Package 'fixes'

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Type Package

Title Tools for Creating and Visualizing Fixed-Effects Event Study Models

Version 0.4.1

Description
Provides functions for creating, analyzing, and visualizing event study models using fixed-effects regression.

Depends R (>= 4.1.0)

Imports dplyr, ggplot2, fixest, broom, tibble, rlang

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Encoding UTF-8

RoxygenNote 7.3.2

Suggests knitr, rmarkdown, haven

VignetteBuilder knitr

URL https://github.com/yo5uke/fixes

BugReports https://github.com/yo5uke/fixes/issues

NeedsCompilation no

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Contents

plot_es *Plot Event Study Results*

Description

This function creates a plot for event study results using ‘ggplot2‘. Users can choose between ribbon-style confidence intervals or error bars to visualize the estimates and their uncertainty.

Usage

```
plot_es(
  data,
  type = "ribbon",
  vline_val = 0,
  vline_color = "#000",
  hline_val = 0,
  hline_color = "#000",
  linewidth = 1,
  pointsize = 2,
  alpha = 0.2,
  barwidth = 0.2,
  color = "#B25D91FF",
  fill = "#B25D91FF"
)
```

Arguments

data	A dataframe containing the results from the ‘run_es‘ function. The dataframe must include the following columns: - ‘relative_time‘: The scaled time relative to the treatment. - ‘estimate‘: The estimated coefficients. - ‘conf_low‘: The lower bound of the 95 - ‘conf_high‘: The upper bound of the 95 - ‘std.error‘: The standard errors (required if ‘type = "errorbar"‘).
type	The type of confidence interval visualization: "ribbon" (default) or "errorbar". - "ribbon": Shaded area representing the confidence intervals. - "errorbar": Vertical error bars for each estimate.
vline_val	The x-intercept for the vertical reference line (default: 0). Typically represents the time of treatment.
vline_color	The color of the vertical reference line (default: "#000").
hline_val	The y-intercept for the horizontal reference line (default: 0). Usually represents the null effect line.
hline_color	The color of the horizontal reference line (default: "#000").
linewidth	The width of the lines in the plot (default: 1).
pointsize	The size of the points for the estimates (default: 2).
alpha	The transparency level for the ribbon (default: 0.2).

barwidth	The width of the error bars (default: 0.2).
color	The color of the lines and points (default: "#B25D91FF").
fill	The fill color for the ribbon (default: "#B25D91FF").

Details

This function provides a flexible visualization tool for event study results. Users can customize the appearance of the plot by adjusting the parameters for line styles, point sizes, colors, and confidence interval types.

Column Requirements: The input dataframe (‘data‘) must include: - ‘relative_time‘: A numeric column for the time relative to the treatment. - ‘estimate‘: The estimated coefficients for each relative time. - ‘conf_low‘ and ‘conf_high‘: The bounds of the confidence intervals. - ‘std.error‘: The standard errors (only required if ‘type = "errorbar"‘).

Type Options: - ‘"ribbon"‘: A shaded area to represent the confidence intervals. - ‘"errorbar"‘: Error bars for each point. Standard errors (‘std.error‘) are required.

Value

A ggplot object displaying the event study results. The plot includes: - A line connecting the estimates over relative time. - Points for the estimated coefficients. - Either ribbon-style confidence intervals or error bars, depending on ‘type‘. - Vertical and horizontal reference lines for better interpretability.

Note

If ‘type = "errorbar"‘, ensure that the ‘std.error‘ column is present in the input dataframe. Missing values in the ‘std.error‘ column for any term will result in incomplete confidence intervals.

Examples

```
## Not run:
# Run event study
event_study <- run_es(
  data       = df,
  outcome    = y,
  treatment  = is_treated,
  time       = year,
  timing     = 2005,
  lead_range = 5,             # Corresponds to years 2000-2004 (relative time: -5 to -1)
  lag_range  = 4,              # Corresponds to years 2006-2009 (relative time: 1 to 4)
  fe         = firm_id + year,
  cluster    = "state_id",
  baseline   = -1,
  interval   = 1
)

# Basic plot
plot_es(event_study)

# Use error bars instead of ribbon confidence intervals
```

```
plot_es(event_study, type = "errorbar")

# Adjust vertical reference line
plot_es(event_study, type = "errorbar", vline_val = -0.5)

# Customize axis breaks and title
library(ggplot2)
plot_es(event_study, type = "errorbar") +
  ggplot2::scale_x_continuous(breaks = seq(-5, 4, by = 1)) +
  ggplot2::ggtitle("Result of Event Study")

## End(Not run)
```

---

run_es *Run Event Study with Fixed Effects*

Description

Performs an event study analysis using fixed effects regression on panel data. The function automatically generates lead and lag dummies for each relative period around treatment, supports covariates and flexible fixed effects, and allows for clustered standard errors and observation weights.

