

estat report — Report estimated IRT parameters

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Description

`estat report` displays the estimated IRT parameters. Estimates can be reorganized and sorted by parameter type.

Quick start

1PL model for binary items `b1` to `b10`

```
irt 1pl b1-b10
```

Report results grouped by parameter type

```
estat report, byparm
```

As above, and sort items by estimated difficulty

```
estat report, byparm sort(b)
```

2PL model for binary items `b1` to `b20` and NRM for nominal items `n1` to `n10`

```
irt (2pl b1-b20) (nrm n1-n10)
```

Report results only for items `b15` and `n5`

```
estat report b15 n5
```

Report nominal item results grouped by parameter type

```
estat report n*, byparm
```

Menu

Statistics > IRT (item response theory)

Syntax

```
estat report [varlist] [, options]
```

```
sort(p [, descending])  sort items by the estimated p parameters; p may be a, b, or c
byparm                 arrange table rows by parameter rather than by item
```

Main

```
alabel(string)         specify the a parameter label; the default is Discrim
blabel(string)         specify the b parameter label; the default is Diff
clabel(string)         specify the c parameter label; the default is Guess
seqlabel              label parameters in sequential order
post                 post estimated IRT parameters and their VCE as estimation results
```

Reporting

```
level(#)              set confidence level; default is level(95)
verbose              display estimation output in long form
display_options     control columns and column formats

coeflegend          display legend instead of statistics
```

collect is allowed; see [U] 11.1.10 Prefix commands.

coeflegend does not appear in the dialog box.

Options

sort(*p* [, descending]) requests that items be sorted according to parameter *p*, where *p* is one of a, b, or c.

sort(a) specifies that items be sorted according to the estimated discrimination parameters.

sort(b) specifies that items be sorted according to the estimated difficulty parameters.

sort(c) specifies that items be sorted according to the estimated pseudoguessing parameters. It is relevant only for a 3PL model when option sepguessing is specified.

descending requests that the sorted items be reported in descending order. Sorted items are reported in ascending order by default.

byparm requests that the table rows be grouped by parameter rather than by item.

Main

alabel(*string*) labels the discrimination parameters with *string*. The default label is **Discrim**.

blabel(*string*) labels the difficulty parameters with *string*. The default label is **Diff**.

clabel(*string*) labels the pseudoguessing parameters with *string*. The default label is **Guess**. This option applies only to 3PL models.

seqlabel labels the estimated difficulty parameters within each categorical item sequentially, starting from 1. In NRM, seqlabel also labels the estimated discrimination parameters within each item sequentially, starting from 1. This option applies only to categorical models.

post causes **estat report** to behave like a Stata estimation (e-class) command. **estat report** posts the vector of estimated IRT parameters along with the corresponding variance–covariance

matrix to `e()`, so that you can treat the estimated IRT parameters just as you would results from any other estimation command. For example, you could use `test` to perform simultaneous tests of hypotheses on the parameters, or you could use `lincom` to create linear combinations.

Reporting

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

`verbose` causes a separate discrimination, difficulty, and pseudoguessing parameter to be displayed for each item, even if the parameters are constrained to be the same across items. This option is implied when option `post` is specified.

display_options: `nocl`, `nopvalues`, `cformat(%fmt)`, `pformat(%fmt)`, `sformat(%fmt)`, and `no1-stretch`; see [R] [Estimation options](#).

The following option is available with `estat report` but is not shown in the dialog box:

`coeflegend`; see [R] [Estimation options](#). This option is allowed only with the `post` option.

Remarks and examples

[stata.com](http://www.stata.com)

The following discussion is about how to use `estat report` with `irt` estimation results. If you are new to the IRT features in Stata, we encourage you to read [IRT] [irt](#) first.

► Example 1: Sorting binary items

We illustrate the features of `estat report` on the 2PL model we fit in [example 1](#) of [IRT] [irt 2pl](#). First, we refit the model.

