Stata Textbook Examples
Introductory Econometrics: A Modern Approach by Jeffrey M. Wooldridge (1st & 2nd eds.)
Chapter 8 - Heteroskedasticity

Example 8.1: Log Wage Equation with Heteroscedasticity-Robust Standard Errors

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/WAGE2

gen single=(~married)

gen male=(~female)

gen marrmale=male*married

gen marrfem=female*married

gen singfem=single*female

reg lwage marrmale marrfem singfem educ exper expersq tenure tenursq, robust
```

```
Regression with robust standard errors                Number of obs =     526
                                                      F(  8,   517) =   51.70
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.4609
                                                      Root MSE      =  .39329

------------------------------------------------------------------------------
             |               Robust
       lwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    marrmale |   .2126756   .0571419     3.72   0.000     .1004167    .3249345
     marrfem |  -.1982676     .05877    -3.37   0.001     -.313725   -.0828102
     singfem |  -.1103502   .0571163    -1.93   0.054    -.2225587    .0018583
        educ |   .0789103   .0074147    10.64   0.000     .0643437    .0934769
       exper |   .0268006   .0051391     5.22   0.000     .0167044    .0368967
     expersq |  -.0005352   .0001063    -5.03   0.000    -.0007442   -.0003263
      tenure |   .0290875   .0069409     4.19   0.000     .0154516    .0427234
     tenursq |  -.0005331   .0002437    -2.19   0.029    -.0010119   -.0000544
       _cons |    .321378    .109469     2.94   0.003     .1063193    .5364368
------------------------------------------------------------------------------
```

```
reg lwage marrmale marrfem singfem educ exper expersq tenure tenursq
```

```
      Source |       SS       df       MS              Number of obs =     526
-------------+------------------------------           F(  8,   517) =   55.25
       Model |  68.3617614     8  8.54522017           Prob > F      =  0.0000
    Residual |  79.9680004   517  .154676983           R-squared     =  0.4609
-------------+------------------------------           Adj R-squared =  0.4525
       Total |  148.329762   525   .28253288           Root MSE      =  .39329

------------------------------------------------------------------------------
       lwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    marrmale |   .2126756   .0553572     3.84   0.000      .103923    .3214283
     marrfem |  -.1982676   .0578355    -3.43   0.001    -.3118891   -.0846462
     singfem |  -.1103502   .0557421    -1.98   0.048     -.219859   -.0008414
        educ |   .0789103   .0066945    11.79   0.000     .0657585    .0920621
       exper |   .0268006   .0052428     5.11   0.000     .0165007    .0371005
     expersq |  -.0005352   .0001104    -4.85   0.000    -.0007522   -.0003183
      tenure |   .0290875    .006762     4.30   0.000     .0158031    .0423719
     tenursq |  -.0005331   .0002312    -2.31   0.022    -.0009874   -.0000789
       _cons |    .321378   .100009     3.21   0.001     .1249041     .517852
------------------------------------------------------------------------------
```

Example 8.2: Heteroscedastisity-Robust F Statistics

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/GPA3

reg cumgpa sat hsperc tothrs female black white if term==2, robust

Regression with robust standard errors                Number of obs =     366
                                                      F(  6,   359) =   39.30
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.4006
                                                      Root MSE      =  .46929

------------------------------------------------------------------------------
             |               Robust
      cumgpa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         sat |   .0011407   .0001915     5.96   0.000     .0007641    .0015174
      hsperc |  -.0085664   .0014179    -6.04   0.000    -.0113548   -.0057779
      tothrs |    .002504   .0007406     3.38   0.001     .0010475    .0039605
      female |   .3034333   .0591378     5.13   0.000     .1871332    .4197334
       black |  -.1282837   .1192413    -1.08   0.283    -.3627829    .1062155
       white |  -.0587217    .111392    -0.53   0.598    -.2777846    .1603411
       _cons |   1.470065   .2206802     6.66   0.000     1.036076    1.904053
------------------------------------------------------------------------------

reg cumgpa sat hsperc tothrs female black white if term==2

      Source |       SS       df       MS              Number of obs =     366
-------------+------------------------------           F(  6,   359) =   39.98
       Model |   52.831358     6  8.80522634           Prob > F      =  0.0000
    Residual |   79.062328   359  .220229326           R-squared     =  0.4006
-------------+------------------------------           Adj R-squared =  0.3905
       Total |  131.893686   365  .361352564           Root MSE      =  .46929

------------------------------------------------------------------------------
      cumgpa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         sat |   .0011407   .0001786     6.39   0.000     .0007896    .0014919
      hsperc |  -.0085664   .0012404    -6.91   0.000    -.0110058    -.006127
      tothrs |    .002504    .000731     3.43   0.001     .0010664    .0039415
      female |   .3034333   .0590203     5.14   0.000     .1873643    .4195023
       black |  -.1282837   .1473701    -0.87   0.385    -.4181009    .1615335
       white |  -.0587217   .1409896    -0.42   0.677    -.3359909    .2185475
       _cons |   1.470065   .2298031     6.40   0.000     1.018135    1.921994
------------------------------------------------------------------------------
```

