Stata Textbook Examples
Introductory Econometrics: A Modern Approach by Jeffrey M. Wooldridge (1st & 2nd eds.)
Chapter 14 - Advanced Panel Data Methods

Example 14.1: Effect of Job Training on Firm Scrap Rates

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/JTRAIN
```

```
iis fcode

tis year
```

可以直接用tsset fcode year即可。

```
xtreg lscrap d88 d89 grant grant_1, fe
```

```
Fixed-effects (within) regression               Number of obs      =       162
Group variable (i) : fcode                      Number of groups   =        54

R-sq:  within  = 0.2010                         Obs per group: min =         3
       between = 0.0079                                        avg =       3.0
       overall = 0.0068                                        max =         3

                                                F(4,104)           =      6.54
corr(u_i, Xb)  = -0.0714                        Prob > F           =    0.0001

------------------------------------------------------------------------------
      lscrap |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         d88 |  -.0802157   .1094751    -0.73   0.465    -.2973089    .1368776
         d89 |  -.2472028   .1332183    -1.86   0.066    -.5113797     .016974
       grant |  -.2523149    .150629    -1.68   0.097    -.5510178     .046388
     grant_1 |  -.4215895      .2102    -2.01   0.047    -.8384239   -.0047551
       _cons |    .597434   .0677344     8.82   0.000     .4631142    .7317539
-------------+----------------------------------------------------------------
     sigma_u |   1.438982
     sigma_e |   .4977442
         rho |  .89313867   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(53, 104) =    24.66                 Prob > F = 0.0000
```

Change in firm's scrap rate in 1989 if the training grant was received in 1988

```
display exp(_b[grant_1])-1
```

```
-.34399671
```

```
xtreg lscrap d88 d89 grant, fe
```

```
Fixed-effects (within) regression               Number of obs      =       162
Group variable (i) : fcode                      Number of groups   =        54

R-sq:  within  = 0.1701                         Obs per group: min =         3
       between = 0.0189                                        avg =       3.0
       overall = 0.0130                                        max =         3

                                                F(3,105)           =      7.18
corr(u_i, Xb)  = -0.0109                        Prob > F           =    0.0002

------------------------------------------------------------------------------
      lscrap |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         d88 |  -.1400659    .106835    -1.31   0.193    -.3518999    .0717681
         d89 |    -.42704   .0999338    -4.27   0.000    -.6251903   -.2288897
       grant |  -.0822141   .1262632    -0.65   0.516    -.3325706    .1681424
       _cons |    .597434   .0687024     8.70   0.000     .4612098    .7336583
-------------+----------------------------------------------------------------
     sigma_u |  1.4283441
     sigma_e |  .50485773
         rho |  .88894293   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(53, 105) =    23.90                 Prob > F = 0.0000
```

Example 14.2: Has the Return to Education Changed Over Time

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/WAGEPAN

iis nr

tis year

gen edd81 = educ*d81

gen edd82 = educ*d82

gen edd83 = educ*d83

gen edd84 = educ*d84

gen edd85 = educ*d85

gen edd86 = educ*d86
```

```
gen edd87 = educ*d87

xtreg lwage expersq union married d81-d87 edd81-edd87, fe

Fixed-effects (within) regression               Number of obs      =      4360
Group variable (i) : nr                         Number of groups   =       545

R-sq:  within  = 0.1814                         Obs per group: min =         8
       between = 0.0211                                        avg =       8.0
       overall = 0.0784                                        max =         8

                                                F(17,3798)         =     49.49
corr(u_i, Xb)  = -0.1732                        Prob > F           =    0.0000

------------------------------------------------------------------------------
       lwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     expersq |  -.0060437   .0008633    -7.00   0.000    -.0077362   -.0043512
       union |   .0789759   .0193328     4.09   0.000     .0410722    .1168796
     married |   .0474337   .0183277     2.59   0.010     .0115006    .0833668
         d81 |     .09842    .145999     0.67   0.500     -.187824     .384664
         d82 |   .2472014   .1493785     1.65   0.098    -.0456685    .5400712
         d83 |   .4088129   .1557146     2.63   0.009     .1035206    .7141052
         d84 |   .6399246   .1652396     3.87   0.000     .3159577    .9638916
         d85 |   .7729394   .1779911     4.34   0.000      .423972    1.121907
         d86 |   .9699322   .1941747     5.00   0.000     .5892354    1.350629
         d87 |   1.188776   .2135856     5.57   0.000     .7700229     1.60753
       edd81 |   .0049906    .012222     0.41   0.683    -.0189718     .028953
       edd82 |    .001651   .0123304     0.13   0.893    -.0225239    .0258259
       edd83 |  -.0026621   .0125098    -0.21   0.831    -.0271886    .0218644
       edd84 |  -.0098257   .0127593    -0.77   0.441    -.0348414      .01519
       edd85 |  -.0092145   .0130721    -0.70   0.481    -.0348436    .0164146
       edd86 |  -.0121382   .0134419    -0.90   0.367    -.0384922    .0142159
       edd87 |  -.0157891    .013868    -1.14   0.255    -.0429785    .0114002
       _cons |   1.436283   .0192766    74.51   0.000     1.398489    1.474076
-------------+----------------------------------------------------------------
     sigma_u |  .39876324
     sigma_e |  .35114511
         rho |   .5632436   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(544, 3798) =     8.25                 Prob > F = 0.0000

test edd81 edd82 edd83 edd84 edd85 edd86 edd87

 ( 1)  edd81 = 0.0
 ( 2)  edd82 = 0.0
 ( 3)  edd83 = 0.0
 ( 4)  edd84 = 0.0
```

```
 ( 5)  edd85 = 0.0
 ( 6)  edd86 = 0.0
 ( 7)  edd87 = 0.0

       F(  7,  3798) =    0.52
            Prob > F =    0.8202
```

