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
```

Grup İçi Tahminci-1

```
. webuse grunfeld

. egen meaninvest= mean(invest), by (company)

. gen meandfinvest=invest-meaninvest

. reg meandfinvest meandfmvalue meandfkstock, nocons

      Source |       SS           df       MS      Number of obs   =       200
-------------+----------------------------------   F(2, 198)       =    325.45
       Model |   1720874.1         2  860437.05   Prob > F        =    0.0000
    Residual |  523478.127       198  2643.82892   R-squared       =    0.7668
-------------+----------------------------------   Adj R-squared   =    0.7644
       Total |  2244352.23       200  11221.7611   Root MSE        =    51.418
------------------------------------------------------------------------------
meandfinvest |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
meandfmvalue |   .1101238   .0115534     9.53   0.000     .0873403    .1329073
meandfkstock |   .3100653   .0169106    18.34   0.000     .2767174    .3434133
------------------------------------------------------------------------------
```

Grup İçi Tahminci-2

```
. xtreg invest mvalue kstock, fe

Fixed-effects (within) regression               Number of obs      =       200
Group variable: company                         Number of groups   =        10

R-sq:                                           Obs per group:
     within  = 0.7668                                         min =        20
     between = 0.8194                                         avg =      20.0
     overall = 0.8060                                         max =        20

                                                F(2,188)           =    309.01
corr(u_i, Xb)  = -0.1517                        Prob > F           =    0.0000
------------------------------------------------------------------------------
      invest |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      mvalue |   .1101238   .0118567     9.29   0.000     .0867345    .1335131
      kstock |   .3100653   .0173545    17.87   0.000     .2758308    .3442999
       _cons |  -58.74393   12.45369    -4.72   0.000    -83.31086    -34.177
-------------+----------------------------------------------------------------
     sigma_u |  85.732501
     sigma_e |  52.767964
         rho |  .72525012   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(9, 188) = 49.18                     Prob > F = 0.0000
```

Gölge Değişkenli EKK-1

```
. gen d2 = 0
. replace d2 = 1 if company==2
(20 real changes made)

. reg invest mvalue kstock d2 d3 d4 d5 d6 d7 d8 d9 d10

. reg invest mvalue kstock d*

      Source |       SS       df       MS              Number of obs =     200
-------------+------------------------------           F(11, 188)    =  288.50
       Model |  8836465.8    11  803315.073           Prob > F      =  0.0000
    Residual |  523478.114   188  2784.45805           R-squared     =  0.9441
-------------+------------------------------           Adj R-squared =  0.9408
       Total |  9359943.92   199  47034.8941           Root MSE      =  52.768
------------------------------------------------------------------------------
      invest |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      mvalue |   .1101238   .0118567     9.29   0.000     .0867345    .1335131
      kstock |   .3100653   .0173545    17.87   0.000     .2758308    .3442999
          d2 |   172.2025   31.16126     5.53   0.000     110.7319    233.6732
          d3 |  -165.2751   31.77556    -5.20   0.000    -227.9576   -102.5927
          d4 |    42.4874   43.90987     0.97   0.334    -44.13197    129.1068
          d5 |  -44.32013   50.49225    -0.88   0.381    -143.9243    55.28406
          d6 |   47.13539   46.81068     1.01   0.315    -45.20629    139.4771
          d7 |   3.743212   50.56493     0.07   0.941    -96.00433    103.4908
          d8 |   12.75103   44.05263     0.29   0.773    -74.14994      99.652
          d9 |  -16.92558   48.45326    -0.35   0.727    -112.5075    78.65636
         d10 |   63.72884   50.33023     1.27   0.207    -35.55572    163.0134
       _cons |  -70.29669   49.70796    -1.41   0.159    -168.3537    27.76035
------------------------------------------------------------------------------
```

Gölge Değişkenli EKK-2

```
. xi: reg invest mvalue kstock i.company
i.company         _Icompany_1-10      (naturally coded; _Icompany_1 omitted)

      Source |       SS           df       MS      Number of obs   =       200
-------------+----------------------------------   F(11, 188)      =    288.50
       Model |  8836465.8         11  803315.073   Prob > F        =    0.0000
    Residual |  523478.114       188  2784.45805   R-squared       =    0.9441
-------------+----------------------------------   Adj R-squared   =    0.9408
       Total |  9359943.92       199  47034.8941   Root MSE        =    52.768

------------------------------------------------------------------------------
      invest |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      mvalue |   .1101238   .0118567     9.29   0.000     .0867345    .1335131
      kstock |   .3100653   .0173545    17.87   0.000     .2758308    .3442999
 _Icompany_2 |   172.2025   31.16126     5.53   0.000     110.7319    233.6732
 _Icompany_3 |  -165.2751   31.77556    -5.20   0.000    -227.9576   -102.5927
 _Icompany_4 |    42.4874   43.90987     0.97   0.334    -44.13197    129.1068
 _Icompany_5 |  -44.32013   50.49225    -0.88   0.381    -143.9243    55.28406
 _Icompany_6 |   47.13539   46.81068     1.01   0.315    -45.20629    139.4771
 _Icompany_7 |   3.743212   50.56493     0.07   0.941    -96.00433    103.4908
 _Icompany_8 |   12.75103   44.05263     0.29   0.773    -74.14994      99.652
 _Icompany_9 |  -16.92558   48.45326    -0.35   0.727    -112.5075    78.65636
_Icompany_10 |   63.72884   50.33023     1.27   0.207    -35.55572    163.0134
       _cons |  -70.29669   49.70796    -1.41   0.159    -168.3537    27.76035
------------------------------------------------------------------------------
```