



```

      name: <unnamed>
      log: C:\Users\bjiao\OneDrive - The University of Chicago\Desktop\College\ECON
> 21160\Week 7 (Harrison)\homework\homework-victor.smcl
      log type: smcl
      opened on: 26 Nov 2024, 00:07:45

```

```

1 .
2 . * configurations and certifications
3 . capture: version 18

4 . set more off

5 . capture: set processors 1

6 . set scheme stcolor

7 . capture: set scheme stcolor

8 . graph set window fontface "Candara"

9 .
10. * install esttab
11. ssc install estout
    checking estout consistency and verifying not already installed...
    all files already exist and are up to date.

12.
13. * tell us what version ran
14. about

```

```

StataNow/MP 18.5 for Windows (64-bit x86-64)
Revision 22 May 2024
Copyright 1985-2023 StataCorp LLC

```

```

Total physical memory:      16.00 GB
Available physical memory:  10.34 GB

```

```

Stata license: 745-user 2-core network, expiring 30 Jun 2025
Serial number: 501809309429
Licensed to: University of Chicago
            ATS

```

```

15.
16. * read in the homework data
17. use dohmen, clear

18.
19. **# Descriptive functions
20. * description of a few variables that may be
21. * useful to the regression
22. * run when necessary
23. describe row_hi row_lo

```

Variable name	Storage type	Display format	Value label	Variable label
<b>row_hi</b>	float	%9.0g		<b>Upper row number of the switch</b>
<b>row_lo</b>	float	%9.0g		<b>Lower row number of the switch</b>

24. describe crra\_hi crra\_lo

Variable name	Storage type	Display format	Value label	Variable label
<b>crra_hi</b>	float	%9.0g		<b>Upper bound of CRRA</b>
<b>crra_lo</b>	float	%9.0g		<b>Lower bound of CRRA</b>

25. summarize row\_hi row\_lo risk\_attitude

Variable	Obs	Mean	Std. dev.	Min	Max
row_hi	<b>420</b>	<b>8.554762</b>	<b>5.285126</b>	<b>1</b>	<b>20</b>
row_lo	<b>417</b>	<b>9.047962</b>	<b>5.704469</b>	<b>1</b>	<b>20</b>
risk_attit~e	<b>450</b>	<b>4.764444</b>	<b>2.535727</b>	<b>0</b>	<b>10</b>

26. summarize crra\_hi crra\_lo risk\_attitude

Variable	Obs	Mean	Std. dev.	Min	Max
crra_hi	<b>417</b>	<b>.4103597</b>	<b>.3797287</b>	<b>-.52</b>	<b>.88</b>
crra_lo	<b>420</b>	<b>.4551429</b>	<b>.31588</b>	<b>-.52</b>	<b>.88</b>
risk_attit~e	<b>450</b>	<b>4.764444</b>	<b>2.535727</b>	<b>0</b>	<b>10</b>

27.

28.

29. \* preserve the dohmen dataset from being directly edited

30. preserve

31.

32. \*\*# Task 1

33. intreg row\_lo row\_hi risk\_attitude

Fitting constant-only model:

Iteration 0: Log likelihood = **-1366.8696**  
 Iteration 1: Log likelihood = **-1360.4703**  
 Iteration 2: Log likelihood = **-1360.4422**  
 Iteration 3: Log likelihood = **-1360.4422**

Fitting full model:

Iteration 0: Log likelihood = **-1354.6637**  
 Iteration 1: Log likelihood = **-1348.3396**  
 Iteration 2: Log likelihood = **-1348.3131**  
 Iteration 3: Log likelihood = **-1348.3131**

Interval regression

Number of obs = **450**  
 Uncensored = **0**  
 Left-censored = **33**  
 Right-censored = **30**  
 Interval-cens. = **387**

Log likelihood = **-1348.3131**

LR chi2(1) = **24.26**  
 Prob > chi2 = **0.0000**

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
risk_attitude	<b>.6113368</b>	<b>.1225556</b>	<b>4.99</b>	<b>0.000</b>	<b>.3711322</b>	<b>.8515413</b>
_cons	<b>5.918866</b>	<b>.6609935</b>	<b>8.95</b>	<b>0.000</b>	<b>4.623343</b>	<b>7.21439</b>
/lnsigma	<b>1.866821</b>	<b>.0374396</b>	<b>49.86</b>	<b>0.000</b>	<b>1.793441</b>	<b>1.940202</b>
sigma	<b>6.467705</b>	<b>.2421485</b>			<b>6.010098</b>	<b>6.960155</b>

34. estimates store homoskedastic\_model

35.

36. \* export into LaTeX

37. esttab homoskedastic\_model using "homoskedastic\_model.tex", replace se title ("Interval regression between row switch and risk attitude, homoskedastic") label keep(risk  
> \_attitude \_cons) stats(ll N, labels("Log-Likelihood" "Observations")) star(\* 0.10 \*\*  
> 0.05 \*\*\* 0.01) nonumber  
(output written to homoskedastic\_model.tex)

38.