Example 8.3: Heteroskedasticity-Robust LM Statistic

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/CRIME1

gen avgsensq=avgsen*avgsen

reg narr86 pcnv avgsen avgsensq ptime86 qemp86 inc86 black hispan, robust

Regression with robust standard errors                Number of obs =    2725
                                                      F(  8,  2716) =   29.84
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.0728
                                                      Root MSE      =  .82843

------------------------------------------------------------------------------
```

```
             |               Robust
      narr86 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        pcnv |  -.1355954   .0336218    -4.03   0.000    -.2015223   -.0696685
      avgsen |   .0178411   .0101233     1.76   0.078    -.0020091    .0376913
    avgsensq |  -.0005163   .0002077    -2.49   0.013    -.0009236   -.0001091
     ptime86 |    -.03936   .0062236    -6.32   0.000    -.0515634   -.0271566
      qemp86 |  -.0505072   .0142015    -3.56   0.000     -.078354   -.0226603
       inc86 |  -.0014797   .0002295    -6.45   0.000    -.0019297   -.0010296
       black |   .3246024   .0585135     5.55   0.000     .2098669     .439338
      hispan |     .19338   .0402983     4.80   0.000     .1143616    .2723985
       _cons |   .5670128   .0402756    14.08   0.000     .4880389    .6459867
------------------------------------------------------------------------------
```

Turning point for avgsen

```
di _b[avgsen]/(2*_b[avgsensq])
-17.276862
```

```
reg narr86 pcnv ptime86 qemp86 inc86 black hispan
```

```
      Source |       SS       df       MS              Number of obs =    2725
-------------+------------------------------           F(  6,  2718) =   34.95
       Model |  143.977563     6  23.9962606           Prob > F      =  0.0000
    Residual |  1866.36959  2718  .686670196           R-squared     =  0.0716
-------------+------------------------------           Adj R-squared =  0.0696
       Total |  2010.34716  2724  .738012906           Root MSE      =  .82866

------------------------------------------------------------------------------
      narr86 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        pcnv |  -.1322784   .0403406    -3.28   0.001    -.2113797   -.0531771
     ptime86 |  -.0377953    .008497    -4.45   0.000    -.0544566    -.021134
      qemp86 |  -.0509814   .0144359    -3.53   0.000    -.0792878    -.022675
       inc86 |    -.00149   .0003404    -4.38   0.000    -.0021575   -.0008224
       black |   .3296885   .0451778     7.30   0.000     .2411022    .4182748
      hispan |   .1954509   .0396929     4.92   0.000     .1176195    .2732823
       _cons |   .5703344   .0360073    15.84   0.000       .49973    .6409388
------------------------------------------------------------------------------
```

```
predict ubar1, resid

quite reg avgsen pcnv ptime86 qemp86 inc86 black hispan

predict r1, r

quite reg avgsensq pcnv ptime86 qemp86 inc86 black hispan

predict r2, r

quite gen ur1 = ubar1*r1

quite gen ur2 = ubar1*r2

gen iota = 1

reg iota ur1 ur2, noconstant
```

```
      Source |       SS       df       MS              Number of obs =    2725
-------------+------------------------------           F(  2,  2723) =    2.00
       Model |  3.99708536     2  1.99854268           Prob > F      =  0.1355
    Residual |  2721.00291  2723  .999266586           R-squared     =  0.0015
-------------+------------------------------           Adj R-squared =  0.0007
       Total |     2725.00  2725        1.00           Root MSE      =  .99963
```

