

```
log using "D:\Jason\workshop\regression analysis 2022\regression2.log", replace
webuse highschool, clear
cd "D:\Jason\workshop\regression analysis 2022"

*****
* Continuous dependent variable
*****

*****
* Questions 1: Determine if X2 is an important predicator when X1 is already in the model
*****

*****
* 1.1 Regression without complex survey data
*****

*****
* 1.1.0 Regression without using the weight variable
*****

reg weight height i.race

*****
* 1.1.1. Regression using a personal weight variable for the whole sample
*****

reg weight height i.race [pw=sampwt]

*****
* 1,1,2. Regression using a personal weight variable and adjusted for
* dependent observations from the same schools.
*****

reg weight height i.race [pw=sampwt], cluster(school)

*****
* 1.1.3. Regression using a personal weight variable and adjusted for
*dependent observations from same schools among female respondents only
*****

reg weight height i.race if sex ==2 [pw=sampwt], cluster(school)

*****
* 1.2. Regression with complex survey data
*****
svydes
svyset, clear
quietly svyset county [pw = sampwt], fpc(ncounties) strata(state)|| school, fpc(nschools)

*****
* 1.2.1. Regression using complex survey data for the whole sample
*****

svy: reg weight height i.race

*****
* 1,2,2. Regression using complex survey data and adjusted for
```

* dependent observations from the same schools.

* Cluster option is not needed because svy command already take
* into account the dependences among different levels of sampling units

* 1.2.3. Regression using a personal weight variable and adjusted for
*dependent observations from same samping units among female respondents only

correct specification

svy, subpop(if sex==2): reg weight height i.race

incorrect specification
svy: reg weight height i.race if sex==2

* Question 2: Do X1 and X2 have significant, but different relations with Y?
* Question 3: Do the effects of X1 and X2 cancel each out?

* 2.1 Modifying Mdoel 1.1.3

reg weight height i.race if sex ==2 [pw=sampwgt], cluster(school)
reg, coeflegend

*testing the equalaity of two regression coefficients
test _b[2.race] = _b[3.race]

*testing the hypothesis that variables cancel out each other
test _b[2.race] =-_b[3.race]

* 2.2 Regression Analysis Using Results from Model 1.2.3.

svy, subpop(if sex==2): reg weight height i.race
reg, coeflegend

*testing the equalaity of two regression coefficients
test _b[2.race] = _b[3.race]

*testing the hypothesis that variables cancel out each other
test _b[2.race] =-_b[3.race]

* Questions 4 : Does the relation between X1 and Y change with the levels of Z?

```
* 4.1 A three-way interactdion: Modify the model 2.1  
*****
```

```
reg weight c.height##i.race##i.sex [pw=sampwgt], cluster(school)  
reg, coeflegend
```

```
* test the coefficients of two-way interactions  
test _b[2.race#c.height] = _b[3.race#c.height]  
test _b[2.race#c.height] = -_b[3.race#c.height]
```

```
* test the coefficients of three-way interactions  
test _b[2.race#2.sex#c.height] = _b[3.race#2.sex#c.height]  
test _b[2.race#2.sex#c.height] = -_b[3.race#2.sex#c.height]
```

```
*****  
* 4.2 A two-way interaction Modify the model 2.2.  
*****
```

```
svy: reg weight c.height##i.race##i.sex  
reg, coeflegend
```

```
* test the coefficients of two-way interactions  
test _b[2.race#c.height] = _b[3.race#c.height]  
test _b[2.race#c.height] = -_b[3.race#c.height]
```

```
* test the coefficients of three-way interactions  
test _b[2.race#2.sex#c.height] = _b[3.race#2.sex#c.height]  
test _b[2.race#2.sex#c.height] = -_b[3.race#2.sex#c.height]
```

```
*****  
* Questions 5: testing the total effect of a variable X with the margins command and complex survy data  
*****
```

```
* test the total effect of sex  
svy: reg weight c.height##i.race##i.sex
```

```
* The total effect of sex for the whole sample  
margins, by(sex)  
marginsplot, by(sex)
```

```
margins i.sex, at(height=(355(50)515)) atmeans  
marginsplot, yline(0)
```

```
margins i.sex, at(height=(355(50)515)) at(race ==1)  
marginsplot, yline(0) saving("D:\Jason\workshop\regression analysis 2022\graph_white.gph", replace)
```

```
margins i.sex, at(height=(355(50)515)) at(race ==2)  
marginsplot, yline(0) saving("D:\Jason\workshop\regression analysis 2022\graph_black.gph", replace)
```

```
margins i.sex, at(height=(355(50)515)) at(race ==3)  
marginsplot, yline(0) saving("D:\Jason\workshop\regression analysis 2022\graph_other.gph", replace)
```

```
margins i.sex, atmeans  
margins, dydx(i.sex) atmeans  
margins, dydx(i.sex i.race) atmeans
```

log close