Tesadüfi Etkiler Tahmincisi

Genelleştirilmiş En Küçük Kareler - En Çok Olabilirlik

Grunfeld Yatırım Modeli

Grunfeld'in (1958), 1935-1954 yılları arası 10 büyük ABD imalatçı firmasına ait verileri (stata-grunfeld)

$$invest_{it} = \beta_0 + \beta_1 mvalue_{it} + \beta_2 kstock_{it} + u_{it}$$

invest: toplam yatırımlar (milyon $, 1947 temelli zımni üreticilerin dayanıklı teçhizat fiyat deflatörü kullanılarak deflate edilmiştir).

mvalue: firmanın piyasa değeri (milyon $, 1947 temelli zımni GSMH fiyat deflatörü kullanılarak deflate edilmiştir).

kstock: kapital stoğu (milyon $, demirbaş ve teçhizata yapılan net ilavelerden (1947 temelli zımni üreticilerin dayanıklı teçhizat fiyat deflatörü kullanılarak deflate edilmiştir) amortisman indirimleri (1947 temelli amortisman giderleri deflatörü ile deflate edilmiştir: metal ve metal ürünlerinin toptan fiyat indeksinin 10 yıllık hareketli ortalaması) düşülerek hesaplanmıştır).

i (company): 10 firma (General Motors, US Steel, General Electric, Chrysler, Atlantic Refining, IBM, Union Oil, Westinghouse, Goodyear, Diamond Match)

t (year): 1935-1954

```
. webuse grunfeld

. xtset company year
       panel variable:  company (strongly balanced)
        time variable:  year, 1935 to 1954
                delta:  1 year
```

Genelleştirilmiş En Küçük Kareler Tahmincisi

```
. xtreg invest mvalue kstock, re theta
Random-effects GLS regression                   Number of obs     =        200
Group variable: company                         Number of groups  =         10

R-sq:                                           Obs per group:
     within  = 0.7668                                         min =         20
     between = 0.8196                                         avg =       20.0
     overall = 0.8061                                         max =         20

                                                Wald chi2(2)      =     657.67
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
theta          = .86122362
------------------------------------------------------------------------------
      invest |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      mvalue |   .1097811   .0104927    10.46   0.000     .0892159    .1303464
      kstock |    .308113   .0171805    17.93   0.000     .2744399    .3417861
       _cons |  -57.83441   28.89893    -2.00   0.045    -114.4753   -1.193537
-------------+----------------------------------------------------------------
     sigma_u |   84.20095
     sigma_e |  52.767964
         rho |  .71800838   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

En Çok Olabilirlik Tahmincisi

```
. xtreg invest mvalue kstock, mle

Fitting constant-only model:
Iteration 0:   log likelihood = -1387.6302
Iteration 1:   log likelihood = -1291.9897
Iteration 2:   log likelihood = -1254.2888
Iteration 3:   log likelihood = -1243.6309
Iteration 4:   log likelihood = -1242.0548
Iteration 5:   log likelihood = -1241.9709
Iteration 6:   log likelihood = -1241.9696
Iteration 7:   log likelihood = -1241.9696

Fitting full model:
Iteration 0:   log likelihood = -1105.6101
Iteration 1:   log likelihood = -1098.8418
Iteration 2:   log likelihood = -1095.4188
Iteration 3:   log likelihood = -1095.2576
Iteration 4:   log likelihood =  -1095.257

Random-effects ML regression                    Number of obs     =         200
Group variable: company                         Number of groups  =          10

Random effects u_i ~ Gaussian                   Obs per group:
                                                              min =          20
                                                              avg =        20.0
                                                              max =          20

                                                LR chi2(2)        =      293.43
Log likelihood  =  -1095.257                    Prob > chi2       =      0.0000
------------------------------------------------------------------------------
      invest |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      mvalue |   .1097626   .0103389    10.62   0.000     .0894988    .1300265
      kstock |    .307942   .0171006    18.01   0.000     .2744254    .3414585
       _cons |   -57.7672   27.70004    -2.09   0.037    -112.0583   -3.476114
-------------+----------------------------------------------------------------
    /sigma_u |   80.29729   18.37811                      51.27213    125.7536
    /sigma_e |   52.49255    2.69306                      47.47094    58.04534
         rho |   .7005943   .0985226                      .4881266    .8603709
------------------------------------------------------------------------------
LR test of sigma_u=0: chibar2(01) = 193.09             Prob >= chibar2 = 0.000
```