```
 1 .
 2 . * Problem B.1.(a)
 3 .
 4 . clear

 5 . set more off

 6 . local path "C:\Users\wonja\Documents\GitHub\14.320"

 7 . cd `path'
   C:\Users\wonja\Documents\GitHub\14.320

 8 . use cps_extract

 9 .
10 . keep if 30 <= age & age < 50
   (92,581 observations deleted)

11 . summ
```

Variable	Obs	Mean	Std. Dev.	Min	Max
age	48,670	39.37163	5.706801	30	49
sex	48,670	1.524307	.499414	1	2
race	48,670	170.812	173.4883	100	830
uhrswork1	48,670	272.4862	410.6439	0	999
educ99	48,670	12.41753	3.123386	1	18
wkswork1	48,670	41.13024	19.78886	0	52
incwage	48,670	49243.79	68764.8	0	1170000

```
12 . gen awe = incwage / wkswork1
   (7,958 missing values generated)

13 . drop if mi(awe)
   (7,958 observations deleted)

14 . gen ahe = awe / uhrswork1
   (17 missing values generated)

15 . drop if mi(ahe)
   (17 observations deleted)

16 . gen lnawe = ln(awe)
   (2,071 missing values generated)

17 . drop if mi(lnawe)
   (2,071 observations deleted)

18 . gen lnahe = ln(ahe)

19 . drop if mi(lnahe)
   (0 observations deleted)

20 . la var awe "average weekly earnings"

21 . la var ahe "average hourly earnings"

22 . la var lnawe "natural log of average weekly earnings"
```

```
23 . la var lnahe "natural log of average hourly earnings"

24 . summ awe ahe lnawe lnahe
```

Variable	Obs	Mean	Std. Dev.	Min	Max
awe	38,624	1252.087	1635.441	.5	100000
ahe	38,624	29.25981	116.0536	.001001	21153.83
lnawe	38,624	6.799581	.8354863	-.6931472	11.51293
lnahe	38,624	2.797933	1.333039	-6.906755	9.959576

```
25 .
26 . * Problem B.1.(b)
27 .
28 . preserve

29 . keep if race == 100 & 40 <= age
(24,034 observations deleted)

30 . ttest lnawe, by (sex)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	7,650	7.080798	.0089728	.7848018	7.063209	7.098387
Female	6,940	6.631288	.0102759	.8560482	6.611145	6.651432
combined	14,590	6.866981	.007034	.8496316	6.853193	6.880768
diff		.4495097	.0135846		.4228822	.4761373

```
    diff = mean(Male) - mean(Female)                              t =  33.0896
Ho: diff = 0                                     degrees of freedom =    14588

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

31 . ttest lnahe, by (sex)

Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	7,650	3.037608	.0141137	1.234448	3.009941	3.065275
Female	6,940	2.726359	.0157995	1.316207	2.695387	2.757331
combined	14,590	2.889557	.0106251	1.283397	2.86873	2.910383
diff		.3112491	.0211195		.2698522	.3526461

```
    diff = mean(Male) - mean(Female)                              t =  14.7375
Ho: diff = 0                                     degrees of freedom =    14588

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

32 .
33 . * Problem B.1.(c)
34 .
35 . reg lnawe sex
```

Source	SS	df	MS		
				Number of obs	= 14,590
				F(1, 14588)	= 1094.92
Model	735.264839	1	735.264839	Prob > F	= 0.0000
Residual	9796.15236	14,588	.671521275	R-squared	= 0.0698
				Adj R-squared	= 0.0698
Total	10531.4172	14,589	.721873822	Root MSE	= .81946

lnawe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sex	-.4495097	.0135846	-33.09	0.000	-.4761373	-.4228822
_cons	7.530308	.0211633	355.82	0.000	7.488825	7.571791

```
36 . reg lnahe sex
```

Source	SS	df	MS		
Model	352.518485	1	352.518485	Number of obs	= 14,590
				F(1, 14588)	= 217.19
Residual	23677.1492	14,588	1.62305656	Prob > F	= 0.0000
				R-squared	= 0.0147
				Adj R-squared	= 0.0146
Total	24029.6677	14,589	1.64710862	Root MSE	= 1.274

lnahe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sex	-.3112491	.0211195	-14.74	0.000	-.3526461	-.2698522
_cons	3.348857	.0329018	101.78	0.000	3.284366	3.413349

```
37 .
38 . * Problem B.1.(d)
39 .
40 . ttest lnahe, by (sex)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	7,650	3.037608	.0141137	1.234448	3.009941	3.065275
Female	6,940	2.726359	.0157995	1.316207	2.695387	2.757331
combined	14,590	2.889557	.0106251	1.283397	2.86873	2.910383
diff		.3112491	.0211195		.2698522	.3526461

