.833	-48317.56	38956.88
_Iage_94		-14250.44	22263.23	-0.64	0.522	-57885.79	29384.91
_Iage_95		0	(omitted)				
_Iage_96		0	(omitted)				
_Iage_97		0	(omitted)				
_Iage_98		0	(omitted)				
_Iage_99		0	(omitted)				
_Irace_200		-3266.402	122.7279	-26.61	0.000	-3506.945	-3025.858
_Irace_300		-3067.402	600.1221	-5.11	0.000	-4243.626	-1891.178
_Irace_650		1231.805	328.7511	3.75	0.000	587.461	1876.148
_Irace_651		0	(omitted)				
_Irace_652		0	(omitted)				
_Irace_700		-2175.854	291.2754	-7.47	0.000	-2746.747	-1604.962
_Irace_801		0	(omitted)				
_Irace_802		0	(omitted)				
_Irace_803		0	(omitted)				
_Irace_804		0	(omitted)				
_Irace_805		0	(omitted)				
_Irace_806		0	(omitted)				
_Irace_807		0	(omitted)				
_Irace_808		0	(omitted)				
_Irace_809		0	(omitted)				
_Irace_810		0	(omitted)				
_Irace_811		0	(omitted)				
_Irace_812		0	(omitted)				
_Irace_813		0	(omitted)				
_Irace_814		0	(omitted)				
_Irace_817		0	(omitted)				
_Irace_818		0	(omitted)				
_Irace_820		0	(omitted)				
_Irace_830		0	(omitted)				
_Istatefip_2		5483.777	468.8128	11.70	0.000	4564.916	6402.638
_Istatefip_4		1118.294	469.5953	2.38	0.017	197.8991	2038.688
_Istatefip_5		-2622.905	480.6507	-5.46	0.000	-3564.968	-1680.842
_Istatefip_6		2463.18	346.3796	7.11	0.000	1784.285	3142.075
_Istatefip_8		2466.822	451.4416	5.46	0.000	1582.008	3351.636

_Istatefip_9		3195.643	451.0901	7.08	0.000	2311.518	4079.768
_Istatefip_10		2786.736	507.9319	5.49	0.000	1791.203	3782.269
_Istatefip_11		6955.836	507.6279	13.70	0.000	5960.898	7950.773
_Istatefip_12		557.919	367.447	1.52	0.129	-162.2678	1278.106
_Istatefip_13		1337.721	420.5913	3.18	0.001	513.3731	2162.069
_Istatefip_15		1790.332	526.8991	3.40	0.001	757.6236	2823.041
_Istatefip_16		-2161.041	477.9832	-4.52	0.000	-3097.876	-1224.206
_Istatefip_17		3066.265	362.2808	8.46	0.000	2356.204	3776.326
_Istatefip_18		964.9299	405.1333	2.38	0.017	170.8791	1758.981
_Istatefip_19		-1212.43	450.9559	-2.69	0.007	-2096.292	-328.5678
_Istatefip_20		405.4579	461.5241	0.88	0.380	-499.1175	1310.033
_Istatefip_21		364.1726	451.3694	0.81	0.420	-520.4998	1248.845
_Istatefip_22		1496.469	445.9257	3.36	0.001	622.4658	2370.472
_Istatefip_23		-1175.429	503.2463	-2.34	0.020	-2161.778	-189.0787
_Istatefip_24		4060.917	424.0838	9.58	0.000	3229.723	4892.11
_Istatefip_25		3884.698	385.1406	10.09	0.000	3129.833	4639.564
_Istatefip_26		3674.966	384.4445	9.56	0.000	2921.464	4428.467
_Istatefip_27		714.8649	444.2293	1.61	0.108	-155.813	1585.543
_Istatefip_28		-720.198	477.7772	-1.51	0.132	-1656.629	216.2331
_Istatefip_29		685.7995	424.1572	1.62	0.106	-145.5377	1517.137
_Istatefip_30		-3240.445	474.8876	-6.82	0.000	-4171.212	-2309.678
_Istatefip_31		-1647.108	460.023	-3.58	0.000	-2548.741	-745.4746
_Istatefip_32		1739.198	482.3559	3.61	0.000	793.7925	2684.603
_Istatefip_33		1541.224	512.1212	3.01	0.003	537.4798	2544.968
_Istatefip_34		4542.584	370.6052	12.26	0.000	3816.207	5268.961
_Istatefip_35		-1287.493	460.5297	-2.80	0.005	-2190.12	-384.8671
_Istatefip_36		3038.823	350.7042	8.66	0.000	2351.451	3726.194
_Istatefip_37		541.7263	386.8356	1.40	0.161	-216.4614	1299.914
_Istatefip_38		-2788.337	469.9028	-5.93	0.000	-3709.334	-1867.34
_Istatefip_39		2340.619	364.4237	6.42	0.000	1626.358	3054.88
_Istatefip_40		-764.5244	466.631	-1.64	0.101	-1679.109	150.0602
_Istatefip_41		468.784	459.3095	1.02	0.307	-431.4507	1369.019
_Istatefip_42		1656.77	361.7872	4.58	0.000	947.6764	2365.864
_Istatefip_44		1461.49	512.2188	2.85	0.004	457.5545	2465.426
_Istatefip_45		450.3249	474.2768	0.95	0.342	-479.2453	1379.895
_Istatefip_46		-4007.142	460.618	-8.70	0.000	-4909.941	-3104.343
_Istatefip_47		59.17401	436.5233	0.14	0.892	-796.4004	914.7484
_Istatefip_48		843.5148	356.7958	2.36	0.018	144.2042	1542.825
