Package Name: Biprobit

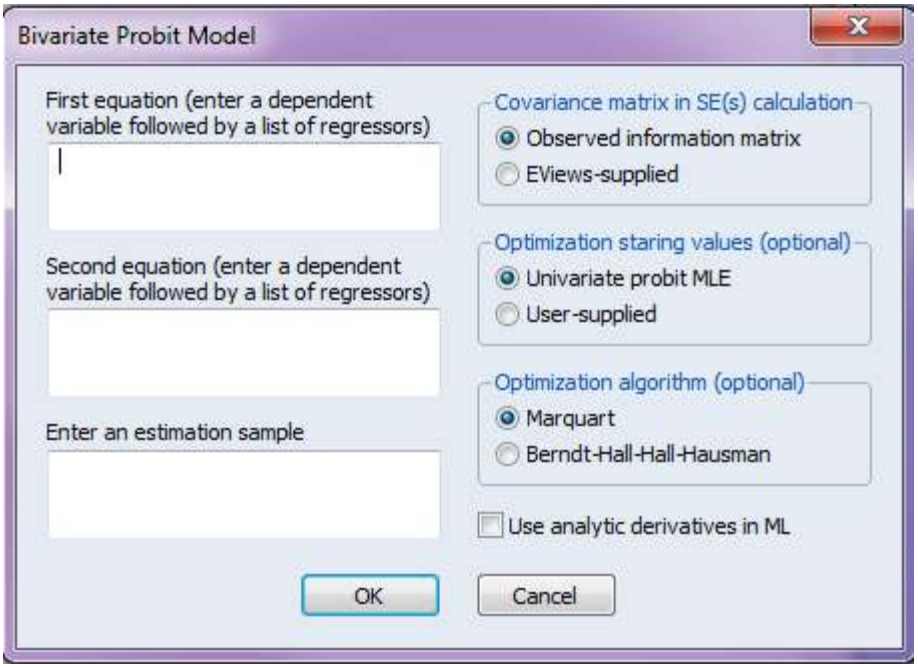
Author: IHS, EViews

Date: 2010/09/28

Add-in Type: Global
Default Proc Name: biprobit
Default Menu Text: Bivariate Probit Model
Interface: Dialog and command line.

Description: This add-in performs the bivariate probit model, in the same spirit as the seemingly unrelated regression models, by using a maximum likelihood procedure. Estimation output for a two probit equation model is given, along with some summary statistics.

Dialog: Upon running the add-in from the menus, a dialog will appear asking the user to specify the bivariate probit model:



In the first box, you should specify the dependent variable for the first probit equation, followed by a (space delimited) list of regressors. In the second box you should do the same equation specification. The final box on the left lets you set the sample for the estimation.

The “Covariance matrix in SE(s) calculation” combo lets you choose the type of a covariance matrix which is required in SE calculation. In particular, the “Observed

information matrix" is the inverse of the negative Hessian and the "EViews-supplied" matrix is the outer product of gradients. For the gradient calculation, the "Use analytic derivatives in ML" checkbox lets you specify whether to use analytic derivatives or numeric derivatives. Note that numeric derivatives can be faster, but may not converge as well.

The "Optimization starting values" and "Optimization algorithm" combos let you choose the starting values and the type of hill-climbing method, respectively, which will be used in the maximum likelihood procedure.

Once you hit "OK", a display of the estimation results will appear.

