

# Package ‘qrmdata’

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**Title** Data Sets for Quantitative Risk Management Practice

**Description** Various data sets (stocks, stock indices, constituent data, FX, zero-coupon bond yield curves, volatility, commodities) for Quantitative Risk Management practice.

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**Depends** R (>= 3.5.0)

**Imports** xts

**Suggests** knitr, qrmtools, lattice

**Enhances**

**License** GPL-2 | GPL-3

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commodities	<i>Commodity Data</i>
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**Description**

Data sets containing commodities.

**Usage**

```
data("OIL_Brent")
data("GOLD")
```

**Format**

`xts` objects containing the Brent Crude price in USD per barrel (for OIL\_Brent) and the World Gold Council gold price in USD per troy ounce (for GOLD).

**Author(s)**

Marius Hofert

**Source**

The data was obtained from Federal Reserve Economic Data (FRED) via Quandl on 2016-01-03 with the function `get_data()` from **qrmtools**.

**Examples**

```
data("OIL_Brent")
data("GOLD")
```

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crypto	<i>Cryptocurrency Prices in USD</i>
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**Description**

Bitcoin, Ethereum, Litecoin and Ripple prices in USD (from their first available date onwards).

**Usage**

```
data("crypto")
```

**Format**

`xts` object containing cryptocurrency prices in USD of Bitcoin (ticker symbol "BTC-USD"), Ethereum (ticker symbol "ETH-USD"), Litecoin (ticker symbol "LTC-USD") and Ripple (ticker symbol "XRP-USD") from their first available date onwards.

**Author(s)**

Marius Hofert

**Source**

The data was obtained from Yahoo Finance on 2018-05-29 via the function `get_data()` from **qrm-tools**.

**Examples**

```
data("crypto")
str(crypto)
library(xts)
plot.zoo(crypto, main = "Cryptocurrencies in USD", xlab = "Time")
```

---

default

*Standard & Poor's Default Data*

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**Description**

A three-dimensional array containing the default data for A-, BBB-, BB-, B- and C-rated companies for the years from 1981 to 2000.

**Usage**

```
data("SP_defaults")
```

**Format**

`xts` objects containing foreign exchange rates of Canadian Dollar (CAD\_\*), US Dollar (USD\_\*), British Pound (GBP\_\*), Euro (EUR\_\*), Swiss Francs (CHF\_\*), Japanese Yen (JPY\_\*), Chinese Yuan (CNY\_\*) with respect to USD (\*\_USD) and GBP (\*\_GBP) from 2000-01-01 to 2015-12-31.

**Author(s)**

Marius Hofert

**Source**

Standard & Poor's Credit Monitor

**Examples**

```
data("SP_defaults")
```

**Description**

Foreign exchange rate data with respect to USD and GBP.

**Usage**

```
data("CAD_USD")
data("GBP_USD")
data("EUR_USD")
data("CHF_USD")
data("JPY_USD")
data("CNY_USD")
data("CAD_GBP")
data("USD_GBP")
data("EUR_GBP")
data("CHF_GBP")
data("JPY_GBP")
data("CNY_GBP")
```

**Format**

`xts` objects containing foreign exchange rates of Canadian Dollar (CAD\_\*), US Dollar (USD\_\*), British Pound (GBP\_\*), Euro (EUR\_\*), Swiss Francs (CHF\_\*), Japanese Yen (JPY\_\*), Chinese Yuan (CNY\_\*) with respect to USD (\*\_USD) and GBP (\*\_GBP) from 2000-01-01 to 2015-12-31.

**Details**

Interpretation: As an example, EUR\_USD contains the EUR/USD exchange rate, so a value  $x$  in EUR\_USD indicates that 1 EUR is worth  $x$  USD at that point in time.

**Author(s)**

Marius Hofert

**Source**

The data was obtained from OANDA (<https://www.oanda.com/>) on 2016-01-03 via the function `get_data()` from **qrmtools**.

