```
 1 . use "/Users/imisiaiyetan/Downloads/Table11_1.dta"
   (Married women's hours of work and related data)

 2 . do "/var/folders/13/xkzn5ncx4x12s95bhv8j20qw0000gn/T//SD00327.000000"

 3 . ***** Homework 8**********
 4 .
 5 . **** Solution to question b and c
 6 .
 7 . ***Import data from download folder****
 8 . use "/Users/imisiaiyetan/Downloads/Table11_1.dta"
   (Married women's hours of work and related data)

 9 .
10 . **** Generate the binary treatment variables******
11 .
12 . gen treat1 = 0

13 .
14 . replace treat1 =  1 if hwage >= 5
   (552 real changes made)

15 .
16 . gen treat2 = 0

17 .
18 . replace treat2 =  1 if wage >= 7
   (51 real changes made)

19 .
20 . gen treat3 = 0

21 .
22 . replace treat3 =  1 if unemployment  >= 5
   (703 real changes made)

23 .
24 . ***Question b*****
25 .
26 . ***Estimate the IV regression by running mrt on the binary treatment variables,
27 . ***** control variables and instrumental varibale
28 .
29 . ivregress 2sls mtr treat1 treat2 age heduc hsiblings  (siblings= treat3)

   Instrumental variables (2SLS) regression              Number of obs =     753
                                                         Wald chi2(6)  =  221.26
                                                         Prob > chi2   =  0.0000
                                                         R-squared     =       .
                                                         Root MSE      =  .09078

------------------------------------------------------------------------------
         mtr |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
    siblings |   .0271812   .0607782     0.45   0.655    -.0919418    .1463042
      treat1 |  -.0584407   .0229095    -2.55   0.011    -.1033425    -.013539
      treat2 |  -.0626907   .0391681    -1.60   0.109    -.1394588    .0140775
         age |  -.0008333   .0007985    -1.04   0.297    -.0023982    .0007317
       heduc |  -.0089675   .0011935    -7.51   0.000    -.0113066   -.0066283
   hsiblings |   -.005162   .0117717    -0.44   0.661    -.0282341     .01791
       _cons |   .8027829    .199089     4.03   0.000     .4125755    1.19299
------------------------------------------------------------------------------
Instrumented:  siblings
Instruments:   treat1 treat2 age heduc hsiblings treat3

30 .
31 . ****Alternative method is to use gmm approach*****
32 .
33 . ivregress gmm mtr treat1 treat2 age heduc hsiblings  (siblings= treat3)

Instrumental variables (GMM) regression               Number of obs =     753
                                                      Wald chi2(6)  =  226.51
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =       .
GMM weight matrix: Robust                             Root MSE      =  .09078

------------------------------------------------------------------------------
             |               Robust
         mtr |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    siblings |   .0271812   .0598936     0.45   0.650     -.090208    .1445704
      treat1 |  -.0584407   .0228697    -2.56   0.011    -.1032645    -.013617
      treat2 |  -.0626907    .039495    -1.59   0.112    -.1400995    .0147182
         age |  -.0008333   .0007484    -1.11   0.266       -.0023    .0006335
       heduc |  -.0089675   .0012995    -6.90   0.000    -.0115145   -.0064205
   hsiblings |   -.005162   .0115997    -0.45   0.656    -.0278971     .017573
       _cons |   .8027829   .1955154     4.11   0.000     .4195796    1.185986
------------------------------------------------------------------------------
Instrumented:  siblings
Instruments:   treat1 treat2 age heduc hsiblings treat3

34 .
35 . *****Question c******
36 .
