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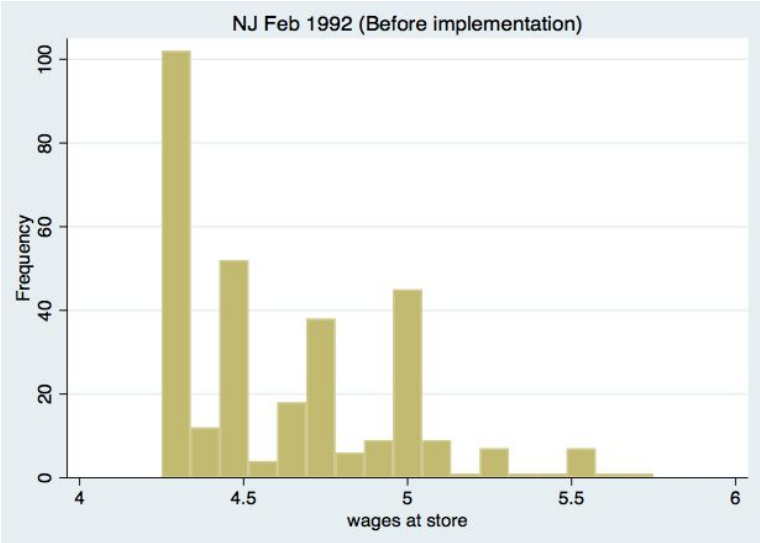
Part 1

Part (a)

```
histogram wagest if wave == 1 & NJ == 1, freq subtitle("Feb 1992
(Before implementation)")
```




```
histogram wagest if wave == 2 & NJ == 1, freq subtitle("Nov 1992
(After implementation)")
```

The minimum wage introduced is $5.05. From the second histogram, we can see that in New Jersey, after the implementation of the minimum wage law (i.e., in Nov 1992), all the wages >= $5.05. Therefore, the employers are complying with the law.

Part (b)

```
est clear

** Change wave to a standard categorical variable called time **
gen time = (wave == 2)

eststo: reg wagest time if NJ == 1, robust
eststo: reg emp time if NJ == 1, robust
eststo: reg hrsopen time if NJ == 1, robust
eststo: reg pentree time if NJ == 1, robust

esttab, se r2 ar2 scalar(rss)
```

	(1) wagest	(2) emp	(3) hrsopen	(4) pentree
time	0.469***	0.507	0.00135	0.0468
	(0.0204)	(0.689)	(0.215)	(0.0520)
_cons	4.612***	17.07***	14.42***	1.348***
	(0.0195)	(0.483)	(0.153)	(0.0361)
N	632	646	652	632
R-sq	0.458	0.001	0.000	0.001
adj. R-sq	0.458	-0.001	-0.002	-0.000
rss	41.01	49341.9	4919.0	268.7

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The coefficient of *time* is statistically significant for *wagest* at the 99.9% level. It is not statistically significant for *emp*, *hropen* or *pentree* even at the 95% level. Hence, we can say that there is evidence that the law affected wages, but no evidence that it affected employment levels, store hours, and meal prices.

Part (c)

1. Omitted variables (changing over time) - We have not considered other variables such as *chain* (Burger King/KFC/etc) which may have an effect on an outcome such as *pentree* with time. For example, if KFC decides to reduce the price of its entree between time = 0 and time = 1, we will have a downward bias in the estimate of the coefficient of

time. Since the coefficient of time is the difference in the outcome *pentree*, this would lead to a downward bias in the difference in the outcome *pentree*.

2. Pre existing trends - assume that say the wages increase with time (say monthly), we might falsely attribute the increase in wages to the policy change. This will lead to an upward bias in the coefficient of time (i.e., wave). Since the coefficient of time is the difference in the outcome wages, this would lead to an upward bias in the difference in the outcome wages.

   We can use a similar argument for other outcomes of *emp*, *hrsopen* and *pentree*.

Part (d)

```
gen time = (wave == 2)
gen treatment = (NJ == 1)
gen did = (time * treatment)

est clear

eststo: reg wagest time treatment did, robust
eststo: reg emp time treatment did, robust
eststo: reg hrsopen time treatment did, robust
eststo: reg pentree time treatment did, robust

esttab, se r2 ar2 scalar(rss)
```

	(1) wagest	(2) emp	(3) hrsopen	(4) pentree
time	-0.0127	-2.407	0.129	-0.0296
	(0.0583)	(1.594)	(0.464)	(0.0970)
treatment	-0.0180	-2.884*	-0.107	0.133
	(0.0447)	(1.403)	(0.364)	(0.0794)
did	0.481***	2.914	-0.127	0.0764
	(0.0618)	(1.737)	(0.512)	(0.110)
_cons	4.630***	19.95***	14.53***	1.215***
	(0.0402)	(1.317)	(0.331)	(0.0707)
N	779	801	809	784
R-sq	0.407	0.008	0.001	0.012
adj. R-sq	0.405	0.004	-0.003	0.008
rss	59.23	64600.6	6240.6	323.0

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The effect of policy is the coefficient of did. In this case, it is statistically significant only for *wagest*, and not for *emp*, *hropen* or *pentree* even at the 95% level. Hence, once again, we can say that there is evidence that the law affected wages, but no evidence that it affected employment levels, store hours, and meal prices.

This value of the coefficient of did (=0.481) indicates the isolated effect of the policy change (assuming of course that the pre-existing trends of control and treatment groups are parallel). This is different from the value of the coefficient of the single difference estimate (=0.469) because there that coefficient may also include the bias because of pre-existing trends.

Part 2

```
est clear

drop if NJ == 0

sort storeid wave

** drop treatment, time, did variables from last question **
```

```
gen treated_aux_1 = (wagest < 5 & wave == 1)
gen treated_aux_2 = treated_aux_1[_n-1]
replace treated_aux_2 = 0 if treated_aux_2 == .
gen treatment = treated_aux_1 | treated_aux_2

gen time = (wave == 2)
gen did = (time * treatment)

eststo: reg wagest time treatment did, robust
eststo: reg emp time treatment did, robust
eststo: reg hrsopen time treatment did, robust
eststo: reg pentree time treatment did, robust

esttab, se r2 ar2 scalar(rss)
```

	(1) wagest	(2) emp	(3) hrsopen	(4) pentree
time	-0.0126	-0.853	-0.0606	0.0740
	(0.0268)	(1.355)	(0.440)	(0.0923)
treatment	-0.655***	-2.207*	0.117	0.0343
	(0.0263)	(1.105)	(0.361)	(0.0772)
did	0.626***	1.865	0.0857	-0.0372
	(0.0306)	(1.572)	(0.504)	(0.112)
_cons	5.115***	18.68***	14.33***	1.323***
	(0.0224)	(0.955)	(0.317)	(0.0638)
N	632	646	652	632
R-sq	0.777	0.007	0.001	0.002
adj. R-sq	0.776	0.003	-0.004	-0.003
rss	16.91	49021.8	4915.5	268.7

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The effect of policy is the coefficient of did. In this case again, it is statistically significant only for *wagest*, and not for *emp*, *hropen* or *pentree* even at the 95% level. Hence, once again, we can say that there is evidence that the law affected wages, but no evidence that it affected employment levels, store hours, and meal prices.