**Examples**

```
data("CAD_USD")
data("GBP_USD")
data("EUR_USD")
data("CHF_USD")
```

```
data("JPY_USD")
data("CNY_USD")
data("CAD_GBP")
data("USD_GBP")
data("EUR_GBP")
data("CHF_GBP")
data("JPY_GBP")
data("CNY_GBP")
```

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interest_rates	<i>Interest-Rate Data</i>
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### Description

Zero-coupon bond yield curves in CAD and USD.

### Usage

```
data("ZCB_CAD")
data("ZCB_USD")
```

### Format

ZCB\_CAD: `xts` object containing, in each row, zero-coupon bond yield curves in percent for 120 times to maturity (ranging from 0.25 to 30 years); only trading days from 1991-01-02 to 2015-08-31 with available values for all maturities are included.

ZCB\_USD: `xts` object containing, in each row, zero-coupon bond yield curves in percent for 30 times to maturity (ranging from 1 to 30 years); only trading days from 1985-11-25 to 2015-12-29 with available values for all maturities are included.

### Author(s)

Marius Hofert

### Source

ZCB\_CAD was created from data obtained from <https://www.bankofcanada.ca/rates/interest-rates/bond-yield-curves/> multiplied by 100. ZCB\_USD was obtained from <https://data.nasdaq.com/data/FED/SVENY-us-treasury-zerocoupon-yield-curve/> (active in 2016) via Quandl. Both data sets were drawn on 2016-01-03 (ZCB\_USD via the function `get_data()` from **qrmtools**).

### Examples

```
data("ZCB_CAD")
data("ZCB_USD")
mat <- as.matrix(ZCB_USD['2015-01-01/2015-12-31',])
df <- data.frame(Day = rep(1:nrow(mat), each = ncol(mat)),
                 Maturity = rep(1:ncol(mat), nrow(mat)),
                 Value = as.vector(t(mat)))
```

```
lattice::wireframe(Value ~ Day * Maturity, data = df,
  alpha.regions = 0.5,
  scales = list(arrows = FALSE, col = "black"),
  par.settings = list(axis.line = list(col = "transparent")))
```

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 losses

*Loss Datasets*


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## Description

Danish fire insurance claims in 1M DKK in Denmark from 1980-01-03 to 1990-12-31. Largest 1% of simulated losses of Norwegian bank DNB.

## Usage

```
data("fire")
data("DNB")
```

## Format

**fire:** univariate `xts` object with 2167 observations.

**DNB:** (25000, 3)-`matrix` containing the largest 1% of simulated (market risk, credit risk, asset risk) losses of DNB; see Aas and Puccetti (2014, Section 2).

## Author(s)

Marius Hofert

## Source

**fire:** Originally Mette Rytgaard (Copenhagen Re).

**DNB:** Originally Kjersti Aas and Giovanni Puccetti.

## References

Aas, K. and Puccetti, G. (2014). Bounds for total economic capital: the DNB case study. *Extremes* **17**(4), 693–715.

## Examples

```
library(xts)
## Danish fire losses
data("fire")
str(fire)
stopifnot(inherits(fire, "xts"), length(fire) == 2167)
plot.zoo(fire, ylab = "Fire insurance claim")

## Largest 1% of simulated DNB losses
data("DNB")
stopifnot(dim(DNB) == c(25000, 3))
```

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stock_data	<i>(Single) Stock Data</i>
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**Description**

Single stock data; only Radioshack at the moment.

**Usage**

```
data("RSHCQ")
```

**Format**

An `xts` object containing adjusted close prices of Radioshack (RSHCQ; ticker symbol "RSHCQ") from 1982-01-04 to 2015-01-20.

**Author(s)**

Marius Hofert

**Source**

Radioshack defaulted early 2015. Yahoo Finance did not provide adjusted close prices thereafter. We thus used the adjusted close prices from 1982-01-04 to 2015-01-20 which we drew from Yahoo Finance on 2015-01-21 via the function `get_data()` from **qrmtools**.

**Examples**

```
data("RSHCQ")
```

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stock_indices	<i>Stock Index Data</i>
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**Description**

Single stock indices.