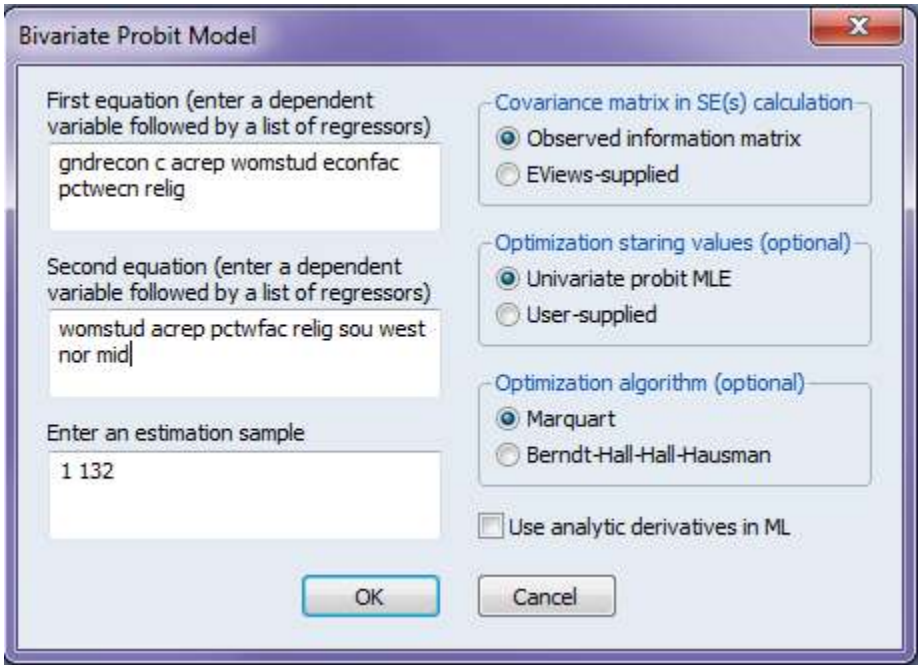
Examples:

As an example we will use the Burnett (1997)'s Liberal Arts College Economics Courses data from Greene (1998). By running the following command,

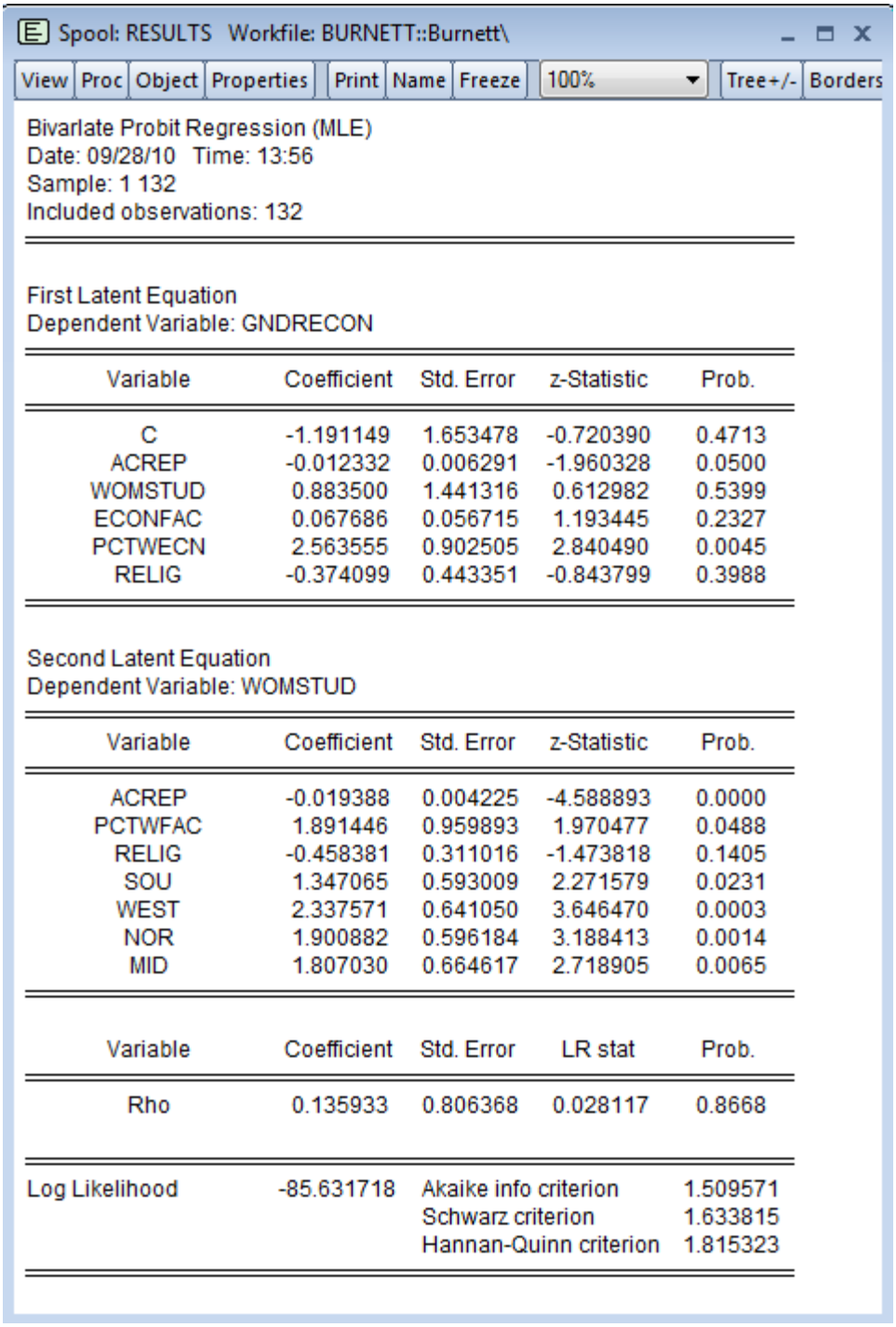
wfopen http://www.stern.nyu.edu/~wgreene/Text/Edition6/Burnett.txt rectype=streamed, recfields=11, delim=" ,"

