```
 1 . do "/Users/imisiaiyetan/Documents/My Econometrics Assignme

 2 .
 3 .  *                                                  Name: Imis
 4 .  *                                                        Co
   > 12
 5 .  *               Topic:   Impact of capital accumulation an
   > conomic Growth
 6 .
 7 .
 8 .  * Let's load the data from download folder
 9 . clear

10 . set more off

11 . webuse auto
   (1978 Automobile Data)

12 .
13 . use "/Users/imisiaiyetan/Downloads/Table2_1.dta"
   (Production data for the USA, 2005)

14 .
15 . * Problem 1a: Run the multiple regression
16 .
17 . reg lnoutput lnlabor lncapital
```

Source	SS	df	MS	Numbe
Model	91.9246133	2	45.9623067	F(2
Residual	3.41551772	48	.071156619	Prob
				R-squ
				Adj R
Total	95.340131	50	1.90680262	Root

lnoutput	Coef.	Std. Err.	t	P>|t|	[9
lnlabor	.4683318	.0989259	4.73	0.000	.
lncapital	.5212795	.096887	5.38	0.000	.
_cons	3.887599	.3962281	9.81	0.000	3.

```
18 .
19 . * problem 1b: Regress lnoutput on lncapital to predict the
   > ilarly, regress  lnlabour on lncapital to predict the seco
20 .
21 . reg lnoutput lncapital
```

Source	SS	df	MS	Numbe
Model	90.3298259	1	90.3298259	F(1
Residual	5.0103051	49	.102251124	Prob
				R-squ
				Adj R
Total	95.340131	50	1.90680262	Root

lnoutput	Coef.	Std. Err.	t	P>|t|	[9
lncapital	.9617962	.0323595	29.72	0.000	.8
_cons	3.391633	.458073	7.40	0.000	2.

```
22 . predict e1, residuals

23 .
24 . reg  lnlabor lncapital
```

Source	SS	df	MS	Numbe
Model	86.3937937	1	86.3937937	F(1
Residual	7.27102154	49	.148388195	Prob
				R-squ
				Adj R
Total	93.6648153	50	1.87329631	Root

lnlabor	Coef.	Std. Err.	t	P>|t|	[9
lncapital	.9406082	.0389823	24.13	0.000	.8
_cons	-1.059006	.5518237	-1.92	0.061	-2.

```
25 . predict e2, residuals
```

```
26 .
27 . reg e1 e2

      Source |       SS       df       MS              Numbe
-------------+------------------------------           F(  1
       Model |  1.59478739     1  1.59478739            Prob
    Residual |  3.41551769    49  .069704443           R-squ
-------------+------------------------------           Adj R
       Total |  5.01030508    50  .100206102           Root

------------------------------------------------------------------------------
          e1 |      Coef.   Std. Err.      t    P>|t|     [9
-------------+----------------------------------------------------------------
          e2 |   .4683318   .0979112     4.78   0.000     .2
       _cons |  -9.90e-10   .0369696    -0.00   1.000    -.0
------------------------------------------------------------------------------

28 .
29 .
30 . * problem 1c: The next procedure is to regress lnoutput on
   >
31 .
32 . reg lnoutput e2

      Source |       SS       df       MS              Numbe
-------------+------------------------------           F(  1
       Model |  1.59478745     1  1.59478745            Prob
    Residual |  93.7453436    49  1.91317028           R-squ
-------------+------------------------------           Adj R
       Total |   95.340131    50  1.90680262           Root

------------------------------------------------------------------------------
    lnoutput |      Coef.   Std. Err.      t    P>|t|     [9
-------------+----------------------------------------------------------------
          e2 |   .4683318   .5129548     0.91   0.366    -.5
       _cons |   16.94139   .1936831    87.47   0.000     16
------------------------------------------------------------------------------

33 .
34 .
35 .
36 . * problem 2: IV regression
```

```
37 .
38 .
39 . * problem 2a: Instrumental Variable regression. lnoutlab i
   > ent in this regression. In that case, we replace lncapital
   > noutput is regressed on lnlabor lnoutlab
40 .
41 . ivregress gmm lnoutput lnlabor (lncapital = lnoutlab)

Instrumental variables (GMM) regression                 Numbe
                                                        Wald
                                                        Prob
                                                        R-squ
GMM weight matrix: Robust                               Root

------------------------------------------------------------
             |               Robust
    lnoutput |      Coef.   Std. Err.      z    P>|z|     [9
-------------+----------------------------------------------
   lncapital |   1.385655   .4317705     3.21   0.001     .5
     lnlabor |  -.3792855   .4425238    -0.86   0.391    -1.
       _cons |   2.044667   1.018963     2.01   0.045     .0
------------------------------------------------------------
Instrumented:  lncapital
Instruments:   lnlabor lnoutlab

42 .
43 .
44 . reg lnoutput lnlabor lnoutlab

      Source |       SS       df       MS              Numbe
-------------+------------------------------           F(  2
       Model |  95.340131      2  47.6700655           Prob
    Residual |  2.0810e-11    48  4.3354e-13           R-squ
-------------+------------------------------           Adj R
       Total |  95.340131     50  1.90680262           Root

------------------------------------------------------------
    lnoutput |      Coef.   Std. Err.      t    P>|t|     [9
-------------+----------------------------------------------
     lnlabor |          1   6.83e-08  1.5e+07   0.000     .9
    lnoutlab |          1   2.81e-07  3.6e+06   0.000     .9
       _cons |  -6.02e-07   1.64e-06    -0.37   0.715    -3.
```

```
45 .
46 . * problem 2b: To perform two stage least squares, predict
   > ereafter regress lnoutput on lnlabour and lncapital_hat
47 .
48 . predict lncapital_hat
   (option xb assumed; fitted values)

49 .
50 . reg lnoutput lnlabor lncapital_hat
```