_Istatefip_49		468.4996	466.1519	1.01	0.315	-445.1462	1382.145
_Istatefip_50		-1450.35	520.9992	-2.78	0.005	-2471.495	-429.2052
_Istatefip_51		4128.076	432.499	9.54	0.000	3280.389	4975.763
_Istatefip_53		2225.136	463.0088	4.81	0.000	1317.651	3132.621
_Istatefip_54		-538.3529	494.7836	-1.09	0.277	-1508.116	431.4101
_Istatefip_55		1578.483	433.1343	3.64	0.000	729.5509	2427.415
_Istatefip_56		-58.79065	496.5236	-0.12	0.906	-1031.964	914.3828
_Istatefip_61		5424.418	2682.866	2.02	0.043	166.0693	10682.77
_Istatefip_65		4115.968	3300.598	1.25	0.212	-2353.118	10585.05
_Istatefip_68		8203.318	4083.347	2.01	0.045	200.0641	16206.57
_Istatefip_69		2842.906	2682.972	1.06	0.289	-2415.65	8101.462
_Istatefip_70		2082.646	513.203	4.06	0.000	1076.781	3088.51
_Istatefip_71		2262.021	427.1177	5.30	0.000	1424.882	3099.161
_Istatefip_72		1487.486	610.2507	2.44	0.015	291.4102	2683.561
_Istatefip_73		787.8619	666.6869	1.18	0.237	-518.8272	2094.551
_Istatefip_74		2474.2	695.1516	3.56	0.000	1111.721	3836.679
_Istatefip_75		1315.839	562.74	2.34	0.019	212.883	2418.795
_Istatefip_76		697.4945	539.9557	1.29	0.196	-360.8049	1755.794
_Istatefip_77		806.0286	772.877	1.04	0.297	-708.7905	2320.848
_Istatefip_78		1632.107	703.9747	2.32	0.020	252.335	3011.88
_Istatefip_79		1635.061	773.0684	2.12	0.034	119.8664	3150.255
_Istatefip_80		2685.034	727.7463	3.69	0.000	1258.67	4111.398
_Istatefip_81		-563.8487	847.7687	-0.67	0.506	-2225.454	1097.756
_Istatefip_83		616.4479	643.3263	0.96	0.338	-644.455	1877.351
_Istatefip_84		81.41925	660.1122	0.12	0.902	-1212.384	1375.222

_Istatefip_85		-337.2696	631.9493	-0.53	0.594	-1575.874	901.3347
_Istatefip_87		.6503894	498.4765	0.00	0.999	-976.3508	977.6516
_Istatefip_88		1020.867	676.0488	1.51	0.131	-304.1716	2345.905
_Istatefip_89		258.3945	603.4876	0.43	0.669	-924.4257	1441.215
_Istatefip_90		1767.638	558.7687	3.16	0.002	672.4654	2862.81
_Istatefip_99		5635.887	3950.08	1.43	0.154	-2106.167	13377.94
_cons		15286.39	15747.89	0.97	0.332	-15579.07	46151.85

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. eststo t1;
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. * could test whether year effects are equal before *;
. xi: regress incwage i.year*treat i.race i.age i.statefip if emp == 1 & year < 2000;
i.year          _Iyear_1962-2013      (naturally coded; _Iyear_1962 omitted)
i.year*treat    _IyeaXtre_#           (coded as above)
i.race          _Irace_100-830        (naturally coded; _Irace_100 omitted)
i.age          _Iage_0-99            (naturally coded; _Iage_0 omitted)
i.statefip      _Istatefip_1-99      (naturally coded; _Istatefip_1 omitted)
note: _Iyear_2000 omitted because of collinearity
note: _Iyear_2001 omitted because of collinearity
note: _Iyear_2002 omitted because of collinearity
note: _Iyear_2003 omitted because of collinearity
note: _Iyear_2004 omitted because of collinearity
note: _Iyear_2005 omitted because of collinearity
note: _Iyear_2006 omitted because of collinearity
note: _Iyear_2007 omitted because of collinearity
note: _Iyear_2008 omitted because of collinearity
note: _Iyear_2009 omitted because of collinearity
note: _Iyear_2010 omitted because of collinearity
note: _Iyear_2011 omitted because of collinearity
note: _Iyear_2012 omitted because of collinearity
note: _Iyear_2013 omitted because of collinearity
note: _IyeaXtre_2000 omitted because of collinearity
note: _IyeaXtre_2001 omitted because of collinearity
note: _IyeaXtre_2002 omitted because of collinearity
note: _IyeaXtre_2003 omitted because of collinearity
note: _IyeaXtre_2004 omitted because of collinearity
note: _IyeaXtre_2005 omitted because of collinearity
note: _IyeaXtre_2006 omitted because of collinearity
note: _IyeaXtre_2007 omitted because of collinearity