Usage

```
run_es(
  data,
  outcome,
  treatment,
  time,
  staggered = FALSE,
  timing,
  lead_range = NULL,
  lag_range = NULL,
  covariates = NULL,
  fe,
  cluster = NULL,
  weights = NULL,
  baseline = -1,
  interval = 1,
  time_transform = FALSE,
  unit = NULL
)
```

Arguments

data	A data frame containing the panel dataset.

outcome	The outcome variable, unquoted. You can supply a raw variable (e.g., 'y') or a function call (e.g., 'log(y)').
treatment	Treatment assignment indicator (unquoted). Should be binary ('0/1' or logical). Typically equals 1 in and after the treated period, 0 otherwise.
time	The time variable (unquoted). Used for relative period calculation.
staggered	Logical. If 'TRUE', allows each unit to have its own treatment timing (supports staggered adoption). If so, supply 'timing' as a variable name. Default is 'FALSE'.
timing	If 'staggered = FALSE', supply a single numeric or date value (e.g., '2005' or '"2005-01-01"'). If 'staggered = TRUE', supply the unquoted variable indicating each unit's treatment time. Never-treated units (with 'NA') are allowed and automatically included as controls. If 'time_transform = TRUE', specify 'timing' as an integer corresponding to the transformed index.
lead_range	Number of pre-treatment periods (leads) to include (e.g., 5 creates 'lead5', ..., 'lead1'). If 'NULL', automatically determined.
lag_range	Number of post-treatment periods (lags) to include (e.g., 3 creates 'lag0', 'lag1', 'lag2', 'lag3'). If 'NULL', automatically determined.
covariates	Optional covariates for the regression. Must be a one-sided formula (e.g., '~ x1 + x2'). Default is 'NULL'.
fe	Fixed effects specification, as a one-sided formula (e.g., '~ id + year'). Required.
cluster	Cluster-robust standard errors. Accepts a one-sided formula (e.g., '~ id'), or a character vector of column names. Default is 'NULL'.
weights	Optional observation weights. Accepts a one-sided formula (e.g., '~ wt'), character string, or bare variable name. Default is 'NULL'.
baseline	Which relative period to use as the omitted (reference) period (e.g., '-1'). This dummy is excluded from estimation and added to the results with estimate 0.
interval	The interval between time periods (e.g., '1' for yearly data, '5' for 5-year periods). Default is '1'.
time_transform	Logical. If 'TRUE', time is replaced by a sequential integer per unit (useful for irregular panels). Default is 'FALSE'.
unit	Panel unit identifier. Required if 'time_transform = TRUE'. Must be an unquoted variable name (e.g., 'id').

Details

This function streamlines event study regression for panel data with flexible support for:

- Staggered adoption: units with 'NA' in 'timing' are included as controls (all event dummies zero). - Relative time calculation: '(time - timing) / interval'. - Automatic dummy generation for specified leads and lags. - Omission of the baseline period from estimation and its re-addition with estimate 0. - Optional transformation of time to a unit-specific sequence ('time_transform = TRUE'), allowing for irregular or gapped panel structures.

Collinearity: If some covariates are perfectly collinear with fixed effects or other regressors, they are automatically dropped from the regression. A message will be displayed listing dropped variables.

Value

A tibble containing the event study estimates: - ‘term‘: Lead or lag dummy name (e.g., ‘"lead3"‘, ‘"lag0"‘) - ‘estimate‘: Coefficient estimate - ‘std.error‘: Standard error - ‘statistic‘: t-statistic - ‘p.value‘: p-value - ‘conf_high‘: Upper 95 - ‘conf_low‘: Lower 95 - ‘relative_time‘: Relative period (scaled by ‘interval‘) - ‘is_baseline‘: Logical, ‘TRUE‘ only for the omitted baseline period

Examples

```
## Not run:
# Minimal use: simple DiD with two-way fixed effects
run_es(
  data = df,
  outcome = y,
  treatment = treat,
  time = year,
  timing = 2000,
  lead_range = 2,
  lag_range = 2,
  fe = ~ id + year,
  baseline = -1
)

# With weights, cluster, and covariates
run_es(
  data = df,
  outcome = y,
  treatment = treat,
  time = year,
  timing = 2000,
  lead_range = 2,
  lag_range = 3,
  covariates = ~ x1 + x2,
  fe = ~ id + year,
  cluster = ~ id,
  weights = ~ popwt,
  baseline = -1
)

# Staggered adoption: timing is unit-specific
run_es(
  data = df,
  outcome = y,
  treatment = treat,
  time = year,
  staggered = TRUE,
  timing = treat_time,
  lead_range = 3,
  lag_range = 4,
  fe = ~ id + year,
  cluster = ~ id,
  baseline = -1
)
```

```
## End(Not run)
```

Index