Package ‘optipod’

June 14, 2023

Title Estimate Option Implied Probability of Default

Version 0.0.1

Description Some functions created to prepare necessary data and estimate the option implied probability as in Vilsmeier, J. (2014). Updating the option implied probability of default methodology. Available at SSRN 2797025.

License use_gpl3_license()

Encoding UTF-8

Imports DBI, RSQLite, jsonlite, data.table

Roxygen list(markdown = TRUE)

RoxygenNote 7.2.3

URL https://github.com/bt-koch/optipod

BugReports https://github.com/bt-koch/optipod/issues

R topics documented:

`extractFrench` *extractFrench*

Description

This function automatically downloads the relevant csv file for risk free rates from Kenneth R. Frenchs Website (https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

Usage

```
extractFrench(path_out = "./data")
```

Arguments

`path_out`	path in which CSV should be unpacked

Value

Fama/French 3 Factors daily data

`extractPolygonMeta` *extractPolygonMeta*

Description

get Metadata of selected ticker from polygon API

Usage

```
extractPolygonMeta(apikey, ticker)
```

Arguments

`apikey`	Personal API key for polygon.io
`ticker`	ticker for underlying

Value

metadata of underlying firm

`extractPolygonOptContracts` *extractPolygonOptContracts*

Description

Get relevant option data for given ticker(s)

Usage

```
extractPolygonOptContracts(
  apikey,
  tickers,
  from,
  to,
  database,
  adjusted = "true",
  limit = 50000,
  limitedAPIcalls = TRUE
)
```

Arguments

`apikey`	Personal API key for polygon.io
`tickers`	The ticker symbol of the options contract (vector of strings)
`from`	The start of the time window. Either a date with the format YYYY-MM-DD or a millisecond timestamp.
`to`	The end of the time window. Either a date with the format YYYY-MM-DD or a millisecond timestamp.
`database`	local rsqlite database to write data on
`adjusted`	Whether or not the results are adjusted for splits ("true" or "false")
`limit`	Limit of number of queries (maximum is 50000)
`limitedAPIcalls`	set TRUE if free plan (only makes 5 API calls per minute)

Value

nothing, data is written on database

`extractPolygonOptTickers` *extractPolygonOptTickers*

Description

Function to get all option contract (tickers) for a specific underlying.

Usage

```
extractPolygonOptTickers(
  apikey,
  tickers,
  database,
  limitedAPIcalls,
  limit = 1000,
  contract_type = "call",
  expired = "true",
  expiration_date.gte = NA,
  expiration_date.lte = NA
)
```

Arguments

`apikey`	Personal API key for polygon.io
`tickers`	tickers of the underlyings (vector of character string)
`database`	local rsqlite database to write data on
`limitedAPIcalls`	set TRUE if free plan (only makes 5 API calls per minute)
`limit`	Limit the number of results returned (maximum is 1000)

`contract_type`	Type of contract ("call" or "put")
`expired`	Whether to query for expired or not expired contracts ("true" or "false")
`expiration_date.gte`	contract expiration date greater than or equal to (format YYYY-MM-DD)
`expiration_date.lte`	contract expiration date smaller than or equal to (format YYYY-MM-DD)

Value

nothing, data is written on database

`extractPolygonStocks` *extractPolygonStocks*

Description

Get relevant stock data for given ticker(s)

Usage

```
extractPolygonStocks(
  apikey,
  tickers,
  database,
  from,
  to,
  limitedAPIcalls,
  limit = 50000,
  adjusted = "true"
)
```

Arguments

`apikey`	Personal API key for polygon.io
`tickers`	Limit the number of results returned (maximum is 1000)
`database`	local rsqlite database to write data on
`from`	The start of the time window. Either a date with the format YYYY-MM-DD or a millisecond timestamp.
`to`	The end of the time window. Either a date with the format YYYY-MM-DD or a millisecond timestamp.
`limitedAPIcalls`	set TRUE if free plan (only makes 5 API calls per minute)
`limit`	Limit of number of queries (maximum is 50000)
`adjusted`	Whether or not the results are adjusted for splits ("true" or "false")

Value

nothing, data is written on database

extractPolygonTickers *extractPolygonTickers*

Description

Function to search for tickers

Usage

```
extractPolygonTickers(apikey, search = NA, limit = 100)
```

Arguments

apikey	Personal API key for polygon.io
search	Search for terms within the ticker and/or company name
limit	Limit the number of results returned (maximum is 1000)

Value

data.frame tickers of Stocks/Equities, Indices, Forex, and Crypto

optipod *optipod*

Description

Function to estimate the option implied probability of default according to "Vilsmeier, J. (2014). Updating the option implied probability of default methodology." Available at SSRN 2797025. Note that the code was provided by Johannes Vilsmeier but was refactored, therefore possible errors might were included in original code.

Usage

```
optipod(
  mu = mu,
  K = K,
  r = r,
  ttm = ttm,
  Lweights = Lweights,
  multiplicationFactor = 5,
  visualise = F,
  ticker = NA,
  date = NA
)
```

Arguments

`mu`	vector of option prices
`K`	vector of strike prices
`r`	annual risk free interest rate (in decimals)
`ttm`	time to maturity in years
`Lweights`	weights assigned to option contract
`multiplicationFactor`	multiplication factor to define upper bound of domain
`visualise`	if TRUE, plots the resulting probability density function
`ticker`	ticker which will be displayed in title of plot
`date`	date which will be displayed in title of plot

Details

Note that all vectors must be ordered by strike price (ascending), such that the first element corresponds to the current stock price which is included with a strike price of zero.

Value

data.frame with necessary results (one row)

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