PUBPOL 639: ASSIGNMENT 4 - Solutions

Due: Friday, April 1st at the start of class

PART II – The Conditional Expectation Function

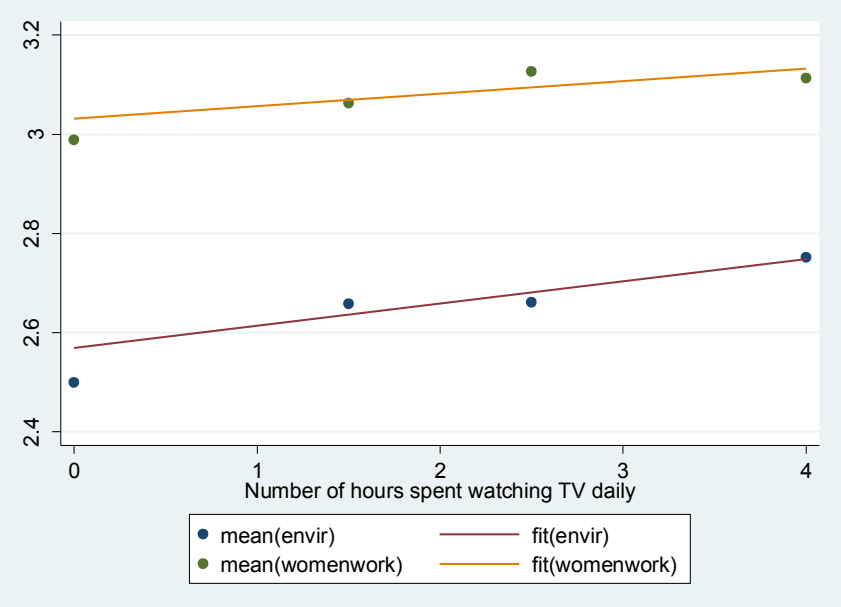
1. Table 2 presents regression estimates from bivariate regressions of environmental concern and support for working women on hours of television viewed daily. Columns (1) and (2) are estimated on individual data and columns (3) and (4) are estimated on aggregate data, where each observation corresponds to an average for each possible value of hours of TV viewing per day. The regression coefficients for the individual and aggregate regressions are identical.

Table 2. Results of OLS Regression of Environmental Concern and Support for Women's Rights on TV Viewing

	Individual Analysis		Aggregated Analysis	
	Environmental concern	Support for women working	Environmental concern	Support for women working
Regressor	(1)	(2)	(3)	(4)
Hours of TV viewing per day	0.0450***	0.0252***	0.0450*	0.0252
	(0.006)	(0.006)	(0.012)	(0.011)
Constant	2.569***	3.032***	2.569***	3.032***
	(0.016)	(0.016)	(0.041)	(0.026)
Observations	17518	17518	4	4
Adjusted R-squared	0.003	0.001	0.74	0.406

Notes: Robust standard errors are in parentheses under coefficients. The individual coefficient is statistically significant at the *** 1% level, ** 5% level, or *10% level of significance using a two-sided t-test. Data comes from the World Values Survey and includes a sample of individuals in Eastern European, former Soviet, and Balkan counties. Observations in columns (3) and (4) represent averages for each possible value of hours of TV viewing per day.

2. Plot the conditional expectation functions and the (appropriately weighted) fitted OLS lines.



3. In these regressions, we have implicitly assumed that the relationship between outcomes and television viewing is linear. The predicted difference in outcomes between 0 and 1.5 hours of television daily is the same as that between 2.5 and 4 hours daily. From the graph, this doesn't seem like a terrible assumption. However, a nonlinear relationship with a steeper slope when going from no television to some television would probably fit the data better. This would be consistent with diminishing returns to each additional hour of TV viewed.

PART I: Memo on Media Access, Environmental Concerns, and Views about Women's Rights

Overview

Some people believe that increasing access to the media may increase people's awareness of global problems (e.g. global warming and environmental pollution) and promote more progressive values (e.g. gender equality). This memo assesses this theory by examining the relationship between media access (as proxied by television viewing) and views about the environment and women's rights. I analyze data from the World Values Survey from 1995-1998.