```
------------------------------------------------------------------------------
        iota |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ur1 |   .0277846   .0140598     1.98   0.048     .0002156    .0553537
         ur2 |  -.0010447   .0005479    -1.91   0.057     -.002119    .0000296
------------------------------------------------------------------------------
```

scalar hetlm = e(N)-e(rss)

scalar pval = chi2tail(2,hetlm)

display _n "Robust LM statistic : " %6.3f hetlm /

> */ _n "Under H0, distrib Chi2(2), p-value: " %5.3f pval

```
Robust LM statistic :  3.997
Under H0, distrib Chi2(2), p-value: 0.136
```

reg narr86 pcnv ptime86 qemp86 inc86 black hispan

```
      Source |       SS       df       MS              Number of obs =    2725
-------------+------------------------------           F(  6,  2718) =   34.95
       Model |  143.977563     6  23.9962606           Prob > F      =  0.0000
    Residual |  1866.36959  2718  .686670196           R-squared     =  0.0716
-------------+------------------------------           Adj R-squared =  0.0696
       Total |  2010.34716  2724  .738012906           Root MSE      =  .82866

------------------------------------------------------------------------------
      narr86 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        pcnv |  -.1322784   .0403406    -3.28   0.001    -.2113797   -.0531771
     ptime86 |  -.0377953    .008497    -4.45   0.000    -.0544566    -.021134
     qemp86 |  -.0509814   .0144359    -3.53   0.000    -.0792878    -.022675
      inc86 |    -.00149   .0003404    -4.38   0.000    -.0021575   -.0008224
      black |   .3296885   .0451778     7.30   0.000     .2411022    .4182748
     hispan |   .1954509   .0396929     4.92   0.000     .1176195    .2732823
      _cons |   .5703344   .0360073    15.84   0.000       .49973    .6409388
------------------------------------------------------------------------------
```

predict ubar2, resid

reg ubar2 pcnv avgsen avgsensq ptime86 qemp86 inc86 black hispan

```
      Source |       SS       df       MS              Number of obs =    2725
-------------+------------------------------           F(  8,  2716) =    0.43
       Model |  2.37155739     8  .296444674           Prob > F      =  0.9025
    Residual |  1863.99804  2716  .686302664           R-squared     =  0.0013
-------------+------------------------------           Adj R-squared = -0.0017
       Total |  1866.36959  2724  .685157707           Root MSE      =  .82843

------------------------------------------------------------------------------
       ubar1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        pcnv |   -.003317   .0403699    -0.08   0.935    -.0824758    .0758418
      avgsen |   .0178411    .009696     1.84   0.066    -.0011713    .0368534
    avgsensq |  -.0005163    .000297    -1.74   0.082    -.0010987    .0000661
     ptime86 |  -.0015647   .0086935    -0.18   0.857    -.0186112    .0154819
     qemp86 |   .0004742   .0144345     0.03   0.974    -.0278295    .0287779
      inc86 |   .0000103   .0003405     0.03   0.976    -.0006574     .000678
      black |  -.0050861   .0454188    -0.11   0.911     -.094145    .0839729
     hispan |  -.0020709   .0397035    -0.05   0.958    -.0799229    .0757812
      _cons |  -.0033216   .0360573    -0.09   0.927    -.0740242    .0673809
------------------------------------------------------------------------------
```

scalar lm1 = e(N)*e(r2)

```
display _n "LM statistic : " %6.3f lm1 /*
```

LM statistic : 3.5425

Example 8.4: Heteroscedasticity in Housing Price Equation

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/HPRICE1

reg price lotsize sqrft bdrms
```

```
      Source |       SS       df       MS              Number of obs =      88
-------------+------------------------------           F(  3,    84) =   57.46
       Model |  617130.701     3  205710.234            Prob > F      =  0.0000
    Residual |  300723.805    84   3580.0453           R-squared     =  0.6724
-------------+------------------------------           Adj R-squared =  0.6607
       Total |  917854.506    87  10550.0518           Root MSE      =  59.833

------------------------------------------------------------------------------
       price |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lotsize |   .0020677   .0006421     3.22   0.002     .0007908    .0033446
       sqrft |   .1227782   .0132374     9.28   0.000     .0964541    .1491022
       bdrms |   13.85252   9.010145     1.54   0.128     -4.06514    31.77018
       _cons |  -21.77031   29.47504    -0.74   0.462    -80.38466    36.84404
------------------------------------------------------------------------------
```

```
whitetst, fitted
```

```
White's special test statistic :  16.26842  Chi-sq( 2)  P-value =  2.9e-04
```

```
reg lprice llotsize lsqrft bdrms
```

```
      Source |       SS       df       MS              Number of obs =      88
-------------+------------------------------           F(  3,    84) =   50.42
       Model |  5.15504028     3  1.71834676            Prob > F      =  0.0000
    Residual |  2.86256324    84  .034078134           R-squared     =  0.6430
-------------+------------------------------           Adj R-squared =  0.6302
       Total |  8.01760352    87  .092156362           Root MSE      =   .1846

------------------------------------------------------------------------------
      lprice |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    llotsize |   .1679667   .0382812     4.39   0.000     .0918404     .244093
      lsqrft |   .7002324   .0928652     7.54   0.000     .5155597    .8849051
       bdrms |   .0369584   .0275313     1.34   0.183    -.0177906    .0917074
       _cons |  -1.297042   .6512836    -1.99   0.050    -2.592191   -.0018931
------------------------------------------------------------------------------
```

```
whitetst, fitted
```

```
White's special test statistic :  3.447243  Chi-sq( 2)  P-value =  .1784
```

