

**ERM options** — Extended regression model options

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## Description

This entry describes the options that are common to the extended regression commands; see [\[ERM\] eregress](#), [\[ERM\] eprobit](#), [\[ERM\] eoprobit](#), and [\[ERM\] eintreg](#).

## Syntax

```
erm_cmd ... [ , extensions options ]
```

*erm\_cmd* is one of [eregress](#), [eprobit](#), [eoprobit](#), [eintreg](#), [xteregress](#), [xteprobit](#), [xteoprobit](#), or [xteintreg](#)

*extensions*

Description

Model

<a href="#"><u>e</u>ndogenous(<i>enspec</i>)</a>	model for endogenous covariates; may be repeated
<a href="#"><u>e</u>ntreat(<i>entrspec</i>)</a>	model for endogenous treatment assignment
<a href="#"><u>e</u>xtreat(<i>extrspec</i>)</a>	exogenous treatment
<a href="#"><u>s</u>elect(<i>selspec</i>)</a>	probit model for selection
<a href="#"><u>t</u>obitselect(<i>tselspec</i>)</a>	tobit model for selection

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<i>options</i>	Description
Model	
<u>noconstant</u>	suppress constant term
<u>offset</u> ( <i>varname<sub>o</sub></i> )	include <i>varname<sub>o</sub></i> in model with coefficient constrained to 1
<u>constraints</u> ( <i>numlist</i> )	apply specified linear constraints
SE/Robust	
<u>vce</u> ( <i>vcetype</i> )	<i>vcetype</i> may be <i>oim</i> , <u>robust</u> , <u>cluster</u> <i>clustvar</i> , <i>opg</i> , <u>bootstrap</u> , or <u>jackknife</u>
Reporting	
<u>level</u> (#)	set confidence level; default is <code>level(95)</code>
<u>nocnsreport</u>	do not display constraints
<u>display_options</u>	control columns and column formats, row spacing, line width, display of omitted variables and base and empty cells, and factor-variable labeling
Integration	
<u>intpoints</u> (#)	set the number of integration (quadrature) points for integration over four or more dimensions; default is <code>intpoints(128)</code>
<u>triintpoints</u> (#)	set the number of integration (quadrature) points for integration over three dimensions; default is <code>triintpoints(10)</code>
<u>reintpoints</u> (#)	set the number of integration (quadrature) points for random-effects integration; default is <code>reintpoints(7)</code>
<u>reintmethod</u> ( <i>intmethod</i> )	integration method for random effects; <i>intmethod</i> may be <u>mvaghermite</u> (the default) or <u>ghermite</u>
Maximization	
<u>maximize_options</u>	control the maximization process; seldom used
<u>collinear</u>	keep collinear variables
<u>coeflegend</u>	display legend instead of statistics

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`reintpoints()` and `reintmethod()` are available only with `xtregress`, `xtintreg`, `xtprobit`, and `xtteprobit`.  
`collinear` and `coeflegend` do not appear in the dialog box.

*enspec* is `depvarsen = varlisten [ , enopts ]`

where *depvars<sub>en</sub>* is a list of endogenous covariates. Each variable in *depvars<sub>en</sub>* specifies an endogenous covariate model using the common *varlist<sub>en</sub>* and options.

*entrspec* is `depvartr [= varlisttr] [ , entropts ]`

where *depvar<sub>tr</sub>* is a variable indicating treatment assignment. *varlist<sub>tr</sub>* is a list of covariates predicting treatment assignment.

*extrspec* is `tvar [ , extropts ]`

where *tvar* is a variable indicating treatment assignment.

*selspec* is `depvars = varlists [ , selopts ]`

where *depvar<sub>s</sub>* is a variable indicating selection status. *depvar<sub>s</sub>* must be coded as 0, indicating that the observation was not selected, or 1, indicating that the observation was selected. *varlist<sub>s</sub>* is a list of covariates predicting selection.

*tselspec* is  $depvar_s = varlist_s [ , tselopts ]$

where  $depvar_s$  is a continuous variable.  $varlist_s$  is a list of covariates predicting  $depvar_s$ . The censoring status of  $depvar_s$  indicates selection, where a censored  $depvar_s$  indicates that the observation was not selected and a noncensored  $depvar_s$  indicates that the observation was selected.

