Description   Remarks and examples   Also see

Description

Interval regression is demonstrated using `intregxmpl.dta`:

```
. use http://www.stata-press.com/data/r13/intregxmpl
(Wages of women)
```

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

Remarks and examples [**stata.com**](stata.com)
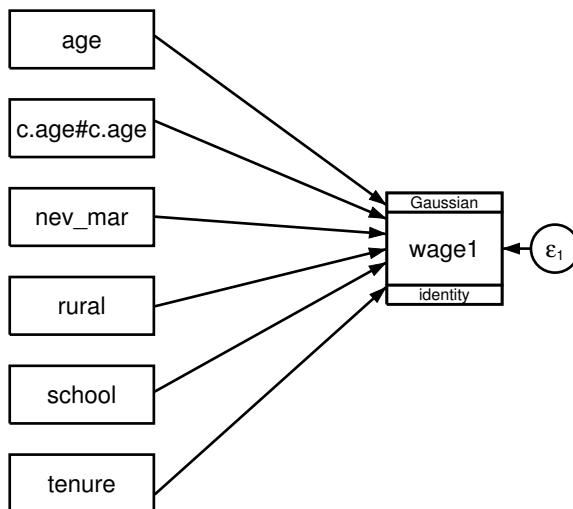
Remarks are presented under the following headings:

> *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 <- age c.age#c.age nev_mar rural school tenure,
> family(gaussian, udepvar(wage2))

Refining starting values:

Grid node 0:    log likelihood = -856.59446

Fitting full model:

Iteration 0:    log likelihood = -856.59446
Iteration 1:    log likelihood = -856.33321
Iteration 2:    log likelihood = -856.33293
Iteration 3:    log likelihood = -856.33293

Generalized structural equation model          Number of obs    =        488
Log likelihood = -856.33293
```

	Coef.	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 http://www.stata-press.com/data/r13/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 ⒢ 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, □.

   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, 📄, 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] **gsem** — Generalized structural equation model estimation command

[SEM] **intro 5** — Tour of models