```
-------------------------------------------------------------------------------
-----------------------------
       log:  c:\drive-d\classes\ec202\nonpar\split.log
  log type:  text
 opened on:  21 Apr 2009, 10:59:22

.
.
. clear

. set obs 1000
obs was 0, now 1000

. set seed 1001

. gen seq=_n

. gen eta=.5+2*uniform()

. expand =2
(1000 observations created)

. sort seq

. gen k=10

. gen brother =_n

. gen y=4+5*uniform()

. gen fsh=(y / 0.2e1 + eta / 0.2e1) / y

. gen n=1

. sort seq brother

. egen ty=sum(y), by(seq)

. quietly by seq: gen y1=y[1]

. quietly by seq: gen y2=y[2]

. quietly by seq: gen joint=( -y1 * eta / 0.2e1 - y2 * eta / 0.2e1 + eta * eta
/ 0.2e1 + y1 * y2 / 0.2e1 - k
> )>0

. quietly by seq: drop if _n==2 & joint

. replace y=ty if joint
(625 real changes made)

. replace fsh=((2 * eta + y ) / y) / 0.2e1 if joint
(625 real changes made)

. replace n=2 if joint
(625 real changes made)

. gen lnpcn=ln(y/n)

. reg fsh lnpcn n

      Source |       SS       df       MS              Number of obs =    1375
-------------+------------------------------           F(  2,  1372) =  563.88
```

```
       Model |  2.13748081     2   1.0687404           Prob > F      =  0.0000
    Residual |  2.60041051  1372  .001895343           R-squared     =  0.4511
-------------+------------------------------           Adj R-squared =  0.4503
       Total |  4.73789132  1374  .003448247           Root MSE      =  .04354

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnpcn |  -.0824241   .0068909   -11.96   0.000    -.0959418   -.0689063
           n |  -.0533626   .0029212   -18.27   0.000    -.0590932   -.0476321
       _cons |   .8623784   .0106029    81.33   0.000     .8415788    .883178
------------------------------------------------------------------------------

. reg fsh lnpcn n eta

      Source |       SS       df       MS              Number of obs =    1375
-------------+------------------------------           F(  3,  1371) =15501.06
       Model |  4.60220965     3  1.53406988           Prob > F      =  0.0000
    Residual |  .135681677  1371  .000098965           R-squared     =  0.9714
-------------+------------------------------           Adj R-squared =  0.9713
       Total |  4.73789132  1374  .003448247           Root MSE      =  .00995

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnpcn |  -.1516671   .0016346   -92.79   0.000    -.1548737   -.1484606
           n |      .0042   .0007607     5.52   0.000     .0027078    .0056922
         eta |   .0849395   .0005382   157.81   0.000     .0838836    .0859953
       _cons |   .7670585    .002497   307.20   0.000     .7621602    .7719568
------------------------------------------------------------------------------

.
. gen yy=y1*y2

. ivreg fsh lnpcn (n=yy)

Instrumental variables (2SLS) regression

      Source |       SS       df       MS              Number of obs =    1375
-------------+------------------------------           F(  2,  1372) =  285.85
       Model |  1.09646719     2  .548233593           Prob > F      =  0.0000
    Residual |  3.64142414  1372  .002654099           R-squared     =  0.2314
-------------+------------------------------           Adj R-squared =  0.2303
       Total |  4.73789132  1374  .003448247           Root MSE      =  .05152

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           n |   .0150993   .0070014     2.16   0.031     .0013647    .0288338
       lnpcn |  -.1777593   .0117633   -15.11   0.000    -.2008354   -.1546833
       _cons |   .9353518   .0141259    66.22   0.000     .9076411    .9630626
------------------------------------------------------------------------------
Instrumented:  n
Instruments:   lnpcn yy
------------------------------------------------------------------------------

.
