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1  **** Problem Set 1 Econ 244
2  * Christina Brown
3
4  /*Preliminaries*/
5  clear
6  set more off
7  cap clear matrix
8  set mem 100m
9  set matsize 800
10
11 set seed 1234
12
13 cap log close
14 log using "$ps_244/log_`c(current_date)'.log", replace
15
16 ***** Problem 4 *****
17 ***** Part a *****
18
19     set obs 100
20
21     gen eta_c=rnormal(1,1)
22     gen v_c=rnormal(0,1)
23     gen clusterid=_n
24
25     expand 100
26
27     gen e_ic=rnormal(0,1)
28     gen dstar_ic=runiform()
29     gen d_ic=(dstar_ic>.5)
30     gen y_ic=v_c + eta_c*d_ic + e_ic
31
32     eststo clear
33
34     eststo: reg y_ic d_ic
35     eststo: reg y_ic d_ic, r
36     eststo: reg y_ic d_ic, cl(clusterid)
37
38     esttab using "$ps_244/ps2_4a_regs.tex", b label starlevels(*
0.10 ** 0.05 *** 0.01) se(5) booktabs r2 obslast ///
39     title("Clustered DGP") replace mtitles("Y_ic, Regular SE"
"Y_ic, Robust SE" "Y_ic, Clustered SE")
40
41 ***** Part b *****
42
43     clear
44     set obs 100
45
46     gen eta_c=1
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47     gen v_c=rnormal(0,1)
48     gen clusterid=_n
49
50     expand 100
51
52     gen e_ic=rnormal(0,1)
53     gen dstar_ic=runiform()
54     gen d_ic=(dstar_ic>.5)
55     gen y_ic=v_c + eta_c*d_ic + e_ic
56
57     eststo clear
58
59     eststo: reg y_ic d_ic
60     eststo: reg y_ic d_ic, r
61     eststo: reg y_ic d_ic, cl(clusterid)
62
63     esttab using "$ps_244/ps2_4b_regs.tex", b label starlevels(*
0.10 ** 0.05 *** 0.01) se(5) booktabs r2 obslast ///
64     title("Clustered DGP") replace mtitles("Y_ic, Regular SE"
"Y_ic, Robust SE" "Y_ic, Clustered SE")
65
66     ***** Part d *****
67
68     set seed 1234
69
70     cap program drop dgp
71     program define dgp, rclass
72         clear
73         set obs 100
74
75         gen eta_c=rnormal(1,1)
76         gen v_c=rnormal(0,1)
77         gen clusterid=_n
78
79         expand 100
80
81         gen e_ic=rnormal(0,1)
82         gen dstar_ic=runiform()
83         gen d_ic=(dstar_ic>.5)
84         gen y_ic=v_c + eta_c*d_ic + e_ic
85
86         reg y_ic d_ic, r
87         test d_ic=1
88         return scalar reject=(r(p)<.05)
89
90         reg y_ic d_ic, cl(clusterid)
91         test d_ic=1
92         return scalar reject_cluster=(r(p)<.05)

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93
94     end
95
96     simulate reject=r(reject) reject_cluster=r(reject_cluster),
reps(1000): dgp
97
98     eststo clear
99     estpost summarize reject reject_cluster
100     esttab using "$ps_244/ps2_4d_regs.tex", cells("count mean
sd min max") title("Monte Carlo Simulations") replace noobs
101
102 ***** Part e *****          *** Need to fix to have
eta_c's fixed
103
104     set seed 1234
105
106     clear
107     set obs 100
108
109     gen eta_c=rnormal(1,1)
110     gen v_c=rnormal(0,1)
111     gen clusterid=_n
112
113     su eta_c
114     global avg_eta_c=`r(mean)'
115     di "`avg_eta_c'"
116
117     expand 100
118
119     cap program drop dgp2
120     program define dgp2, rclass
121
122         cap drop e_ic dstar_ic d_ic y_ic
123         gen e_ic=rnormal(0,1)
124         gen dstar_ic=runiform()
125         gen d_ic=(dstar_ic>.5)
126         gen y_ic=v_c + eta_c*d_ic + e_ic
127
128         reg y_ic d_ic, r
129         test d_ic=1.033752
130         return scalar reject=(r(p)<.05)
131
132         reg y_ic d_ic, cl(clusterid)
133         test d_ic=1.033752
134         return scalar reject_cluster=(r(p)<.05)
135
136     end
137

