

Homework 4

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ECON 7910- Econometrics I

Due on Oct 14, 2021

1 Question 1 – 4.11

Solution:

- a) With KWW and IQ as proxy of ability, $\beta_7 = 0.049837$. However, with only IQ as proxy of ability, $\beta_7 = 0.0544106$, which is a little increase. For specific information, see Table (1)
- b) Since p-value is 0.0003181 only, thus, we can't reject null hypothesis.
- c) No, it will not disappear. $AME = -0.1304$, and corresponding p value is 0.0011.
- d) From the table 2, the interaction term $educ(iq - 100)$, aka, $educ : iq_diff$ whose p value is high, which means not significant. However, $educ : kww_educ$ is significant. The conclusion the interaction of educ and kww difference can somehow positively contribute to the log wage.

R codes as below:

```
#This file is for homework 4- Econometrics
#####
##All the codes are written by Wei Ye #####
#####
library(tidyverse)
library(stargazer)
library(car)# In order to use linearHypothesis function
library(margins)

#Import data from csv file
NLS80 <- read_csv('nls80.csv')
head(NLS80, n=5)
```

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#Question 4.11(a)
with_iq_kww<-lm(lwage~exper+tenure+married+south+urban+black+educ+kww+iq , data=NLS80)
summary(with_iq_kww)
with_iq_only<- lm(lwage~exper+tenure+married+south+urban+black+educ+iq , data=NLS80)
summary(with_iq_only)
stargazer(with_iq_kww,with_iq_only , title = 'Compare_Different_Proxy_of_Ability')
#Question 4.11 (b)
linearHypothesis(with_iq_kww,c('iq=0','kww=0'),white.adjust = 'hc1')

#Question 4.11 (c)
summary(margins(with_iq_kww, variables = 'black'))

#Question 4.11 (d)
NLS80<- NLS80%>%
  mutate(mean_kww=mean(kww))
NLS80<-NLS80%>%
  mutate(iq_diff=iq-100,
         kww_diff=kww-mean_kww)
with_all_terms_required<- lm(lwage~exper+tenure+married+south+urban+black+educ+kww+iq_diff, data=NLS80)
summary(with_all_terms_required)
stargazer(with_iq_kww,with_iq_only , with_all_terms_required , titile='Regression_Analysis')
## 4.11 DONE!

```

Appendix

Table 1: Compare Different Proxy of Ability in 4.11

	<i>Dependent variable:</i>	
	lwage	
	(1)	(2)
exper	0.013*** (0.003)	0.014*** (0.003)
tenure	0.011*** (0.002)	0.011*** (0.002)
married	0.192*** (0.039)	0.200*** (0.039)
south	-0.082*** (0.026)	-0.080*** (0.026)
urban	0.176*** (0.027)	0.182*** (0.027)
black	-0.130*** (0.040)	-0.143*** (0.039)
educ	0.050*** (0.007)	0.054*** (0.007)
kww	0.004** (0.002)	
iq	0.003*** (0.001)	0.004*** (0.001)
Constant	5.176*** (0.128)	5.176*** (0.128)
Observations	935	935
R ²	0.266	0.263
Adjusted R ²	0.259	0.256
Residual Std. Error	0.363 (df = 925)	0.363 (df = 926)
F Statistic	37.284*** (df = 9; 925)	41.265*** (df = 8; 926)

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 2

	<i>Dependent variable:</i>		
	lwage		
	(1)	(2)	(3)
exper	0.013*** (0.003)	0.014*** (0.003)	0.012*** (0.003)
tenure	0.011*** (0.002)	0.011*** (0.002)	0.011*** (0.002)
married	0.192*** (0.039)	0.200*** (0.039)	0.198*** (0.039)
south	-0.082*** (0.026)	-0.080*** (0.026)	-0.081*** (0.026)
urban	0.176*** (0.027)	0.182*** (0.027)	0.178*** (0.027)
black	-0.130*** (0.040)	-0.143*** (0.039)	-0.138*** (0.040)
educ	0.050*** (0.007)	0.054*** (0.007)	0.045*** (0.008)
kww	0.004** (0.002)		-0.025** (0.011)
iq	0.003*** (0.001)	0.004*** (0.001)	0.005 (0.006)
educ:iq_diff			-0.0001 (0.0004)
educ:kww_diff			0.002*** (0.001)
Constant	5.176*** (0.128)	5.176*** (0.128)	6.080*** (0.561)
Observations	935	935	935
R ²	0.266	0.263	0.273
Adjusted R ²	0.259	0.256	0.264
Residual Std. Error	0.363 (df = 925)	0.363 (df = 926)	0.361 (df = 923)
F Statistic	37.284*** (df = 9; 925)	41.265*** (df = 8; 926)	31.478*** (df = 11; 923)

Note:

*p<0.1; **p<0.05; ***p<0.01