```
      name:  <unnamed>
       log:  C:\Users\XuQi\Documents\第八章.smcl
  log type:  smcl
 opened on:  15 Jul 2024, 10:15:32

. do "C:\Users\XuQi\Desktop\第8章.do", nostop

. use "C:\Users\XuQi\Desktop\simulation.dta", clear

.
. *多元线性回归
. reg lninc college
```

Source	SS	df	MS		
Model	1768.49262	1	1768.49262	Number of obs	= 10,000
Residual	14149.4062	9,998	1.41522366	F(1, 9998)	= 1249.62
				Prob > F	= 0.0000
				R-squared	= 0.1111
				Adj R-squared	= 0.1110
Total	15917.8988	9,999	1.59194908	Root MSE	= 1.1896

lninc	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
college	1.223779	.0346189	35.35	0.000	1.155919	1.291639
_cons	8.338612	.0128043	651.23	0.000	8.313513	8.363711

```
. reg lninc college gender age age2 hukou feduy meduy sibling, robust
```

Linear regression

Number of obs	= 10,000
F(8, 9991)	= 607.66
Prob > F	= 0.0000
R-squared	= 0.3171
Root MSE	= 1.0431

lninc	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
college	.9058374	.0314346	28.82	0.000	.8442193	.9674555
gender	.7710099	.0211603	36.44	0.000	.7295315	.8124883
age	.2730867	.011892	22.96	0.000	.2497761	.2963974
age2	-.0041989	.0001894	-22.17	0.000	-.0045701	-.0038276
hukou	.3756471	.0354001	10.61	0.000	.3062559	.4450384
feduy	.0378026	.0027645	13.67	0.000	.0323837	.0432215
meduy	.022306	.0030646	7.28	0.000	.0162988	.0283132
sibling	-.1026486	.0088941	-11.54	0.000	-.1200828	-.0852143
_cons	3.688726	.1810034	20.38	0.000	3.333923	4.043529

```
.
. *假设高考时的运气可观测，可使用其作为工具变量来识别大学对收入的影响
. corr luck1 luck2 luck3 college
(obs=10,000)
```

	luck1	luck2	luck3	college
luck1	1.0000			
luck2	-0.0036	1.0000		
luck3	0.0031	-0.0087	1.0000	
college	0.1841	0.1667	0.0232	1.0000

```
.
. *两阶段最小二乘法
```

```
. ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck1), vce(robust) first

First-stage regressions
```

```
                                                Number of obs =     10,000
                                                F(8, 9991)    =     169.85
                                                Prob > F      =     0.0000
                                                R-squared     =     0.1564
                                                Adj R-squared =     0.1557
                                                Root MSE      =     0.3158
```

college	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
gender	-.0498054	.0064536	-7.72	0.000	-.0624558	-.037155
age	.0384085	.0030797	12.47	0.000	.0323716	.0444454
age2	-.0005812	.0000491	-11.84	0.000	-.0006774	-.000485
hukou	.1806179	.0143323	12.60	0.000	.1525238	.208712
feduy	.0086345	.0008356	10.33	0.000	.0069966	.0102725
meduy	.0099724	.0010186	9.79	0.000	.0079758	.0119689
sibling	-.0199209	.0023318	-8.54	0.000	-.0244917	-.0153501
luck1	.0612274	.003246	18.86	0.000	.0548645	.0675902
_cons	-.4910525	.0465114	-10.56	0.000	-.5822242	-.3998807

```
Instrumental variables 2SLS regression          Number of obs   =     10,000
                                                Wald chi2(8)    =    3992.49
                                                Prob > chi2     =     0.0000
                                                R-squared       =     0.3134
                                                Root MSE        =     1.0455
```

lninc	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
college	.6662753	.1719651	3.87	0.000	.3292298	1.003321
gender	.7587879	.0229832	33.01	0.000	.7137416	.8038342
age	.2823288	.0135849	20.78	0.000	.255703	.3089547
age2	-.0043386	.0002139	-20.28	0.000	-.0047579	-.0039194
hukou	.4193268	.0465068	9.02	0.000	.3281751	.5104785
feduy	.0398998	.0031489	12.67	0.000	.033728	.0460716
meduy	.0247089	.0034991	7.06	0.000	.0178507	.0315671
sibling	-.1074756	.0096097	-11.18	0.000	-.1263102	-.0886409
_cons	3.570269	.1993796	17.91	0.000	3.179492	3.961046

```
Endogenous: college
Exogenous:  gender age age2 hukou feduy meduy sibling luck1

. ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck2), vce(robust) first

First-stage regressions
```

```
                                                Number of obs =     10,000
                                                F(8, 9991)    =     167.65
                                                Prob > F      =     0.0000
                                                R-squared     =     0.1531
                                                Adj R-squared =     0.1524
                                                Root MSE      =     0.3164
```

