Title

> **estat report —** Report estimated IRT parameters

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

Same 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 <u>rep</u>ort [*varlist*] [, *options*]

sort(*p*[, <u>desc</u>ending])	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*[, <u>desc</u>ending]) 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: noci, nopvalues, cformat(%*fmt*), pformat(%*fmt*), sformat(%*fmt*), and nol-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**

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.

```
. use https://www.stata-press.com/data/r18/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   Number of obs = 800
Log likelihood = -4118.4697

	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

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   Number of obs = 800
Log likelihood = -4118.4697

	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   Number of obs = 800
Log likelihood = -4118.4697

	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

For suggested citations, see the FAQ on citing Stata documentation.