Package ‘implied’

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Type Package

Title Convert Bookmaker Odds to Probabilities

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Description Convert bookmaker odds into proper probabilities. Seven different algorithms are available, including basic normalization, Shin’s method (Hyun Song Shin, (1992) <doi:10.2307/2234526>), and others.

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.0.2

Suggests testthat (>= 2.0.1), knitr, rmarkdown

VignetteBuilder knitr

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implied_probabilities

Implied probabilities from bookmaker odds.

Description

This function calculates the implied probabilities from bookmaker odds in decimal format, while accounting for overround in the odds.

Usage

```r
implied_probabilities(
  odds,
  method = "basic",
  normalize = TRUE,
  grossmargin = 0
)
```

Arguments

- **odds**: A matrix or numeric of bookmaker odds. The odds must be in the decimal format.
- **method**: A string giving the method to use. Valid methods are 'basic', 'shin', 'bb', 'wpo', 'or', 'power' or 'additive'.
- **normalize**: Logical. Some of the methods will give small rounding errors. If TRUE (default) a final normalization is applied to make absolutely sure the probabilities sum to 1.
- **grossmargin**: Numeric. Must be 0 or greater. See the details.

Details

The method 'basic' is the simplest method, and computes the implied probabilities by dividing the inverted odds by the sum of the inverted odds.

The methods 'wpo' (Weights Proportional to the Odds), 'or' (Odds Ratio) and 'power' are from the Wisdom of the Crowds document (the updated version) by Joseph Buchdahl. The method 'or' is originally by Cheung (2015), and the method 'power' is referred to as the logarithmic method.

The method 'shin' uses the method by Shin (1992, 1993). This model assumes that there is a fraction of insider trading, and that the bookmakers try to maximize their profits. In addition to providing implied probabilities, the method also gives an estimate of the proportion of inside trade. The method implemented here is based on the algorithm in Jullien & Salanié (1994).

The 'bb' (short for "balanced books") method is from Fingleton & Waldron (1999), and is a variant of Shin’s method. It too assume a fraction of insiders, but instead of assuming that the bookmakers maximize their profits, they minimize their risk.

Both the 'shin' and 'bb' methods can be used together with the 'grossmargin' argument. This is also from the Fingleton & Waldron (1999) paper, and adds some further assumption to the calculations, related to operating costs. grossmargin should be 0 (default) or greater, typical range is 0 to 0.05.
For values other than 0, this might sometimes cause some probabilities to not be identifiable. A warning will be given if this happens.

Value

A named list. The first component is named 'probabilities' and contain a matrix of implied probabilities. The second is the bookmaker margins (aka the overround). The third depends on the method used to compute the probabilities:

- zvalues (method = 'shin' and method='bb'): The estimated amount of insider trade.
- specificMargins (method = 'wpo'): Matrix of the margins applied to each outcome.
- oddsRatios (method = 'or'): Numeric with the odds ratio that is used to convert true probabilities to bookmaker probabilities.
- exponents (method = 'power'): The (inverse) exponents that is used to convert true probabilities to bookmaker probabilities.

The fourth component 'problematic' is a logical vector called indicating if any probabilities has fallen outside the 0-1 range, or if there were some other problem computing the probabilities.

References

- Joseph Buchdahl - USING THE WISDOM OF THE CROWD TO FIND VALUE IN A FOOTBALL MATCH BETTING MARKET (https://www.football-data.co.uk/wisdom_of_crowd_bets)

Examples

```r
# Two sets of odds for a three-outcome game.
my_odds <- rbind(c(4.20, 3.70, 1.95),
                 c(2.45, 3.70, 2.90))

# Convert to probabilities using Shin's method.
converted_odds <- impliedProbabilities(my_odds, method='shin')

# Look at the probabilities
converted_odds$probabilities
```
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