college	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
gender	-.0517735	.006465	-8.01	0.000	-.0644462	-.0391008
age	.0392778	.0030852	12.73	0.000	.0332301	.0453255
age2	-.0005956	.0000492	-12.12	0.000	-.000692	-.0004993
hukou	.1853484	.0143511	12.92	0.000	.1572173	.2134794
feduy	.0086325	.0008394	10.28	0.000	.0069871	.0102778
meduy	.0100091	.0010235	9.78	0.000	.0080029	.0120153
sibling	-.0193321	.0023129	-8.36	0.000	-.0238658	-.0147984
luck2	.0575641	.0032359	17.79	0.000	.0512211	.063907
_cons	-.5049241	.0466455	-10.82	0.000	-.5963586	-.4134895

```
Instrumental variables 2SLS regression          Number of obs   =     10,000
                                                Wald chi2(8)    =    3990.24
                                                Prob > chi2     =     0.0000
                                                R-squared       =     0.3140
                                                Root MSE        =      1.045
```

lninc	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
college	.688817	.1785721	3.86	0.000	.3388222	1.038812
gender	.7599379	.0229423	33.12	0.000	.7149718	.8049041
age	.2814592	.0134274	20.96	0.000	.255142	.3077764
age2	-.0043255	.0002117	-20.43	0.000	-.0047405	-.0039105
hukou	.4152167	.0476301	8.72	0.000	.3218635	.5085699
feduy	.0397025	.0031449	12.62	0.000	.0335386	.0458663
meduy	.0244828	.0035723	6.85	0.000	.0174811	.0314844
sibling	-.1070214	.0095726	-11.18	0.000	-.1257834	-.0882594
_cons	3.581415	.1972292	18.16	0.000	3.194853	3.967977

```
Endogenous: college
Exogenous:  gender age age2 hukou feduy meduy sibling luck2
```

```
. ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck3), vce(robust) first

First-stage regressions
```

```
                                                Number of obs = 10,000
                                                F(8, 9991)    = 128.67
                                                Prob > F      = 0.0000
                                                R-squared     = 0.1254
                                                Adj R-squared = 0.1247
                                                Root MSE      = 0.3215
```

college	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
gender	-.0508021	.0065697	-7.73	0.000	-.0636801	-.0379241
age	.0386755	.0031176	12.41	0.000	.0325643	.0447867
age2	-.000585	.0000497	-11.78	0.000	-.0006823	-.0004876
hukou	.1820838	.0146968	12.39	0.000	.153275	.2108926
feduy	.0087529	.0008561	10.22	0.000	.0070748	.0104309
meduy	.010016	.0010423	9.61	0.000	.0079729	.012059
sibling	-.0201732	.0023403	-8.62	0.000	-.0247607	-.0155857
luck3	.0064889	.0032	2.03	0.043	.0002162	.0127616
_cons	-.4959444	.0471004	-10.53	0.000	-.5882707	-.403618

```
Instrumental variables 2SLS regression          Number of obs   =     10,000
                                                Wald chi2(8)    =    3421.03
                                                Prob > chi2     =     0.0000
                                                R-squared       =     0.2088
                                                Root MSE        =     1.1223
```

