

Package ‘sp500SlidingWindow’

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Type Package

Title Sliding Window Investment Analysis

Description Test the results of any given investment/expense combinations for a series of sliding-window periods of the S&P500 from 1950 to the present.

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License GPL-3

LazyData TRUE

Imports dplyr (>= 0.4.3), FinCal (>= 0.6.2), gdata (>= 2.17.0),
lubridate (>= 1.5.6)

Depends R (>= 3.2.5), magrittr (>= 1.5)

RoxygenNote 5.0.1

Suggests knitr (>= 1.12.3), rmarkdown (>= 0.9.6), testthat (>= 1.0.2)

VignetteBuilder knitr

NeedsCompilation no

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CAGR

Compound Annual Growth Rate

Description

- **geometric** $FV = PV * (1 + \text{geometric})^{**} \text{ years}$
- **continuous** $FV = PV * \exp(\text{continuous} * \text{years})$

Usage

CAGR(PV, FV, fractional_years, type = "geometric")

Arguments

PV	the price at the beginning of the period
FV	the price at the end of the period
fractional_years	the length of the period in (fractional) years
type	either "geometric" or "continuous"

Value

the compounded rate of return, annualized

Note

see *r_continuous* and *r_discrete*

Author(s)

George Fisher <GeorgeRFisher@gmail.com>

Examples

```
PV   <- 9000
FV   <- 13000
years <- 3
(geometric <- CAGR(9000, 13000, years, type="geometric"))
(continuous <- CAGR(9000, 13000, years, type="continuous"))
9000 * (1 + geometric) ** years
9000 * exp(continuous * years)

## Not run:
error <- CAGR(9000, 13000, years, type="error")
## End(Not run)
```

calc_chg

Calculate The Changes In A Series

Description

Calculate The Changes In A Series

Usage

```
calc_chg(series)
```

Arguments

series a vector of values, assumed to be an evenly-spaced time series, to calculate the changes between

Details

The amount of change between two numbers in a series is current / previous.

Value

a vector of the changes with an NA in the first position

Author(s)

George Fisher
#@description

Examples

```
series = c(16.66, 16.85, 16.93, 16.98, 17.08, 17.03)
calc_chg(series)
```

fmt

Format a Number with Commas and No Decimals

Description

Format a Number with Commas and No Decimals

Usage

```
fmt(dat)
```

Arguments

dat number to be formatted

Value

formatted string

Author(s)

George Fisher

#@description

#@details

Examples

```
## Not run:  
dat = 123456.654  
fmt(dat)  
  
## End(Not run)
```

plot_effect_of_fees*Plot the Effect of Fees*

Description

Plot the Effect of Fees

Usage

```
plot_effect_of_fees(raw_data, annual_fee, output_path)
```

Arguments

raw_data	s&p500 daily data
annual_fee	annual fee
output_path	file path of plot

Value

No explicit returned values, just a plot to output_path

Author(s)

George Fisher
#@description
#@details
#@examples

plot_ending_bal_distribution
Plot the Distribution of Ending Balances

Description

Plot the Distribution of Ending Balances

Usage

plot_ending_bal_distribution(window_df, output_path, window_width)

Arguments

window_df	data.frame output of sp500SlidingWindow
output_path	folder to write the file and the plot, if NULL then the image is plotted to the screen
window_width	number of years in each window

Value

No explicit returned values, (1) writes 'distribution.txt' with statistics about the windows (2) creates a plot 'distribution.png' in the output_path showing the distribution of outcomes

Author(s)

George Fisher
#@description
#@details
#@examples

plot_ending_bal_withdrawals

Plot the Ending Balances and Withdrawals

Description

Plot the Ending Balances and Withdrawals

Usage

```
plot_ending_bal_withdrawals(window_df, output_path, lump_sum, annual_withdrawal,  
                             annual_inflation, window_width)
```

Arguments

window_df	data.frame output of sp500SlidingWindow
output_path	folder to write the file and the plot
lump_sum	the amount initiall invested
annual_withdrawal	the amount of hoped-for withdrawals
annual_inflation	each year the withdrawal goes up this much
window_width	the number of years in the sliding window

Value

No explicit returned values, creates the plots 'ending_bal.png' and 'withdrawals.png' in the output_path