Summary of Findings

Table 1 presents results from OLS regressions of environmental concern and support for working women on hours of television viewed per day and various controls. Both outcomes are measured on a four-point scale. The unadjusted regressions (columns (1) and (3)) indicate that each additional hour of daily TV viewing is associated with a 0.045 point increase in environmental concern and a 0.025 point increase in support for working women. These estimates change very little when controls for education, age, sex, and town size are included, as is done in columns (2) and (4). Controlling for these four factors, each additional hour of daily TV viewing is associated with a 0.042 point increase in environmental concern and a 0.024 point increase in support for working women. Both coefficients are different from zero at a 99% level of confidence. Each additional hour of TV is associated with a change in outcomes that is similar to 15 and 17% of the adjusted outcome difference between college graduates and high school dropouts for environmental concern and working women support, respectively. These findings are strongly consistent with the theory that greater media access may increase awareness of global problems and promote gender equality.

Limitations

There are two main limitations of this analysis. First, hours of television viewing is not randomly assigned so there may be other factors that should be controlled for. Failing to control for income and the level of development of respondents' country may cause the relationship between these outcomes and TV viewership to be overstated. Second, the results may not generalize to other populations or time periods. The relationship between media access and beliefs or values may differ in Eastern Europe and Latin America and may have changed due to the spread of the internet since this data was collected.

Table 1. Results of OLS Regression of Environmental Concern and Support for Women's Rights on TV Viewing

	Dependent variable			
	Environmental concern		Support for women working	
Regressor	(1)	(2)	(3)	(4)
Hours of TV viewing per day	0.0450***	0.0415***	0.0252***	0.0239***
	(0.006)	(0.006)	(0.006)	(0.006)
High school education		0.142***		0.130***
		(0.016)		(0.016)
College education		0.270***		0.137***
		(0.020)		(0.020)
Age		-0.0023***		-0.0013***
		(0.0004)		(0.0004)
Male		-0.026**		-0.121***
		(0.013)		(0.013)
Townsize (million)		-0.0108		-0.162***
		(0.0356)		(0.036)
Constant	2.569***	2.568***	3.032***	3.080***
	(0.016)	(0.029)	(0.016)	(0.029)
Adjusted R-squared	0.003	0.020	0.001	0.012

Notes: Robust standard errors are in parentheses under coefficients. The individual coefficient is statistically significant at the *** 1% level, ** 5% level, or *10% level of significance using a two-sided t-test. Data comes from the World Values Survey and includes a sample of individuals in Eastern European, former Soviet, and Balkan counties. All regressions have 17,518 observations.

Do file

```
#delimit ;
clear all;
set mem 1g;
set more off;
capture log close;
log using assignment4solns.log, text replace;

* Load dataset;
use wvs_micro.dta;
desc;

* Part I - regressions with micro data
* ------------------------------------;
reg envir tvhours, robust;
outreg2 using assignment4a.txt, adjr2 replace;
outreg2 using assignment4c.txt, adjr2 replace;

reg envir tvhours educ_hs educ_coll, robust;
outreg2 using assignment4a.txt, adjr2 append;

reg envir tvhours educ_hs educ_coll age, robust;
outreg2 using assignment4a.txt, adjr2 append;

reg envir tvhours educ_hs educ_coll age male, robust;
outreg2 using assignment4a.txt, adjr2 append;

reg envir tvhours educ_hs educ_coll age male townsize, robust;
outreg2 using assignment4a.txt, adjr2 append;

reg womenwork tvhours, robust;
outreg2 using assignment4b.txt, adjr2 replace;
outreg2 using assignment4c.txt, adjr2 append;

reg womenwork tvhours educ_hs educ_coll, robust;
outreg2 using assignment4b.txt, adjr2 append;

reg womenwork tvhours educ_hs educ_coll age, robust;
outreg2 using assignment4b.txt, adjr2 append;

reg womenwork tvhours educ_hs educ_coll age male, robust;
outreg2 using assignment4b.txt, adjr2 append;

reg womenwork tvhours educ_hs educ_coll age male townsize, robust;
outreg2 using assignment4b.txt, adjr2 append;

* Part II - regressions with collapsed data
* -----------------------------------------;
collapse (count) count=country (mean) envir women, by(tvhours);


reg envir tvhours [aweight=count], robust;
outreg2 using assignment4c.txt, adjr2 append;

reg womenwork tvhours [aweight=count], robust;
outreg2 using assignment4c.txt, adjr2 append;

twoway scatter envir tvhours || lfit envir tvhours [aw = count] ||
       scatter womenwork tvhours || lfit womenwork tvhours [aw = count] ||,
       legend( lab(1 "mean(envir)") lab(2 "fit(envir)") lab(3 "mean(womenwork)") lab(4
"fit(womenwork)"));
graph export graph4_1.wmf, replace;


log close;
```