note: _IyeaXtre_2008 omitted because of collinearity
note: _IyeaXtre_2009 omitted because of collinearity
note: _IyeaXtre_2010 omitted because of collinearity
note: _IyeaXtre_2011 omitted because of collinearity
note: _IyeaXtre_2012 omitted because of collinearity
note: _IyeaXtre_2013 omitted because of collinearity
note: _Irace_651 omitted because of collinearity
note: _Irace_652 omitted because of collinearity
note: _Irace_801 omitted because of collinearity
note: _Irace_802 omitted because of collinearity
note: _Irace_803 omitted because of collinearity
note: _Irace_804 omitted because of collinearity
note: _Irace_805 omitted because of collinearity
note: _Irace_806 omitted because of collinearity
note: _Irace_807 omitted because of collinearity
note: _Irace_808 omitted because of collinearity
note: _Irace_809 omitted because of collinearity
note: _Irace_810 omitted because of collinearity
note: _Irace_811 omitted because of collinearity
note: _Irace_812 omitted because of collinearity
note: _Irace_813 omitted because of collinearity
note: _Irace_814 omitted because of collinearity
note: _Irace_817 omitted because of collinearity
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note: _Irace_818 omitted because of collinearity
 note: _Irace_820 omitted because of collinearity
 note: _Irace_830 omitted because of collinearity
 note: _Iage_1 omitted because of collinearity
 note: _Iage_2 omitted because of collinearity
 note: _Iage_3 omitted because of collinearity
 note: _Iage_4 omitted because of collinearity
 note: _Iage_5 omitted because of collinearity
 note: _Iage_6 omitted because of collinearity
 note: _Iage_7 omitted because of collinearity
 note: _Iage_8 omitted because of collinearity
 note: _Iage_9 omitted because of collinearity
 note: _Iage_10 omitted because of collinearity
 note: _Iage_11 omitted because of collinearity
 note: _Iage_12 omitted because of collinearity
 note: _Iage_13 omitted because of collinearity
 note: _Iage_95 omitted because of collinearity
 note: _Iage_96 omitted because of collinearity
 note: _Iage_97 omitted because of collinearity
 note: _Iage_98 omitted because of collinearity
 note: _Iage_99 omitted because of collinearity
 note: _Istatefip_23 omitted because of collinearity

Source	SS	df	MS	Number of obs	=	232,099
Model	1.7793e+13	233	7.6366e+10	F(233, 231865)	=	309.74
Residual	5.7167e+13	231,865	246553522	Prob > F	=	0.0000
				R-squared	=	0.2374
				Adj R-squared	=	0.2366
Total	7.4961e+13	232,098	322969247	Root MSE	=	15702

incwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_Iyear_1963	177.0417	608.2739	0.29	0.771	-1015.159	1369.243
_Iyear_1964	462.1032	538.2695	0.86	0.391	-592.8912	1517.098
_Iyear_1965	848.0491	537.4168	1.58	0.115	-205.2739	1901.372
_Iyear_1966	1008.97	467.6612	2.16	0.031	92.3657	1925.574
_Iyear_1967	1489.552	504.9796	2.95	0.003	499.8045	2479.299
_Iyear_1968	1401.41	461.9765	3.03	0.002	495.9484	2306.872
_Iyear_1969	1771.505	461.9598	3.83	0.000	866.0762	2676.935
_Iyear_1970	2375.963	464.3709	5.12	0.000	1465.808	3286.118
_Iyear_1971	2901.807	464.0543	6.25	0.000	1992.273	3811.342
_Iyear_1972	3199.713	464.8544	6.88	0.000	2288.61	4110.815
_Iyear_1973	3698.96	466.0688	7.94	0.000	2785.477	4612.443
_Iyear_1974	4154.678	468.5899	8.87	0.000	3236.253	5073.102
_Iyear_1975	4824.055	472.2205	10.22	0.000	3898.515	5749.595
_Iyear_1976	5147.984	469.3988	10.97	0.000	4227.974	6067.993
_Iyear_1977	5983.987	459.135	13.03	0.000	5084.094	6883.88
_Iyear_1978	6974.223	458.1331	15.22	0.000	6076.294	7872.152
_Iyear_1979	7564.36	459.9886	16.44	0.000	6662.794	8465.925
_Iyear_1980	8915.469	448.5875	19.87	0.000	8036.249	9794.689
_Iyear_1981	9515.41	447.9503	21.24	0.000	8637.439	10393.38