EViews will put the data in its workfile.

Then, specify the bivariate probit model as follows:



The results will look like this:



Spool: RESULTS Workfile: BURNETT::Burnett\

View | Proc | Object | Properties | Print | Name | Freeze | 100% | Tree+/- | Borders

Bivarlate Probit Regression (MLE)
Date: 09/28/10 Time: 13:56
Sample: 1 132
Included observations: 132

First Latent Equation
Dependent Variable: GNDRECON

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.191149	1.653478	-0.720390	0.4713
ACREP	-0.012332	0.006291	-1.960328	0.0500
WOMSTUD	0.883500	1.441316	0.612982	0.5399
ECONFAC	0.067686	0.056715	1.193445	0.2327
PCTWECN	2.563555	0.902505	2.840490	0.0045
RELIG	-0.374099	0.443351	-0.843799	0.3988

Second Latent Equation
Dependent Variable: WOMSTUD

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ACREP	-0.019388	0.004225	-4.588893	0.0000
PCTWFAC	1.891446	0.959893	1.970477	0.0488
RELIG	-0.458381	0.311016	-1.473818	0.1405
SOU	1.347065	0.593009	2.271579	0.0231
WEST	2.337571	0.641050	3.646470	0.0003
NOR	1.900882	0.596184	3.188413	0.0014
MID	1.807030	0.664617	2.718905	0.0065

Variable	Coefficient	Std. Error	LR stat	Prob.
Rho	0.135933	0.806368	0.028117	0.8668

Log Likelihood	-85.631718	Akaike info criterion	1.509571
		Schwarz criterion	1.633815
		Hannan-Quinn criterion	1.815323

For another example of a bivariate probit model, we use the health care utilization data from Greene (2008, p. 822). The dataset is available either on *Journal of Applied Econometrics Data Archive* (http://econ.queensu.ca/jae/2003-v18.4/riphahn-wambach-million/).