39. \*\*# Task 2

40. intreg row\_lo row\_hi risk\_attitude, het(crta\_mid)

Fitting full model:

Iteration 0: Log likelihood = **-2817.9191**  
Iteration 1: Log likelihood = **-1301.6748**  
Iteration 2: Log likelihood = **-1279.3144**  
Iteration 3: Log likelihood = **-1253.3326**  
Iteration 4: Log likelihood = **-1252.1545**  
Iteration 5: Log likelihood = **-1252.1508**  
Iteration 6: Log likelihood = **-1252.1508**

Interval regression

Number of obs = **450**  
Uncensored = **0**  
Left-censored = **33**  
Right-censored = **30**  
Interval-cens. = **387**

Log likelihood = **-1252.1508**

Wald chi2(1) = **6.89**  
Prob > chi2 = **0.0087**

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
<b>model</b>						
risk_attitude	<b>.1887805</b>	<b>.0719184</b>	<b>2.62</b>	<b>0.009</b>	<b>.0478229</b>	<b>.329738</b>
_cons	<b>2.676423</b>	<b>.354476</b>	<b>7.55</b>	<b>0.000</b>	<b>1.981663</b>	<b>3.371183</b>
<b>lnsigma</b>						
crta_mid	<b>-2.158737</b>	<b>.1761862</b>	<b>-12.25</b>	<b>0.000</b>	<b>-2.504056</b>	<b>-1.813418</b>
_cons	<b>2.624498</b>	<b>.089372</b>	<b>29.37</b>	<b>0.000</b>	<b>2.449332</b>	<b>2.799664</b>

41. estimates store heteroskedastic\_model

42.

43. \* export into LaTeX

44. esttab heteroskedastic\_model using "heteroskedastic\_model.tex", replace se title ("Interval regression between row switch and risk attitude, heteroskedastic") label keep(risk  
> \_attitude \_cons) stats(ll N, labels("Log-Likelihood" "Observations")) star(\* 0  
> .10 \*\* 0.05 \*\*\* 0.01) nonumber  
(output written to heteroskedastic\_model.tex)

45.

46. \* We can compare the heteroskedastic and homoskedastic model by running an lrtest

47. lrtest homoskedastic\_model heteroskedastic\_model

Likelihood-ratio test

Assumption: homoskedastic~1 nested within heteroskedastic~1

LR chi2(1) = **192.32**  
Prob > chi2 = **0.0000**

```

48.
49. **# Task 3
50. * repeating the estimation in Task 1 but using CRRA as a dependent variable
51. intreg crra_lo crra_hi risk_attitude

```

Fitting constant-only model:

```

Iteration 0: Log likelihood = -1407.3573
Iteration 1: Log likelihood = -1400.9064
Iteration 2: Log likelihood = -1400.8777
Iteration 3: Log likelihood = -1400.8777

```

Fitting full model:

```

Iteration 0: Log likelihood = -1396.7633
Iteration 1: Log likelihood = -1390.388
Iteration 2: Log likelihood = -1390.3608
Iteration 3: Log likelihood = -1390.3608

```

Interval regression	Number of obs	=	450
	Uncensored	=	0
	Left-censored	=	30
	Right-censored	=	33
	Interval-cens.	=	387

Log likelihood = -1390.3608	LR chi2(1)	=	21.03
	Prob > chi2	=	0.0000

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
risk_attitude	-.0377299	.0081376	-4.64	0.000	-.0536793	-.0217806
_cons	.6037262	.0439114	13.75	0.000	.5176614	.689791
/lnsigma	-.844802	.0375384	-22.50	0.000	-.918376	-.771228
sigma	.4296424	.0161281			.3991667	.4624448

```

52. estimates store crra_homoskedastic_model

```

```

53.
54. * export into LaTeX
55. esttab crra_homoskedastic model using "crra_homoskedastic_model.tex", replace se tit
> le ("Interval regression between CRRA estimations and risk attitude, homoskedastic")
> label keep(risk_attitude _cons) stats(ll N, labels("Log-Likelihood" "Observations")
> ) star(* 0.10 **0.05 *** 0.01) nonumber
(output written to crra_homoskedastic_model.tex)

```

```

56.
57. * shows how predicted mean of CRRA varies with the hypothetical survey response leve
> 1, showing 95% confidence intervals on this prediction from the estimated model
58. margins, at(risk_attitude=(0(1)10)) predict(xb)

```

Adjusted predictions	Number of obs = 450
Model VCE: OIM	

Expression: **Linear prediction, predict(xb)**

```

1._at: risk_attitude = 0
2._at: risk_attitude = 1
3._at: risk_attitude = 2
4._at: risk_attitude = 3
5._at: risk_attitude = 4
6._at: risk_attitude = 5
7._at: risk_attitude = 6
8._at: risk_attitude = 7
9._at: risk_attitude = 8
10._at: risk_attitude = 9
11._at: risk_attitude = 10