_Iyear_1982	10430.61	454.7093	22.94	0.000	9539.387	11321.82
_Iyear_1983	10949.68	456.3117	24.00	0.000	10055.32	11844.03
_Iyear_1984	11451.3	454.9087	25.17	0.000	10559.69	12342.91
_Iyear_1985	12764.52	451.9587	28.24	0.000	11878.69	13650.35
_Iyear_1986	13280.92	453.2082	29.30	0.000	12392.65	14169.2
_Iyear_1987	13706.18	452.8559	30.27	0.000	12818.6	14593.77
_Iyear_1988	14977.3	453.1025	33.05	0.000	14089.23	15865.37
_Iyear_1989	15398.31	454.0158	33.92	0.000	14508.45	16288.17
_Iyear_1990	16429.81	451.6533	36.38	0.000	15544.59	17315.04
_Iyear_1991	16554.52	452.8372	36.56	0.000	15666.97	17442.07
_Iyear_1992	17635.53	454.0466	38.84	0.000	16745.61	18525.45

_Iyear_1993		18017.89	453.449	39.74	0.000	17129.15	18906.64
_Iyear_1994		19047.43	453.7476	41.98	0.000	18158.1	19936.76
_Iyear_1995		20037.1	455.0305	44.03	0.000	19145.25	20928.95
_Iyear_1996		22165.24	462.8619	47.89	0.000	21258.05	23072.44
_Iyear_1997		23761.1	461.5773	51.48	0.000	22856.42	24665.78
_Iyear_1998		24402.23	459.6885	53.08	0.000	23501.25	25303.21
_Iyear_1999		25675.4	460.8205	55.72	0.000	24772.2	26578.6
_Iyear_2000		0	(omitted)				
_Iyear_2001		0	(omitted)				
_Iyear_2002		0	(omitted)				
_Iyear_2003		0	(omitted)				
_Iyear_2004		0	(omitted)				
_Iyear_2005		0	(omitted)				
_Iyear_2006		0	(omitted)				
_Iyear_2007		0	(omitted)				
_Iyear_2008		0	(omitted)				
_Iyear_2009		0	(omitted)				
_Iyear_2010		0	(omitted)				
_Iyear_2011		0	(omitted)				
_Iyear_2012		0	(omitted)				
_Iyear_2013		0	(omitted)				
treat		-880.454	808.311	-1.09	0.276	-2464.723	703.8148
_IyeaXtre_1963		105.8274	985.1483	0.11	0.914	-1825.038	2036.693
_IyeaXtre_1964		-167.4116	873.1668	-0.19	0.848	-1878.796	1543.973
_IyeaXtre_1965		-388.5158	881.7135	-0.44	0.659	-2116.652	1339.62
_IyeaXtre_1966		25.02609	759.7618	0.03	0.974	-1464.087	1514.14
_IyeaXtre_1967		-366.5131	825.8508	-0.44	0.657	-1985.159	1252.133
_IyeaXtre_1968		577.0695	811.5478	0.71	0.477	-1013.543	2167.682
_IyeaXtre_1969		304.9747	802.8589	0.38	0.704	-1268.608	1878.557
_IyeaXtre_1970		444.0297	823.1286	0.54	0.590	-1169.281	2057.34
_IyeaXtre_1971		250.7727	817.8786	0.31	0.759	-1352.248	1853.794
_IyeaXtre_1972		-190.5825	814.2673	-0.23	0.815	-1786.525	1405.36
_IyeaXtre_1973		-81.72434	840.5555	-0.10	0.923	-1729.191	1565.743
_IyeaXtre_1974		-43.16986	851.6817	-0.05	0.960	-1712.444	1626.104
_IyeaXtre_1975		-648.5022	852.6557	-0.76	0.447	-2319.685	1022.681
_IyeaXtre_1976		141.4042	842.7618	0.17	0.867	-1510.387	1793.196
_IyeaXtre_1977		-414.5519	750.9549	-0.55	0.581	-1886.404	1057.3
_IyeaXtre_1978		-369.6594	747.2173	-0.49	0.621	-1834.186	1094.867
_IyeaXtre_1979		-292.9568	747.8578	-0.39	0.695	-1758.739	1172.825
_IyeaXtre_1980		-607.4882	733.4175	-0.83	0.408	-2044.968	829.9913
_IyeaXtre_1981		-262.1055	734.763	-0.36	0.721	-1702.222	1178.011
_IyeaXtre_1982		64.13235	745.4111	0.09	0.931	-1396.854	1525.119
_IyeaXtre_1983		242.2087	746.026	0.32	0.745	-1219.983	1704.4
_IyeaXtre_1984		166.0992	744.4743	0.22	0.823	-1293.051	1625.25
_IyeaXtre_1985		-301.7912	739.4793	-0.41	0.683	-1751.152	1147.569
_IyeaXtre_1986		84.11556	745.6006	0.11	0.910	-1377.242	1545.473
_IyeaXtre_1987		312.9271	745.0833	0.42	0.674	-1147.417	1773.271
_IyeaXtre_1988		-152.6621	741.9619	-0.21	0.837	-1606.888	1301.564
_IyeaXtre_1989		286.7091	752.0858	0.38	0.703	-1187.36	1760.778
_IyeaXtre_1990		-535.8191	741.0434	-0.72	0.470	-1988.245	916.6068
_IyeaXtre_1991		644.9126	742.8459	0.87	0.385	-811.0462	2100.871
_IyeaXtre_1992		-379.0756	744.3066	-0.51	0.611	-1837.897	1079.746
_IyeaXtre_1993		-45.95331	744.7516	-0.06	0.951	-1505.647	1413.741
_IyeaXtre_1994		-716.6554	746.6464	-0.96	0.337	-2180.063	746.7522
_IyeaXtre_1995		-1032.823	747.9011	-1.38	0.167	-2498.69	433.0441
_IyeaXtre_1996		42.90171	763.1101	0.06	0.955	-1452.774	1538.578