Author(s)

George Fisher

#@description

#@details

#@examples

plot_market_results *Plot The Daily Chart For One Window*

Description

Plot The Daily Chart For One Window

Usage

```
plot_market_results(filtered_data, statistics, output_path)
```

Arguments

filtered_data	data.frame of the window's daily data
statistics	summary statistics for this window
output_path	file path to write the graph to

Value

No explicit returned values, merely the side-effect of a graphs sent to the output_path folder

Author(s)

George Fisher
#@description
#@details
#@examples

plot_total_stock_market
Plot the Entire Stock Market History from 1950

Description

Plot the Entire Stock Market History from 1950

Usage

```
plot_total_stock_market(raw_data, output_path)
```

Arguments

raw_data	output of SP500TR_1950()
output_path	folder to write the file and the plot

Value

No explicit returned values, creates a plot `paste0("SP500_", start_year, "-", end_year, ".png")` in the `output_path`

Author(s)

George Fisher

`#@description`

`#@details`

`#@examples`

schiller

Read Bob Schiller's Data

Description

Read Bob Schiller's Data

Usage

`schiller()`

SP500

Daily S&P 500 data from Jan 3, 1950 to present

Description

The "usual" S&P 500 index, without dividends reinvested.

Usage

`SP500(tr = FALSE)`

Arguments

`tr` (bool) choose Total Return (`tr=TRUE`) or not (default `tr=FALSE`) Total Return data is available only from 1988; non-dividend-reinvested data is available from 1950.

Details

The columns of the data.frame returned

- **Date**
- **Open**
- **High**
- **Low**
- **Close**
- **Volume**
- **Adj.Close**

Value

A data.frame with the daily data

Author(s)

George Fisher

References

Yahoo Finance

Examples

```
sp500_idx <- SP500()  
head(sp500_idx)  
tail(sp500_idx)
```

sp500SlidingWindow *Sliding Window Investment Analysis*

Description

Uses the S&P500 daily data on a series of windows and generates graphs & statistics on the performance.

Usage

```
sp500SlidingWindow(investment_vector, withdrawal_vector, window_width = 30,  
  annual_fee = 0.0125, output_path = "~/")
```

Arguments

investment_vector	a vector of annual investments, (positive values represent investment into the account), length must be window_width
withdrawal_vector	a vector of annual withdrawals, (positive values represent withdrawal from the account), length must be window_width
window_width	the number of years in each window
annual_fee	the total annual percent removed by the investment managers
output_path	file path to a folder in which graphs & statistics will be saved

Details

The daily market data for the S&P 500 from 1950 to the present is broken into a series of periods or windows of equal length (except for the last period). The investment and expense data provided is analyzed to see how it would fare in each widow. Graphs and statistics are produced.

Value

data.frame with summary statistics for each window plus the side-effects of graphs written to the output_path given

Author(s)

George Fisher

Examples

```
## Not run:
investment_vector <- seq(1,30)*10
withdrawal_vector <- c(investment_vector[1:10] * 0.15,
                      investment_vector[11:20] * 0.35,
                      investment_vector[21:30] * runif(10, min=0.01, max=0.90))
window_df <- sp500SlidingWindow(investment_vector,
                               withdrawal_vector, output_path='~/Downloads/')

## End(Not run)
```

Description

Yahoo Finance returns TR data (^SP500TR) from 1988, non-TR (^GSPC) data from 1950. I spent a lot of time working with Bob Schiller's data (<http://www.econ.yale.edu/~shiller/data.htm>) which contains dividends back to 1871. What I found was that adjusting for dividends was difficult and I could never improve upon appending the TR data to the non-TR data at the 1987-1988 year break. Neither can anyone else I can find on the Internet. I keep hoping to find better data than this but so far I have been stymied.

Usage

```
SP500TR_1950()
```

Details

The columns of the data.frame returned

- **Date**
- **Open**
- **High**
- **Low**
- **Close**
- **Volume**
- **Adj.Close**
- **Year**
- **Month**

Value

A data.frame with the daily data

Author(s)

George Fisher

References

Yahoo Finance, Bob Schiller

Examples

```
sp500_idx <- SP500TR_1950()
head(sp500_idx)
tail(sp500_idx)
```

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