

total — Estimate totals

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Description

`total` produces estimates of totals, along with standard errors.

Quick start

Total of continuous variable `v1`

```
total v1
```

Same as above, but restrict estimation to observations where `catvar = 1`

```
total v1 if catvar==1
```

Same as above, but using `svyset` data

```
svy, subpop(if catvar==1): total v1
```

Total of `v1` for each level of `catvar`

```
total v1, over(catvar)
```

With jackknife standard errors

```
total v1, vce(jackknife)
```

Menu

Statistics > Summaries, tables, and tests > Summary and descriptive statistics > Totals

Syntax

```
total varlist [if] [in] [weight] [, options]
```

<i>options</i>	Description
<i>if/in/over</i> <code>over(<i>varlist</i>_o)</code>	group over subpopulations defined by <i>varlist</i> _o
SE/Cluster <code>vce(<i>vcetype</i>)</code>	<i>vcetype</i> may be <code>analytic</code> , <code>cluster <i>clustvar</i></code> , <code>bootstrap</code> , or <code>jackknife</code>
Reporting <code>level(#)</code> <code>noheader</code> <code>display_options</code>	set confidence level; default is <code>level(95)</code> suppress table header control column formats, line width, display of omitted variables and base and empty cells, and factor-variable labeling
<code>coeflegend</code>	display legend instead of statistics

varlist may contain factor variables; see [U] 11.4.3 **Factor variables**.

`bootstrap`, `collect`, `jackknife`, `mi estimate`, `rolling`, `statsby`, and `svy` are allowed; see [U] 11.1.10 **Prefix commands**.

`vce(bootstrap)` and `vce(jackknife)` are not allowed with the `mi estimate` prefix.

Weights are not allowed with the `bootstrap` prefix; see [R] **bootstrap**.

`vce()` and weights are not allowed with the `svy` prefix; see [SVY] **svy**.

`fweights`, `iweights`, and `pweights` are allowed; see [U] 11.1.6 **weight**.

`coeflegend` does not appear in the dialog box.

See [U] 20 **Estimation and postestimation commands** for more capabilities of estimation commands.

Options

if/in/over

`over(varlisto)` specifies that estimates be computed for multiple subpopulations, which are identified by the different values of the variables in *varlist*_o. Only numeric, nonnegative, integer-valued variables are allowed in `over(varlisto)`.

SE/Cluster

`vce(vcetype)` specifies the type of standard error reported, which includes types that are derived from asymptotic theory (`analytic`), that allow for intragroup correlation (`cluster clustvar`), and that use bootstrap or jackknife methods (`bootstrap`, `jackknife`); see [R] **vce_option**.

`vce(analytic)`, the default, uses the analytically derived variance estimator associated with the sample total.

Reporting

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

`noheader` prevents the table header from being displayed.

display_options: noomitted, vsquish, noemptycells, baselevels, allbaselevels, nofvlabel, fvwrap(#), fvwrapon(style), cformat(%fnt), and no1stretch; see [R] [Estimation options](#).

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

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

Remarks and examples

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

▶ Example 1

Suppose that we collected data on incidence of heart attacks. The variable `heartatk` indicates whether a person ever had a heart attack (1 means yes; 0 means no). We can then estimate the total number of persons who have had heart attacks for each sex in the population represented by the data we collected.

```
. use https://www.stata-press.com/data/r18/total
(Fictional incidence of heart-attack data)
. total heartatk [pw=swgt], over(sex)
```

Total estimation Number of obs = 4,946

	Total	Std. err.	[95% conf. interval]	
c.heartatk@sex				
Male	944559	104372.3	739943	1149175
Female	581590	82855.59	419156.3	744023.7

◀

Stored results

`total` stores the following in `e()`:

Scalars

<code>e(N)</code>	number of observations
<code>e(N_over)</code>	number of subpopulations
<code>e(N_clust)</code>	number of clusters
<code>e(k_eq)</code>	number of equations in <code>e(b)</code>
<code>e(df_r)</code>	sample degrees of freedom
<code>e(rank)</code>	rank of <code>e(V)</code>

Macros

<code>e(cmd)</code>	<code>total</code>
<code>e(cmdline)</code>	command as typed
<code>e(varlist)</code>	<i>varlist</i>
<code>e(wtype)</code>	weight type
<code>e(wexp)</code>	weight expression
<code>e(title)</code>	title in estimation output
<code>e(clustvar)</code>	name of cluster variable
<code>e(over)</code>	<i>varlist</i> from <code>over()</code>
<code>e(vce)</code>	<i>vcetype</i> specified in <code>vce()</code>
<code>e(vcetype)</code>	title used to label Std. err.
<code>e(properties)</code>	<code>b V</code>
<code>e(estat_cmd)</code>	program used to implement <code>estat</code>
<code>e(marginsnotok)</code>	predictions disallowed by <code>margins</code>

Matrices	
<code>e(b)</code>	vector of total estimates
<code>e(V)</code>	(co)variance estimates
<code>e(_N)</code>	vector of numbers of nonmissing observations
<code>e(error)</code>	error code corresponding to <code>e(b)</code>
Functions	
<code>e(sample)</code>	marks estimation sample

In addition to the above, the following is stored in `r()`:

Matrices	
<code>r(table)</code>	matrix containing the coefficients with their standard errors, test statistics, p -values, and confidence intervals

Note that results stored in `r()` are updated when the command is replayed and will be replaced when any `r`-class command is run after the estimation command.

