```
------------------------------------------------------------------------------
      name:  <Jiajun Li>
       log:  C:\Users\Danny\Desktop\ECON 120B\HW3\HW3.txt
  log type:  text
 opened on:  27 Jan 2023, 00:19:45

. use CPS96_15.dta, clear

.
. ****Q a.i&ii
. sum ahe if year == 1996

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
         ahe |      6,103    12.69326    6.359035        1.36       62.5

. *display "Average hourly earnings in 1996 = 12.69326"
. *display "Sample standard deviation for AHE in 1996 = 6.359035"
. sum ahe if year == 2015

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
         ahe |      7,098    21.23744     12.1245    2.040816   105.7692

. *display "Average hourly earnings in 2015 = 21.23744 "
. *display "Sample standard deviation for AHE in 2015 = 12.1245"
. ****Q a.iii
. ttest ahe, by(year) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
    1996 |   6,103    12.69326    .0813991    6.359035    12.53369    12.85283
    2015 |   7,098    21.23744    .1439117     12.1245    20.95533    21.51955
---------+--------------------------------------------------------------------
Combined |  13,201    17.28735    .0936909    10.76467     17.1037      17.471
---------+--------------------------------------------------------------------
    diff |           -8.544178    .1653372               -8.868268   -8.220087
------------------------------------------------------------------------------
    diff = mean(1996) - mean(2015)                                t = -51.6773
H0: diff = 0                     Satterthwaite's degrees of freedom =  11049.1

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

. *display "95% confidence interval for the population means of AHE in 1996 = [12.53369 12.85283]"
. *display "95% confidence interval for the population means of AHE in 2015 = [20.95533 21.51955]"
. ****Q a.iv
```

```
. *display "95% confidence interval for the change in the population means of AHE between 1996 and
2015 = [-8.868268 -8.220087]"
.
.
. ****Q b
. ge adjusted_ahe = ahe if year == 2015
(6,103 missing values generated)

. replace adjusted_ahe = ahe*(237/156.9) if year == 1996
(6,103 real changes made)

. ttest adjusted_ahe, by(year) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
    1996 |   6,103    19.17338    .1229546    9.605425    18.93234    19.41441
    2015 |   7,098    21.23744    .1439117     12.1245    20.95533    21.51955
---------+--------------------------------------------------------------------
Combined |  13,201    20.28319    .0964278    11.07913    20.09418    20.47221
---------+--------------------------------------------------------------------
    diff |           -2.064062    .1892839               -2.435086   -1.693038
------------------------------------------------------------------------------
    diff = mean(1996) - mean(2015)                                t = -10.9046
H0: diff = 0                     Satterthwaite's degrees of freedom =  13113.1

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

. *display "Average hourly earnings in 1996 in 2015 dollar = 19.17338"
. *display "Sample standard deviation for AHE in 1996 in 2015 dollar = 9.605425"
. *display "95% confidence interval for the population means of AHE in 1996 in 2015 dollar = [18.93234
19.41441]"
. *display "95% confidence interval for the change in the population means of AHE between 1996 and
2015 in 2015 dollar = [-2.435086 -1.693038]"
.
.
. ****Q c
. * I would use the results from b and compare with a because the CPI shows the real purchase power
of 1996 in 2015 dollar, but without comparison, we cannot tell the change in purchasing power.
.
.
. ****Q d.i
. generate ahe_15 = ahe if year == 2015
(6,103 missing values generated)

. ttest ahe_15, by(bachelor)
```

```
Two-sample t test with equal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
       0 |   3,365    16.38111    .1471396    8.535368    16.09262     16.6696
       1 |   3,733    25.61503    .2155545    13.17001    25.19241    26.03765
---------+--------------------------------------------------------------------
Combined |   7,098    21.23744    .1439117     12.1245    20.95533    21.51955
---------+--------------------------------------------------------------------
    diff |           -9.233924    .2665732               -9.756487   -8.711361
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t = -34.6394
H0: diff = 0                                     Degrees of freedom =     7096

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

. *display "95% confidence interval for the means of AHE for high school graduates = [16.09262
16.6696]"
. ****Q d.ii
. *display "95% confidence interval for the means of AHE for workers with a college degree = [25.19241
26.03765]"
. ****Q d.iii
. *display "95% confidence interval for the difference between the two means = [-9.756487    -
8.711361]"
.
.
. ****Q e
. generate ahe_96 = ahe if year == 1996
(7,098 missing values generated)

. generate adjusted_ahe_96 = ahe_96*(237/156.9)
(7,098 missing values generated)

. ttest adjusted_ahe_96, by(bachelor) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. err.   Std. dev.   [95% conf. interval]
---------+--------------------------------------------------------------------
       0 |   3,484    16.26823    .1299935    7.672919    16.01336     16.5231
       1 |   2,619    23.03803     .205452    10.51424    22.63517     23.4409
---------+--------------------------------------------------------------------
Combined |   6,103    19.17338    .1229546    9.605425    18.93234    19.41441
---------+--------------------------------------------------------------------
    diff |           -6.769806    .2431231               -7.246445   -6.293168
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t = -27.8452
H0: diff = 0                     Satterthwaite's degrees of freedom =  4581.78
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```
    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

. *display "95% confidence interval for the means of AHE for high school graduates in 2015 dollar = [16.01336 16.5231]"

. *display "95% confidence interval for the means of AHE for workers with a college degree in 2015 dollar = [22.63517 23.4409]"

. *display "95% confidence interval for the difference between the two means = [-7.246445 -6.293168]"

.

.

. ****Q f.i

. * No, the real wages of high school graduates did not increase a lot because the means of AHE for high school graduates in 2015 is similar to the means of AHE for high school graduates in 1996 in 2015 dollar

. ****Q f.ii

. * Yes, the real wages of college graduates increase because the means of AHE for college graduates in 2015 is larger than the means of AHE for college graduates in 1996 in 2015 dollar

. ****Q f.iii

. * Yes, the gap between earnings of college and high school graduates increase because the difference in means of AHE in 2015 is larger than the difference in means of AHE in 1996 in 2015 dollar

.

.

. ****Q g

. table (year female) (bachelor) (), nototals statistic(mean ahe) statistic(sd ahe) statistic(frequency)

	Education, High School Diploma = 0, Bachelors Degree = 1	
	0	1
Year		
1996		
Sex, Male=0; Female=1		
0		
Mean	11.77404	16.45946
Standard deviation	5.455404	7.574837
Frequency	2,168	1,387
1		
Mean	9.115878	13.89213
Standard deviation	3.859964	5.91154
Frequency	1,316	1,232
2015		
Sex, Male=0; Female=1		
0		
Mean	17.49846	28.05536
Standard deviation	9.026855	14.36643
Frequency	2,222	1,917

```
      1                 |
        Mean            |     14.20896     23.03898
        Standard deviation |     6.998409     11.21769
        Frequency       |        1,143        1,816
--------------------------------------------------------------------------------
```

```
. * Yes, there are notable differences between the results for high school and college graduates
.
.
. cap log close
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