

WANG Liangjiayi - ECO372 Assignment 4

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a.

- i) The unit of observation is one fictitious online job applications on behalf of a young male applicants to employer.
- ii) There are 14,637 observations
- iii) 'posresponse' records an applicant received a positive response to their application
'interview' records an applicant received an interview request
- iv) $\frac{928}{1715} \approx 54.1\%$ of interviews receiving a positive response also received an interview request
- v) 'crime' records whether an applicant had a criminal record or not, 'white' records whether they are Black or White applicants, 'empgap' records whether they have an employment gap and 'ged' records whether they hold a GED.
- vi) 'pre' and 'post' records whether an application took place before or after the ban
pre=1 if pre-BTB period, =0 if post-BTB
post=1 if post-BTB period, =0 if pre-BTB
- vii) 'box' records whether the job application asked about the criminal record of the applicant.

b.

. table post, contents(mean white mean crime mean ged mean empgap mean box)

Period	mean(white)	mean(crime)	mean(ged)	mean(empgap)	mean(box)
Pre-BTB	.5024155	.4970324	.4977226	.4923396	.3664596
Post-BTB	.4967532	.5128517	.5021645	.5041937	.035579

. table post, contents(mean posresponse mean interview)

Period	mean(posres~e)	mean(interv~w)
Pre-BTB	.1094548	.0597654
Post-BTB	.1247294	.0669643

C.

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. ttest white, by(pre) unequal
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Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
0	7,392	.4967532	.0058158	.5000233	.4853526 .5081539
1	7,245	.5024155	.0058746	.5000287	.4908996 .5139313
combined	14,637	.4995559	.0041329	.5000169	.4914548 .507657
diff		-.0056622	.0082664		-.0218655 .0105411

diff = mean(0) - mean(1) t = -0.6850
Ho: diff = 0 Satterthwaite's degrees of freedom = 14629.1

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.2467 Pr(|T| > |t|) = 0.4934 Pr(T > t) = 0.7533

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. ttest crime, by(pre) unequal
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Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
0	7,392	.5128517	.005814	.4998686	.5014546 .5242488
1	7,245	.4970324	.0058745	.5000257	.4855166 .5085482
combined	14,637	.5050215	.0041327	.4999919	.4969209 .5131222
diff		.0158193	.0082651		-.0003814 .03202

diff = mean(0) - mean(1) t = 1.9140
Ho: diff = 0 Satterthwaite's degrees of freedom = 14628.9

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.9722 Pr(|T| > |t|) = 0.0556 Pr(T > t) = 0.0278

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. ttest box, by(pre) unequal
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Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
0	7,392	.035579	.0021547	.1852506	.0313553 .0398028
1	7,245	.3664596	.0056612	.4818703	.355362 .3775573
combined	14,637	.1993578	.0033024	.3995312	.1928847 .2058308
diff		-.3308806	.0060574		-.3427545 -.3190068

diff = mean(0) - mean(1) t = -54.6242
Ho: diff = 0 Satterthwaite's degrees of freedom = 9303.34

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 1.0000

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. ttest ged, by(pre) unequal
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Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
0	7,392	.5021645	.0058159	.5000291	.4907637 .5135653
1	7,245	.4977226	.0058746	.5000293	.4862067 .5092384
combined	14,637	.4999658	.0041329	.5000171	.4918648 .5080669
diff		.0044419	.0082665		-.0117614 .0206453

diff = mean(0) - mean(1) t = 0.5373
Ho: diff = 0 Satterthwaite's degrees of freedom = 14629.1

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.7045 Pr(|T| > |t|) = 0.5910 Pr(T > t) = 0.2955

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. ttest empgap, by(pre) unequal
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Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
0	7,392	.5041937	.0058157	.5000162	.4927933 .5155942
1	7,245	.4923395	.0058739	.4999758	.4808249 .5038542
combined	14,637	.4983262	.0041329	.5000143	.4902251 .5064272
diff		.0118542	.0082659		-.0043481 .0280565

diff = mean(0) - mean(1) t = 1.4341
Ho: diff = 0 Satterthwaite's degrees of freedom = 14629.1

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.9242 Pr(|T| > |t|) = 0.1516 Pr(T > t) = 0.0758

H_0 : there is no difference between pre and post – BTB applicants' characteristics

H_a : there is statistically significant difference between pre and post

– BTB applicants' characteristics

We set the significance level at 5%. From the table, we conclude that the P-value for the observable characteristics: white, conviction (or crime), GED and Employment Gap are greater than 0.05. Thus, those variables are not statistically significant at 5%. There is no difference between applicants in pre-BTB and Post-BTB period for those observable characteristics (white, conviction (or crime), GED and Employment Gap).