<i>enopts</i>	Description
Model	
<u>probit</u>	treat endogenous covariate as binary
<u>oprobit</u>	treat endogenous covariate as ordinal
<u>povariance</u>	estimate a different variance for each level of a binary or an ordinal endogenous covariate
<u>pocorrelation</u>	estimate different correlations for each level of a binary or an ordinal endogenous covariate
<u>nomain</u>	do not add endogenous covariate to main equation
<u>nore</u>	do not include random effects in model for endogenous covariate
<u>noconstant</u>	suppress constant term

povariance is available only with `eregress`, `eintreg`, `xteregress`, and `xteintreg`.

nore is available only with `xteregress`, `xteintreg`, `xteprobit`, and `xteoprobit`.

<i>entropths</i>	Description
Model	
<u>povariance</u>	estimate a different variance for each potential outcome
<u>pocorrelation</u>	estimate different correlations for each potential outcome
<u>nomain</u>	do not add treatment indicator to main equation
<u>nocutsinteract</u>	do not interact treatment with cutpoints
<u>nointeract</u>	do not interact treatment with covariates in main equation
<u>nore</u>	do not include random effects in model for endogenous treatment
<u>noconstant</u>	suppress constant term
<u>offset(varname<sub>o</sub>)</u>	include $varname_o$ in model with coefficient constrained to 1

povariance is available only with `eregress`, `eintreg`, `xteregress`, and `xteintreg`.

nocutsinteract is available only with `eoprobit`.

nore is available only with `xteregress`, `xteintreg`, `xteprobit`, and `xteoprobit`.

<i>extropths</i>	Description
Model	
<u>povariance</u>	estimate a different variance for each potential outcome
<u>pocorrelation</u>	estimate different correlations for each potential outcome
<u>nomain</u>	do not add treatment indicator to main equation
<u>nocutsinteract</u>	do not interact treatment with cutpoints
<u>nointeract</u>	do not interact treatment with covariates in main equation

povariance is available only with `eregress`, `eintreg`, `xteregress`, and `xteintreg`.

nocutsinteract is available only with `eoprobit`.

<i>selopts</i>	Description
Model	
<b>nore</b>	do not include random effects in selection model
<b>noconstant</b>	suppress constant term
<b>offset</b> ( <i>varname<sub>o</sub></i> )	include <i>varname<sub>o</sub></i> in model with coefficient constrained to 1

**nore** is available only with `xteregress`, `xteintreg`, `xteprobit`, and `xteoprobit`.

<i>tseopts</i>	Description
Model	
* <b>ll</b> ( <i>varname</i>   #)	left-censoring variable or limit
* <b>ul</b> ( <i>varname</i>   #)	right-censoring variable or limit
<b>main</b>	add censored selection variable to main equation
<b>nore</b>	do not include random effects in tobit selection model
<b>noconstant</b>	suppress constant term
<b>offset</b> ( <i>varname<sub>o</sub></i> )	include <i>varname<sub>o</sub></i> in model with coefficient constrained to 1

\* You must specify either `ll()` or `ul()`.

**nore** is available only with `xteregress`, `xteintreg`, `xteprobit`, and `xteoprobit`.

## Options

### Model

**endogenous**(*depvars<sub>en</sub>* = *varlist<sub>en</sub>* [, *enopts*]) specifies the model for endogenous covariates. *depvars<sub>en</sub>* is a list of one or more endogenous covariates modeled with *varlist<sub>en</sub>*. This option may be repeated to allow a different model specification for each endogenous covariate. By default, the endogenous covariates are assumed to be continuous, and a linear Gaussian model is used. Unless the **nomain** suboption is specified, the variables specified in *depvars<sub>en</sub>* are automatically included in the main equation. The following *enopts* are available:

**probit** specifies to use a probit model for the endogenous covariates. **probit** may not be specified with **oprobit**; however, you may specify **endogenous**(..., **probit**) and **endogenous**(..., **oprobit**).