Log file

```
. * Load dataset;
. use wvs_micro.dta;

. desc;

Contains data from wvs_micro.dta
  obs:        17,518
 vars:            39                          7 Mar 2011 23:01
 size:     1,313,850 (99.9% of memory free)
-------------------------------------------------------------------------------
              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
country         int    %8.0g       s003       country/region
year            int    %8.0g       s020       year survey
countryyear     long   %12.0g      s025       country - year
age             byte   %8.0g       x003       age
educ            byte   %8.0g       x025       highest educational level attained
townsizeg       byte   %8.0g       x049       size of town
envir           float  %9.0g                  Support for tax increase to fund pollution
                                                reduction
womenwork       float  %9.0g                  Agree that working mother can be good
                                                parent
educ_nohs       float  %9.0g                  Did not complete secondary education
educ_hs         float  %9.0g                  Completed secondary education, no college
educ_coll       float  %9.0g                  Obtained some postsecondary education
townsize        float  %9.0g                  size of town, 1000
tvhours         float  %9.0g                  Number of hours spent watching TV daily
tvany           float  %9.0g                  Watch any TV
male            float  %9.0g                   1 = male, 0 = female
c_1             byte   %8.0g                  country=="albania"
c_2             byte   %8.0g                  country=="bosnia and herzegovina"
c_3             byte   %8.0g                  country=="bulgaria"
c_4             byte   %8.0g                  country=="belarus"
c_5             byte   %8.0g                  country=="hungary"
c_6             byte   %8.0g                  country=="latvia"
c_7             byte   %8.0g                  country=="lithuania"
c_8             byte   %8.0g                  country=="moldova"
c_9             byte   %8.0g                  country=="poland"
c_10            byte   %8.0g                  country=="romania"
c_11            byte   %8.0g                  country=="russian federation"
c_12            byte   %8.0g                  country=="slovakia"
c_13            byte   %8.0g                  country=="slovenia"
c_14            byte   %8.0g                  country=="ukraine"
c_15            byte   %8.0g                  country=="macedonia"
c_16            byte   %8.0g                  country=="serbia and montenegro"
size_1          byte   %8.0g                  townsize== 1.5000
size_2          byte   %8.0g                  townsize== 3.5000
size_3          byte   %8.0g                  townsize== 7.5000
size_4          byte   %8.0g                  townsize== 15.0000
size_5          byte   %8.0g                  townsize== 35.0000
size_6          byte   %8.0g                  townsize== 75.0000
size_7          byte   %8.0g                  townsize== 300.0000
size_8          byte   %8.0g                  townsize== 500.0000
-------------------------------------------------------------------------------
Sorted by:

. * Part I - regressions with micro data
> * ----------------------------------;
. reg envir tvhours, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  1, 17516) =   56.05
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0033
                                                       Root MSE      =   .8609

------------------------------------------------------------------------------
```

```
             |               Robust
       envir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |    .045008   .0060117     7.49   0.000     .0332245    .0567916
       _cons |   2.568826   .0156329   164.32   0.000     2.538183    2.599468
------------------------------------------------------------------------------

. outreg2 using assignment4a.txt, adjr2 replace;
dir : seeout

. outreg2 using assignment4c.txt, adjr2 replace;
dir : seeout

. reg envir tvhours educ_hs educ_coll, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  3, 17514) =  107.91
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0184
                                                       Root MSE      =  .85441

------------------------------------------------------------------------------
             |               Robust
       envir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0412061   .0059852     6.88   0.000     .0294746    .0529377
     educ_hs |   .1666083   .0149291    11.16   0.000     .1373458    .1958707
   educ_coll |   .2915593   .0183651    15.88   0.000     .2555618    .3275568
       _cons |   2.440301   .0177687   137.34   0.000     2.405473     2.47513
------------------------------------------------------------------------------

. outreg2 using assignment4a.txt, adjr2 append;
dir : seeout

. reg envir tvhours educ_hs educ_coll age, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  4, 17513) =   89.83
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0200