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138     simulate reject=r(reject) reject_cluster=r(reject_cluster),
reps(1000): dgp2
139
140     eststo clear
141     estpost summarize reject reject_cluster
142     esttab using "$ps_244/ps2_4e_regs.tex", cells("count mean
sd min max") title("Monte Carlo Simulations") replace noobs
143
144     ***** Problem 5 *****
145     ***** Part a *****
146     use "$ps_244/cps2000.dta" if empstat==10, clear
147
148     drop if incwage>999000|incwage==0 //those without valid
earnings
149     gen wage=incwage/(uhrswork*wkswork1) //average annual
hourly wages
150     drop if wage<2|wage>99 //drop outliers
151     gen lnwage=ln(wage) //take logs
152
153     *construct age categories
154     gen agecat=1 if age<=25
155     replace agecat=2 if age>25&age<=35
156     replace agecat=3 if age>35&age<=45
157     replace agecat=4 if age>45&age<=55
158     replace agecat=5 if age>55&age<=65
159     replace agecat=6 if age>65
160
161     *construct education categories
162     gen educcat=1 if educ99>=1&educ99<=9
163     replace educcat=2 if educ99==10
164     replace educcat=3 if educ99>=11&educ99<=13
165     replace educcat=4 if educ99>=14
166
167     lab var agecat "Age Category"
168     lab var educcat "Education Category"
169
170     lab def agecatlbl 1 "<=25" 2 "25-35" 3 "35-45" 4 "45-55" 5
"55-65" 6 ">65"
171     lab val agecat agecatlbl
172
173     lab def educcatlbl 1 "Dropout" 2 "HS" 3 "Some College" 4
"BA+"
174     lab val educcat educcatlbl
175
176     eststo clear
177     eststo: xi: reg lnwage i.agecat i.educcat sex
178
179     ***** Part b-f *****

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180     bys agecat educat sex: gen count=_N
181     su lnwage
182     local var `r(Var)'
183     gen cell_var=`var'/count
184     gen cell_var_inv=1/cell_var
185
186     collapse count lnwage cell_var cell_var_inv age educ99, by(
agecat educat sex)
187
188     lab var agecat "Age Category"
189     lab var educat "Education Category"
190     lab val agecat agecatlbl
191     lab val educat educatlbl
192
193     eststo: xi: reg lnwage i.agecat i.educat sex [iweight=count]
194     eststo: xi: reg lnwage i.agecat i.educat sex [iweight=
cell_var_inv]
195
196     esttab using "$ps_244/ps2_5a.tex", b label starlevels(*
0.10 ** 0.05 *** 0.01) se(5) booktabs r2 obslast style(tex) ///
197     title("Wage Regression (Weighted)") replace mtitles
("Log wage" "Log wage (weighted by cell size)" "Log wage (weighted
by 1/cell var)")
198
199     ***** Part h *****
200     eststo clear
201     eststo: xi: reg lnwage i.agecat i.educat sex agecat#educat
agecat#sex educat#sex [iweight=cell_var_inv]
202     predict lnwage_hat
203
204     esttab using "$ps_244/ps2_5h.tex", b label starlevels(*
0.10 ** 0.05 *** 0.01) se(5) booktabs r2 obslast style(tex) ///
205     title("Wage Regression (Weighted)") replace mtitles
("Log wage" "Log wage (weighted by cell size)" "Log wage (weighted
by 1/cell var)")
206
207     twoway (scatter lnwage agecat, msize(tiny) mcolor(red)) (
scatter lnwage_hat agecat, msize(tiny) mcolor(blue)), scheme(s1mono
) by(educat sex, cols(2)) xsize(3)
208     graph export "$ps_244/ps2_5j.pdf", replace
209
210
211     cap log close
212

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