In comparison, the P-value for the observable characteristics: Box is smaller than 0.05, which represents ‘Application has a box’ is statistically significant at 5%. There is a significant difference between applicants in pre-BTB and Post-BTB period for ‘Application has box’

We expect the means of the characteristics in the two groups are the close and we can use this to test the existence of selection bias and whether the randomization is successfully assigned. The selection bias will cause biased estimate. From the above result, most of observables characteristics are the same in both groups, so each of randomized characteristics is successfully assigned to our fictitious applicants, except for whether the application has box. About 36% of applications has box in pre-BTB

and 3.6% of applications has box in Post-BTB. This make sense since whether have the box is influenced by the policy not by the individuals. Since our research is to investigate the BTB effect, this result indicates that we successfully control the characteristics of applicants and eliminate the effect other than BTB.

d.

	(1) Full Sample	(2) Employers with Box
white	0.0242*** (0.00563)	-0.000868 (0.00937)
crime	-0.0129* (0.00545)	-0.0520*** (0.0123)
ged	-0.00519 (0.00504)	0.0105 (0.0134)
empgap	0.00125 (0.00458)	0.0103 (0.0100)
pre	-0.0151 (0.0102)	
Obs.	14637	2918
R-squared	0.179	0.186
F-statistic	.	.

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table III column 1: For full sample data, controlling the chain and geographic center as fixed effect, White applicants are about 2.5 percentage points more likely to receive the callback and the applicants with crime are about 1.3 percentage points less likely to receive the callback, which indicate that race have significant impact on callback rate.

Table III column 2: For employers with box, controlling the chain and geographic center as fixed effect, the applicants with crime are about 5.2 percentage points less likely to receive the callback, and the gap between black and white is ignorable.

e.

	(1) Full Sample	(2) Employers with Box
white	0.0135** (0.00471)	-0.00740 (0.00633)
crime	-0.00931* (0.00458)	-0.0353*** (0.00625)
ged	-0.00239 (0.00339)	-0.0000279 (0.00837)
empgap	-0.00305 (0.00287)	0.00662 (0.00720)
pre	-0.00715 (0.00918)	
Obs.	14637	2918
R-squared	0.147	0.190
F-statistic	.	.

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

f. If composition of stores present in different time period are not identical, it will lead to cross-sectional variation in regression. The industries with unmatched characteristics like chain and center will involve in analysis which lead to the estimation bias.

g.

‘balanced’ denotes whether an application is sent to a store present in both time periods. 11,188 applications were sent to such stores.

. table balanced

Applicati on is in balanced sample	Freq.
0	3,449
1	11,188

h.

	(1)	(2)	(3)	(4)
	Pre-BTB	Box Remover Balanced	Box Remover Full	Other empl. balanced
c.box#c.white	-0.0302* (0.0153)	-0.0364* (0.0139)	-0.0327* (0.0138)	
white	0.0315** (0.0120)	0.0442*** (0.0126)	0.0401** (0.0117)	0.0221* (0.00882)
box	0.0150 (0.0245)	0.00317 (0.0149)	-0.00175 (0.0133)	
c.white#c.pre				0.00203 (0.0138)
pre				-0.0159 (0.0175)
Obs.	7245	3712	4794	7476
R-squared	0.0341	0.00311	0.0437	0.00213
F-statistic	9.219	3.634	.	1.923

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

i.

	(1)	(2)	(3)	(4)
	Pre-BTB	Box Remover Balanced	Box Remover Full	Other empl. balanced
c.box#c.white	-0.0262** (0.0101)	-0.0409* (0.0163)	-0.0360** (0.0132)	
white	0.0169* (0.00701)	0.0399* (0.0181)	0.0323* (0.0144)	0.0158* (0.00680)
box	0.0226 (0.0155)	0.0108 (0.00904)	0.00563 (0.00828)	
c.white#c.pre				-0.00237 (0.00865)
pre				-0.00580 (0.0155)
Obs.	7245	3712	4794	7476
R-squared	0.0249	0.00319	0.0373	0.00139
F-statistic	4.518	1.991	.	2.303

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

j.

Yes, the paper's conclusions similar for interview requests.

The table e and i indicate that the regression estimation using interview requests as a dependent variable has a similar positive/negative sign and significance to the regression estimation that uses callback rate as a dependent variable. For employers with the box, the felony conviction status has a significant negative influence on the employment application. Moreover, in the pre-BTB period, the white-black gap in interview rate is not apparent. After the BTB policy, racial discrimination emerges, and the white-black gap for receiving interviews increased. Those two findings are similar to the paper's conclusion that after the BTB policy, the employers cannot clearly classify the group with crime, and they are more likely to hire white employers.

k.

The original column 5 results are based on the sample from the employers who do not change their job applications before BTB and after BTB. This condition matched the result that there is no box variation.

For those companies, with box and without box will not influence their attitude towards applicants. If the estimates of interest would have been negative and statistically significant in column, we cannot conclude that the sharp increase in the race gap is influenced by BTB effects. There may exist some potential factors that lead to the race gap lower before BTB and race gap higher after BTB. The original estimation of race gap is biased while the box is removed after BTB policy.