                                                       Root MSE      =  .85374

------------------------------------------------------------------------------
             |               Robust
       envir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0412715   .0059802     6.90   0.000     .0295497    .0529932
     educ_hs |   .1411468   .0157906     8.94   0.000     .1101957     .172098
   educ_coll |   .2687263   .0189765    14.16   0.000     .2315305     .305922
         age |  -.0022797   .0004332    -5.26   0.000    -.0031288   -.0014306
       _cons |   2.555621      .0285    89.67   0.000     2.499758    2.611484
------------------------------------------------------------------------------

. outreg2 using assignment4a.txt, adjr2 append;
dir : seeout

. reg envir tvhours educ_hs educ_coll age male, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  5, 17512) =   72.77
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0202
                                                       Root MSE      =  .85367

------------------------------------------------------------------------------
             |               Robust
       envir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0413296   .0059799     6.91   0.000     .0296085    .0530507
     educ_hs |   .1413356   .0157896     8.95   0.000     .1103865    .1722848
   educ_coll |   .2684601   .0189783    14.15   0.000     .2312608    .3056594
```

```
         age |  -.0022888   .0004332    -5.28   0.000    -.0031378   -.0014397
        male |  -.0261305    .012964    -2.02   0.044    -.0515412   -.0007199
       _cons |   2.568113   .0291615    88.07   0.000     2.510954    2.625272
------------------------------------------------------------------------------

. outreg2 using assignment4a.txt, adjr2 append;
dir : seeout

. reg envir tvhours educ_hs educ_coll age male townsize, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  6, 17511) =   60.64
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0202
                                                       Root MSE      =  .85369

------------------------------------------------------------------------------
             |               Robust
       envir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0415106     .00601     6.91   0.000     .0297304    .0532908
     educ_hs |   .1421197   .0160324     8.86   0.000     .1106947    .1735448
   educ_coll |   .2699705   .0196224    13.76   0.000     .2315086    .3084324
         age |  -.0022795    .000434    -5.25   0.000    -.0031302   -.0014288
        male |  -.0262702   .0129651    -2.03   0.043    -.0516831   -.0008572
    townsize |  -.0000108   .0000356    -0.30   0.762    -.0000805     .000059
       _cons |   2.568179   .0291627    88.06   0.000     2.511018    2.625341
------------------------------------------------------------------------------

. outreg2 using assignment4a.txt, adjr2 append;
dir : seeout

. reg womenwork tvhours, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  1, 17516) =   17.27
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0010
                                                       Root MSE      =  .86619

------------------------------------------------------------------------------
             |               Robust
   womenwork |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0251987   .0060634     4.16   0.000     .0133139    .0370835
       _cons |   3.031834   .0158273   191.56   0.000     3.000811    3.062857
------------------------------------------------------------------------------

. outreg2 using assignment4b.txt, adjr2 replace;
dir : seeout

. outreg2 using assignment4c.txt, adjr2 append;
dir : seeout

. reg womenwork tvhours educ_hs educ_coll, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  3, 17514) =   34.14
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0060
                                                       Root MSE      =  .86407

------------------------------------------------------------------------------
             |               Robust
   womenwork |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0208389   .0060856     3.42   0.001     .0089105    .0327674
     educ_hs |   .1323686   .0152433     8.68   0.000     .1024901     .162247
   educ_coll |   .1290713   .0185859     6.94   0.000     .0926412    .1655014
       _cons |   2.953255   .0180955   163.20   0.000     2.917786    2.988724
------------------------------------------------------------------------------
```

```
. outreg2 using assignment4b.txt, adjr2 append;
dir : seeout

. reg womenwork tvhours educ_hs educ_coll age, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  4, 17513) =   28.41
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0066
                                                       Root MSE      =  .86385

------------------------------------------------------------------------------
             |               Robust
   womenwork |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0208781   .0060836     3.43   0.001     .0089537    .0328026
     educ_hs |    .117087   .0160754     7.28   0.000     .0855776    .1485963