**oprobit** specifies to use an ordered probit model for the endogenous covariates. **oprobit** may not be specified with **probit**; however, you may specify **endogenous**(..., **probit**) and **endogenous**(..., **oprobit**).

**povariance** specifies that different variance parameters be estimated for each level of the endogenous covariates. In a treatment-effects framework, we refer to levels of endogenous covariates as potential outcomes, and **povariance** specifies that the variance be estimated separately for each potential outcome. **povariance** may be specified only with **eregress** and **eintreg** and with a binary or an ordinal endogenous covariate.

**pocorrelation** specifies that different correlation parameters be estimated for each level of the endogenous covariates. In a treatment-effects framework, we refer to levels of endogenous covariates as potential outcomes, and **pocorrelation** specifies that correlations be estimated separately for each potential outcome. **pocorrelation** may be specified only with a binary or an ordinal endogenous covariate.

`nomain` specifies that the endogenous covariate of covariates be excluded from the main model, thus removing the effect. This option is for those who intend to manually construct the effect by adding it to the main model in their own way.

`nore` specifies that random effects not be included in the equations for the endogenous covariates.

`noconstant` suppresses the constant term (intercept) in the model for the endogenous covariates.

`entreat()` and `extreat()` specify a model for treatment assignment. You may specify only one.

`entreat(depvartr [= varlisttr] [, trtopts modopts])` specifies a model for endogenous treatment assignment with *depvar*<sub>tr</sub> = 1 indicating treatment and *depvar*<sub>tr</sub> = 0 indicating no treatment. *varlist*<sub>tr</sub> are the covariates for the treatment model; they are optional.

`extreat(depvartr [, trtopts])` specifies a variable that signals exogenous treatment. *depvar*<sub>tr</sub> = 1 indicates treatment and *depvar*<sub>tr</sub> = 0 indicates no treatment.

*trtopts* are

`povariance` specifies that different variance parameters be estimated for each potential outcome (for each treatment level). `povariance` may be specified only with `eregress` and `eintreg`.

`pocorrelation` specifies that different correlation parameters be estimated for each potential outcome (for each treatment level).

`nomain`, `nocutsinteract`, and `nointeract` affect the way the treatment enters the main equation.

`nomain` specifies that the main effect of treatment be excluded from the main equation. Thus, a separate intercept is not estimated for each treatment level. In the case of `eoprobit`, this means separate cutpoints are not added.

`nocutsinteract` specifies that instead of the default of having separate cutpoints for each treatment level, you get one set of cutpoints that are shifted by a constant value for each treatment level. This is implemented by placing a separate constant in the main equation for each treatment level. `nocutsinteract` is available only with `eoprobit`.

`nointeract` specifies that the treatment variable not be interacted with the other covariates in the main equation.

These options allow you to customize how the treatment enters the main equation. When `nomain` and `nointeract` are specified together, they remove the effect entirely, and you will need to explicitly reintroduce the treatment effect.

*modopts* are

`nore` specifies that a random effect not be included in the treatment equation.

`noconstant` suppresses the constant term (intercept) in the treatment model.

`offset(varnameo)` specifies that *varname*<sub>o</sub> be included in the treatment model with the coefficient constrained to 1.

`select()` and `tobitselect()` specify a model for endogenous sample selection. You may specify only one.

`select(depvars = varlists [, modopts])` specifies a probit model for sample selection with *varlist*<sub>s</sub> as the covariates for the selection model. When *depvar*<sub>s</sub> = 1, the model's dependent variable is treated as observed (selected); when *depvar*<sub>s</sub> = 0, it is treated as unobserved (not selected).

`tobitselect(depvars = varlists [ , ll(varname | #) ul(varname | #) main modopts ])` specifies a tobit model for sample selection with *depvar*<sub>s</sub> as a censored selection variable and *varlist*<sub>s</sub> as the covariates for the selection model.

`ll(arg)` specifies that when *depvar*<sub>s</sub> ≤ *arg*, the selection variable is treated as censored and the model's dependent variable is unobserved (not selected).

`ul(arg)` specifies that when *depvar*<sub>s</sub> ≥ *arg*, the selection variable is treated as censored and the model's dependent variable is unobserved (not selected).

