

Welcome to the course!

IMPORTING AND MANAGING FINANCIAL DATA IN R



Joshua Ulrich
Instructor

About me

- Author and/or maintainer of several packages
 - `TTR` , `xts` , `quantmod` , `blotter` , `quantstrat`
- R/Finance Conference Organizing Committee
- St. Louis R User Group

What is `getSymbols()`?

- Provides access to multiple data sources
- Returns `xts` object by default
- Can import data two ways:
 - Return data like an ordinary function
 - Create an object like `load()` does in base R

```
getSymbols(Symbols = "AAPL", src = "yahoo")
```

```
"AAPL"
```






```
getSymbols("AAPL")
```

```
"AAPL"
```

```
head(AAPL)
```

	AAPL.Open	AAPL.High	AAPL.Low	AAPL.Close	AAPL.Volume	AAPL.Adjusted
2007-01-03	86.29	86.58	81.90	83.80	309579900	10.85709
2007-01-04	84.05	85.95	83.82	85.66	211815100	11.09807
2007-01-05	85.77	86.20	84.40	85.05	208685400	11.01904
2007-01-08	85.96	86.53	85.28	85.47	199276700	11.07345
2007-01-09	86.45	92.98	85.15	92.57	837324600	11.99333
2007-01-10	94.75	97.80	93.45	97.00	738220000	12.56728

getSymbols() data sources

Yahoo! Finance	
Google Finance	
FRED	
Oanda	
CSV	

Other `getSymbols()` data sources

- Yahoo! Finance Japan
- MySQL
- SQLite
- RData
- rds (created by `saveRDS()`)

getSymbols() example

```
# Load data like load()
getSymbols("AAPL", auto.assign = TRUE)
```

```
"AAPL"
```

```
head(AAPL, n = 3)
```

	AAPL.Open	AAPL.High	AAPL.Low	AAPL.Close	AAPL.Volume	AAPL.Adjusted
2007-01-03	86.29	86.58	81.90	83.80	309579900	10.85709
2007-01-04	84.05	85.95	83.82	85.66	211815100	11.09807
2007-01-05	85.77	86.20	84.40	85.05	208685400	11.01904

getSymbols() example

```
# Return data like a normal function  
aapl <- getSymbols("AAPL", auto.assign = FALSE)  
head(aapl, n = 3)
```

	AAPL.Open	AAPL.High	AAPL.Low	AAPL.Close	AAPL.Volume	AAPL.Adjusted
2007-01-03	86.29	86.58	81.90	83.80	309579900	10.85709
2007-01-04	84.05	85.95	83.82	85.66	211815100	11.09807
2007-01-05	85.77	86.20	84.40	85.05	208685400	11.01904

Let's practice!

IMPORTING AND MANAGING FINANCIAL DATA IN R

Introduction to Quandl

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What is Quandl?

- Data service:
 - <https://www.quandl.com/>
- R package:
 - <https://CRAN.R-project.org/package=Quandl>
- Function:
 - `Quandl::Quandl()`

Quandl() versus getSymbols()

- Both provide access to multiple data sources
- `Quandl()` always returns data (i.e. does not behave like `Load()`)

```
# Instrument and source specified by Symbols and src arguments  
quantmod::getSymbols(Symbols = "DGS10", src = "FRED")
```

```
# Instrument and source specified by code argument  
dgs10 <- Quandl::Quandl(code = "FRED/DGS10")
```

Quandl() versus getSymbols()

- `type` argument controls class of return object:
 - "raw" (`data.frame` object), `xts`, `zoo`, `ts`, `timeSeries`

```
# Return xts object instead of data.frame
```

```
dgs10 <- Quandl::Quandl(code = "FRED/DGS10", type = "xts")
```

- Defaults
 - `getSymbols()` returns `xts`
 - `Quandl()` returns `data.frame`

Let's practice!

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Finding data from internet sources

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Yahoo Finance

The screenshot shows the Yahoo Finance homepage. At the top, there is a navigation bar with links to Home, Mail, Flickr, Tumblr, News, Sports, Finance, Celebrity, Answers, Groups, Mobile, and More. Below this is the Yahoo Finance logo and a search bar. The main content area features a row of market data for S&P Futures, Dow Futures, Nasdaq Futures, and Crude Oil. A large news article titled "Stocks inch up, dollar rises" is prominently displayed. To the right, there is a "Quote Lookup" section and a "My Portfolio & Markets" section with a table of recently viewed assets.