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```
. use https://www.stata-press.com/data/r17/masc1
(Data from De Boeck & Wilson (2004))
. irt 2pl q1-q9
```

Fitting fixed-effects model:

```
Iteration 0: log likelihood = -4275.6606
Iteration 1: log likelihood = -4269.7861
Iteration 2: log likelihood = -4269.7825
Iteration 3: log likelihood = -4269.7825
```

Fitting full model:

```
Iteration 0: log likelihood = -4146.9386
Iteration 1: log likelihood = -4119.3568
Iteration 2: log likelihood = -4118.4716
Iteration 3: log likelihood = -4118.4697
Iteration 4: log likelihood = -4118.4697
```

Two-parameter logistic model

Number of obs = 800

Log likelihood = -4118.4697

		Coefficient	Std. err.	z	P> z	[95% conf. interval]	
q1	Discrim	1.615292	.2436467	6.63	0.000	1.137754	2.092831
	Diff	-.4745635	.074638	-6.36	0.000	-.6208513	-.3282757
q2	Discrim	.6576171	.1161756	5.66	0.000	.4299171	.885317
	Diff	-.1513023	.1202807	-1.26	0.208	-.3870481	.0844435
q3	Discrim	.9245051	.1569806	5.89	0.000	.6168289	1.232181
	Diff	-1.70918	.242266	-7.05	0.000	-2.184012	-1.234347
q4	Discrim	.8186403	.1284832	6.37	0.000	.5668179	1.070463
	Diff	.3296791	.1076105	3.06	0.002	.1187663	.5405919
q5	Discrim	.8956621	.1535128	5.83	0.000	.5947825	1.196542
	Diff	1.591164	.2325918	6.84	0.000	1.135293	2.047036
q6	Discrim	.9828441	.147888	6.65	0.000	.6929889	1.272699
	Diff	.622954	.1114902	5.59	0.000	.4044373	.8414708
q7	Discrim	.3556064	.1113146	3.19	0.001	.1374337	.5737791
	Diff	2.840278	.8717471	3.26	0.001	1.131685	4.548871
q8	Discrim	1.399926	.233963	5.98	0.000	.9413668	1.858485
	Diff	-1.714416	.1925531	-8.90	0.000	-2.091814	-1.337019
q9	Discrim	.6378452	.1223972	5.21	0.000	.3979512	.8777392
	Diff	-1.508254	.2787386	-5.41	0.000	-2.054571	-.9619361

For models with many items, it is often convenient to arrange the output according to highest or lowest difficulty (b) or discrimination (a). `estat report` makes sorting in a desired order easy. Below we specify option `sort(b)` to cause `estat report` to display the items in ascending order of the estimated difficulty parameter.

. estat report, sort(b)

Two-parameter logistic model
 Log likelihood = -4118.4697

Number of obs = 800

		Coefficient	Std. err.	z	P> z	[95% conf. interval]	
q8	Discrim	1.399926	.233963	5.98	0.000	.9413668	1.858485
	Diff	-1.714416	.1925531	-8.90	0.000	-2.091814	-1.337019
q3	Discrim	.9245051	.1569806	5.89	0.000	.6168289	1.232181
	Diff	-1.70918	.242266	-7.05	0.000	-2.184012	-1.234347
q9	Discrim	.6378452	.1223972	5.21	0.000	.3979512	.8777392
	Diff	-1.508254	.2787386	-5.41	0.000	-2.054571	-.9619361
q1	Discrim	1.615292	.2436467	6.63	0.000	1.137754	2.092831
	Diff	-.4745635	.074638	-6.36	0.000	-.6208513	-.3282757
q2	Discrim	.6576171	.1161756	5.66	0.000	.4299171	.885317
	Diff	-.1513023	.1202807	-1.26	0.208	-.3870481	.0844435
q4	Discrim	.8186403	.1284832	6.37	0.000	.5668179	1.070463
	Diff	.3296791	.1076105	3.06	0.002	.1187663	.5405919
q6	Discrim	.9828441	.147888	6.65	0.000	.6929889	1.272699
	Diff	.622954	.1114902	5.59	0.000	.4044373	.8414708
q5	Discrim	.8956621	.1535128	5.83	0.000	.5947825	1.196542
	Diff	1.591164	.2325918	6.84	0.000	1.135293	2.047036
q7	Discrim	.3556064	.1113146	3.19	0.001	.1374337	.5737791
	Diff	2.840278	.8717471	3.26	0.001	1.131685	4.548871

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Here we add the `byparm` option to cause `estat report` to arrange the table rows by parameter type then by item difficulty.