`main` specifies that the censored selection variable be included as a covariate in the main equation. By default, it is excluded from the main equation.

Only the uncensored values of the selection variable contribute to the likelihood through the main equation. Thus, the selection variable participates as though it were uncensored.

*modopts* are

`nore` specifies that a random effect not be included in the selection equation.

`noconstant` suppresses the constant term (intercept) in the selection model.

`offset(varnameo)` specifies that *varname*<sub>o</sub> be included in the selection model with the coefficient constrained to 1.

`noconstant`, `offset(varnameo)`, `constraints(numlist)`; see [R] Estimation options.

#### SE/Robust

`vce(vcetype)` specifies the type of standard error reported, which includes types that are derived from asymptotic theory (`oim`, `opg`), that are robust to some kinds of misspecification (`robust`), that allow for intragroup correlation (`cluster clustvar`), and that use bootstrap or jackknife methods (`bootstrap`, `jackknife`); see [R] *vce\_option*.

#### Reporting

`level(#)`, `nocnsreport`; see [R] Estimation options.

*display\_options*: `nocl`, `nopvalues`, `noomitted`, `vsquish`, `noemptycells`, `baselevels`, `allbaselevels`, `nofvlabel`, `fvwrap(#)`, `fvwrapon(style)`, `cformat(%fmt)`, `pformat(%fmt)`, `sformat(%fmt)`, and `nolstretch`; see [R] Estimation options.

#### Integration

`intpoints(#)` and `triintpoints(#)` control the number of integration (quadrature) points used to approximate multivariate normal probabilities in the likelihood and scores.

`intpoints()` sets the number of integration (quadrature) points for integration over four or more dimensions. The number of integration points must be between 3 and 5,000. The default is `intpoints(128)`.

`triintpoints()` sets the number of integration (quadrature) points for integration over three dimensions. The number of integration points must be between 3 and 5,000. The default is `triintpoints(10)`.

When four dimensions of integration are used in the likelihood, three will be used in the scores. The algorithm for integration over four or more dimensions differs from the algorithm for integration over three dimensions.

`reintpoints(#)` and `reintmethod(intmethod)` control how the integration of random effects is numerically calculated.

`reintpoints()` sets the number of integration (quadrature) points used for integration of the random effects. The default is `intpoints(7)`. Increasing the number increases accuracy but also increases computational time. Computational time is roughly proportional to the number specified. See *Likelihood for multiequation models* in [ERM] **eprobit** for more details.

`reintmethod()` specifies the integration method. The default method is mean–variance adaptive Gauss–Hermite quadrature, `reintmethod(mvaghermite)`. We recommend this method. `reintmethod(ghermite)` specifies that nonadaptive Gauss–Hermite quadrature be used. This method is less computationally intensive and less accurate. It is sometimes useful to try `reintmethod(ghermite)` to get the model to converge and then perhaps use the results as initial values specified in option `from` when fitting the model using the more accurate `intmethod(mvaghermite)`. See *Likelihood for multiequation models* in [ERM] **eprobit** for more details.

#### Maximization

`maximize_options`: `difficult`, `technique(algorithm_spec)`, `iterate(#)`, `[no]log`, `trace`, `gradient`, `showstep`, `hessian`, `showtolerance`, `tolerance(#)`, `ltolerance(#)`, `nrtolerance(#)`, `nonrtolerance`, and `from(init_specs)`; see [R] **Maximize**.

The default technique for `eintreg`, `eoprobit`, `eprobit`, and `eregress` is `technique(nr)`. The default technique for `xteintreg`, `xteoprobit`, `xteprobit`, and `xteregress` is `technique(bhhh 10 nr 2)`.

Setting the optimization type to `technique(bhhh)` resets the default `vcetype` to `vce(opg)`.

The following option is available with `erm_cmd` but is not shown in the dialog box: `collinear`, `coeflegend`; see [R] **Estimation options**.

## Also see

[ERM] **eintreg** — Extended interval regression

[ERM] **eoprobit** — Extended ordered probit regression

[ERM] **eprobit** — Extended probit regression

[ERM] **eregress** — Extended linear regression