```
 1 . use "/Users/imisiaiyetan/Downloads/Table11_1.dta", clear
   (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 .
40 . reg siblings treat1 treat2 treat3 age heduc hsiblings
```

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

```
41 . predict e_y, residuals

42 .
43 . reg treat3 treat1 treat2 age heduc hsiblings
```

Source	SS	df	MS		
Model	2.42569724	5	.485139447	Number of obs	753
Residual	44.2542496	747	.059242637	F(5, 747)	8.19
				Prob > F	0.0000
Total	46.6799469	752	.062074397	R-squared	0.0520
				Adj R-squared	0.0456
				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

```
44 . predict e_t, residuals

45 .
46 . * Estimate the first covariance using the second and the first residuals
47 .
48 . corr e_y e_z, covariance
   (obs=753)

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


49 . scalar scov1 = r(cov_12)

50 .
51 . * Estimate the second covariance using the third and the first residuals
52 .
53 . corr e_t e_z, covariance
   (obs=753)

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


54 . scalar scov2 = r(cov_12)

55 .
56 . * Finally, divide the first covariance by the second covariance.
57 .
58 . scalar alpha_hat2 = scov1/scov2

59 . display alpha_hat2
   41319651

60 .
   end of do-file

61 .
```