**Usage**

```
data("SP500")  
data("DJ")  
data("NASDAQ")  
data("FTSE")  
data("SMI")  
data("EURSTOXX")  
data("CAC")
```

```
data("DAX")
data("CSI")
data("HSI")
data("SSEC")
data("NIKKEI")
```

### Format

`xts` objects containing adjusted close prices of the S&P 500 (SP500; ticker symbol “^GSPC”), Dow Jones (DJ; ticker symbol “^DJI”), NASDAQ 100 (NASDAQ; ticker symbol “^NDX”), FTSE 100 (FTSE; ticker symbol “^FTSE”), Swiss Market Index (SMI; ticker symbol “^SSMI”), Euro Stoxx 50 (EURSTOXX; ticker symbol “^STOXX50E”), Cotation Assistée en Continu (CAC; ticker symbol “^FCHI”), Deutscher Aktienindex (DAX; ticker sybmol “^GDAXI”), China Securities Index (CSI; ticker sybmol “000300.SS”), Hang Seng Index (HSI; ticker symbol “^HSI”), Shanghai Stock Exchange Composite Index (SSEC; ticker symbol “000001.SS”) and the NIKKEI (NIKKEI; ticker symbol “^N225”) from their first date of availability to 2015-12-31.

### Author(s)

Marius Hofert

### Source

The data was obtained from Yahoo Finance on 2016-01-03 via the function `get_data()` from **qrm-tools**.

### Examples

```
data("SP500")
data("DJ")
data("NASDAQ")
data("FTSE")
data("SMI")
data("EURSTOXX")
data("CAC")
data("DAX")
data("CSI")
data("HSI")
data("SSEC")
data("NIKKEI")
```

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stock\_indices\_constituents

*Stock Index Constituents Data*

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### Description

Constituent data of various stock indices.



## Usage

```
data("SP500_const")
data("DJ_const")
data("FTSE_const")
data("EURSTX_const")
data("HSI_const")
```

## Format

`xts` objects containing adjusted close prices of the constituents of the respective stock indices. These are the S&P 500 constituents (SP500\_const with corresponding Global Industry Classification Standard (GICS) information SP500\_const\_info; see [https://en.wikipedia.org/wiki/List\\_of\\_S%26P\\_500\\_companies](https://en.wikipedia.org/wiki/List_of_S%26P_500_companies); given these tickers, the data was obtained from Yahoo! Finance) as of 2015-10-12, the Dow Jones constituents (DJ\_const; information about the constituents not available anymore) as of 2016-01-03, the FTSE 100 constituents (FTSE\_const; see <https://uk.finance.yahoo.com/quote/%5EFTSE/components?ltr=1/>) as of 2016-01-03 (the data was only available for 98 constituents), the Euro Stoxx 50 constituents (EURSTX\_const; see <https://uk.finance.yahoo.com/quote/%5ESTOXX50E/components?ltr=1/>) as of 2016-01-03 (the data was only available for 98 constituents) and the Hang Seng Index constituents (HSI\_const; see <https://uk.finance.yahoo.com/quote/%5EHSI/components?ltr=1/>) as of 2016-01-03.

The constituents data ranges from the first date at least one of the constituents is available (with missing data if not available) to 2015-12-31.

## Author(s)

Marius Hofert

## Source

The data was obtained from the respective URLs on 2016-01-03 via the function `get_data()` from **qrmtools**.

Note that for the S&P 500 constituents, the data was rounded to two decimal places to reduce the file size of the data set.

## Examples

```
data("SP500_const")
data("DJ_const")
data("FTSE_const")
data("EURSTX_const")
data("HSI_const")
```

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`volatility`*Volatility Index*

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**Description**

Chicago Board Options Exchange (CBOE) volatility index (VIX) data.

**Usage**

```
data("VIX")
```

**Format**

An `xts` object containing the volatility index (VIX; ticker symbol “^VIX”) from its first date of availability to 2015-12-31.

**Details**

The VIX is typically used as a market-based measure of volatility in percent.

**Author(s)**

Marius Hofert

**Source**

The data was obtained from Yahoo Finance on 2016-01-03 via the function `get_data()` from **qrm-tools**.

**Examples**

```
data("VIX")
```

# Index

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