_IyeaXtre_1997		474.6688	759.5635	0.62	0.532	-1014.056	1963.394
_IyeaXtre_1998		-1634.575	758.9391	-2.15	0.031	-3122.076	-147.0737
_IyeaXtre_1999		-92.01522	758.3891	-0.12	0.903	-1578.438	1394.408
_IyeaXtre_2000		0	(omitted)				
_IyeaXtre_2001		0	(omitted)				
_IyeaXtre_2002		0	(omitted)				
_IyeaXtre_2003		0	(omitted)				

_IyeaXtre_2004		0	(omitted)				
_IyeaXtre_2005		0	(omitted)				
_IyeaXtre_2006		0	(omitted)				
_IyeaXtre_2007		0	(omitted)				
_IyeaXtre_2008		0	(omitted)				
_IyeaXtre_2009		0	(omitted)				
_IyeaXtre_2010		0	(omitted)				
_IyeaXtre_2011		0	(omitted)				
_IyeaXtre_2012		0	(omitted)				
_IyeaXtre_2013		0	(omitted)				
_Irace_200		-3307.925	122.4653	-27.01	0.000	-3547.953	-3067.896
_Irace_300		-3660.098	599.4602	-6.11	0.000	-4835.025	-2485.172
_Irace_650		746.5339	329.1541	2.27	0.023	101.4003	1391.667
_Irace_651		0	(omitted)				
_Irace_652		0	(omitted)				
_Irace_700		-1788.52	291.4992	-6.14	0.000	-2359.851	-1217.189
_Irace_801		0	(omitted)				
_Irace_802		0	(omitted)				
_Irace_803		0	(omitted)				
_Irace_804		0	(omitted)				
_Irace_805		0	(omitted)				
_Irace_806		0	(omitted)				
_Irace_807		0	(omitted)				
_Irace_808		0	(omitted)				
_Irace_809		0	(omitted)				
_Irace_810		0	(omitted)				
_Irace_811		0	(omitted)				
_Irace_812		0	(omitted)				
_Irace_813		0	(omitted)				
_Irace_814		0	(omitted)				
_Irace_817		0	(omitted)				
_Irace_818		0	(omitted)				
_Irace_820		0	(omitted)				
_Irace_830		0	(omitted)				
_Iage_1		0	(omitted)				
_Iage_2		0	(omitted)				
_Iage_3		0	(omitted)				
_Iage_4		0	(omitted)				
_Iage_5		0	(omitted)				
_Iage_6		0	(omitted)				
_Iage_7		0	(omitted)				
_Iage_8		0	(omitted)				
_Iage_9		0	(omitted)				
_Iage_10		0	(omitted)				
_Iage_11		0	(omitted)				
_Iage_12		0	(omitted)				
_Iage_13		0	(omitted)				
_Iage_14		-11094.58	15720.39	-0.71	0.480	-41906.14	19716.97
_Iage_15		-15807.06	15713.59	-1.01	0.314	-46605.29	14991.18
_Iage_16		-16345.7	15711	-1.04	0.298	-47138.87	14447.46
_Iage_17		-15925.8	15709.81	-1.01	0.311	-46716.61	14865.02
_Iage_18		-14799.31	15709.49	-0.94	0.346	-45589.5	15990.88
_Iage_19		-13417.4	15709.32	-0.85	0.393	-44207.26	17372.46
_Iage_20		-12241.34	15709.2	-0.78	0.436	-43030.97	18548.3
_Iage_21		-11211.46	15709.16	-0.71	0.475	-42001.01	19578.08
_Iage_22		-10551.92	15709.04	-0.67	0.502	-41341.24	20237.4
_Iage_23		-9451.555	15709	-0.60	0.547	-40240.8	21337.69
_Iage_24		-8312.728	15708.94	-0.53	0.597	-39101.84	22476.39
_Iage_25		-6743.519	15708.94	-0.43	0.668	-37532.63	24045.6
_Iage_26		-6321.689	15708.91	-0.40	0.687	-37110.74	24467.36
_Iage_27		-5381.571	15708.95	-0.34	0.732	-36170.7	25407.56
_Iage_28		-5132.313	15708.91	-0.33	0.744	-35921.38	25656.75
_Iage_29		-4664.752	15708.94	-0.30	0.767	-35453.86	26124.36

_Iage_30		-3629.08	15708.91	-0.23	0.817	-34418.15	27159.99
_Iage_31		-3789.812	15708.94	-0.24	0.809	-34578.92	26999.3
_Iage_32		-3375.042	15708.94	-0.21	0.830	-34164.16	27414.08
_Iage_33		-3336.468	15708.95	-0.21	0.832	-34125.6	27452.67
_Iage_34		-2941.552	15709	-0.19	0.851	-33730.79	27847.68
_Iage_35		-2017.472	15708.99	-0.13	0.898	-32806.69	28771.74
_Iage_36		-2021.571	15709.02	-0.13	0.898	-32810.85	28767.71
_Iage_37		-1831.282	15709.02	-0.12	0.907	-32620.56	28957.99
_Iage_38		-1636.736	15709.04	-0.10	0.917	-32426.06	29152.59
_Iage_39		-1355.93	15709.07	-0.09	0.931	-32145.3	29433.44
_Iage_40		-1531.372	15709.05	-0.10	0.922	-32320.71	29257.97
_Iage_41		-1097.268	15709.08	-0.07	0.944	-31886.66	29692.13
_Iage_42		-1210.384	15709.11	-0.08	0.939	-31999.83	29579.07
_Iage_43		-765.875	15709.14	-0.05	0.961	-31555.39	30023.64
_Iage_44		-915.3278	15709.22	-0.06	0.954	-31705	29874.34
_Iage_45		-986.5059	15709.2	-0.06	0.950	-31776.13	29803.12
_Iage_46		-754.346	15709.3	-0.05	0.962	-31544.17	30035.47