Example 8.5: Special Form of the White Test in the Log Housing Price Equation

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/HPRICE1

reg lprice llotsize lsqrft bdrms
```

```
      Source |       SS       df       MS              Number of obs =      88
-------------+------------------------------           F(  3,    84) =   50.42
```

```
       Model |  5.15506425     3  1.71835475           Prob > F      =  0.0000
    Residual |  2.86255771    84  .034078068           R-squared     =  0.6430
-------------+------------------------------           Adj R-squared =  0.6302
       Total |  8.01762195    87  .092156574           Root MSE      =   .1846

------------------------------------------------------------------------------
      lprice |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    llotsize |    .167968   .0382811     4.39   0.000     .0918418    .2440941
      lsqrft |   .7002326   .0928652     7.54   0.000     .5155601    .8849051
       bdrms |   .0369585   .0275313     1.34   0.183    -.0177905    .0917075
       _cons |     5.6107   .6512829     8.61   0.000     4.315553    6.905848
------------------------------------------------------------------------------
```

whitetst, fitted

```
White's special test statistic :  3.447286  Chi-sq( 2)  P-value =  .1784
```

Example 8.6: Family Saving Equation

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

reg sav inc

```
      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  1,    98) =    6.49
       Model |  66368437.0     1  66368437.0           Prob > F      =  0.0124
    Residual |  1.0019e+09    98  10223460.8           R-squared     =  0.0621
-------------+------------------------------           Adj R-squared =  0.0526
       Total |  1.0683e+09    99  10790581.8           Root MSE      =  3197.4

------------------------------------------------------------------------------
         sav |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inc |   .1466283   .0575488     2.55   0.012     .0324247     .260832
       _cons |   124.8424   655.3931     0.19   0.849    -1175.764    1425.449
------------------------------------------------------------------------------
```

reg sav inc [aw = 1/inc]

```
(sum of wgt is   1.3877e-02)

      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  1,    98) =    9.14
       Model |  58142339.8     1  58142339.8           Prob > F      =  0.0032
    Residual |   623432468    98  6361555.80           R-squared     =  0.0853
-------------+------------------------------           Adj R-squared =  0.0760
       Total |   681574808    99  6884594.02           Root MSE      =  2522.2

------------------------------------------------------------------------------
         sav |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inc |   .1717555   .0568128     3.02   0.003     .0590124    .2844986
       _cons |  -124.9528   480.8606    -0.26   0.796    -1079.205    829.2994
------------------------------------------------------------------------------
```

reg sav inc size educ age black

```
      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  5,    94) =    1.70
       Model |  88426246.4     5  17685249.3           Prob > F      =  0.1430
    Residual |   979841351    94  10423844.2           R-squared     =  0.0828
```

```
-------------+------------------------------           Adj R-squared =  0.0340
       Total |  1.0683e+09    99  10790581.8           Root MSE      =  3228.6

------------------------------------------------------------------------------
         sav |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inc |    .109455   .0714317     1.53   0.129    -.0323742    .2512842
        size |   67.66119   222.9642     0.30   0.762    -375.0395    510.3619
        educ |   151.8235   117.2487     1.29   0.199    -80.97646    384.6235
         age |   .2857217   50.03108     0.01   0.995    -99.05217    99.62361
       black |   518.3934   1308.063     0.40   0.693    -2078.796    3115.583
       _cons |  -1605.416   2830.707    -0.57   0.572    -7225.851    4015.019
------------------------------------------------------------------------------
```

reg sav inc size educ age black [aw = 1/inc]

