Example to show results of variable transformations

```
u ps1dat                        /* read in data */

/* simple 2 variable regression of log hourly pay on age */
 reg lhw age

      Source |       SS       df       MS              Number of obs =   17321
-------------+------------------------------           F(  1, 17319) =  534.59
       Model |  184.631739     1  184.631739            Prob > F      =  0.0000
    Residual |  5981.53099 17319  .345373924           R-squared     =  0.0299
-------------+------------------------------           Adj R-squared =  0.0299
       Total |  6166.16272 17320  .356014014           Root MSE      =  .58769

------------------------------------------------------------------------------
         lhw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .0090856    .000393    23.12   0.000     .0083154    .0098558
       _cons |   1.603024   .0158896   100.89   0.000     1.571879    1.634169
------------------------------------------------------------------------------

/* add constant (in this case the value 1) to original rhs variable */
g age1=age+1

reg lhw age1

      Source |       SS       df       MS              Number of obs =   17321
-------------+------------------------------           F(  1, 17319) =  534.59
       Model |  184.631739     1  184.631739            Prob > F      =  0.0000
    Residual |  5981.53099 17319  .345373924           R-squared     =  0.0299
-------------+------------------------------           Adj R-squared =  0.0299
       Total |  6166.16272 17320  .356014014           Root MSE      =  .58769

------------------------------------------------------------------------------
         lhw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        age1 |   .0090856    .000393    23.12   0.000     .0083154    .0098558
       _cons |   1.593939   .0162671    97.99   0.000     1.562054    1.625824
------------------------------------------------------------------------------

Can see slope coefficient (on age) is unchanged and new constant equals original
minus original slope on age multiplied by constant

. di 1.593939+(1*.0090856)


1.6030246
```

```
/* now try transformation by multiplication in logarithmic specification */


g lage=log(age)

. reg lhw lage

      Source |       SS       df       MS              Number of obs =   17321
-------------+------------------------------           F(  1, 17319) =  841.53
       Model |  285.731332     1  285.731332           Prob > F      =  0.0000
    Residual |  5880.43139 17319  .339536428           R-squared     =  0.0463
-------------+------------------------------           Adj R-squared =  0.0463
       Total |  6166.16272 17320  .356014014           Root MSE      =   .5827

------------------------------------------------------------------------------
         lhw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lage |   .4078875   .0140606    29.01   0.000     .3803273    .4354478
       _cons |   .4824305   .0509756     9.46   0.000     .3825132    .5823477
------------------------------------------------------------------------------

g twoage=2*age
g l2age=log(twoage)

reg lhw l2age

      Source |       SS       df       MS              Number of obs =   17321
-------------+------------------------------           F(  1, 17319) =  841.53
       Model |  285.731304     1  285.731304           Prob > F      =  0.0000
    Residual |  5880.43142 17319  .339536429           R-squared     =  0.0463
-------------+------------------------------           Adj R-squared =  0.0463
       Total |  6166.16272 17320  .356014014           Root MSE      =   .5827

------------------------------------------------------------------------------
         lhw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       l2age |   .4078875   .0140606    29.01   0.000     .3803272    .4354477
       _cons |   .1997046   .0606907     3.29   0.001     .0807446    .3186645
------------------------------------------------------------------------------

Can see slope unchanged and new constant equals original minus original slope on
age multiplied by constant

. di ln(2)*.4078875
.28272607

. di .4824305-(ln(2)*.4078875)
.19970443
```

```
/* Effect of multiplication of variable by a scalar */

reg lhw lage

      Source |       SS       df       MS              Number of obs =   17321
-------------+------------------------------           F(  1, 17319) =  841.53
       Model |  285.731332     1  285.731332           Prob > F      =  0.0000
    Residual |  5880.43139 17319  .339536428           R-squared     =  0.0463
-------------+------------------------------           Adj R-squared =  0.0463
       Total |  6166.16272 17320  .356014014           Root MSE      =   .5827

------------------------------------------------------------------------------
         lhw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        lage |   .4078875   .0140606    29.01   0.000     .3803273    .4354478
       _cons |   .4824305   .0509756     9.46   0.000     .3825132    .5823477
------------------------------------------------------------------------------

/* now multiply log age by a scalar (in this case two) */

g tlogage=2*lage

reg lhw tlogage

      Source |       SS       df       MS              Number of obs =   17321
-------------+------------------------------           F(  1, 17319) =  841.53
       Model |  285.731332     1  285.731332           Prob > F      =  0.0000
    Residual |  5880.43139 17319  .339536428           R-squared     =  0.0463
-------------+------------------------------           Adj R-squared =  0.0463
       Total |  6166.16272 17320  .356014014           Root MSE      =   .5827

------------------------------------------------------------------------------
         lhw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tlogage |   .2039438   .0070303    29.01   0.000     .1901636    .2177239
       _cons |   .4824305   .0509756     9.46   0.000     .3825132    .5823477
------------------------------------------------------------------------------


Can see constant unchanged and slope coefficient is reduced by original
slope/constant (ie halved in this case), which makes sense. If units of
observation doubled, estimated effect of unit increase of this transformed
variable must halve.
```