_Iage_47		-1143.461	15709.27	-0.07	0.942	-31933.23	29646.31
_Iage_48		-788.4948	15709.38	-0.05	0.960	-31578.46	30001.48
_Iage_49		-1022.439	15709.38	-0.07	0.948	-31812.42	29767.55
_Iage_50		-1364.311	15709.34	-0.09	0.931	-32154.21	29425.59
_Iage_51		-1368.19	15709.53	-0.09	0.931	-32158.47	29422.09
_Iage_52		-1620.535	15709.59	-0.10	0.918	-32410.92	29169.85
_Iage_53		-1826.224	15709.68	-0.12	0.907	-32616.78	28964.34
_Iage_54		-1922.292	15709.76	-0.12	0.903	-32713.03	28868.44
_Iage_55		-2053.231	15709.81	-0.13	0.896	-32844.06	28737.6
_Iage_56		-2569.754	15709.89	-0.16	0.870	-33360.74	28221.23
_Iage_57		-2742.388	15710.07	-0.17	0.861	-33533.73	28048.95
_Iage_58		-2415.628	15710.27	-0.15	0.878	-33207.36	28376.11
_Iage_59		-2960.331	15710.28	-0.19	0.851	-33752.08	27831.42
_Iage_60		-3102.708	15710.34	-0.20	0.843	-33894.58	27689.16
_Iage_61		-3158.4	15710.72	-0.20	0.841	-33951.01	27634.21
_Iage_62		-4466.99	15711.36	-0.28	0.776	-35260.85	26326.87
_Iage_63		-5614.104	15711.79	-0.36	0.721	-36408.81	25180.61
_Iage_64		-5277.543	15712.85	-0.34	0.737	-36074.33	25519.24
_Iage_65		-7902.77	15714.1	-0.50	0.615	-38701.99	22896.45
_Iage_66		-8382.615	15715.94	-0.53	0.594	-39185.46	22420.23
_Iage_67		-9498.906	15717.05	-0.60	0.546	-40303.92	21306.11
_Iage_68		-8914.197	15718.44	-0.57	0.571	-39721.94	21893.54
_Iage_69		-9190.186	15720.31	-0.58	0.559	-40001.59	21621.22
_Iage_70		-10788.27	15721.98	-0.69	0.493	-41602.95	20026.41
_Iage_71		-11237.3	15723.88	-0.71	0.475	-42055.71	19581.11
_Iage_72		-10928.55	15727.5	-0.69	0.487	-41754.04	19896.94
_Iage_73		-12435.37	15730.32	-0.79	0.429	-43266.4	18395.66
_Iage_74		-11560.64	15733.65	-0.73	0.462	-42398.2	19276.91
_Iage_75		-12272.08	15741.38	-0.78	0.436	-43124.79	18580.62
_Iage_76		-12253.61	15744.35	-0.78	0.436	-43112.13	18604.92
_Iage_77		-11119.69	15755.72	-0.71	0.480	-42000.5	19761.12
_Iage_78		-11810.95	15773.92	-0.75	0.454	-42727.43	19105.54
_Iage_79		-13648.95	15779.26	-0.86	0.387	-44575.89	17278
_Iage_80		-13928.46	15808.12	-0.88	0.378	-44911.98	17055.05
_Iage_81		-12431.22	15820.81	-0.79	0.432	-43439.6	18577.16
_Iage_82		-12972.71	15924.38	-0.81	0.415	-44184.08	18238.65
_Iage_83		-12895.85	15930.42	-0.81	0.418	-44119.06	18327.36
_Iage_84		-10884.34	15975.88	-0.68	0.496	-42196.66	20427.98
_Iage_85		-7025.804	16115.61	-0.44	0.663	-38611.99	24560.38
_Iage_86		7667.539	16300.32	0.47	0.638	-24280.68	39615.76
_Iage_87		-9246.581	16191.06	-0.57	0.568	-40980.65	22487.48
_Iage_88		-15372.34	16300.53	-0.94	0.346	-47320.95	16576.27
_Iage_89		-6040.026	17561.14	-0.34	0.731	-40459.41	28379.36
_Iage_90		-9766.821	16138.12	-0.61	0.545	-41397.11	21863.47
_Iage_91		-20637.92	19237.38	-1.07	0.283	-58342.69	17066.85
_Iage_92		-9102.864	19238.11	-0.47	0.636	-46809.06	28603.33

_Iage_93		-3829.559	22212.29	-0.17	0.863	-47365.08	39705.96
_Iage_94		-12947.7	22215.77	-0.58	0.560	-56490.03	30594.63
_Iage_95		0	(omitted)				
_Iage_96		0	(omitted)				
_Iage_97		0	(omitted)				
_Iage_98		0	(omitted)				
_Iage_99		0	(omitted)				
_Istatefip_2		5786.421	467.9637	12.37	0.000	4869.224	6703.617
_Istatefip_4		2045.15	502.9676	4.07	0.000	1059.347	3030.954
_Istatefip_5		-2519.543	479.5946	-5.25	0.000	-3459.536	-1579.55
_Istatefip_6		3554.148	395.6418	8.98	0.000	2778.701	4329.596
_Istatefip_8		2558.427	450.535	5.68	0.000	1675.39	3441.464
_Istatefip_9		3261.708	450.6377	7.24	0.000	2378.47	4144.946
_Istatefip_10		2901.372	506.8916	5.72	0.000	1907.877	3894.866
_Istatefip_11		7167.077	506.8997	14.14	0.000	6173.566	8160.587
_Istatefip_12		693.4871	367.6524	1.89	0.059	-27.10215	1414.076
_Istatefip_13		2247.664	462.7164	4.86	0.000	1340.751	3154.576
_Istatefip_15		2042.229	525.9003	3.88	0.000	1011.478	3072.98
_Istatefip_16		-2019.717	477.0017	-4.23	0.000	-2954.628	-1084.806