```
    diff = mean(Male) - mean(Female)                              t =  14.7375
Ho: diff = 0                                     degrees of freedom =    14588

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

```
41 . ttest lnahe, by (sex) unequal
```

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	7,650	3.037608	.0141137	1.234448	3.009941	3.065275
Female	6,940	2.726359	.0157995	1.316207	2.695387	2.757331
combined	14,590	2.889557	.0106251	1.283397	2.86873	2.910383
diff		.3112491	.0211854		.2697229	.3527754

```
    diff = mean(Male) - mean(Female)                              t =  14.6916
Ho: diff = 0                     Satterthwaite's degrees of freedom =  14218.4

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

```
42 . reg lnahe sex
```

Source	SS	df	MS	Number of obs	=	14,590
				F(1, 14588)	=	217.19
Model	352.518485	1	352.518485	Prob > F	=	0.0000
Residual	23677.1492	14,588	1.62305656	R-squared	=	0.0147
				Adj R-squared	=	0.0146
Total	24029.6677	14,589	1.64710862	Root MSE	=	1.274

lnahe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sex	-.3112491	.0211195	-14.74	0.000	-.3526461	-.2698522
_cons	3.348857	.0329018	101.78	0.000	3.284366	3.413349

```
43 .
44 . restore

45 .
46 . * Problem B.1.(e)
47 .
48 . gen age2 = age^2

49 . bys sex: reg lnahe age age2
```

-> sex = Male

Source	SS	df	MS	Number of obs	=	19,900
				F(2, 19897)	=	78.44
Model	261.889233	2	130.944617	Prob > F	=	0.0000
Residual	33215.536	19,897	1.66937408	R-squared	=	0.0078
				Adj R-squared	=	0.0077
Total	33477.4253	19,899	1.68236722	Root MSE	=	1.292

lnahe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
age	.1547217	.0245054	6.31	0.000	.1066891	.2027543
age2	-.0017311	.0003097	-5.59	0.000	-.0023381	-.001124
_cons	-.4411667	.4769551	-0.92	0.355	-1.376038	.493705

-> sex = Female

Source	SS	df	MS	Number of obs	=	18,724
				F(2, 18721)	=	39.47
Model	145.434056	2	72.7170278	Prob > F	=	0.0000
Residual	34490.7213	18,721	1.84235465	R-squared	=	0.0042
				Adj R-squared	=	0.0041
Total	34636.1554	18,723	1.84992551	Root MSE	=	1.3573

lnahe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
age	.1356085	.0266498	5.09	0.000	.0833724	.1878446
age2	-.0015505	.0003368	-4.60	0.000	-.0022106	-.0008904
_cons	-.2062682	.5185655	-0.40	0.691	-1.222704	.8101673

```
50 .
51 . * Problem B.1.(f)
52 .
53 . gen white = 0

54 . replace white = 1 if race == 100
(30,102 real changes made)

55 . gen ba = 0

56 . replace ba = 1 if 15 <= educ99
(16,713 real changes made)

57 . reg lnahe sex
```

Source	SS	df	MS	Number of obs	=	38,624
				F(1, 38622)	=	294.40
Model	519.206356	1	519.206356	Prob > F	=	0.0000
Residual	68113.5806	38,622	1.76359538	R-squared	=	0.0076
				Adj R-squared	=	0.0075
Total	68632.787	38,623	1.77699265	Root MSE	=	1.328

lnahe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sex	-.2319919	.0135208	-17.16	0.000	-.258493	-.2054908
_cons	3.142389	.0211821	148.35	0.000	3.100872	3.183907

```
58 . reg lnahe sex white age2 ba
```

Source	SS	df	MS	Number of obs	=	38,624
				F(4, 38619)	=	959.72
Model	6205.48752	4	1551.37188	Prob > F	=	0.0000
Residual	62427.2995	38,619	1.61649187	R-squared	=	0.0904
				Adj R-squared	=	0.0903
Total	68632.787	38,623	1.77699265	Root MSE	=	1.2714

lnahe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sex	-.2920032	.013	-22.46	0.000	-.3174835	-.2665228
white	.0756611	.015615	4.85	0.000	.0450553	.1062668
age2	.0001992	.0000143	13.91	0.000	.0001712	.0002273
ba	.7553846	.0131041	57.64	0.000	.7297002	.781069
_cons	2.530724	.0332966	76.01	0.000	2.465462	2.595986

```
59 .
60 . * Problem B.2.(b)i.
61 .
62 . * Problem B.2.(b)ii.
63 .
64 . * Problem B.2.(b)iii.
65 .
66 . * Problem B.2.(c).
67 .
68 . log close
      name:  <unnamed>
       log:  C:\Users\wonja\Documents\GitHub\14.320\PS2-b1.smcl
  log type:  smcl
 closed on:  16 Mar 2021, 23:50:21
```