Description Remarks and examples Also see

Description

Interval regression is demonstrated using intregxmpl.dta:

. use https://www.stata-press.com/data/r19/intregxmpl (Wages of women)

See Structural models 1: Linear regression in [SEM] Intro 5 for background.

Remarks and examples

Remarks are presented under the following headings:

Fitting interval regression models Fitting the model with the Builder

Fitting interval regression models

The first example in [R] intreg is

. intreg wage1 wage2 age c.age#c.age nev_mar rural school tenure

This model corresponds to



Interval measure information does not appear in the path diagram by default. It can be added to the path diagram by customizing the appearance of wage1 in the Builder. The Builder reports the interval measure information for wage1 in the Details pane.

To fit this model with gsem, we type

. gsem wage1 < > family(gauss	<- age c.age#c sian, udepvar(.age nev_ma wage2))	r rural :	school t	enure,	
Refining start	ing values:					
Grid node 0:	Log likelihoo	d = -856.59	446			
Fitting full m	nodel:					
Iteration 0: Iteration 1: Iteration 2: Iteration 3:	Log likelihoo Log likelihoo Log likelihoo Log likelihoo	d = -856.59 $d = -856.33$ $d = -856.33$ $d = -856.33$	446 321 293 293			
Generalized st Lower response Upper response Family: Link: Log likelihood	cructural equa e: wage1 e: wage2 Gaussian Identity d = -856.33293	tion model			Number of obs Uncens Left-cens Right-cens Interval-c	= 488 ored = 0 ored = 14 ored = 6 ens. = 468
	Coefficient	Std. err.	Z	P> z	[95% conf.	interval]
wage1						
age	.7914438	.4433604	1.79	0.074	0775265	1.660414
c.age#c.age	0132624	.0073028	-1.82	0.069	0275757	.0010509
nev mar	2075022	.8119581	-0.26	0.798	-1.798911	1.383906
rural	-3.043044	.7757324	-3.92	0.000	-4.563452	-1.522637
school	1.334721	.1357873	9.83	0.000	1.068583	1.600859
tenure	.8000664	.1045077	7.66	0.000	.5952351	1.004898
_cons	-12.70238	6.367117	-1.99	0.046	-25.1817	2230584
var(e.wage1)	53.28454	3.693076			46.51635	61.0375

Notes:

- 1. Just like intreg, gsem requires two dependent variables for fitting interval regression models. The udepvar() suboption in family(gaussian) allows you to specify the dependent variable containing the upper-limit values for the interval regression. Consequently, the dependent variable participating in the path specification necessarily contains the lower-limit values.
- 2. Reported coefficients match those reported by intreg.
- 3. Reported standard errors (SEs) match those reported by intreg.
- 4. gsem reports the point estimate of e.wage1 as 53.28454. This is an estimate of σ^2 , the error variance. intreg reports an estimated σ as 7.299626. And $\sqrt{53.28454} = 7.299626$.

Fitting the model with the Builder

Use the diagram in Fitting interval regression models above for reference.

1. Open the dataset.

In the Command window, type

. use https://www.stata-press.com/data/r19/intregxmpl

2. Open a new Builder diagram.

Select menu item Statistics > SEM (structural equation modeling) > Model building and estimation.

- 3. Put the Builder in gsem mode by clicking on the $\frac{G}{SEM}$ button.
- 4. Create the independent variables.

Select the Add observed variables set tool, "", and then click in the diagram about one-fourth of the way in from the left and one-fourth of the way up from the bottom.

In the resulting dialog box,

- a. select the Select variables radio button (it may already be selected);
- b. type the following variable names in the Variables control: age, c.age#c.age, nev_mar, rural, school, and tenure;
- c. select Vertical in the Orientation control; and
- d. click on OK.

If you wish, move the set of variables by clicking on any variable and dragging it.

- 5. Create the interval responses.
 - a. Select the Add generalized response variable tool, \Box .
 - b. Click about one-third of the way in from the right side of the diagram, to the right of the nev_mar rectangle.
 - c. In the Contextual Toolbar, select Gaussian, Identity in the Family/Link control (it may already be selected).
 - d. In the Contextual Toolbar, use the Variable control to select the variable wage1.
 - e. In the Contextual Toolbar, click on the Properties... button.
 - f. In the resulting *Variable properties* dialog box, click on the **Censoring...** button in the **Variable** tab.
 - g. In the resulting *Censoring* dialog box, select the *Interval-measured*, *depvar is lower boundary* radio button. In the resulting *Interval-measured* box below, use the *Upper bound* control to select the variable wage2.
 - h. Click on **OK** in the *Censoring* dialog box, and then click on **OK** in the *Variable properties* dialog box. The Details pane will now show that wage1 is the lower bound and wage2 is the upper bound of our interval measure.
- 6. Create paths from the independent variables to the dependent variable.
 - a. Select the Add path tool, -.
 - b. Click in the right side of the age rectangle (it will highlight when you hover over it), and drag a path to the left side of the wage1 rectangle (it will highlight when you can release to connect the path).

c. Continuing with the — tool, create the following paths by clicking first in the right side of the rectangle for the independent variable and dragging it to the left side of the rectangle for the dependent variable:

```
c.age#c.age -> wage1
nev_mar -> wage1
rural -> wage1
school -> wage1
tenure -> wage1
```

7. Estimate.

Click on the **Estimate** button, \mathbb{P} , in the Standard Toolbar, and then click on **OK** in the resulting *GSEM* estimation options dialog box.

You can open a completed diagram in the Builder by typing

. webgetsem gsem_intreg

Also see

- [SEM] **Example 38g** Random-intercept and random-slope models (multilevel)
- [SEM] Example 43g Tobit regression

[SEM] Example 45g — Heckman selection model

[SEM] Example 46g — Endogenous treatment-effects model

[SEM] Intro 5 — Tour of models

[SEM] gsem — Generalized structural equation model estimation command

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