   educ_coll |   .1153672   .0191252     6.03   0.000     .0778799    .1528545
         age |  -.0013683    .000437    -3.13   0.002    -.0022249   -.0005117
       _cons |   3.022468   .0288041   104.93   0.000     2.966009    3.078927
------------------------------------------------------------------------------

. outreg2 using assignment4b.txt, adjr2 append;
dir : seeout

. reg womenwork tvhours educ_hs educ_coll age male, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  5, 17512) =   39.64
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0113
                                                       Root MSE      =  .86184

------------------------------------------------------------------------------
             |               Robust
   womenwork |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0211424   .0060638     3.49   0.000     .0092567     .033028
     educ_hs |    .117945   .0160306     7.36   0.000     .0865235    .1493665
   educ_coll |   .1141578   .0190905     5.98   0.000     .0767385    .1515771
         age |  -.0014094   .0004362    -3.23   0.001    -.0022643   -.0005545
        male |  -.1187484   .0130708    -9.09   0.000    -.1443684   -.0931284
       _cons |   3.079238   .0294144   104.68   0.000     3.021583    3.136894
------------------------------------------------------------------------------

. outreg2 using assignment4b.txt, adjr2 append;
dir : seeout

. reg womenwork tvhours educ_hs educ_coll age male townsize, robust;

Linear regression                                      Number of obs =   17518
                                                       F(  6, 17511) =   36.61
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.0124
                                                       Root MSE      =  .86137

------------------------------------------------------------------------------
             |               Robust
   womenwork |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0238621   .0060805     3.92   0.000     .0119437    .0357804
     educ_hs |   .1297291   .0162348     7.99   0.000     .0979072    .1615509
   educ_coll |   .1368572   .0196732     6.96   0.000     .0982957    .1754187
         age |  -.0012701   .0004366    -2.91   0.004     -.002126   -.0004142
        male |  -.1208469   .0130657    -9.25   0.000     -.146457   -.0952368
    townsize |  -.0001617   .0000362    -4.47   0.000    -.0002326   -.0000908
       _cons |   3.080232   .0294167   104.71   0.000     3.022573    3.137892
------------------------------------------------------------------------------

. outreg2 using assignment4b.txt, adjr2 append;
```

```
dir : seeout

. * Part II - regressions with collapsed data
> * ---------------------------------------;
. collapse (count) count=country (mean) envir women, by(tvhours);

. reg envir tvhours [aweight=count], robust;
(sum of wgt is   1.7518e+04)

Linear regression                                      Number of obs =       4
                                                       F(  1,     2) =   14.08
                                                       Prob > F      =  0.0642
                                                       R-squared     =  0.8268
                                                       Root MSE      =  .03213

------------------------------------------------------------------------------
             |               Robust
       envir |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |    .045008   .0119933     3.75   0.064    -.0065951    .0966112
       _cons |   2.568826   .0406335    63.22   0.000     2.393994    2.743657
------------------------------------------------------------------------------

. outreg2 using assignment4c.txt, adjr2 append;
dir : seeout

. reg womenwork tvhours [aweight=count], robust;
(sum of wgt is   1.7518e+04)

Linear regression                                      Number of obs =       4
                                                       F(  1,     2) =    5.03
                                                       Prob > F      =  0.1541
                                                       R-squared     =  0.6041
                                                       Root MSE      =  .03182

------------------------------------------------------------------------------
             |               Robust
   womenwork |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     tvhours |   .0251987   .0112354     2.24   0.154    -.0231431    .0735405
       _cons |   3.031834   .0258628   117.23   0.000     2.920555    3.143112
------------------------------------------------------------------------------

. outreg2 using assignment4c.txt, adjr2 append;
dir : seeout

. twoway scatter envir tvhours || lfit envir tvhours [aw = count] ||
>         scatter womenwork tvhours || lfit womenwork tvhours [aw = count] ||,
>         legend( lab(1 "mean(envir)") lab(2 "fit(envir)") lab(3 "mean(womenwork)") lab(
> 4 "fit(womenwork)"));

. graph export graph4_1.wmf, replace;

. log close;
-------------------------------------------------------------------------------------------
```