lninc	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
college	-.3859112	1.723558	-0.22	0.823	-3.764023	2.9922
gender	.7051075	.0909592	7.75	0.000	.5268307	.8833842
age	.3229214	.067601	4.78	0.000	.1904259	.4554169
age2	-.0049526	.0010237	-4.84	0.000	-.0069591	-.0029461
hukou	.6111732	.3162383	1.93	0.053	-.0086425	1.230989
feduy	.0491108	.0153072	3.21	0.001	.0191093	.0791123
meduy	.0352626	.0176762	1.99	0.046	.0006179	.0699073
sibling	-.1286765	.0363541	-3.54	0.000	-.1999293	-.0574237
_cons	3.049993	.8717742	3.50	0.000	1.341346	4.758639

```
Endogenous: college
Exogenous:  gender age age2 hukou feduy meduy sibling luck3
```

```
.
. *同时使用三个工具变量
. ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), vce(robust)

Instrumental variables 2SLS regression          Number of obs   =     10,000
                                                Wald chi2(8)    =    4001.37
                                                Prob > chi2     =     0.0000
                                                R-squared       =     0.3135
                                                Root MSE        =     1.0454

------------------------------------------------------------------------------
             |               Robust
      lninc | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
     college |   .6703614    .120531     5.56   0.000     .4341249    .9065979
      gender |   .7589964   .0220328    34.45   0.000     .7158128    .8021799
         age |   .2821712   .0125903    22.41   0.000     .2574946    .3068478
        age2 |  -.0043363   .0001995   -21.73   0.000    -.0047273   -.0039452
       hukou |   .4185817   .0409591    10.22   0.000     .3383033    .4988601
       feduy |    .039864   .0029423    13.55   0.000     .0340972    .0456309
       meduy |   .0246679   .0032976     7.48   0.000     .0182047    .0311311
     sibling |  -.1073933    .009253   -11.61   0.000    -.1255289   -.0892577
       _cons |    3.57229   .1881435    18.99   0.000     3.203535    3.941044
------------------------------------------------------------------------------
Endogenous: college
Exogenous:  gender age age2 hukou feduy meduy sibling luck1 luck2 luck3

.
. *使用广义矩估计法
. ivregress gmm lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), vce(robust)

Instrumental variables GMM regression           Number of obs   =     10,000
                                                Wald chi2(8)    =    4001.06
                                                Prob > chi2     =     0.0000
                                                R-squared       =     0.3135
GMM weight matrix: Robust                       Root MSE        =     1.0454

------------------------------------------------------------------------------
             |               Robust
      lninc | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
     college |   .6697812   .1205048     5.56   0.000     .4335963    .9059662
      gender |   .7590011   .0220292    34.45   0.000     .7158246    .8021777
         age |   .2821799    .012581    22.43   0.000     .2575215    .3068383
        age2 |  -.0043368   .0001994   -21.75   0.000    -.0047276    -.003946
       hukou |   .4185789   .0409599    10.22   0.000     .3382988    .4988589
       feduy |     .03991   .0029406    13.57   0.000     .0341465    .0456735
       meduy |   .0246561   .0032974     7.48   0.000     .0181933    .0311189
     sibling |  -.1071712   .0092456   -11.59   0.000    -.1252923     -.08905
       _cons |   3.571827   .1880171    19.00   0.000      3.20332    3.940334
------------------------------------------------------------------------------
Endogenous: college
Exogenous:  gender age age2 hukou feduy meduy sibling luck1 luck2 luck3

.
. *使用有限信息最大似然法
. ivregress liml lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), vce(robust)

Instrumental variables LIML regression          Number of obs   =     10,000
                                                Wald chi2(8)    =    4001.31
                                                Prob > chi2     =     0.0000
                                                R-squared       =     0.3135
                                                Root MSE        =     1.0454

------------------------------------------------------------------------------
             |               Robust
      lninc | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
     college |   .6702121   .1206029     5.56   0.000     .4338348    .9065893
      gender |   .7589887   .0220339    34.45   0.000     .7158031    .8021744
         age |    .282177   .0125913    22.41   0.000     .2574985    .3068555
        age2 |  -.0043363   .0001995   -21.73   0.000    -.0047274   -.0039452
       hukou |    .418609   .0409661    10.22   0.000      .338317     .498901
       feduy |   .0398653   .0029426    13.55   0.000      .034098    .0456326
       meduy |   .0246694   .0032979     7.48   0.000     .0182057    .0311331
     sibling |  -.1073963   .0092534   -11.61   0.000    -.1255327   -.0892598
       _cons |   3.572216    .188154    18.99   0.000     3.203441    3.940991
------------------------------------------------------------------------------
```

Endogenous: **college**
Exogenous: **gender age age2 hukou feduy meduy sibling luck1 luck2 luck3**

```
.
. *弱工具变量检验
. qui ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck1), vce(robust)

. estat firststage, all forcenonrobust
```

First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F(1,9991)	Prob > F
college	**0.1564**	**0.1557**	**0.0359**	**355.785**	**0.0000**

Shea's partial R-squared

Variable	Shea's partial R-sq.	Shea's adj. partial R-sq.
college	**0.0359**	**0.0352**

Minimum eigenvalue statistic = **371.903**

Critical Values — # of endogenous regressors: **1**
H0: Instruments are weak — # of excluded instruments: **1**

