

Description

ERM stands for extended regression model. The ERMs are linear regression, interval regression, probit, and ordered probit. This manual introduces, explains, and documents ERM features.

Remarks and examples

The entries in this manual are organized as follows:

Introductions
Examples
ERM commands
Postestimation
Technical details
Glossary

Introductions

Read the introductions first.

We recommend reading [\[ERM\] Intro 1](#)–[\[ERM\] Intro 7](#) in order. In them, you will find introductions to the models that can be fit with the ERM commands, the syntax, the complications—endogenous covariates, sample selection, treatment assignment, and observations that are correlated within panels or groups—that ERM commands address, and the interpretation of results.

- [\[ERM\] Intro 1](#) An introduction to the ERM commands
- [\[ERM\] Intro 2](#) The models that ERMs fit
- [\[ERM\] Intro 3](#) Endogenous covariates features
- [\[ERM\] Intro 4](#) Endogenous sample-selection features
- [\[ERM\] Intro 5](#) Treatment assignment features
- [\[ERM\] Intro 6](#) Panel data and grouped data model features
- [\[ERM\] Intro 7](#) Model interpretation

The next introduction is a Rosetta stone for anyone who has used other Stata commands to account for endogenous covariates, sample selection, nonrandom treatment assignment, or panel data. It provides a simple mapping of syntax from commands such as `ivregress`, `heckman`, `xtreg`, `ivprobit`, `heckoprobit`, `xttobit` and `etregress` to the corresponding ERM command. If you are already familiar with these other commands, this entry may be all you need to get started using the ERM commands.

- [\[ERM\] Intro 8](#) A Rosetta stone for extended regression commands

Finally, we include an introduction to some of the important concepts in ERMs in the context of a worked example. Here, we discuss endogeneity, sample selection, and nonrandom treatment assignment. We fit models that account for each of these complications, and we show you how to use postestimation commands to interpret the results.

[ERM] [Intro 9](#) Conceptual introduction via worked example

[ERM] [Intro 9](#) can be read either before or after [ERM] [Intro 1](#)–[ERM] [Intro 7](#).

Examples

The example entries demonstrate how to fit models using `eregress`, `eintreg`, `eprobit`, `eoprobit`, `xteregress`, `xteintreg`, `xteprobit`, and `xteoprobit`.

We do not recommend selecting the examples you read based only on the type of outcome discussed in the example. The syntax of the ERM commands is interchangeable. Therefore, you can substitute `eintreg`, `eoprobit`, `eprobit`, or `eregress` for each other to fit a model that addresses the same complications. The `xteintreg`, `xteoprobit`, `xteprobit`, and `xteregress` commands address one additional complication—observations that are correlated within panels or groups. Again, the syntax is interchangeable. You can add `xt` to the beginning of any other ERM commands and fit random-effects models that address this additional complication. Remove the `xt` from the beginning of the command to fit the same model without random effects. The table below lists the command, the type of outcome variable, and the complications that are addressed in each example to help you locate examples that are of most interest to you.

Example	Command	Outcome	Complications
[ERM] Example 1a	<code>eregress</code>	continuous	continuous endogenous covariate
[ERM] Example 1b	<code>eintreg</code>	interval	continuous endogenous covariate
[ERM] Example 1c	<code>eintreg</code>	interval	continuous endogenous covariate, endogenous sample selection
[ERM] Example 2a	<code>eregress</code>	continuous	binary endogenous covariate
[ERM] Example 2b	<code>eregress</code>	continuous	exogenous treatment
[ERM] Example 2c	<code>eregress</code>	continuous	endogenous treatment
[ERM] Example 3a	<code>eprobit</code>	binary	continuous endogenous covariate
[ERM] Example 3b	<code>eprobit</code>	binary	continuous endogenous covariate, endogenous treatment
[ERM] Example 4a	<code>eprobit</code>	binary	endogenous sample selection
[ERM] Example 4b	<code>eprobit</code>	binary	endogenous sample selection, endogenous treatment
[ERM] Example 5	<code>eprobit</code>	binary	endogenous ordinal treatment
[ERM] Example 6a	<code>eoprobit</code>	ordinal	endogenous treatment
[ERM] Example 6b	<code>eoprobit</code>	ordinal	endogenous treatment, endogenous sample selection
[ERM] Example 7	<code>xteregress</code>	continuous	continuous endogenous covariate, random effects in all equations
[ERM] Example 8a	<code>xteregress</code>	continuous	continuous endogenous covariate, random effects in one equation
[ERM] Example 8b	<code>xteregress</code>	continuous	continuous endogenous covariate, endogenous sample selection, random effects in two equations
[ERM] Example 9	<code>xteoprobit</code>	ordinal	endogenous treatment, random effects in all equations

The type of outcome does play a role in the way results are interpreted, so examples with the same outcome type will be of interest for interpretation. If your main interest is in interpretation, also see [ERM] [Intro 7](#) and [ERM] [Intro 9](#).

ERM commands

The entries for the individual commands provide details on syntax and implementation. The *Methods and formulas* sections include full details on the models that can be fit using these commands. The `xteintreg`, `xteoprobit`, `xteprobit`, and `xteregress` commands are documented in these entries as well.

[ERM] eintreg	Extended interval regression
[ERM] eoprobit	Extended ordered probit regression
[ERM] eprobit	Extended probit regression
[ERM] eregress	Extended linear regression
[ERM] ERM options	Extended regression model options

Postestimation

The postestimation commands allow you to estimate treatment effects, obtain predictions, perform tests, and more. They are documented in the entries listed below.

[ERM] eintreg postestimation	Postestimation tools for eintreg and xteintreg
[ERM] eintreg predict	predict after eintreg and xteintreg
[ERM] eoprobit postestimation	Postestimation tools for eoprobit and xteoprobit
[ERM] eoprobit predict	predict after eoprobit and xteoprobit
[ERM] eprobit postestimation	Postestimation tools for eprobit and xteprobit
[ERM] eprobit predict	predict after eprobit and xteprobit
[ERM] eregress postestimation	Postestimation tools for eregress and xtegress
[ERM] eregress predict	predict after eregress and xtegress
[ERM] estat teffects	Average treatment effects for extended regression models
[ERM] predict advanced	predict's advanced features
[ERM] predict treatment	predict for treatment statistics

Examples using postestimation commands are found in [ERM] **Intro 9** and in the [example entries](#).

Technical details

ERM commands require that endogenous covariates form a triangular or recursive system. Here, we discuss triangular systems and possible solutions if your model does not have this required form.

[ERM] **Triangularize** How to triangularize a system of equations

Glossary

Finally, we provide a glossary that can be referred to as needed.

[ERM] **Glossary** Glossary of technical terms