

## Syntax of `ctreatreg`

```
ctreatreg outcome treatment [varlist] [if] [in] [weight],
model(modeltype) ct(treat_level) [hetero(varlist_h)
estype(model) iv_t(instrument_t) iv_w(instrument_w)
delta(number) ci(number) graphate graphdrf conf(number)
vce(robust) const(noconstant) head(noheader) beta]
```

This routine appears rather straightforward to use and useful to provide suitable graphical representations of results. In particular, it provides a plot of the dose-response function (along with its confidence interval curves) and of the density of  $ATE(x,t)$ ,  $ATET(x,t)$  and  $ATENT(x,t)$ . The main `ctreatreg`'s options with a comment of their function are reported below:

**model**(*modeltype*) specifies the treatment model to be estimated, where *modeltype* must be one of the following two models: "ct-ols", "ct-iv". It is always required to specify one model.

**ct**(*treat\_level*) specifies the treatment level (or dose). This variable takes values in the [0;100] interval, where 0 is the treatment level of non-treated units. The maximum dose is thus 100.

**hetero**(*varlist\_h*) specifies the variables over which to calculate the idiosyncratic Average Treatment Effect  $ATE(x)$ ,  $ATET(x)$  and  $ATENT(x)$ , where  $x=varlist_h$ . It is optional for all models. When this option is not specified, the command estimates the specified model without heterogeneous average effect. Observe that *varlist\_h* should be the same set or a subset of the variables specified in *varlist*. Observe however that only numerical variables may be considered.

**estype**(*model*) specifies which type of estimation method has to be used for estimating the type-2 tobit model in the endogenous treatment case. Two choices are available: "twostep" implements a Heckman two-step procedure; "ml" implements a maximum-likelihood estimation. This option is required only for "ct-iv".

**iv\_t**(*instrument\_t*) specifies the variable to be used as instrument for the continuous treatment variable *t* in the type-2 tobit model. This option is required only for "ct-iv".

**iv\_w**(*instrument\_w*) specifies the variable to be used as instrument for the binary treatment variable *w* in the type-2 tobit model. This option is required only for "ct-iv".

**delta**(*number*) identifies the average treatment effect between two states: *t* and *t+delta*. For any reliable *delta*, we can obtain the response function  $ATE(t;delta)=E[y(t)-y(t+delta)]$ .

**ci**(*number*) sets the significant level for the dose-response function, where *number* may be 1, 5 or 10. This option is mandatory when option `graphdrf` is called.

**graphate** allows for a graphical representation of the density distributions of  $ATE(x;t)$ ,  $ATET(x;t)$  and  $ATENT(x;t)$ . It is