Symbol	Last Price	Change	% Change
^DJI	20,934.76	-29.58	-0.14%
DOW	63.15	-0.36	-0.57%
IYY	238.57	-0.70	-0.29%
SPYVDE	14.06	-0.06	-0.42%
SPYV	114.44	-0.59	-0.52%
AAPL	139.52	0.18	0.13%

Google Finance

The screenshot displays the Google Finance homepage. At the top, there is a search bar with the text "Search Finance" and a magnifying glass icon. Below the search bar, the "Market Summary" tab is selected, showing a line chart of market indices. The chart includes data for the Dow Jones, S&P 500, and Nasdaq. To the left of the chart, there are navigation links for "Markets", "News", "Portfolios", "Stock screener", "Google Domestic Trends", and "Recent Quotes (180 days)". Below these links, there are stock quotes for DJI, CVX, and AAPL. The main content area features a news article titled "On Women's Day eve, statue of girl stares down Wall Street bull" with a sub-headline "CHBC - 15 hours ago". Below the article, there are "Top stories" and "Market" sections. On the right side, there is an advertisement for "Create a portfolio" and a "World markets" section showing the Shanghai market.

Market Summary

On Women's Day eve, statue of girl stares down Wall Street bull
CHBC - 15 hours ago

People look at a statue of a girl facing the Wall St. Bull in the financial district of New York, March 7, 2017. As many American women prepare to draw attention to their role in the workplace, a Wall Street firm on Tuesday put up a statue of a girl in ...
On International Women's Day, A Girl Stares Down The Bull
MediaPost Communications

Girl statue faces Wall St bull to fight gender inequality
BBC News
Business Insider
Forbes

10am 11 12 1 2 3 4pm

Dow Jones	20,924.76	-29.58	(-0.14%)
S&P 500	2,368.39	-8.92	(-0.37%)
Nasdaq	5,833.93	-15.25	(-0.26%)

Top stories

Market

China posts first monthly trade deficit in three years as imports soar
Reuters - 8 hours ago
FILE PHOTO: Onlookers watch from a harbour wall as the largest container ship in world, CSCI Globe, docks during its maiden voyage, at the port of Felixstowe in south east England, January 7, 2015.

ZTE receives record \$1.2 billion fine for breaking US sanctions
The Verge - 4 hours ago
Visitors examine ZTE device at Mobile World Congress in 2016. Photo by David Ramos/Getty Images. ZTE, China's second-largest maker of telecoms equipment, has been hit by a record fine from the US government.

Ha: Despite Boycott, Ivanka Trump's Fashion Line Reports Record Sales
Townhall - 52 minutes ago
Boycotts of Ivanka Trump's clothing line have backfired, as the company reported record sales numbers. "Since the beginning of February, they were some of the best performing weeks in the history of the brand," Abigail Klam, the president of the Ivanka ...

Fiat Chrysler's merger options dwindle as Volkswagen rejects overtures
Reuters - 3 hours ago
Volkswagen CEO Matthias Mueller speaks during Volkswagen event ahead of the 87th International Motor Show at Palexpo in Geneva, Switzerland, March 8, 2017.

Trump adviser Inhofe accused of harassing lobbyist aides

World markets

Shanghai	3,240.68	-1.74	(-0.05%)
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The screenshot shows the FRED Economic Research website. At the top left is the FRED logo with the tagline 'ECONOMIC RESEARCH' and 'FEDERAL RESERVE BANK OF ST. LOUIS'. To the right are links for 'REGISTER' and 'SIGN IN', and a search bar labeled 'Search FRED'. Below the header is a navigation menu with links: 'FRED Economic Data', 'Information Services', 'Publications', 'Working Papers', 'Economists', and 'About'. On the far right of the menu is 'St. Louis Fed Home'. The main content area features a large banner with the text 'Download, graph, and track 469,000 US and international time series from 83 sources.' Below this is a search input field with the placeholder text 'Search FRED data e.g., gdp, inflation, unemployment' and a search icon. Underneath the search field are links to 'Browse data by Tag, Category, Release, Source, Release Calendar or Get Help'. The page is divided into two columns. The left column contains 'FRED News' and 'FRED Blog' sections with links to articles like 'FRED Adds Data on Burdened Households' and 'What is unemployment? : There is more to it than not working'. The right column features a 'GEOFRED' section with the text 'Build your own U.S. data map. Show FRED data at state, county, and metropolitan statistical area levels.' and a 'Send feedback' button. At the bottom, there are tabs for 'AT A GLANCE', 'POPULAR SERIES', 'LATEST RELEASES', 'TOOLS', and 'NEED HELP?'. Below these tabs are two data cards: 'CPI' showing '+2.5 % Chg. from Yr. Ago on Jan 2017' and 'US/Euro FX Rate' showing '1.0552 U.S. \$ to 1 Euro on 2017-03-03'. Each card includes a small line graph icon.

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