Source	SS	df	MS	Numbe
Model	95.340131	2	47.6700655	F(2
Residual	4.0460e-11	48	8.4292e-13	Prob
				R-squ
				Adj R
Total	95.340131	50	1.90680262	Root

lnoutput	Coef.	Std. Err.	t	P>|t|	[
lnlabor	2.09e-07	3.96e-07	0.53	0.600	-5
lncapital_hat	.9999998	3.92e-07	2.5e+06	0.000	
_cons	1.38e-06	2.28e-06	0.60	0.548	-3

```
51 .
52 . * problem 2c: Regress lnoutput on lnlabor and lnoutlab and
   > coefficient. Similarly, Regress lncapital on lnlabor and l
   >  the second coefficient
53 .
54 . reg lnoutput lnlabor lnoutlab
```

Source	SS	df	MS	Numbe
Model	95.340131	2	47.6700655	F(2
Residual	2.0810e-11	48	4.3354e-13	Prob
				R-squ
				Adj R
Total	95.340131	50	1.90680262	Root

```
    lnoutput |      Coef.   Std. Err.      t    P>|t|     [9
-------------+----------------------------------------------
     lnlabor |           1   6.83e-08  1.5e+07   0.000     .9
    lnoutlab |           1   2.81e-07  3.6e+06   0.000     .9
       _cons |  -6.02e-07   1.64e-06    -0.37   0.715    -3.
------------------------------------------------------------
```

```
55 . mat beta = e(b)

56 . svmat beta, names(matcol)

57 .
58 . reg lncapital lnlabor lnoutlab
```

```
      Source |       SS       df       MS              Numbe
-------------+------------------------------           F(  2
       Model |  92.9197874     2  46.4598937            Prob
    Residual |  4.72858879    48  .098512266            R-squ
-------------+------------------------------           Adj R
       Total |  97.6483762    50  1.95296752            Root

------------------------------------------------------------
   lncapital |      Coef.   Std. Err.      t    P>|t|     [9
-------------+----------------------------------------------
     lnlabor |   .9954032   .0325471    30.58   0.000     .9
    lnoutlab |   .7216804   .1341345     5.38   0.000     .4
       _cons |  -1.475596   .7796798    -1.89   0.064    -3.
------------------------------------------------------------
```

```
59 . mat gamma = e(b)

60 . svmat gamma, names(matcol)

61 .
62 . * Take the ratio of the two coefficients derived
63 .
64 . scalar alpha_hat1 = betalnoutlab/gammalnoutlab

65 . display alpha_hat1
   1.3856551

66 .
```

```
67 . * problem 2d: Check using another approach, if we will arr
   > a_hat1. The procedure is as follows
68 .
69 . * regress lnoutlab on lnlabor and predict the first residu
70 .
71 . reg lnoutlab lnlabor
```

Source	SS	df	MS	Numbe
Model	.039343945	1	.039343945	F(1
Residual	5.47531704	49	.111741164	Prob
				R-squ
				Adj R
Total	5.51466099	50	.11029322	Root

lnoutlab	Coef.	Std. Err.	t	P>|t|	[9
lnlabor	-.0204951	.0345397	-0.59	0.556	-.0
_cons	4.999017	.42371	11.80	0.000	4

```
72 . predict e_z, residuals

73 .
74 . * regress lnoutput on lnlabor and predict the second resid
75 .
76 . reg lnoutput lnlabor
```

Source	SS	df	MS	Numbe
Model	89.8648125	1	89.8648125	F(1
Residual	5.47531855	49	.111741195	Prob
				R-squ
				Adj R
Total	95.340131	50	1.90680262	Root

lnoutput	Coef.	Std. Err.	t	P>|t|	[9
lnlabor	.9795049	.0345397	28.36	0.000	.9
_cons	4.999017	.42371	11.80	0.000	4

```
77 . predict e_y, residuals

78 .
79 . * regress lnoutlab on lnlabor and predict the third residu
80 .
81 . reg lncapital lnlabor
```

Source	SS	df	MS	Numbe
Model	90.0681184	1	90.0681184	F(1
Residual	7.5802578	49	.154699139	Prob
				R-squ
				Adj R
Total	97.6483762	50	1.95296752	Root

lncapital	Coef.	Std. Err.	t	P>|t|	[9
lnlabor	.9806122	.0406402	24.13	0.000	.8
_cons	2.132096	.4985469	4.28	0.000	1.

```
82 . predict e_t, residuals

83 .
84 . * Estimate the first covariance using the second and the f
85 .
86 . corr e_y e_z, covariance
   (obs=51)
```

	e_y	e_z
e_y	.109506	
e_z	.109506	.109506

```
87 . scalar scov1 = r(cov_12)

88 .
89 . * Estimate the second covariance using the third and the f
90 .
91 . corr e_t e_z, covariance
   (obs=51)
```

```
             |      e_t      e_z
-------------+------------------
         e_t |   .151605
         e_z |   .079029  .109506
```

```
 92 . scalar scov2 = r(cov_12)

 93 .
 94 . * Finally, divide the first covariance by the second covar
 95 .
 96 . scalar alpha_hat2 = scov1/scov2

 97 . display alpha_hat2
    1.3856551

 98 .
 99 .
100 .
    end of do-file

101 .
```