_Istatefip_17		3148.822	362.8208	8.68	0.000	2437.703	3859.941
_Istatefip_18		1151.655	405.5383	2.84	0.005	356.8101	1946.499
_Istatefip_19		-163.3445	486.4944	-0.34	0.737	-1116.861	790.172
_Istatefip_20		473.4274	460.5217	1.03	0.304	-429.1833	1376.038
_Istatefip_21		1328.463	489.1037	2.72	0.007	369.8324	2287.094
_Istatefip_22		1443.522	445.5828	3.24	0.001	570.1913	2316.853
_Istatefip_23		0	(omitted)				
_Istatefip_24		4095.132	423.7711	9.66	0.000	3264.551	4925.712
_Istatefip_25		5041.597	427.6136	11.79	0.000	4203.485	5879.709
_Istatefip_26		4614.329	426.2712	10.82	0.000	3778.849	5449.81
_Istatefip_27		1714.255	480.6632	3.57	0.000	772.1674	2656.342
_Istatefip_28		342.4564	512.378	0.67	0.504	-661.7913	1346.704
_Istatefip_29		1616.014	465.5243	3.47	0.001	703.5985	2528.43
_Istatefip_30		-3015.391	473.9344	-6.36	0.000	-3944.29	-2086.492
_Istatefip_31		-1576.174	459.0382	-3.43	0.001	-2475.877	-676.4705
_Istatefip_32		1954.872	481.5035	4.06	0.000	1011.137	2898.606
_Istatefip_33		2671.775	542.2743	4.93	0.000	1608.931	3734.618
_Istatefip_34		4677.844	370.8029	12.62	0.000	3951.08	5404.608
_Istatefip_35		-163.4812	494.0537	-0.33	0.741	-1131.814	804.8513
_Istatefip_36		3116.61	351.1251	8.88	0.000	2428.414	3804.806
_Istatefip_37		733.1424	386.7055	1.90	0.058	-24.79037	1491.075
_Istatefip_38		-2568.521	468.9933	-5.48	0.000	-3487.736	-1649.306
_Istatefip_39		3437.174	412.4883	8.33	0.000	2628.708	4245.641
_Istatefip_40		-772.3464	465.6659	-1.66	0.097	-1685.04	140.3469
_Istatefip_41		506.6221	458.6344	1.10	0.269	-392.2896	1405.534
_Istatefip_42		1723.515	362.3906	4.76	0.000	1013.238	2433.791
_Istatefip_44		1501.711	511.1611	2.94	0.003	499.8484	2503.574
_Istatefip_45		491.1702	473.2806	1.04	0.299	-436.4477	1418.788
_Istatefip_46		-3789.807	459.7206	-8.24	0.000	-4690.848	-2888.766
_Istatefip_47		-17.52796	436.1983	-0.04	0.968	-872.4653	837.4094
_Istatefip_48		996.8795	357.0729	2.79	0.005	297.0258	1696.733
_Istatefip_49		568.9749	465.226	1.22	0.221	-342.8561	1480.806
_Istatefip_50		-1257.241	520.0238	-2.42	0.016	-2276.475	-238.0079
_Istatefip_51		5159.199	470.5361	10.96	0.000	4236.96	6081.437
_Istatefip_53		2173.001	461.969	4.70	0.000	1267.554	3078.449
_Istatefip_54		471.477	527.5421	0.89	0.371	-562.492	1505.446
_Istatefip_55		1412.29	432.1917	3.27	0.001	565.2054	2259.375
_Istatefip_56		77.5301	495.576	0.16	0.876	-893.7861	1048.846
_Istatefip_61		2102.4	2702.317	0.78	0.437	-3194.071	7398.871
_Istatefip_65		784.7765	3313.739	0.24	0.813	-5710.066	7279.619
_Istatefip_68		4591.624	4090.803	1.12	0.262	-3426.246	12609.49
_Istatefip_69		-453.5025	2702.41	-0.17	0.867	-5750.157	4843.152
_Istatefip_70		2131.326	529.5287	4.02	0.000	1093.463	3169.188
_Istatefip_71		2777.717	440.6413	6.30	0.000	1914.071	3641.363

_Istatefip_72		1555.659	623.6629	2.49	0.013	333.2955	2778.022
_Istatefip_73		824.2032	678.7307	1.21	0.225	-506.0915	2154.498
_Istatefip_74		2560.37	706.6364	3.62	0.000	1175.381	3945.359
_Istatefip_75		1386.993	577.5329	2.40	0.016	255.0434	2518.943
_Istatefip_76		1259.795	550.3796	2.29	0.022	181.0651	2338.525
_Istatefip_77		879.5233	782.8365	1.12	0.261	-654.8161	2413.863
_Istatefip_78		1728.804	715.4468	2.42	0.016	326.547	3131.061
_Istatefip_79		1716.581	783.1613	2.19	0.028	181.6047	3251.557
_Istatefip_80		2700.578	738.7596	3.66	0.000	1252.628	4148.528
_Istatefip_81		569.4249	862.0682	0.66	0.509	-1120.207	2259.056
_Istatefip_83		1764.302	663.2474	2.66	0.008	464.3538	3064.249
_Istatefip_84		1223.089	679.4825	1.80	0.072	-108.6796	2554.857
_Istatefip_85		830.9829	652.3132	1.27	0.203	-447.5342	2109.5
_Istatefip_87		1138.546	524.5986	2.17	0.030	110.3468	2166.746
_Istatefip_88		2143.64	694.8944	3.08	0.002	781.6652	3505.615
_Istatefip_89		1419.058	624.9288	2.27	0.023	194.2136	2643.902
