```
      name:  <unnamed>
       log:  C:\Users\kbyjr\Downloads\documents-export-2013-02-13\Problem 10.sm
> cl
  log type:  smcl
 opened on:  13 Feb 2013, 18:53:27

. log off
      name:  <unnamed>
       log:  C:\Users\kbyjr\Downloads\documents-export-2013-02-13\Problem 10.sm
> cl
  log type:  smcl
 paused on:  13 Feb 2013, 18:53:38
```

```
      name:  <unnamed>
       log:  C:\Users\kbyjr\Downloads\documents-export-2013-02-13\Problem 10.sm
> cl
  log type:  smcl
resumed on:  13 Feb 2013, 18:54:02

. gen y = log(cost)

. gen x = log(output)

. reg y x
```

Source	SS	df	MS		
Model	33.617333	1	33.617333	Number of obs =	24
Residual	1.01520396	22	.046145635	F(1, 22) =	728.51
				Prob > F =	0.0000
				R-squared =	0.9707
				Adj R-squared =	0.9694
Total	34.6325369	23	1.50576248	Root MSE =	.21482

y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
x	.8879868	.0328996	26.99	0.000	.8197573	.9562164
_cons	-4.174783	.2768684	-15.08	0.000	-4.748973	-3.600593

```
. xtset firm
       panel variable:  firm (balanced)

. reg y x d1 d2 d3 d4 d5
```

Source	SS	df	MS		
Model	34.368475	6	5.72807917	Number of obs =	24
Residual	.264061918	17	.015533054	F(6, 17) =	368.77
				Prob > F =	0.0000
				R-squared =	0.9924
				Adj R-squared =	0.9897
Total	34.6325369	23	1.50576248	Root MSE =	.12463

y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
x	.6742789	.0611307	11.03	0.000	.5453044	.8032534
d1	-.7900151	.2436915	-3.24	0.005	-1.304159	-.275871
d2	-1.008219	.1912571	-5.27	0.000	-1.411736	-.6047021
d3	-.5364458	.1189422	-4.51	0.000	-.7873918	-.2854998
d4	-.2309764	.1011107	-2.28	0.035	-.4443012	-.0176515
d5	-.407327	.1039617	-3.92	0.001	-.6266671	-.187987
_cons	-1.903512	.6080806	-3.13	0.006	-3.18645	-.6205737

```
. xtreg y x,fe

Fixed-effects (within) regression               Number of obs      =        24
Group variable: firm                            Number of groups   =         6

R-sq:  within  = 0.8774                         Obs per group: min =         4
       between = 0.9833                                        avg =       4.0
       overall = 0.9707                                        max =         4

                                                F(1,17)            =    121.66
corr(u_i, Xb)  = 0.8495                         Prob > F           =    0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |    .6742789   .0611307    11.03   0.000     .5453044    .8032534
       _cons |   -2.399009    .508593    -4.72   0.000    -3.472046   -1.325972
-------------+----------------------------------------------------------------
     sigma_u |   .36730483
     sigma_e |   .12463167
         rho |   .89675322   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5, 17) =      9.67                 Prob > F = 0.0002

. xtreg y x, be

Between regression (regression on group means)  Number of obs      =        24
Group variable: firm                            Number of groups   =         6

R-sq:  within  = 0.8774                         Obs per group: min =         4
       between = 0.9833                                        avg =       4.0
       overall = 0.9707                                        max =         4

                                                F(1,4)             =    236.23
sd(u_i + avg(e_i.))=  .1838474                  Prob > F           =    0.0001

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |    .9110734   .0592772    15.37   0.000     .7464935    1.075653
       _cons |   -4.366618   .4982409    -8.76   0.001    -5.749957   -2.983279
------------------------------------------------------------------------------

. xtreg y x, re

Random-effects GLS regression                   Number of obs      =        24
Group variable: firm                            Number of groups   =         6

R-sq:  within  = 0.8774                         Obs per group: min =         4
       between = 0.9833                                        avg =       4.0
       overall = 0.9707                                        max =         4

                                                Wald chi2(1)       =    268.10
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |    .7963203   .0486336    16.37   0.000     .7010002    .8916404
       _cons |   -3.413094   .4131166    -8.26   0.000    -4.222788     -2.6034
-------------+----------------------------------------------------------------
     sigma_u |   .17296414
     sigma_e |   .12463167
         rho |   .65823599   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

```
. xtreg y x,fe

Fixed-effects (within) regression               Number of obs      =        24
Group variable: firm                            Number of groups   =         6

R-sq:  within  = 0.8774                         Obs per group: min =         4
       between = 0.9833                                        avg =       4.0
       overall = 0.9707                                        max =         4

                                                F(1,17)            =    121.66
corr(u_i, Xb)  = 0.8495                         Prob > F           =    0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |    .6742789   .0611307    11.03   0.000     .5453044    .8032534
       _cons |   -2.399009    .508593    -4.72   0.000    -3.472046   -1.325972
-------------+----------------------------------------------------------------
     sigma_u |   .36730483
     sigma_e |   .12463167
         rho |   .89675322   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5, 17) =      9.67                 Prob > F = 0.0002

. estimates store b0

. xtreg y x, re

Random-effects GLS regression                   Number of obs      =        24
Group variable: firm                            Number of groups   =         6

R-sq:  within  = 0.8774                         Obs per group: min =         4
       between = 0.9833                                        avg =       4.0
       overall = 0.9707                                        max =         4

                                                Wald chi2(1)       =    268.10
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           x |    .7963203   .0486336    16.37   0.000     .7010002    .8916404
       _cons |   -3.413094   .4131166    -8.26   0.000    -4.222788     -2.6034
-------------+----------------------------------------------------------------
     sigma_u |   .17296414
     sigma_e |   .12463167
         rho |   .65823599   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. estimates store b1

. hausman b0 b1

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       b0           b1         Difference          S.E.
-------------+----------------------------------------------------------------
           x |    .6742789     .7963203      -.1220414        .0370369
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic
```

```
                  chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       10.86
                Prob>chi2 =      0.0010

. log close
      name:  <unnamed>
       log:  C:\Users\kbyjr\Downloads\documents-export-2013-02-13\Problem 10.sm
> cl
  log type:  smcl
 closed on:  13 Feb 2013, 18:54:25
```