

Package ‘MIIVefa’

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Type Package

Title Exploratory Factor Analysis Using Model Implied Instrumental Variables

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Description Data-driven approach for Exploratory Factor Analysis (EFA) that uses Model Implied Instrumental Variables (MIIVs). The method starts with a one factor model and arrives at a suggested model with enhanced interpretability that allows cross-loadings and correlated errors.

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URL <https://github.com/lluo0/MIIVefa/>

BugReports <https://github.com/lluo0/MIIVefa/issues>

Depends R (>= 4.2.0)

Imports MIIVsem

Suggests knitr, rmarkdown, spelling, testthat (>= 3.0.0), mnormt, lavaan, MPsychoR

VignetteBuilder knitr

Encoding UTF-8

Language en-US

RoxygenNote 7.2.3

Config/testthat/edition 3

NeedsCompilation no

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miivefa	<i>Exploratory Factor Analysis Using Model Implied Instrumental Variables.</i>
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Description

This function is the user-level function that conducts miivefa.

Usage

```
miivefa(data,
        sigLevel = .05,
        scalingCrit = "sargan+factorloading_R2",
        correlatedErrors = NULL)
```

Arguments

data	A data frame, list or environment or an object coercible by <code>as.data.frame</code> to data frame. The most common application is to supply a <code>data.frame</code> .
sigLevel	The significance level threshold, default is <code>.05</code> .
scalingCrit	The criterion used to select the scaling indicators, default is <code>'factorloading_R2.'</code> More details see select_scalingind
correlatedErrors	The pairs of variables whose errors should be correlated in the model search procedure, default is <code>NULL</code> .

Value

A `miivefa` object containing a vector of the recovered model syntax, and a `miivsem` object of model fit of the recovered model when applicable. The recovered model syntax and `miivsem` fit object can be accessed using `output$model` and `output$fit`. The `output$model` `miivsem` object contains both parameter estimation and model fit information.

select_scalingind	<i>Exploratory Factor Analysis Using Model Implied Instrumental Variables.</i>
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Description

This function selects a scaling indicator for an initial one factor model given a raw data frame matrix.

Usage

```
select_scalingind(data,
                  sigLevel = .05,
                  scalingCrit = "sargan+factorloading_R2",
                  correlatedErrors = NULL)
```

Arguments

data	A data frame, list or environment or an object coercible by <code>as.data.frame</code> to data frame. The most common application is to supply a <code>data.frame</code> .
sigLevel	The significance level threshold, default is <code>.05</code> .
scalingCrit	The criterion used to select the scaling indicators, default is <code>'sargan+factorloading_R2.'</code>
correlatedErrors	The pairs of variables whose errors should be correlated in the model search procedure, default is <code>NULL</code> .

Details

All possible criteria for `scalingCrit` order: uses the first appearing variable as the scaling indicator

`sargan`: uses the variable with the least number of significant sargans as the scaling indicator. if multiple variables have the same least number of significant sargans, chooses the first appearing variable.

`R2`: uses the variable with the highest R2 as the scaling indicator. if multiple variables have the same R2 value, chooses the first appearing variable.

`factor loading`: uses the variable with the most number of significant factor loadings as the scaling indicator. if multiple variables have the same most number of significant factor loadings, chooses the first appearing variable.

`sargan_R2`: uses the variable with the least number of significant sargans as the scaling indicator. if multiple variables have the same least number of significant sargans, chooses the one with higher R2. if still multiple options, chooses the first appearing variable.

`sargan_factorloading`: uses the variable with the least number of significant sargans as the scaling indicator. if multiple variables have the same least number of significant sargans, chooses the one with more significant factor loadings. if still multiple options, chooses the first appearing variable.

sargan_factorloading_R2: uses the variable with the least number of significant sargans as the scaling indicator. if multiple variables have the same least number of significant sargans, chooses the one with more significant factor loadings. if still multiple options, chooses the one with higher R2.

factorloading_R2: uses the variable with the most number of significant factor loadings as the scaling indicator. if multiple variables have the same nist number of significant factor loadings, chooses the one with higher R2. if still multiple options, chooses the first appearing variable.

factorloading_sargan: uses the variable with the most number of significant factor loadings as the scaling indicator. if multiple variables have the same nist number of significant factor loadings, chooses the one with less significant sargans. if still multiple options, chooses the first appearing variable.

factorloading_sargan_R2: uses the variable with the most number of significant factor loadings as the scaling indicator. if multiple variables have the same nist number of significant factor loadings, chooses the one with less significant sargans. if still multiple options, chooses the one with higher R2.

sargan+factorloading: uses the variable with the least sum of significant sargans and non-significant factor loadings. if multiple variables have the same least sum of significant sargans and non-significant factor loadings, chooses the first appearing variable.

sargan+factorloading_R2: uses the variable with the least sum of significant sargans and non-significant factor loadings. if multiple variables have the same least sum of significant sargans and non-significant factor loadings, chooses the one with higher R2.

Value

A vector indicating the variable (column name) that is suggested to be the scaling indicator for the initial one factor model.

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