Example 14.3: Effect of Job Training on Firm Scrap Rates

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/JTRAIN

iis fcode

tis year

xtreg lscrap d88 d89 grant grant_1 lsales lemploy, fe

Fixed-effects (within) regression               Number of obs      =       148
Group variable (i) : fcode                      Number of groups   =        51

R-sq:  within  = 0.2131                         Obs per group: min =         1
       between = 0.0341                                        avg =       2.9
       overall = 0.0004                                        max =         3

                                                F(6,91)            =      4.11
corr(u_i, Xb)  = -0.2258                        Prob > F           =    0.0011

------------------------------------------------------------------------------
      lscrap |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         d88 |  -.0039605   .1195487    -0.03   0.974    -.2414293    .2335083
         d89 |  -.1321925   .1536863    -0.86   0.392    -.4374715    .1730865
       grant |  -.2967544    .157086    -1.89   0.062    -.6087866    .0152777
     grant_1 |  -.5355783    .224206    -2.39   0.019    -.9809359   -.0902207
      lsales |  -.0868607   .2596993    -0.33   0.739    -.6027214    .4290001
     lemploy |  -.0763642   .3502912    -0.22   0.828    -.7721747    .6194462
       _cons |   2.115513   3.108438     0.68   0.498    -4.059017    8.290043
-------------+----------------------------------------------------------------
     sigma_u |  1.4415147
     sigma_e |  .49149052
         rho |  .89585684   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(50, 91) =    20.75                 Prob > F = 0.0000
```

Example 14.4: Has the Return to Education Changed Over Time

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/WAGEPAN

iis nr

tis year

reg lwage educ black hisp exper expersq married union d81-d87
```

```
      Source |       SS       df       MS              Number of obs =    4360
-------------+------------------------------           F( 14,  4345) =   72.46
       Model |  234.048277    14  16.7177341           Prob > F      =  0.0000
    Residual |  1002.48136  4345  .230720682           R-squared     =  0.1893
-------------+------------------------------           Adj R-squared =  0.1867
       Total |  1236.52964  4359  .283672779           Root MSE      =  .48033

------------------------------------------------------------------------------
       lwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        educ |   .0913498   .0052374    17.44   0.000     .0810819    .1016177
       black |  -.1392342   .0235796    -5.90   0.000    -.1854622   -.0930062
        hisp |   .0160195   .0207971     0.77   0.441    -.0247535    .0567925
       exper |   .0672345   .0136948     4.91   0.000     .0403856    .0940834
     expersq |  -.0024117     .00082    -2.94   0.003    -.0040192   -.0008042
     married |   .1082529   .0156894     6.90   0.000     .0774937    .1390122
       union |   .1824613   .0171568    10.63   0.000     .1488253    .2160973
         d81 |     .05832   .0303536     1.92   0.055    -.0011886    .1178286
         d82 |   .0627744   .0332141     1.89   0.059    -.0023421    .1278909
         d83 |   .0620117   .0366601     1.69   0.091    -.0098608    .1338843
         d84 |   .0904672   .0400907     2.26   0.024      .011869    .1690654
         d85 |   .1092463   .0433525     2.52   0.012     .0242533    .1942393
         d86 |   .1419596    .046423     3.06   0.002     .0509469    .2329723
         d87 |   .1738334    .049433     3.52   0.000     .0769194    .2707474
       _cons |   .0920558   .0782701     1.18   0.240    -.0613935    .2455051
------------------------------------------------------------------------------
```

```
xtreg lwage educ black hisp exper expersq married union, re
```

```
Random-effects GLS regression                   Number of obs      =      4360