Methods and formulas

Methods and formulas are presented under the following headings:

The total estimator
Survey data
The survey total estimator
The poststratified total estimator
Subpopulation estimation

The total estimator

Let y denote the variable on which to calculate the total and $y_j, j = 1, \dots, n$, denote an individual observation on y . Let w_j be the frequency weight (or `iweight` or `pweight`), and if no weight is specified, define $w_j = 1$ for all j . The sum of the weights is an estimate of the population size:

$$\hat{N} = \sum_{j=1}^n w_j$$

If the population values of y are denoted by $Y_j, j = 1, \dots, N$, the associated population total is

$$Y = \sum_{j=1}^N Y_j = N\bar{y}$$

where \bar{y} is the population mean. The total is estimated as

$$\hat{Y} = \hat{N}\bar{y}$$

The variance estimator for the total is

$$\hat{V}(\hat{Y}) = \hat{N}^2 \hat{V}(\bar{y})$$

where $\hat{V}(\bar{y})$ is the variance estimator for the mean; see [\[R\] mean](#). The standard error of the total is the square root of the variance.

If x, x_j, \bar{x} , and \hat{X} are similarly defined for another variable (observed jointly with y), the covariance estimator between \hat{X} and \hat{Y} is

$$\widehat{\text{Cov}}(\hat{X}, \hat{Y}) = \hat{N}^2 \widehat{\text{Cov}}(\bar{x}, \bar{y})$$

where $\widehat{\text{Cov}}(\bar{x}, \bar{y})$ is the covariance estimator between two means; see [\[R\] mean](#).

Survey data

See [SVY] [Variance estimation](#) and [SVY] [Poststratification](#) for discussions that provide background information for the following formulas.

The survey total estimator

Let Y_j be a survey item for the j th individual in the population, where $j = 1, \dots, M$ and M is the size of the population. The associated population total for the item of interest is

$$Y = \sum_{j=1}^M Y_j$$

Let y_j be the survey item for the j th sampled individual from the population, where $j = 1, \dots, m$ and m is the number of observations in the sample.

The estimator \widehat{Y} for the population total Y is

$$\widehat{Y} = \sum_{j=1}^m w_j y_j$$

where w_j is a sampling weight. The estimator for the number of individuals in the population is

$$\widehat{M} = \sum_{j=1}^m w_j$$

The score variable for the total estimator is the variable itself,

$$z_j(\widehat{Y}) = y_j$$

The poststratified total estimator

Let P_k denote the set of sampled observations that belong to poststratum k , and define $I_{P_k}(j)$ to indicate if the j th observation is a member of poststratum k , where $k = 1, \dots, L_P$ and L_P is the number of poststrata. Also, let M_k denote the population size for poststratum k . P_k and M_k are identified by specifying the `poststrata()` and `postweight()` options on `svyset`; see [SVY] [svyset](#).

The estimator for the poststratified total is

$$\widehat{Y}^P = \sum_{k=1}^{L_P} \frac{M_k}{\widehat{M}_k} \widehat{Y}_k = \sum_{k=1}^{L_P} \frac{M_k}{\widehat{M}_k} \sum_{j=1}^m I_{P_k}(j) w_j y_j$$

where

$$\widehat{M}_k = \sum_{j=1}^m I_{P_k}(j) w_j$$

The score variable for the poststratified total is

$$z_j(\widehat{Y}^P) = \sum_{k=1}^{L_P} I_{P_k}(j) \frac{M_k}{\widehat{M}_k} \left(y_j - \frac{\widehat{Y}_k}{\widehat{M}_k} \right)$$

Subpopulation estimation

Let S denote the set of sampled observations that belong to the subpopulation of interest, and define $I_S(j)$ to indicate if the j th observation falls within the subpopulation.

The estimator for the subpopulation total is

$$\widehat{Y}^S = \sum_{j=1}^m I_S(j) w_j y_j$$

and its score variable is

$$z_j(\widehat{Y}^S) = I_S(j) y_j$$

The estimator for the poststratified subpopulation total is

$$\widehat{Y}^{PS} = \sum_{k=1}^{L_P} \frac{M_k}{\widehat{M}_k} \widehat{Y}_k^S = \sum_{k=1}^{L_P} \frac{M_k}{\widehat{M}_k} \sum_{j=1}^m I_{P_k}(j) I_S(j) w_j y_j$$

and its score variable is

$$z_j(\widehat{Y}^{PS}) = \sum_{k=1}^{L_P} I_{P_k}(j) \frac{M_k}{\widehat{M}_k} \left\{ I_S(j) y_j - \frac{\widehat{Y}_k^S}{\widehat{M}_k} \right\}$$

References

Cochran, W. G. 1977. *Sampling Techniques*. 3rd ed. New York: Wiley.

Stuart, A., and J. K. Ord. 1994. *Kendall's Advanced Theory of Statistics: Distribution Theory, Vol. 1*. 6th ed. London: Arnold.

Also see

[R] **total postestimation** — Postestimation tools for total

[R] **mean** — Estimate means

[R] **proportion** — Estimate proportions

[R] **ratio** — Estimate ratios

[MI] **Estimation** — Estimation commands for use with mi estimate

[SVY] **Direct standardization** — Direct standardization of means, proportions, and ratios

[SVY] **Poststratification** — Poststratification for survey data

[SVY] **Subpopulation estimation** — Subpopulation estimation for survey data

[SVY] **svy estimation** — Estimation commands for survey data

[SVY] **Variance estimation** — Variance estimation for survey data

[U] 20 Estimation and postestimation commands

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