Package 'BVARverse'

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Type Package

Title Tidy Bayesian Vector Autoregression

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Description Functions to prepare tidy objects from estimated models via 'BVAR' (see Kuschnig & Vashold, 2019 <doi:10.13140/RG.2.2.25541.60643>) and visualisation thereof. Bridges the gap between estimating models with 'BVAR' and plotting the results in a more sophisticated way with 'ggplot2' as well as passing them on in a tidy format.

URL https://github.com/nk027/bvarverse

BugReports https://github.com/nk027/bvarverse/issues

Depends R (>= 3.5.0), BVAR

Imports ggplot2, tidyr, generics, rlang

Suggests tinytest

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

NeedsCompilation no

Repository CRAN

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R topics documented:

augment.bvar *Augment BVAR outputs and convert into a tibble*

Description

Turn the outputs of a Bayesian VAR (see bvar) into a an augmented tibble. Methods are available for bvar objects (will yield coefficients and their quantiles), bvar_fcast objects (with predictions, their quantiles and optionally real datapoints), and bvar_irf objects (with impulse responses).

Usage

```
## S3 method for class 'bvar'
augment(x, conf_bands = 0.16, ...)

## S3 method for class 'bvar_fcast'
augment(x, t_back = 0L, ...)

## S3 method for class 'bvar_irf'
augment(x, ...)
```

Arguments

x	A bvar or derived object to turn into a tibble.
conf_bands	Numeric vector. Credible intervals of coefficients to include in the tibble.
...	Not used.
t_back	Integer scalar. Whether to include actual datapoints in the tidied forecast.

Value

Returns a tibble with relevant information; quantiles can be found in the columns.

Examples

```
# Access a subset of the fred_qd dataset
data <- fred_qd[, c("CPIAUCSL", "UNRATE", "FEDFUNDS")]
# Transform it to be stationary
data <- fred_transform(data, codes = c(5, 5, 1), lag = 4)

# Estimate a BVAR using one lag, default settings and very few draws
x <- bvar(data, lags = 1, n_draw = 1000L, n_burn = 200L, verbose = FALSE)

# Create tibbles from the outputs
augment(x)
augment(irf(x))
augment(predict(x))
```

bv_ggplot *Quick ggplot2 plots for Bayesian VARs*

Description

Function to quickly plot outputs from bvar and derived objects. Supported plots include traces and densities, forecasts, and impulse response functions. For more flexible plots one may use the outputs of tidy.bvar and augment.bvar.

Usage

```
bv_ggplot(x, ...)

## Default S3 method:
bv_ggplot(x, ...)

## S3 method for class 'bvar_chains'
bv_ggplot(x, ...)

## S3 method for class 'bvar'
bv_ggplot(
  x,
  type = c("trace", "density"),
  vars = NULL,
  vars_response = NULL,
  vars_impulse = NULL,
  orientation = c("horizontal", "vertical"),
  chains = list(),
  ...
)

## S3 method for class 'bvar_irf'
bv_ggplot(x, vars_response = NULL, vars_impulse = NULL, col = "#737373", ...)

## S3 method for class 'bvar_fcast'
bv_ggplot(x, vars = NULL, col = "#737373", t_back = 1L, ...)
```

Arguments

x	A bvar or derived object to turn into a dataframe.
...	Not used.
type	A string with the type (trace or density) of plot desired.
vars	Character vector used to select variables. Elements are matched to hyperparameters or coefficients. Coefficients may be matched based on the dependent variable (by providing the name or position) or the explanatory variables (by providing the name and the desired lag). See the example section for a demonstration. Defaults to NULL, i.e. all hyperparameters.

vars_response	Optional character or integer vectors used to select coefficents. Dependent variables are specified with *vars_response*, explanatory ones with *vars_impulse*. Defaults to NULL, indicating that no coefficients will be processed. draws.
vars_impulse	Optional character or integer vectors used to select coefficents. Dependent variables are specified with *vars_response*, explanatory ones with *vars_impulse*. Defaults to NULL, indicating that no coefficients will be processed. draws.
orientation	A string indicating the desired orientation of trace or density plots
chains	List of bvar objects. Contents of multiple runs are added to the output, in order to help in assessing covergence.
col	Character vector. Colour(s) of the lines delineating credible intervals. Single values will be recycled if necessary. Recycled HEX color codes are varied in transparency if not provided (e.g. "#737373FF"). Lines can be bypassed by setting this to "transparent".
t_back	Integer scalar. Whether to include actual datapoints in the tidied forecast.

Value

Returns a ggplot object with a basic structure.

Examples

```
# Access a subset of the fred_qd dataset
data <- fred_qd[, c("CPIAUCSL", "UNRATE", "FEDFUNDS")]
# Transform it to be stationary
data <- fred_transform(data, codes = c(5, 5, 1), lag = 4)

# Estimate a BVAR using one lag, default settings and very few draws
x <- bvar(data, lags = 1, n_draw = 1000L, n_burn = 200L, verbose = FALSE)

# Plot the outputs - alternatively use ggplot() with fortify()
bv_ggplot(x)
bv_ggplot(irf(x))
bv_ggplot(predict(x))
```

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tidy.bvar *Tidy BVAR outputs and convert into a tibble*

Description

Turn the outputs of a Bayesian VAR (see bvar) into a a tidy tibble. Methods are available for bvar objects (will yield a subset of coefficient and/or hyperparameter draws), bvar_coefs objects (with the coefficients and their quantiles) bvar_fcast objects (with predictions, their quantiles and optionally real datapoints), and bvar_irf objects (with impulse responses).

Usage

```
## S3 method for class 'bvar'
tidy(
  x,
  vars = NULL,
  vars_response = NULL,
  vars_impulse = NULL,
  chains = list(),
  ...
)

## S3 method for class 'bvar_coefs'
tidy(x, ...)

## S3 method for class 'bvar_fcast'
tidy(x, t_back = 0L, ...)

## S3 method for class 'bvar_irf'
tidy(x, ...)
```

Arguments

x	A bvar or derived object to turn into a dataframe.
vars	Character vector used to select variables. Elements are matched to hyperparameters or coefficients. Coefficients may be matched based on the dependent variable (by providing the name or position) or the explanatory variables (by providing the name and the desired lag). See the example section for a demonstration. Defaults to NULL, i.e. all hyperparameters.
vars_impulse, vars_response	Optional character or integer vectors used to select coefficents. Dependent variables are specified with *vars_response*, explanatory ones with *vars_impulse*. Defaults to NULL, indicating that no coefficients will be processed. draws.
chains	List of bvar objects. Contents of multiple runs are added to the output, in order to help in assessing covergence.
...	Not used.
t_back	Integer scalar. Whether to include actual datapoints in the tidied forecast.

Value

Returns a tidy tibble with relevant information for further processing.

Examples

```
# Access a subset of the fred_qd dataset
data <- fred_qd[, c("CPIAUCSL", "UNRATE", "FEDFUNDS")]
# Transform it to be stationary
data <- fred_transform(data, codes = c(5, 5, 1), lag = 4)
```

```
# Estimate a BVAR using one lag, default settings and very few draws
x <- bvar(data, lags = 1, n_draw = 1000L, n_burn = 200L, verbose = FALSE)

# Create tidy tibbles from the outputs
tidy(x)
tidy(irf(x))
tidy(predict(x))
```

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