```
. estat report, sort(b) byparm
```

```
Two-parameter logistic model
Log likelihood = -4118.4697
```

Number of obs = 800

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
Discrim						
q8	1.399926	.233963	5.98	0.000	.9413668	1.858485
q3	.9245051	.1569806	5.89	0.000	.6168289	1.232181
q9	.6378452	.1223972	5.21	0.000	.3979512	.8777392
q1	1.615292	.2436467	6.63	0.000	1.137754	2.092831
q2	.6576171	.1161756	5.66	0.000	.4299171	.885317
q4	.8186403	.1284832	6.37	0.000	.5668179	1.070463
q6	.9828441	.147888	6.65	0.000	.6929889	1.272699
q5	.8956621	.1535128	5.83	0.000	.5947825	1.196542
q7	.3556064	.1113146	3.19	0.001	.1374337	.5737791
Diff						
q8	-1.714416	.1925531	-8.90	0.000	-2.091814	-1.337019
q3	-1.70918	.242266	-7.05	0.000	-2.184012	-1.234347
q9	-1.508254	.2787386	-5.41	0.000	-2.054571	-.9619361
q1	-.4745635	.074638	-6.36	0.000	-.6208513	-.3282757
q2	-.1513023	.1202807	-1.26	0.208	-.3870481	.0844435
q4	.3296791	.1076105	3.06	0.002	.1187663	.5405919
q6	.622954	.1114902	5.59	0.000	.4044373	.8414708
q5	1.591164	.2325918	6.84	0.000	1.135293	2.047036
q7	2.840278	.8717471	3.26	0.001	1.131685	4.548871

Finally, we can tell `estat report` that we want to see parameter estimates for selected items only. Below we choose items `q3`, `q5`, and `q8` and use the `blabel()` option to change the default label of the difficulty parameter from `Diff` to `Location`.

```
. estat report q3 q5 q8, sort(b) byparm blabel(Location)
```

```
Two-parameter logistic model
Log likelihood = -4118.4697
```

Number of obs = 800

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
Discrim						
q8	1.399926	.233963	5.98	0.000	.9413668	1.858485
q3	.9245051	.1569806	5.89	0.000	.6168289	1.232181
q5	.8956621	.1535128	5.83	0.000	.5947825	1.196542
Location						
q8	-1.714416	.1925531	-8.90	0.000	-2.091814	-1.337019
q3	-1.70918	.242266	-7.05	0.000	-2.184012	-1.234347
q5	1.591164	.2325918	6.84	0.000	1.135293	2.047036

Stored results

`estat report` stores the following in `r()`:

Scalars

`r(level)` confidence level

Matrices

`r(table)` matrix containing the parameter estimates with their standard errors, test statistics, *p*-values, and confidence intervals

`r(b)` vector of estimated IRT parameters

`r(b_pclass)` parameter class

`r(V)` variance–covariance matrix of the estimated IRT parameters

`estat report` with the `post` option also stores the following in `e()`:

Macros

`e(properties)` `b V`

Matrices

`e(b)` vector of estimated IRT parameters

`e(V)` variance–covariance matrix of the estimated IRT parameters

Also see

- [IRT] [irt](#) — Introduction to IRT models
- [IRT] [irt 1pl](#) — One-parameter logistic model
- [IRT] [irt 2pl](#) — Two-parameter logistic model
- [IRT] [irt 3pl](#) — Three-parameter logistic model
- [IRT] [irt grm](#) — Graded response model
- [IRT] [irt hybrid](#) — Hybrid IRT models
- [IRT] [irt nrm](#) — Nominal response model
- [IRT] [irt pcm](#) — Partial credit model
- [IRT] [irt rsm](#) — Rating scale model