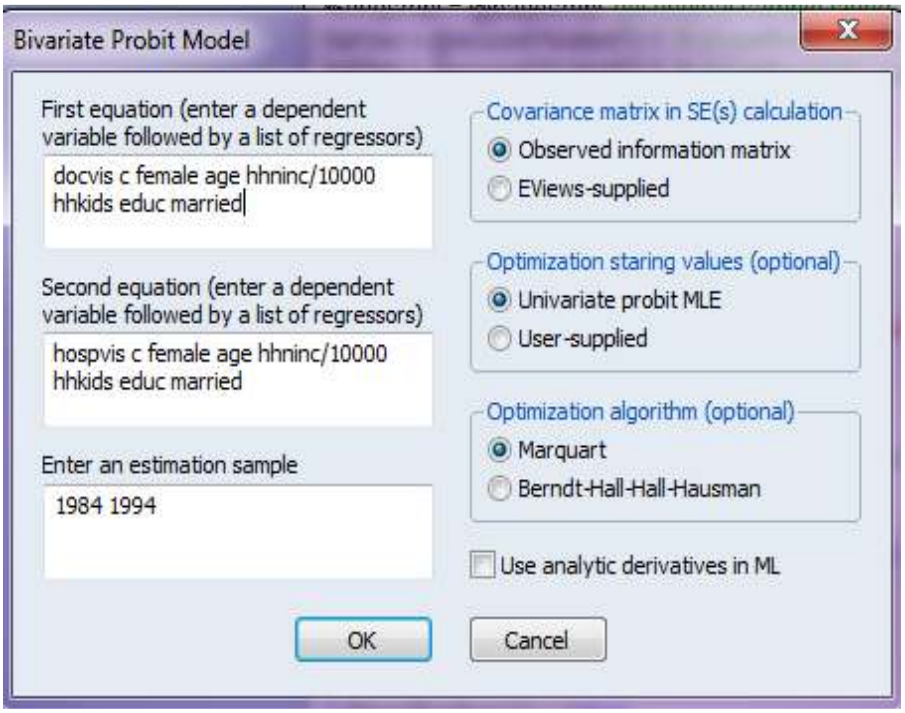
Once you download the dataset, you can put this data into EViews by running the following command:

```
wfopen "c:\data storage\rwm.data" names=(id, female, year, age, hsat, handdum, handper, hhninc, hhkids, educ, married, haupts, reals, fachhs, abitur, univ, working, bluec, whitec, self, beamt, docvis, hospvis, public, addon)
```

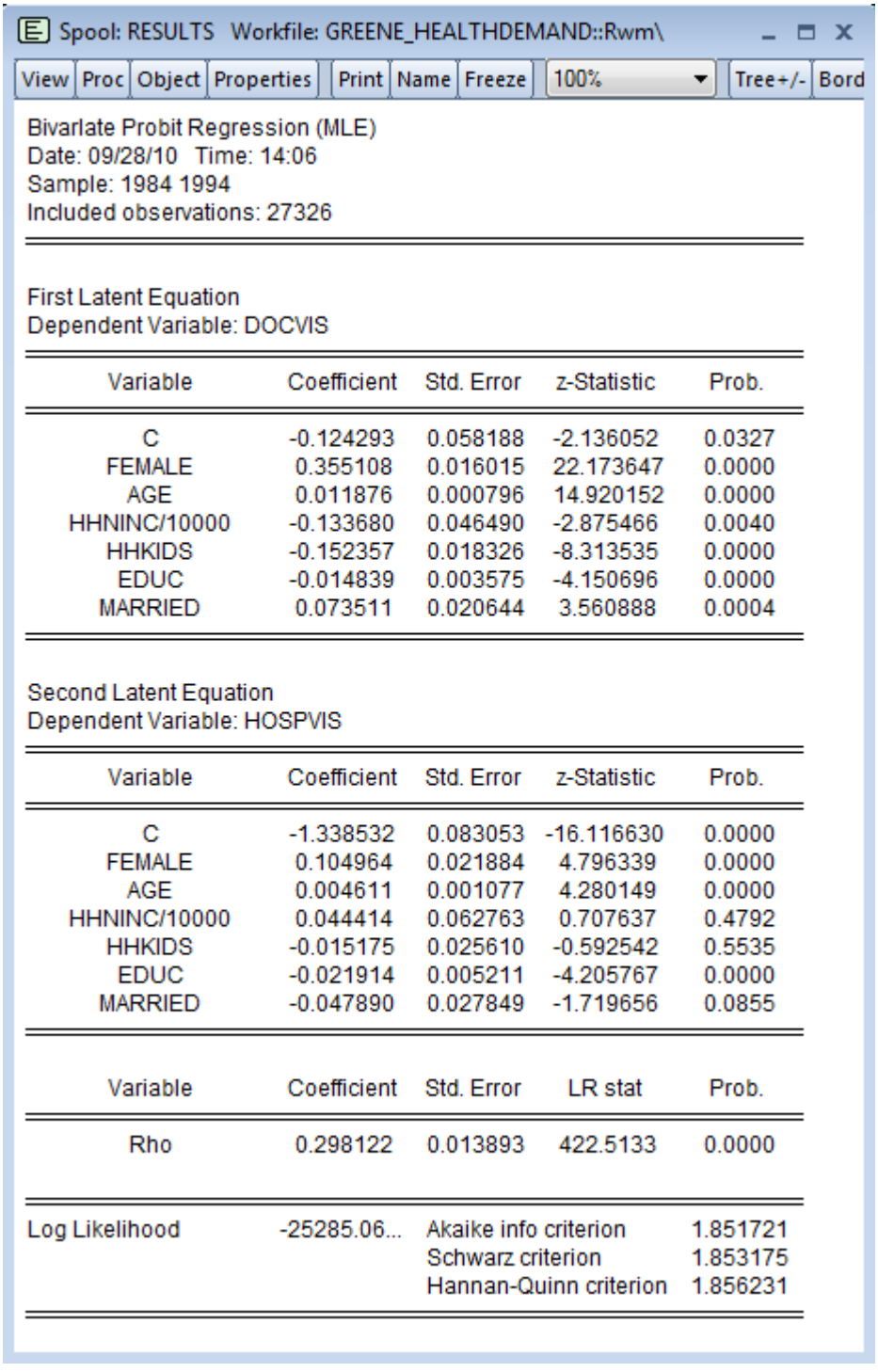
To make the binary response variable, we run the following commands:

```
series hospvis = hospvis>0
series docvis = docvis>0
```