```
(sum of wgt is   1.3877e-02)

      Source |       SS       df       MS              Number of obs =     100
-------------+------------------------------           F(  5,    94) =    2.19
       Model |  71020334.9     5  14204067.0           Prob > F      =  0.0621
    Residual |   610554473    94  6495260.35           R-squared     =  0.1042
-------------+------------------------------           Adj R-squared =  0.0566
       Total |   681574808    99  6884594.02           Root MSE      =  2548.6

------------------------------------------------------------------------------
         sav |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inc |   .1005179   .0772511     1.30   0.196     -.052866    .2539017
        size |  -6.868501   168.4327    -0.04   0.968    -341.2956    327.5586
        educ |   139.4802   100.5362     1.39   0.169     -60.1368    339.0972
         age |   21.74721   41.30598     0.53   0.600    -60.26678    103.7612
       black |   137.2842   844.5941     0.16   0.871    -1539.677    1814.246
       _cons |  -1854.814   2351.797    -0.79   0.432    -6524.362    2814.734
------------------------------------------------------------------------------
```

Example 8.7: Demand for Cigarettes

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

reg cigs lincome lcigpric educ age agesq restaurn

```
      Source |       SS       df       MS              Number of obs =     807
-------------+------------------------------           F(  6,   800) =    7.42
       Model |  8003.02506     6  1333.83751           Prob > F      =  0.0000
    Residual |  143750.658   800  179.688322           R-squared     =  0.0527
-------------+------------------------------           Adj R-squared =  0.0456
       Total |  151753.683   806  188.280003           Root MSE      =  13.405

------------------------------------------------------------------------------
        cigs |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lincome |   .8802689   .7277838     1.21   0.227    -.5483223     2.30886
    lcigpric |  -.7508498   5.773343    -0.13   0.897    -12.08354    10.58184
        educ |  -.5014982   .1670772    -3.00   0.003    -.8294597   -.1735368
         age |   .7706936   .1601223     4.81   0.000      .456384    1.085003
       agesq |  -.0090228    .001743    -5.18   0.000    -.0124443   -.0056013
    restaurn |  -2.825085   1.111794    -2.54   0.011    -5.007462    -.642708
       _cons |  -3.639884   24.07866    -0.15   0.880     -50.9047    43.62493
------------------------------------------------------------------------------
```

Change in cigs if income increases by 10%

```
display _b[lincome]*10/100
.08802689
```

Turnover point for age

```
display _b[age]/2/_b[agesq]
-42.708116
```

```
whitetst, fitted

White's special test statistic :  26.57258  Chi-sq( 2)  P-value =  1.7e-06
```

```
gen lubar=log(ub*ub)

qui reg lubar lincome lcigpric educ age agesq restaurn

predict cigsh, xb

gen cigse = exp(cigsh)

reg cigs lincome lcigpric educ age agesq restaurn [aw=1/cigse]

(sum of wgt is   1.9977e+01)

      Source |       SS       df       MS              Number of obs =     807
-------------+------------------------------           F(  6,   800) =   17.06
       Model |  10302.6415     6  1717.10692           Prob > F      =  0.0000
    Residual |  80542.0684   800  100.677586           R-squared     =  0.1134
-------------+------------------------------           Adj R-squared =  0.1068
       Total |    90844.71   806  112.710558           Root MSE      =  10.034