_Istatefip_90		2912.073	582.0368	5.00	0.000	1771.296	4052.85
_Istatefip_99		3858.869	3946.374	0.98	0.328	-3875.922	11593.66
_cons		6162.495	15715.78	0.39	0.695	-24640.02	36965.01

```

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. local testvals _IyeaXtre_1963;

. forvalues y=1964/1999
> {;
2. local testvals `testvals' = _IyeaXtre_`y';
3. };

. test `testvals' = 0;

( 1) _IyeaXtre_1963 - _IyeaXtre_1964 = 0
( 2) _IyeaXtre_1963 - _IyeaXtre_1965 = 0
( 3) _IyeaXtre_1963 - _IyeaXtre_1966 = 0
( 4) _IyeaXtre_1963 - _IyeaXtre_1967 = 0
( 5) _IyeaXtre_1963 - _IyeaXtre_1968 = 0
( 6) _IyeaXtre_1963 - _IyeaXtre_1969 = 0
( 7) _IyeaXtre_1963 - _IyeaXtre_1970 = 0
( 8) _IyeaXtre_1963 - _IyeaXtre_1971 = 0
( 9) _IyeaXtre_1963 - _IyeaXtre_1972 = 0
(10) _IyeaXtre_1963 - _IyeaXtre_1973 = 0
(11) _IyeaXtre_1963 - _IyeaXtre_1974 = 0
(12) _IyeaXtre_1963 - _IyeaXtre_1975 = 0
(13) _IyeaXtre_1963 - _IyeaXtre_1976 = 0
(14) _IyeaXtre_1963 - _IyeaXtre_1977 = 0
(15) _IyeaXtre_1963 - _IyeaXtre_1978 = 0
(16) _IyeaXtre_1963 - _IyeaXtre_1979 = 0
(17) _IyeaXtre_1963 - _IyeaXtre_1980 = 0
(18) _IyeaXtre_1963 - _IyeaXtre_1981 = 0
(19) _IyeaXtre_1963 - _IyeaXtre_1982 = 0
(20) _IyeaXtre_1963 - _IyeaXtre_1983 = 0
(21) _IyeaXtre_1963 - _IyeaXtre_1984 = 0
(22) _IyeaXtre_1963 - _IyeaXtre_1985 = 0
(23) _IyeaXtre_1963 - _IyeaXtre_1986 = 0
(24) _IyeaXtre_1963 - _IyeaXtre_1987 = 0
(25) _IyeaXtre_1963 - _IyeaXtre_1988 = 0
(26) _IyeaXtre_1963 - _IyeaXtre_1989 = 0
(27) _IyeaXtre_1963 - _IyeaXtre_1990 = 0
(28) _IyeaXtre_1963 - _IyeaXtre_1991 = 0
(29) _IyeaXtre_1963 - _IyeaXtre_1992 = 0
(30) _IyeaXtre_1963 - _IyeaXtre_1993 = 0
(31) _IyeaXtre_1963 - _IyeaXtre_1994 = 0
(32) _IyeaXtre_1963 - _IyeaXtre_1995 = 0
(33) _IyeaXtre_1963 - _IyeaXtre_1996 = 0

```

```
(34) _IyeaXtre_1963 - _IyeaXtre_1997 = 0
(35) _IyeaXtre_1963 - _IyeaXtre_1998 = 0
(36) _IyeaXtre_1963 - _IyeaXtre_1999 = 0
(37) _IyeaXtre_1963 = 0
```

```
F( 37,231865) = 1.12
Prob > F = 0.2776
```

```
. eststo t2;
```

```
. *** E.2. diff-in-diff regression *****;
. * regression to paralell diff in diff summary stats *;
. regress incwage treat_after treat after if emp == 1;
```

Source	SS	df	MS	Number of obs	=	365,948
Model	4.8351e+13	3	1.6117e+13	F(3, 365944)	=	15011.22
Residual	3.9290e+14	365,944	1.0737e+09	Prob > F	=	0.0000
				R-squared	=	0.1096
				Adj R-squared	=	0.1096
Total	4.4125e+14	365,947	1.2058e+09	Root MSE	=	32767

incwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
treat_after	-1360.156	238.5852	-5.70	0.000	-1827.776	-892.5355
treat	1358.759	145.6492	9.33	0.000	1073.291	1644.227
after	24279.31	137.7779	176.22	0.000	24009.27	24549.35
_cons	13608.72	82.55693	164.84	0.000	13446.91	13770.53

```
. eststo r0;
```

```
. * make a marker for the regression sample *;
. gen r0emp = e(sample);
```

```
. *** E.3. summary tables for diff-in-diff ***;
. * save the data for later *;
. preserve;
```

```
. sort treat after;
```

```
. collapse (mean) incwage (sem) incwage_sd = incwage (count) incwage_obs=incwage
> if r0emp == 1, by(treat after);
```

```
. * output to excel *;
. outsheet using output/{date}_prob2c_ttests_`sample'.txt, replace;
(note: file output/20231006_prob2c_ttests_big.txt not found)
```

```
. *** E.4. output regression results ***;
. estout *
> using "output/{date}_prob2_regs_`sample'.txt",
> replace
> varwidth(12) varlabels(_cons Constant)
> cells(b(star fmt(%12.1f)) se(par fmt(%12.1f)))
> stats(r2 N, fmt(%9.3f %9.0g %9.3f) labels("R-squared" "Observations"));
(note: file output/20231006_prob2_regs_big.txt not found)
(output written to output/20231006_prob2_regs_big.txt)
```

```
. log close;
name: <unnamed>
log: /groups/brooksgrp/pppa6022/2023_fall/problem_sets/ps2/ps2v15.log
log type: text
closed on: 6 Oct 2023, 00:04:11
```