Then, specify the bivariate probit model as follows:



The results will look like this:



Spool: RESULTS Workfile: GREENE_HEALTHDEMAND::Rwm\

View | Proc | Object | Properties | Print | Name | Freeze | 100% | Tree+/- | Bord

Bivarlate Probit Regression (MLE)
Date: 09/28/10 Time: 14:06
Sample: 1984 1994
Included observations: 27326

First Latent Equation
Dependent Variable: DOCVIS

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.124293	0.058188	-2.136052	0.0327
FEMALE	0.355108	0.016015	22.173647	0.0000
AGE	0.011876	0.000796	14.920152	0.0000
HHNINC/10000	-0.133680	0.046490	-2.875466	0.0040
HHKIDS	-0.152357	0.018326	-8.313535	0.0000
EDUC	-0.014839	0.003575	-4.150696	0.0000
MARRIED	0.073511	0.020644	3.560888	0.0004

Second Latent Equation
Dependent Variable: HOSPVIS

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.338532	0.083053	-16.116630	0.0000
FEMALE	0.104964	0.021884	4.796339	0.0000
AGE	0.004611	0.001077	4.280149	0.0000
HHNINC/10000	0.044414	0.062763	0.707637	0.4792
HHKIDS	-0.015175	0.025610	-0.592542	0.5535
EDUC	-0.021914	0.005211	-4.205767	0.0000
MARRIED	-0.047890	0.027849	-1.719656	0.0855

Variable	Coefficient	Std. Error	LR stat	Prob.
Rho	0.298122	0.013893	422.5133	0.0000

Log Likelihood	-25285.06...	Akaike info criterion	1.851721
		Schwarz criterion	1.853175
		Hannan-Quinn criterion	1.856231

Reference:

Green, W. (1998) “Gender Economics Courses in Liberal Arts Colleges: Further Results,” *Journal of Economic Education* 29, 4, pp. 291-300.

Greene, W. (2008) “Econometric Analysis,” Prentice Hall, 6th Edition.

Command line:

biprobit(options) equation1_spec @ equation2_spec

Options:

st	use a constant vector *c* for starting values (default is univariate Probit MLEs)
b	use Berndt-Hall-Hall-Hausman (BHHH) algorithm (default is Marquardt).
d	use analytic derivatives
h	use the EViews supplied covariance matrix in standard errors calculation