```

	Margin	Delta-method std. err.	z	P> z	[95% conf. interval]	
_at						
1	.6037262	.0439114	13.75	0.000	.5176614	.689791
2	.5659963	.0369109	15.33	0.000	.4936523	.6383403
3	.5282664	.0304803	17.33	0.000	.468526	.5880067
4	.4905364	.0250625	19.57	0.000	.4414148	.5396581
5	.4528065	.0214394	21.12	0.000	.4107861	.494827
6	.4150766	.0205817	20.17	0.000	.3747372	.455416
7	.3773467	.0228036	16.55	0.000	.3326524	.4220409
8	.3396167	.027365	12.41	0.000	.2859824	.3932511
9	.3018868	.0333185	9.06	0.000	.2365838	.3671898
10	.2641569	.0400479	6.60	0.000	.1856644	.3426494
11	.226427	.0472228	4.79	0.000	.1338719	.318982

```

59.
60.
61. * save the edited dataset in a separate file
62. save "dohmen_updated.dta", replace
    file dohmen_updated.dta saved
63.
64. * restore original dohmen
65. restore

66.
67. **# Task 4
68. * preserve again, as this task requires clearing the data
69. preserve

70.
71. * interval regression using CRRA intervals, like in Task 3
72. intreg crra_lo crra_hi risk_attitude

```

Fitting constant-only model:

```

Iteration 0: Log likelihood = -1407.3573
Iteration 1: Log likelihood = -1400.9064
Iteration 2: Log likelihood = -1400.8777
Iteration 3: Log likelihood = -1400.8777

```

Fitting full model:

```

Iteration 0: Log likelihood = -1396.7633
Iteration 1: Log likelihood = -1390.388
Iteration 2: Log likelihood = -1390.3608
Iteration 3: Log likelihood = -1390.3608

```

Interval regression

```

Number of obs      =    450
Uncensored         =     0
Left-censored      =    30
Right-censored     =    33
Interval-cens.     =    387

```

Log likelihood = **-1390.3608**

```

LR chi2(1)         =    21.03
Prob > chi2         =    0.0000

```

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
risk_attitude	-.0377299	.0081376	-4.64	0.000	-.0536793	-.0217806
_cons	.6037262	.0439114	13.75	0.000	.5176614	.689791
/lnsigma	-.844802	.0375384	-22.50	0.000	-.918376	-.771228
sigma	.4296424	.0161281			.3991667	.4624448

```

73.
74. * Store the estimated coefficients and sigma
75. scalar beta0 = _b[_cons]

76. scalar betal = _b[risk_attitude]

77. scalar sigma = exp(_b[_lnsigma])

78.
79. * Create a dataset for simulation
80. clear

81. set obs 11
    Number of observations (_N) was 0, now 11.

82. generate risk_attitude = _n - 1

83.
84. * Calculate predicted means for each risk_attitude level
85. generate pred_mean = beta0 + betal * risk_attitude

86.
87. * simulate CRRA values for each risk_attitude level
88. set seed 12345

89. expand 1000
    (10,989 observations created)

90. bysort risk_attitude: generate sim_id = _n

91. generate sim_crta = pred_mean + sigma * invnorm(uniform())

92.
93. * calculate mean and 95% confidence intervals
94. bysort risk_attitude: egen mean_crta = mean(sim_crta)

95. bysort risk_attitude: egen p2_5 = pctlile(sim_crta), p(2.5)

96. bysort risk_attitude: egen p97_5 = pctlile(sim_crta), p(97.5)

97.
98. * Keep only one observation per risk attitude level
99. bysort risk_attitude: keep if _n == 1
    (10,989 observations deleted)

100
101 * visualize the results
102 twoway (line mean_crta risk_attitude, sort) ///
    > (rcap p97_5 p2_5 risk_attitude, sort), ///
    > ytitle("Predicted CRRA") ///
    > xtitle("Risk Attitude Score") ///
    > title("Predicted Mean CRRA with 95% Confidence Intervals") ///
    > legend(off)

103
104 list risk_attitude mean_crta p2_5 p97_5, clean noobs

```

risk_a~e	mean_c~a	p2_5	p97_5
0	.5940551	-.2334366	1.460884
1	.5577046	-.3121462	1.387828
2	.5290354	-.324188	1.42221
3	.4867336	-.3644379	1.307482
4	.4552341	-.3514957	1.301346
5	.4160047	-.3933557	1.201797
6	.4000891	-.4246299	1.260857
7	.3249075	-.5175887	1.138151
8	.324099	-.5437163	1.197112
9	.2834082	-.552037	1.179043
10	.2393259	-.6460882	1.077323

```
105
106 * save the charts
107 graph export "crra_homoskedastic_model_predicted_graph.png", replace
    (file crra_homoskedastic_model_predicted_graph.png not found)
    file crra_homoskedastic_model_predicted_graph.png saved as PNG format

108
109
110 * restore previous data state
111 restore

112
113 **# Finishing up
114 * closes log file, translate into PDF
115 log close
    name: <unnamed>
    log: C:\Users\bjiao\OneDrive - The University of Chicago\Desktop\College\ECON
> 21160\Week 7 (Harrison)\homework\homework-victor.smcl
    log type: smcl
    closed on: 26 Nov 2024, 00:07:49
```

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