	5%	10%	20%	30%
2SLS relative bias	(not available)			

	10%	15%	20%	25%
2SLS size of nominal 5% Wald test	**16.38**	**8.96**	**6.66**	**5.53**
LIML size of nominal 5% Wald test	**16.38**	**8.96**	**6.66**	**5.53**

```
.
. qui ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck2), vce(robust)

. estat firststage, all forcenonrobust
```

First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F(1,9991)	Prob > F
college	**0.1531**	**0.1524**	**0.0321**	**316.46**	**0.0000**

Shea's partial R-squared

Variable	Shea's partial R-sq.	Shea's adj. partial R-sq.
college	**0.0321**	**0.0314**

Minimum eigenvalue statistic = **331.004**

Critical Values — # of endogenous regressors: **1**
H0: Instruments are weak — # of excluded instruments: **1**

	5%	10%	20%	30%
2SLS relative bias	(not available)			

	10%	15%	20%	25%
2SLS size of nominal 5% Wald test	**16.38**	**8.96**	**6.66**	**5.53**
LIML size of nominal 5% Wald test	**16.38**	**8.96**	**6.66**	**5.53**

```
.
. qui ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck3), vce(robust)

. estat firststage, all forcenonrobust

  First-stage regression summary statistics
```

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F(1,9991)	Prob > F
college	**0.1254**	**0.1247**	**0.0004**	**4.11179**	**0.0426**

```
  Shea's partial R-squared
```

Variable	Shea's partial R-sq.	Shea's adj. partial R-sq.
college	**0.0004**	**-0.0003**

```
  Minimum eigenvalue statistic = 4.03006
```

Critical Values	# of endogenous regressors:	**1**
H0: Instruments are weak	# of excluded instruments:	**1**

	5%	10%	20%	30%
2SLS relative bias	(not available)			

	10%	15%	20%	25%
2SLS size of nominal 5% Wald test	**16.38**	**8.96**	**6.66**	**5.53**
LIML size of nominal 5% Wald test	**16.38**	**8.96**	**6.66**	**5.53**

```
.
. *过度识别检验
. qui ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), vce(robust)

. estat overid

  Test of overidentifying restrictions:

  Score chi2(2)          =  .439215  (p = 0.8028)

.
. qui ivregress 2sls lninc gender hukou feduy meduy sibling (college=luck1 luck2 luck3 age age2), robust first

. estat overid

  Test of overidentifying restrictions:

  Score chi2(4)          =  419.319  (p = 0.0000)

.
. *豪斯曼检验
. qui ivregress 2sls lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), vce(robust)

. estat endogenous

  Tests of endogeneity
  H0: Variables are exogenous

  Robust score chi2(1)           =   4.1346  (p = 0.0420)
  Robust regression F(1,9990)    =  4.13972  (p = 0.0419)
```

```
.
. *使用ivreg2
. ivreg2 lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), robust

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

                                                      Number of obs =     10000
                                                      F(  8,  9991) =    499.72
                                                      Prob > F      =    0.0000
Total (centered) SS     =  15917.89881                Centered R2   =    0.3135
Total (uncentered) SS   =    739442.52                Uncentered R2 =    0.9852
Residual SS             =  10927.87721                Root MSE      =     1.045

------------------------------------------------------------------------------
             |               Robust
      lninc  | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
     college |   .6703614    .120531     5.56   0.000     .4341249    .9065979
      gender |   .7589964   .0220328    34.45   0.000     .7158128    .8021799
         age |   .2821712   .0125903    22.41   0.000     .2574946    .3068478
        age2 |  -.0043363   .0001995   -21.73   0.000    -.0047273   -.0039452
       hukou |   .4185817   .0409591    10.22   0.000     .3383033    .4988601
       feduy |    .039864   .0029423    13.55   0.000     .0340972    .0456309
       meduy |   .0246679   .0032976     7.48   0.000     .0182047    .0311311
     sibling |  -.1073933    .009253   -11.61   0.000    -.1255289   -.0892577
       _cons |    3.57229   .1881435    18.99   0.000     3.203535    3.941044
------------------------------------------------------------------------------

Underidentification test (Kleibergen-Paap rk LM statistic):           565.798
                                                      Chi-sq(3) P-val =    0.0000
------------------------------------------------------------------------------

Weak identification test (Cragg-Donald Wald F statistic):             245.411
                         (Kleibergen-Paap rk Wald F statistic):       224.013
Stock-Yogo weak ID test critical values:  5% maximal IV relative bias    13.91
                                         10% maximal IV relative bias     9.08
                                         20% maximal IV relative bias     6.46
                                         30% maximal IV relative bias     5.39
                                         10% maximal IV size             22.30
                                         15% maximal IV size             12.83
                                         20% maximal IV size              9.54
                                         25% maximal IV size              7.80
Source: Stock-Yogo (2005).  Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
------------------------------------------------------------------------------

Hansen J statistic (overidentification test of all instruments):        0.439
                                                      Chi-sq(2) P-val =    0.8028
------------------------------------------------------------------------------

Instrumented:         college
Included instruments: gender age age2 hukou feduy meduy sibling
Excluded instruments: luck1 luck2 luck3
------------------------------------------------------------------------------

. ivreg2 lninc gender hukou feduy meduy sibling (college=luck1 luck2 luck3 age age2), robust orthog(age age2)

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

                                                      Number of obs =     10000
                                                      F(  6,  9993) =    513.72
                                                      Prob > F      =    0.0000
Total (centered) SS     =  15917.89881                Centered R2   =    0.2389
Total (uncentered) SS   =    739442.52                Uncentered R2 =    0.9836
Residual SS             =  12115.73885                Root MSE      =     1.101
```

