<u>**Title**</u>

scplot — Synthetic Control Methods Plots.

<u>**Syntax**</u>

scplot , [**scest uncertainty(***string***) joint dots_tr_col(***<u>colorstyle</u>***) dots_tr_symb(***<u>symbolstyle</u>***)**
    dots_tr_size(*<u>markersizestyle</u>***) dots_sc_col(***<u>colorstyle</u>***) dots_sc_symb(***<u>symbolstyle</u>***)**
    dots_sc_size(*<u>markersizestyle</u>***) line_tr_col(***<u>colorstyle</u>***) line_tr_patt(***<u>linepatternstyle</u>***)**
    line_tr_width(*<u>linewidthstyle</u>***) line_sc_col(***<u>colorstyle</u>***) line_sc_patt(***<u>linepatternstyle</u>***)**
    line_sc_width(*<u>linewidthstyle</u>***) spike_sc_col(***<u>colorstyle</u>***) spike_sc_patt(***<u>linepatternstyle</u>***)**
    spike_sc_width(*<u>linewidthstyle</u>***) gphoptions(***string***) gphsave(***string***) savedata(***dta_name***) pypinocheck**]

<u>**Description**</u>

scplot implements several Synthetic Control (SC) plots. The command is designed te be called after <u>scest</u>
    or <u>scpi</u> which implement estimation and inference procedures for SC methods using least squares,
    lasso, ridge, or simplex-type constraints according to <u>Cattaneo, Feng, and Titiunik (2021)</u> for a
    single treated unit and <u>Cattaneo, Feng, Palomba, and Titiunik (2023)</u> for multiple treated units and
    staggered adoption. The command is a wrapper of the companion Python package. As such, the user
    needs to have a running version of Python with the package installed. A tutorial on how to install
    Python and link it to Stata can be found <u>here</u>.

    Companion <u>R</u> and <u>Python</u> packages are described in <u>Cattaneo, Feng, Palomba and Titiunik (2022)</u>.

    Companion commands are: <u>scdata</u> for data preparation, <u>scest</u> for estimation procedures, and <u>scpi</u> for
    inference procedures.

Related Stata, R, and Python packages useful for inference in SC designs are described in the following
    website:

    <u>https://nppackages.github.io/scpi/</u>

For an introduction to synthetic control methods, see <u>Abadie (2021)</u> and references therein.

<u>**Options**</u>

scest if specified **scplot** must be called after <u>scest</u>. Otherwise, it is presumed that **scplot** is called
    after <u>scpi</u>.

uncertainty(*string***)** specifies which prediction intervals are plotted. It does not affect the plot if
    scest is specified. Options are:
    insample prediction intervals quantify only in-sample uncertainty.
    gaussian prediction intervals quantify in-sample and out-of-sample uncertainty using conditional
        subgaussian bounds.
    ls prediction intervals quantify in-sample and out-of-sample uncertainty imposing a location-scale
        model.
    qreg prediction intervals quantify in-sample and out-of-sample uncertainty using quantile
        regressions.

joint if specified simultaneous prediction intervals are included in the plot.

┌─── Marker Options └───

 These options let the user specify color, size, and form of the markers in the plot.

    dots_tr_col(*<u>colorstyle</u>***)** specifies the color of the markers for the treated unit.

dots_tr_symb(_symbolstyle_**)** specifies the form of the markers for the treated unit.
dots_tr_size(_markersizestyle_**)** specifies the size of the markers for the treated unit.
dots_sc_col(_colorstyle_**)** specifies the color of the markers for the SC unit.
dots_sc_symb(_symbolstyle_**)** specifies the form of the markers for the SC unit.
dots_sc_size(_markersizestyle_**)** specifies the size of the markers for the SC unit.

─────┌──┐───
     │ │ Line Options
─────┘ └───

These options let the user specify color, pattern, and width of the lines in the plot.

line_tr_col(_colorstyle_**)** specifies the color of the line for the treated unit.
line_tr_patt(_linepatternstyle_**)** specifies the pattern of the line for the treated unit.
line_tr_width(_linewidthstyle_**)** specifies the width of the line for the treated unit.
line_sc_col(_colorstyle_**)** specifies the color of the line for the SC unit.
line_sc_patt(_linepatternstyle_**)** specifies the pattern of the line for the SC unit.
line_sc_width(_linewidthstyle_**)** specifies the width of the line for the SC unit.

─────┌──┐───
     │ │ Bar Options
─────┘ └───

These options let the user specify color, pattern, and width of the bar (spikes) in the plot. These options
do not have effect if **scest** is specified.

spike_sc_col(_colorstyle_**)** specifies the color of the bars for the SC unit.
spike_sc_patt(_linepatternstyle_**)** specifies the pattern of the bars for the SC unit.
spike_sc_width(_linewidthstyle_**)** specifies the width of the bars for the SC unit.

─────┌──┐───
     │ │ Others
─────┘ └───

gphoptions(_string_**)** specifies additional options to modify the plot.
gphsave(_string_**)** specifies the path and the name of the _.gph_ file that is saved by the command.
savedata(_dta_name_**)** saves a _dta_name.dta_ file containing the processed data used to produce the plot.

pypinocheck) if specified avoids to check that the version of scpi_pkg in Python is the one required by
scplot in Stata. When not specified performs the check and stores a macro called to avoid checking it
multiple times.{p_end

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Example: Germany Data

Setup
    . **use scpi_germany.dta**

Prepare data
    . **scdata gdp, dfname("python_scdata") id(country) outcome(gdp) time(year) treatment(status)**
    cointegrated

Estimate Synthetic Control with a simplex constraint and quantify uncertainty
    . **scpi, dfname("python_scdata") name(simplex) u_missp**

Plot Synthetic Control Estimate with Prediction Intervals
    . **scplot, gphsave("plot_scpi")**

References

Abadie, A. 2021. Using synthetic controls: Feasibility, data requirements, and methodological aspects.

Journal of Economic Literature, 59(2), 391–425.

Cattaneo, M. D., Feng, Y., and Titiunik, R. 2021. <u>Prediction Intervals for Synthetic Sontrol Methods</u>.
     Journal of the American Statistical Association, 116(536), 1865–1880.

Cattaneo, M. D., Feng, Y., Palomba F., and Titiunik, R. 2022. <u>scpi: Uncertainty Quantification for
     Synthetic Control Estimators</u>, *arXiv*:2202.05984.

Cattaneo, M. D., Feng, Y., Palomba F., and Titiunik, R. 2023. <u>Uncertainty Quantification in Synthetic
     Controls with Staggered Treatment Adoption</u>, *arXiv*:2210.05026.

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