------------------------------------------------------------------------------
        cigs |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lincome |    1.295241   .4370118     2.96   0.003     .4374154    2.153066
    lcigpric |    -2.94028   4.460142    -0.66   0.510    -11.69524    5.814684
        educ |   -.4634462   .1201586    -3.86   0.000    -.6993095   -.2275829
         age |    .4819474   .0968082     4.98   0.000     .2919194    .6719755
       agesq |   -.0056272   .0009395    -5.99   0.000    -.0074713   -.0037831
    restaurn |   -3.461066   .7955047    -4.35   0.000    -5.022589   -1.899543
       _cons |    5.63533   17.80313     0.32   0.752    -29.31103    40.58169
------------------------------------------------------------------------------
```

Example 8.8: Labor Force Participation of Married Women

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

reg inlf nwifeinc educ exper expersq age kidslt6 kidsge6

      Source |       SS       df       MS              Number of obs =     753
-------------+------------------------------           F(  7,   745) =   38.22
       Model |  48.8080578     7  6.97257968           Prob > F      =  0.0000
    Residual |  135.919698   745  .182442547           R-squared     =  0.2642
-------------+------------------------------           Adj R-squared =  0.2573
       Total |  184.727756   752  .245648611           Root MSE      =  .42713

------------------------------------------------------------------------------
        inlf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |   -.0034052   .0014485    -2.35   0.019    -.0062488   -.0005616
        educ |    .0379953    .007376     5.15   0.000      .023515    .0524756
       exper |    .0394924   .0056727     6.96   0.000     .0283561    .0506287
```

```
     expersq |  -.0005963   .0001848    -3.23   0.001    -.0009591   -.0002335
         age |  -.0160908   .0024847    -6.48   0.000    -.0209686    -.011213
     kidslt6 |  -.2618105   .0335058    -7.81   0.000    -.3275875   -.1960335
     kidsge6 |   .0130122    .013196     0.99   0.324    -.0128935    .0389179
       _cons |   .5855192    .154178     3.80   0.000     .2828442    .8881943
------------------------------------------------------------------------------
```

reg inlf nwifeinc educ exper expersq age kidslt6 kidsge6, robust

```
Regression with robust standard errors                Number of obs =     753
                                                      F(  7,   745) =   62.48
                                                      Prob > F      =  0.0000
                                                      R-squared     =  0.2642
                                                      Root MSE      =  .42713

------------------------------------------------------------------------------
             |               Robust
        inlf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |  -.0034052   .0015249    -2.23   0.026    -.0063988   -.0004115
        educ |   .0379953    .007266     5.23   0.000      .023731    .0522596
       exper |   .0394924     .00581     6.80   0.000     .0280864    .0508983
     expersq |  -.0005963     .00019    -3.14   0.002    -.0009693   -.0002233
         age |  -.0160908    .002399    -6.71   0.000    -.0208004   -.0113812
     kidslt6 |  -.2618105   .0317832    -8.24   0.000    -.3242058   -.1994152
     kidsge6 |   .0130122   .0135329     0.96   0.337     -.013555    .0395795
       _cons |   .5855192   .1522599     3.85   0.000     .2866098    .8844287
------------------------------------------------------------------------------
```

Example 8.9: Determinants of Personal Computer Ownership

use http://fmwww.bc.edu/ec-p/data/wooldridge/GPA1

gen parcoll = (mothcoll | fathcoll)

reg PC hsGPA ACT parcoll

```
      Source |       SS       df       MS              Number of obs =     141
-------------+------------------------------           F(  3,   137) =    1.98
       Model |  1.40186813     3  .467289377           Prob > F      =  0.1201
    Residual |  32.3569971   137  .236182461           R-squared     =  0.0415
-------------+------------------------------           Adj R-squared =  0.0205
       Total |  33.7588652   140  .241134752           Root MSE      =  .48599

------------------------------------------------------------------------------
          PC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hsGPA |   .0653943   .1372576     0.48   0.635    -.2060231    .3368118
         ACT |   .0005645   .0154967     0.04   0.971    -.0300792    .0312082
     parcoll |   .2210541    .092957     2.38   0.019      .037238    .4048702
       _cons |  -.0004322   .4905358    -0.00   0.999     -.970433    .9695686
------------------------------------------------------------------------------
```

predict phat

gen h=phat*(1-phat)

reg PC hsGPA ACT parcoll [aw=1/h]

```
(sum of wgt is   6.2818e+02)

      Source |       SS       df       MS              Number of obs =     141
-------------+------------------------------           F(  3,   137) =    2.22
       Model |  1.54663033     3  .515543445           Prob > F      =  0.0882
```

```
    Residual |  31.7573194   137  .231805251           R-squared     =  0.0464
-------------+------------------------------           Adj R-squared =  0.0256
       Total |  33.3039497   140  .237885355           Root MSE      =  .48146

------------------------------------------------------------------------------
          PC |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       hsGPA |   .0327029   .1298817     0.25   0.802    -.2241292     .289535
         ACT |    .004272   .0154527     0.28   0.783    -.0262847    .0348286
     parcoll |   .2151862   .0862918     2.49   0.014       .04455    .3858224
       _cons |   .0262099   .4766498     0.05   0.956    -.9163323    .9687521
------------------------------------------------------------------------------
```

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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