Group variable (i) : nr                         Number of groups   =       545

R-sq:  within  = 0.1799                         Obs per group: min =         8
       between = 0.1860                                        avg =       8.0
       overall = 0.1830                                        max =         8
```

```
Random effects u_i ~ Gaussian                   Wald chi2(14)      =    957.77
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
       lwage |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        educ |   .0918763   .0106597     8.62   0.000     .0709836    .1127689
       black |  -.1393767   .0477228    -2.92   0.003    -.2329117   -.0458417
        hisp |   .0217317   .0426063     0.51   0.610    -.0617751    .1052385
       exper |   .1057545   .0153668     6.88   0.000     .0756361    .1358729
     expersq |  -.0047239   .0006895    -6.85   0.000    -.0060753   -.0033726
     married |    .063986   .0167742     3.81   0.000     .0311091    .0968629
       union |   .1061344   .0178539     5.94   0.000     .0711415    .1411273
         d81 |    .040462   .0246946     1.64   0.101    -.0079385    .0888626
         d82 |   .0309212   .0323416     0.96   0.339    -.0324672    .0943096
         d83 |   .0202806    .041582     0.49   0.626    -.0612186    .1017798
         d84 |   .0431187   .0513163     0.84   0.401    -.0574595    .1436969
         d85 |   .0578155   .0612323     0.94   0.345    -.0621977    .1778286
         d86 |   .0919476   .0712293     1.29   0.197    -.0476592    .2315544
         d87 |   .1349289   .0813135     1.66   0.097    -.0244427    .2943005
       _cons |   .0235864   .1506683     0.16   0.876     -.271718    .3188907
-------------+----------------------------------------------------------------
     sigma_u |  .32460315
     sigma_e |  .35099001
         rho |  .46100216   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

xtreg lwage expersq married union d81-d87, fe

```
Fixed-effects (within) regression               Number of obs      =      4360
Group variable (i) : nr                         Number of groups   =       545

R-sq:  within  = 0.1806                         Obs per group: min =         8
       between = 0.0286                                        avg =       8.0
       overall = 0.0888                                        max =         8

                                                F(10,3805)         =     83.85
corr(u_i, Xb)  = -0.1222                        Prob > F           =    0.0000

------------------------------------------------------------------------------
       lwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     expersq |  -.0051855   .0007044    -7.36   0.000    -.0065666   -.0038044
     married |   .0466804   .0183104     2.55   0.011     .0107811    .0825796
       union |   .0800019   .0193103     4.14   0.000     .0421423    .1178614
         d81 |   .1511912   .0219489     6.89   0.000     .1081584     .194224
         d82 |   .2529709   .0244185    10.36   0.000     .2050963    .3008454
         d83 |   .3544437   .0292419    12.12   0.000     .2971125    .4117749
```

```
         d84 |   .4901148   .0362266    13.53   0.000     .4190894    .5611402
         d85 |   .6174823   .0452435    13.65   0.000     .5287784    .7061861
         d86 |   .7654966   .0561277    13.64   0.000     .6554532    .8755399
         d87 |   .9250249   .0687731    13.45   0.000     .7901893    1.059861
       _cons |   1.426019   .0183415    77.75   0.000     1.390058    1.461979
-------------+----------------------------------------------------------------
     sigma_u |  .39176195
     sigma_e |  .35099001
         rho |  .55472817   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(544, 3805) =     9.16                 Prob > F = 0.0000
```

This page prepared by Oleksandr Talavera (revised 8 Nov 2002)

Send your questions/comments/suggestions to Kit Baum at **baum@bc.edu**
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