lninc	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
college	**1.770388**	**.1193018**	**14.84**	**0.000**	**1.536561**	**2.004215**
gender	**.8226807**	**.0229812**	**35.80**	**0.000**	**.7776384**	**.8677229**
hukou	**.2611968**	**.0432643**	**6.04**	**0.000**	**.1764003**	**.3459932**
feduy	**.0301675**	**.0030575**	**9.87**	**0.000**	**.024175**	**.03616**
meduy	**.0122471**	**.0034466**	**3.55**	**0.000**	**.0054918**	**.0190024**
sibling	**-.0879799**	**.0087492**	**-10.06**	**0.000**	**-.1051279**	**-.0708318**
_cons	**7.782271**	**.0347036**	**224.25**	**0.000**	**7.714253**	**7.850288**

Underidentification test (Kleibergen-Paap rk LM statistic): **669.151**
Chi-sq(**5**) P-val = **0.0000**

Weak identification test (Cragg-Donald Wald F statistic): **174.450**
(Kleibergen-Paap rk Wald F statistic): **161.738**
Stock-Yogo weak ID test critical values: 5% maximal IV relative bias **18.37**
10% maximal IV relative bias **10.83**
20% maximal IV relative bias **6.77**
30% maximal IV relative bias **5.25**
10% maximal IV size **26.87**
15% maximal IV size **15.09**
20% maximal IV size **10.98**
25% maximal IV size **8.84**
Source: Stock-Yogo (2005). Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.

Hansen J statistic (overidentification test of all instruments): **419.319**
Chi-sq(**4**) P-val = **0.0000**
-orthog- option:
Hansen J statistic (eqn. excluding suspect orthog. conditions): **0.868**
Chi-sq(**2**) P-val = **0.6478**
C statistic (exogeneity/orthogonality of suspect instruments): **418.451**
Chi-sq(**2**) P-val = **0.0000**
Instruments tested: age age2