. reg eta yy lnpcn if joint

      Source |       SS       df       MS              Number of obs =     625
-------------+------------------------------           F(  2,   622) =   79.54
       Model |  39.4969108     2  19.7484554           Prob > F      =  0.0000
    Residual |  154.439759   622  .248295433           R-squared     =  0.2037
```

```
-------------+------------------------------           Adj R-squared =  0.2011
       Total |   193.93667   624  .310795945           Root MSE      =  .49829

------------------------------------------------------------------------------
         eta |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          yy |  -.0231302   .0094368    -2.45   0.015    -.0416621   -.0045983
       lnpcn |   4.568009    .972275     4.70   0.000      2.65867    6.477348
       _cons |  -6.398469   1.438374    -4.45   0.000    -9.223127   -3.573811
------------------------------------------------------------------------------

. predict ehat1
(option xb assumed; fitted values)

. reg eta yy lnpcn if ~joint

      Source |       SS       df       MS              Number of obs =     750
-------------+------------------------------           F(  2,   747) =   67.80
       Model |  26.7670793     2  13.3835397           Prob > F      =  0.0000
    Residual |  147.447562   747  .197386295           R-squared     =  0.1536
-------------+------------------------------           Adj R-squared =  0.1514
       Total |  174.214642   749  .232596317           Root MSE      =  .44428

------------------------------------------------------------------------------
         eta |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          yy |   .0276591   .0027936     9.90   0.000     .0221748    .0331434
       lnpcn |  -.0333831   .0938415    -0.36   0.722    -.2176076    .1508414
       _cons |   1.039441    .133723     7.77   0.000      .776923    1.301958
------------------------------------------------------------------------------

. predict ehat2
(option xb assumed; fitted values)

. replace ehat2=ehat1 if joint
(625 real changes made)

.
. reg fsh lnpcn n ehat2

      Source |       SS       df       MS              Number of obs =    1375
-------------+------------------------------           F(  3,  1371) =  522.34
       Model |  2.52699075     3   .84233025           Prob > F      =  0.0000
    Residual |  2.21090057  1371  .001612619           R-squared     =  0.5334
-------------+------------------------------           Adj R-squared =  0.5323
       Total |  4.73789132  1374  .003448247           Root MSE      =  .04016

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnpcn |  -.1631334   .0082079   -19.88   0.000    -.1792348    -.147032
           n |   .0137321    .005089     2.70   0.007     .0037489    .0237152
       ehat2 |    .099005   .0063704    15.54   0.000     .0865083    .1115017
       _cons |   .7512741   .0121144    62.02   0.000     .7275094    .7750387
------------------------------------------------------------------------------

. gen xlnpcn=int(lnpcn*10)

. areg fsh lnpcn n, a(xlnpcn)

Linear regression, absorbing indicators          Number of obs =    1375
                                                 F(  2,  1364) =  156.06
                                                 Prob > F      =  0.0000
```

```
                                                      R-squared     =  0.4749
                                                      Adj R-squared =  0.4710
                                                      Root MSE      =  .04271

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnpcn |  -.0572883   .0404897    -1.41   0.157    -.1367172    .0221406
           n |  -.0530008   .0030166   -17.57   0.000    -.0589185   -.0470831
       _cons |   .8163571   .0733171    11.13   0.000     .6725305    .9601837
-------------+----------------------------------------------------------------
      xlnpcn |        F(8, 1364) =      7.711   0.000           (9 categories)

.
. lowess fsh lnpcn if n==1, gen(psh1)

. lowess fsh lnpcn if n==2, gen(psh2)

.
. twoway (line psh1 lnpcn, sort) (line psh2 lnpcn, sort), legend(order(1 "n=1"
2 "n=2")) saving(fig1,replace
> )
(file fig1.gph saved)

.
.
