```
1
2   ******************************************************************
3   * Question 2
4   ******************************************************************
5   clear all
6   set more off
7   cap log close
8
9   program define weak_IV, rclass
10      syntax [, obs(integer 200) f_stat(real 10) ]
11      drop _all
12
13      set obs `obs'
14
15      * DGP
16      gen u = rnormal()
17      gen v = 0.99 * u + sqrt(1-0.99^2) * rnormal()
18      gen z = rnormal()
19
20      local gamma_0 = sqrt((`f_stat' - 1) / `obs')
21      gen x = `gamma_0' * z + v
22      gen y = u
23
24      * OLS
25      qui reg y x, robust
26      return scalar OLS_b   = _b[x]
27      return scalar OLS_se  = _se[x]
28      return scalar OLS_rej = abs(_b[x]/_se[x]) > 1.96
29
30      * 2SLS
31      qui ivregress 2sls y (x = z)
32      return scalar TSLS_b   = _b[x]
33      return scalar TSLS_se  = _se[x]
34      return scalar TSLS_rej = abs(_b[x]/_se[x]) > 1.96
35      qui reg x z
36      return scalar TSLS_F   = e(F)
37  end
38
39  * simulation 1: F = 1
40  simulate OLS_b=r(OLS_b) OLS_se=r(OLS_se) OLS_rej=r(OLS_rej) ///
41      TSLS_b=r(TSLS_b) TSLS_se=r(TSLS_se) TSLS_rej=r(TSLS_rej) TSLS_F=r(TSLS_F), ///
42      reps(5000) seed(123) nodots: ///
43      weak IV, f stat(1)
44
45  local k = 1
46  matrix Results = J(7, 5, .)
47
48  qui sum OLS_b, detail
49  matrix Results[`k',1] = r(mean)
50  matrix Results[`k',2] = r(sd)
51  matrix Results[`k',3] = r(p10)
52  matrix Results[`k',4] = r(p50)
53  matrix Results[`k',5] = r(p90)
54  local k = `k' + 1
55
56  qui sum OLS_se, detail
57  matrix Results[`k',1] = r(mean)
58  matrix Results[`k',2] = r(sd)
59  matrix Results[`k',3] = r(p10)
60  matrix Results[`k',4] = r(p50)
61  matrix Results[`k',5] = r(p90)
62  local k = `k' + 1
63
64  qui sum OLS_rej, detail
65  matrix Results[`k',1] = r(mean)
66  matrix Results[`k',2] = r(sd)
67  matrix Results[`k',3] = r(p10)
68  matrix Results[`k',4] = r(p50)
69  matrix Results[`k',5] = r(p90)
70  local k = `k' + 1
```

```
 71
 72  qui sum TSLS_b, detail
 73  matrix Results[`k',1] = r(mean)
 74  matrix Results[`k',2] = r(sd)
 75  matrix Results[`k',3] = r(p10)
 76  matrix Results[`k',4] = r(p50)
 77  matrix Results[`k',5] = r(p90)
 78  local k = `k' + 1
 79
 80  qui sum TSLS_se, detail
 81  matrix Results[`k',1] = r(mean)
 82  matrix Results[`k',2] = r(sd)
 83  matrix Results[`k',3] = r(p10)
 84  matrix Results[`k',4] = r(p50)
 85  matrix Results[`k',5] = r(p90)
 86  local k = `k' + 1
 87
 88  qui sum TSLS rej, detail
 89  matrix Results[`k',1] = r(mean)
 90  matrix Results[`k',2] = r(sd)
 91  matrix Results[`k',3] = r(p10)
 92  matrix Results[`k',4] = r(p50)
 93  matrix Results[`k',5] = r(p90)
 94  local k = `k' + 1
 95
 96  qui sum TSLS_F, detail
 97  matrix Results[`k',1] = r(mean)
 98  matrix Results[`k',2] = r(sd)
 99  matrix Results[`k',3] = r(p10)
100  matrix Results[`k',4] = r(p50)
101  matrix Results[`k',5] = r(p90)
102  local k = `k' + 1
103
104  mat2txt, matrix(Results) saving(result1.txt) format(%9.4f) replace
105
106
107
108  ********************************************************************
109  * Question 3
110  ********************************************************************
111  clear all
112  set more off
113  cap log close
114  use "Angrist_Krueger.dta"
115
116  *****************************************************************************
117  * The following replicates Columns (5)-(8), Table V
118  * in Angrist and Krueger (1991 QJE)
119  *****************************************************************************
120
121  *** Column 5, Table V, Angrist and Krueger (1991 QJE)
122  reg l_w_wage educ non_white married SMSA i.region i.YoB_ld
123
124  *** Column 6, Table V, Angrist and Krueger (1991 QJE)
125  ivregress 2sls l_w_wage non_white married SMSA i.region i.YoB_ld ///
126      (educ = i.YoB_ld##i.QoB)
127  estat firststage
128
129  *** Column 7, Table V, Angrist and Krueger (1991 QJE)
130  reg  l_w_wage educ non_white married SMSA age_q age_sq i.region i.YoB_ld
131
132  *** Column 8, Table V, Angrist and Krueger (1991 QJE)
133  ivregress 2sls l_w_wage non_white married SMSA age_q age_sq i.region i.YoB_ld ///
134      (educ = i.YoB_ld##i.QoB)
135  estat firststage
136
137  *****************************************************************************
138  * The following replicates Columns (1) and (2), Table 3
139  * in Bound et al. (1995)
140  *****************************************************************************
```

```
141  capture program drop IV_quick
142  program define IV_quick, rclass
143      syntax varlist(max=1) [, model(integer 1) ]
144      local x "`varlist'"
145
146      if (`model' == 1) {
147          capture drop educ_hat
148          qui reg educ non_white married SMSA i.region i.YoB_ld i.YoB_ld##i.`x'
149          predict educ_hat
150          qui reg l_w_wage educ_hat non_white married SMSA i.region i.YoB_ld
151          return scalar beta = _b[educ_hat]
152      }
153      if (`model' == 2) {
154          capture drop educ_hat
155          qui reg educ non_white married SMSA age_q age_sq i.region i.YoB_ld i.YoB_ld##i.`x'
156          predict educ_hat
157          qui reg l_w_wage educ_hat non_white married SMSA age_q age_sq i.region i.YoB_ld
158          return scalar beta =  b[educ hat]
159      }
160  end
161
162
163  permute QoB TSLS_1_b = r(beta), reps(500) seed(123) saving(premute1, replace): ///
164      IV_quick QoB, model(1)
165
166  permute QoB TSLS_2_b = _b[educ], reps(500) seed(123) saving(premute2, replace): ///
167      ivregress 2sls l_w_wage non_white married SMSA age_q age_sq i.region i.YoB_ld ///
168      (educ = i.YoB_ld##i.QoB)
169
170  clear all
171  use "premute1.dta"
172  sum TSLS_1_b
173
174  clear all
175  use "premute2.dta"
176  sum TSLS_2_b
177
178
179
180
181
```