Instrumented: college
Included instruments: gender hukou feduy meduy sibling
Excluded instruments: luck1 luck2 luck3 age age2

```
. ivreg2 lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), robust redundant(luck3)

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

                                                      Number of obs =    10000
                                                      F(  8,  9991) =   499.72
                                                      Prob > F      =   0.0000
Total (centered) SS     =  15917.89881                Centered R2   =   0.3135
Total (uncentered) SS   =    739442.52                Uncentered R2 =   0.9852
Residual SS             =  10927.87721                Root MSE      =    1.045

------------------------------------------------------------------------------
             |               Robust
      lninc  |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     college |   .6703614    .120531     5.56   0.000     .4341249    .9065979
      gender |   .7589964   .0220328    34.45   0.000     .7158128    .8021799
         age |   .2821712   .0125903    22.41   0.000     .2574946    .3068478
        age2 |  -.0043363   .0001995   -21.73   0.000    -.0047273   -.0039452
       hukou |   .4185817   .0409591    10.22   0.000     .3383033    .4988601
       feduy |    .039864   .0029423    13.55   0.000     .0340972    .0456309
       meduy |   .0246679   .0032976     7.48   0.000     .0182047    .0311311
     sibling |  -.1073933    .009253   -11.61   0.000    -.1255289   -.0892577
       _cons |    3.57229   .1881435    18.99   0.000     3.203535    3.941044
------------------------------------------------------------------------------
Underidentification test (Kleibergen-Paap rk LM statistic):           565.798
                                                   Chi-sq(3) P-val =  0.0000
-redundant- option:
IV redundancy test (LM test of redundancy of specified instruments):    4.936
                                                   Chi-sq(1) P-val =  0.0263
Instruments tested:  luck3
------------------------------------------------------------------------------
```

```
Weak identification test (Cragg-Donald Wald F statistic):              245.411
                         (Kleibergen-Paap rk Wald F statistic):        224.013
Stock-Yogo weak ID test critical values:  5% maximal IV relative bias    13.91
                                         10% maximal IV relative bias     9.08
                                         20% maximal IV relative bias     6.46
                                         30% maximal IV relative bias     5.39
                                         10% maximal IV size             22.30
                                         15% maximal IV size             12.83
                                         20% maximal IV size              9.54
                                         25% maximal IV size              7.80
Source: Stock-Yogo (2005).  Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
------------------------------------------------------------------------------
Hansen J statistic (overidentification test of all instruments):         0.439
                                                     Chi-sq(2) P-val =    0.8028
------------------------------------------------------------------------------
Instrumented:         college
Included instruments: gender age age2 hukou feduy meduy sibling
Excluded instruments: luck1 luck2 luck3
------------------------------------------------------------------------------
```

```
. ivreg2 lninc gender age age2 hukou feduy meduy sibling (college=luck1 luck2 luck3), robust endog(college)

IV (2SLS) estimation
--------------------

Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

                                                      Number of obs =     10000
                                                      F(  8,  9991) =    499.72
                                                      Prob > F      =    0.0000
Total (centered) SS     =  15917.89881                Centered R2   =    0.3135
Total (uncentered) SS   =    739442.52                Uncentered R2 =    0.9852
Residual SS             =  10927.87721                Root MSE      =     1.045

------------------------------------------------------------------------------
             |               Robust
       lninc |  Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
     college |    .6703614    .120531     5.56   0.000     .4341249    .9065979
      gender |    .7589964   .0220328    34.45   0.000     .7158128    .8021799
         age |    .2821712   .0125903    22.41   0.000     .2574946    .3068478
        age2 |   -.0043363   .0001995   -21.73   0.000    -.0047273   -.0039452
       hukou |    .4185817   .0409591    10.22   0.000     .3383033    .4988601
       feduy |     .039864   .0029423    13.55   0.000     .0340972    .0456309
       meduy |    .0246679   .0032976     7.48   0.000     .0182047    .0311311
     sibling |   -.1073933    .009253   -11.61   0.000    -.1255289   -.0892577
       _cons |     3.57229   .1881435    18.99   0.000     3.203535    3.941044
------------------------------------------------------------------------------
Underidentification test (Kleibergen-Paap rk LM statistic):            565.798
                                                     Chi-sq(3) P-val =    0.0000
------------------------------------------------------------------------------
Weak identification test (Cragg-Donald Wald F statistic):              245.411
                         (Kleibergen-Paap rk Wald F statistic):        224.013
Stock-Yogo weak ID test critical values:  5% maximal IV relative bias    13.91
                                         10% maximal IV relative bias     9.08
                                         20% maximal IV relative bias     6.46
                                         30% maximal IV relative bias     5.39
                                         10% maximal IV size             22.30
                                         15% maximal IV size             12.83
                                         20% maximal IV size              9.54
                                         25% maximal IV size              7.80
Source: Stock-Yogo (2005).  Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
------------------------------------------------------------------------------
Hansen J statistic (overidentification test of all instruments):         0.439
                                                     Chi-sq(2) P-val =    0.8028
-endog- option:
Endogeneity test of endogenous regressors:                               4.154
                                                     Chi-sq(1) P-val =    0.0415
Regressors tested:    college
------------------------------------------------------------------------------
Instrumented:         college
Included instruments: gender age age2 hukou feduy meduy sibling
Excluded instruments: luck1 luck2 luck3
------------------------------------------------------------------------------
```

```
.
end of do-file

. log close
      name:  <unnamed>
       log:  C:\Users\XuQi\Documents\第八章.smcl
  log type:  smcl
 closed on:  15 Jul 2024, 10:15:46
```