37 . reg mtr treat1 treat2 treat3 age heduc hsiblings

      Source |       SS       df       MS              Number of obs =     753
-------------+------------------------------           F(  6,   746) =   66.30
       Model |  1.82334348     6  .303890579            Prob > F      =  0.0000
    Residual |  3.41922921   746  .004583417            R-squared     =  0.3478
-------------+------------------------------           Adj R-squared =  0.3425
       Total |  5.24257268   752  .006971506            Root MSE      =   .0677

------------------------------------------------------------------------------
         mtr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      treat1 |   -.067291   .0060121   -11.19   0.000    -.0790937   -.0554882
      treat2 |  -.0461611   .0099636    -4.63   0.000    -.0657211   -.0266012
```

```
      treat3 |  -.0061028   .0101769    -0.60   0.549    -.0260816    .0138761
         age |  -.0011407    .000311    -3.67   0.000    -.0017512   -.0005302
       heduc |  -.0088924    .000881   -10.09   0.000     -.010622   -.0071628
   hsiblings |   .0000467   .0010281     0.05   0.964    -.0019717     .002065
       _cons |   .8964564   .0205165    43.69   0.000     .8561794    .9367333
------------------------------------------------------------------------------

38 . predict e_z, residuals

39 . mat beta = e(b)

40 . svmat beta, names(matcol)

41 .
42 . reg siblings treat1 treat2 treat3 age heduc hsiblings

      Source |       SS       df       MS              Number of obs =     753
-------------+------------------------------           F(  6,   746) =    6.38
       Model |  196.411427     6  32.7352378           Prob > F      =  0.0000
    Residual |  3826.14103   746  5.12887538           R-squared     =  0.0488
-------------+------------------------------           Adj R-squared =  0.0412
       Total |  4022.55246   752  5.34913891           Root MSE      =  2.2647

------------------------------------------------------------------------------
    siblings |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      treat1 |  -.3256005   .2011154    -1.62   0.106      -.72042    .0692189
      treat2 |   .6081235   .3332966     1.82   0.068    -.0461875    1.262434
      treat3 |   -.224522   .3404345    -0.66   0.510    -.8928457    .4438017
         age |  -.0113107    .010403    -1.09   0.277    -.0317334     .009112
       heduc |   .0027604   .0294719     0.09   0.925    -.0550973    .0606181
   hsiblings |   .1916292   .0343924     5.57   0.000     .1241117    .2591467
       _cons |   3.446259   .6863091     5.02   0.000     2.098932    4.793586
------------------------------------------------------------------------------

43 . predict e_y, residuals

44 . mat gamma = e(b)

45 . svmat gamma, names(matcol)

46 .
47 . scalar alpha_hat1 = betatreat3/gammatreat3

48 . display alpha_hat1
.02718123

49 .
50 . reg treat3 treat1 treat2 age heduc hsiblings

      Source |       SS       df       MS              Number of obs =     753
-------------+------------------------------           F(  5,   747) =    8.19
       Model |  2.42569724     5  .485139447           Prob > F      =  0.0000
    Residual |  44.2542496   747  .059242637           R-squared     =  0.0520
```

```
-------------+------------------------------           Adj R-squared =  0.0456
       Total |  46.6799469   752  .062074397           Root MSE      =   .2434

------------------------------------------------------------------------------
      treat3 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      treat1 |   .1263408   .0211147     5.98   0.000     .0848895    .1677921
      treat2 |   .0103424   .0358189     0.29   0.773    -.0599754    .0806602
         age |  -.0004761   .0011179    -0.43   0.670    -.0026707    .0017186
       heduc |  -.0001401   .0031675    -0.04   0.965    -.0063583    .0060781
   hsiblings |  -.0032171   .0036944    -0.87   0.384    -.0104698    .0040357
       _cons |   .8733817   .0664794    13.14   0.000      .742873    1.00389
------------------------------------------------------------------------------

51 . predict e_t, residuals

52 .
53 . * Estimate the first covariance using the second and the first residuals
54 .
55 . corr e_y e_z, covariance
(obs=753)

             |      e_y      e_z
-------------+------------------
         e_y |  5.08795
         e_z |  .000997  .004547


56 . scalar scov1 = r(cov_12)

57 .
58 . * Estimate the second covariance using the third and the first residuals
59 .
60 . corr e_t e_z, covariance
(obs=753)

             |      e_t      e_z
-------------+------------------
         e_t |  .058849
         e_z |  2.4e-11  .004547


61 . scalar scov2 = r(cov_12)

62 .
63 . * Finally, divide the first covariance by the second covariance.
64 .
65 . scalar alpha_hat2 = scov1/scov2

66 . display alpha_hat2
41319651

67 .
end of do-file
```

```
68 .
```