. clear

. set obs 1000
obs was 0, now 1000

. set seed  1001

. gen seq=_n

. gen eta=1

. expand =2
(1000 observations created)

. sort seq

. gen k=10

. gen brother =_n

. gen y=4+5*uniform()

. gen fsh=(y / 0.2e1 + eta / 0.2e1) / y

. gen n=1

. sort seq brother

. egen ty=sum(y), by(seq)

. quietly by seq: gen y1=y[1]

. quietly by seq: gen y2=y[2]

. quietly by seq: gen joint=( -y1 * eta / 0.2e1 - y2 * eta / 0.2e1 + eta * eta
/ 0.2e1 + y1 * y2 / 0.2e1 - k
> )>0
```

```
. quietly by seq: drop if _n==2 & joint

. replace y=ty if joint
(820 real changes made)

. replace fsh=((2 * eta + y ) / y) / 0.2e1 if joint
(820 real changes made)

. replace n=2 if joint
(820 real changes made)

. gen lnpcn=ln(y/n)

. reg fsh lnpcn n

      Source |       SS       df       MS              Number of obs =    1180
-------------+------------------------------           F(  2,  1177) =56067.10
       Model |  .321270812     2  .160635406           Prob > F      =  0.0000
    Residual |  .003372171  1177  2.8651e-06           R-squared     =  0.9896
-------------+------------------------------           Adj R-squared =  0.9896
       Total |  .324642984  1179  .000275355           Root MSE      =  .00169

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnpcn |  -.0826638   .0003892  -212.39   0.000    -.0834274   -.0819002
           n |  -.0015793    .000163    -9.69   0.000    -.0018992   -.0012594
       _cons |   .7357083    .000537  1370.15   0.000     .7346548    .7367618
------------------------------------------------------------------------------

. gen yy=y1*y2

. ivreg fsh lnpcn (n=yy)

Instrumental variables (2SLS) regression

      Source |       SS       df       MS              Number of obs =    1180
-------------+------------------------------           F(  2,  1177) =  673.42
       Model |  .041899111     2  .020949556           Prob > F      =  0.0000
    Residual |  .282743872  1177  .000240224           R-squared     =  0.1291
-------------+------------------------------           Adj R-squared =  0.1276
       Total |  .324642984  1179  .000275355           Root MSE      =   .0155

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           n |   .0493338   .0151727     3.25   0.001     .0195651    .0791024
       lnpcn |  -.1743548    .027425    -6.36   0.000    -.2281622   -.1205474
       _cons |   .8170286    .024613    33.20   0.000     .7687383    .8653188
------------------------------------------------------------------------------
Instrumented:  n
Instruments:   lnpcn yy
------------------------------------------------------------------------------

. gen xlnpcn=int(lnpcn*10)

. areg fsh lnpcn n, a(xlnpcn)

Linear regression, absorbing indicators              Number of obs =    1180
                                                     F(  2,  1169) =14259.46
                                                     Prob > F      =  0.0000
                                                     R-squared     =  0.9992
```

```
                                                      Adj R-squared =  0.9992
                                                      Root MSE      =  .00047

------------------------------------------------------------------------------
         fsh |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lnpcn |  -.0824747   .0004924  -167.51   0.000    -.0834407   -.0815087
           n |  -.0000158   .0000531    -0.30   0.766    -.0001201    .0000885
       _cons |   .7327126   .0008934   820.18   0.000     .7309598    .7344654
-------------+----------------------------------------------------------------
      xlnpcn |        F(8, 1169) =   1735.510   0.000           (9 categories)

.
. lowess fsh lnpcn if n==1, gen(psh1)

. lowess fsh lnpcn if n==2, gen(psh2)

.
.
.
. twoway (line psh1 lnpcn, sort) (line psh2 lnpcn, sort), legend(order(1 "n=1"
2 "n=2")) saving(fig2,replace
> )
(file fig2.gph saved)

.
. log close
       log:  c:\drive-d\classes\ec202\nonpar\split.log
  log type:  text
 closed on:  21 Apr 2009, 10:59:48
------------------------------------------------------------------------------
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