



IMPORTING AND MANAGING FINANCIAL DATA IN R

Welcome to the course

About me

- Author and/or maintainer of several packages
 - TTR, xts, quantmod, quantstrat, blotter
- 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() example

```
> getSymbols(Symbols = "AAPL", src = "yahoo")  
[1] "AAPL"
```

```
> getSymbols("AAPL")  
[1] "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

Default

```
> # Load data like load()
> getSymbols("AAPL", auto.assign = TRUE)
[1] "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

```
> # 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



IMPORTING AND MANAGING FINANCIAL DATA IN R

Let's practice!



IMPORTING AND MANAGING FINANCIAL DATA IN R

Introduction to Quandl

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), "ts", "zoo", "xts", "timeSeries"

```
> # Return xts object instead of data.frame  
> dgs10 <- Quandl::Quandl(code = "FRED/DGS10", type = "xts")
```

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



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Let's practice!




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US Markets open in 1 hr and 38 mins

S&P Futures
2,366.00
-0.50 (-0.02%)

Dow Futures
20,906.00
-7.00 (-0.03%)


Nasdaq Futures
5,348.50
-1.25 (-0.02%)

Crude Oil
52.60
-0.54 (-1.02%)




Stocks inch up, dollar rises

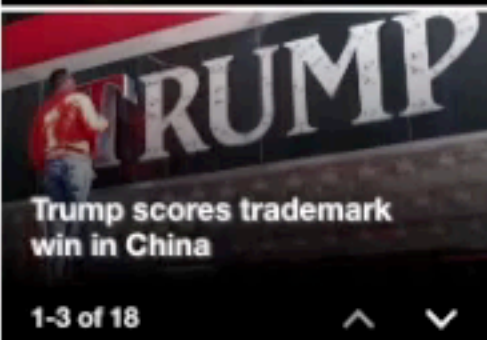
European shares edged up on Wednesday after minor gains in Asia as Chinese import data signalled a recovering economy. [Read More »](#)



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^DJI	20,924.76	-29.58	-0.14%
Dow Jones Industrial Average			
DOW	63.15	-0.36	-0.57%
The Dow Chemical Company			
IVV	238.57	-0.70	-0.29%
iShares Core S&P 500			
SPYV.DE	14.06	-0.06	-0.42%
SPDR® S&P Emerging Markets Dividend ETF			
SPYV	114.44	-0.59	-0.52%
SPDR S&P 500 Value ETF			
AAPL	139.52	0.18	0.13%
Apple Inc.			

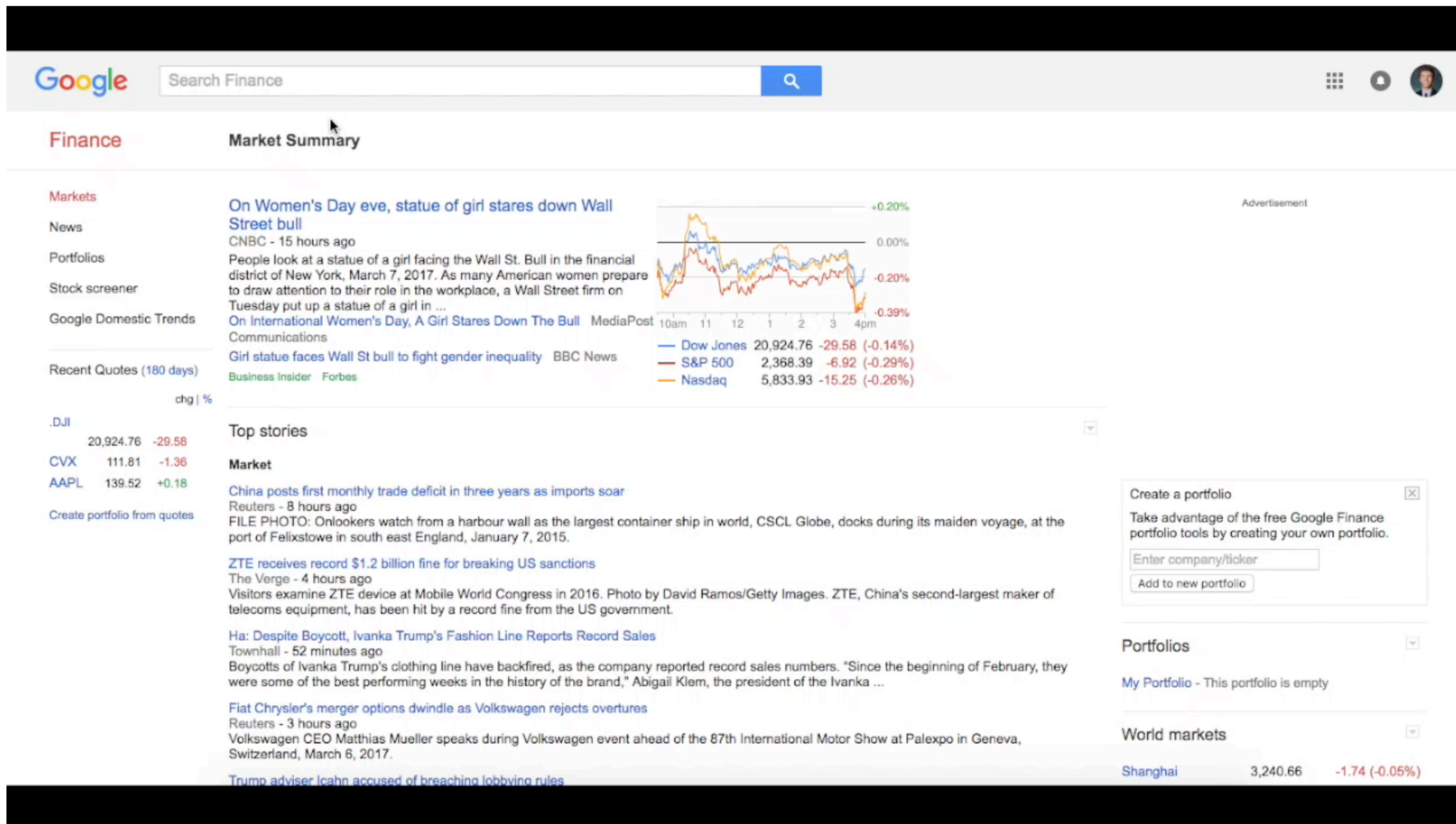


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Boeing's 737 MAX 9 Jetliner Raises Eyebrows, Travels 3,515 Miles Nonstop

Chicago-based Boeing BA released its newest jetliner, the Boeing 737 MAX 9. The MAX 9 jet was rolled out Tuesday at

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.DJI
20,924.76 -29.58
CVX 111.81 -1.36
AAPL 139.52 +0.18
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CNBC - 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 ...
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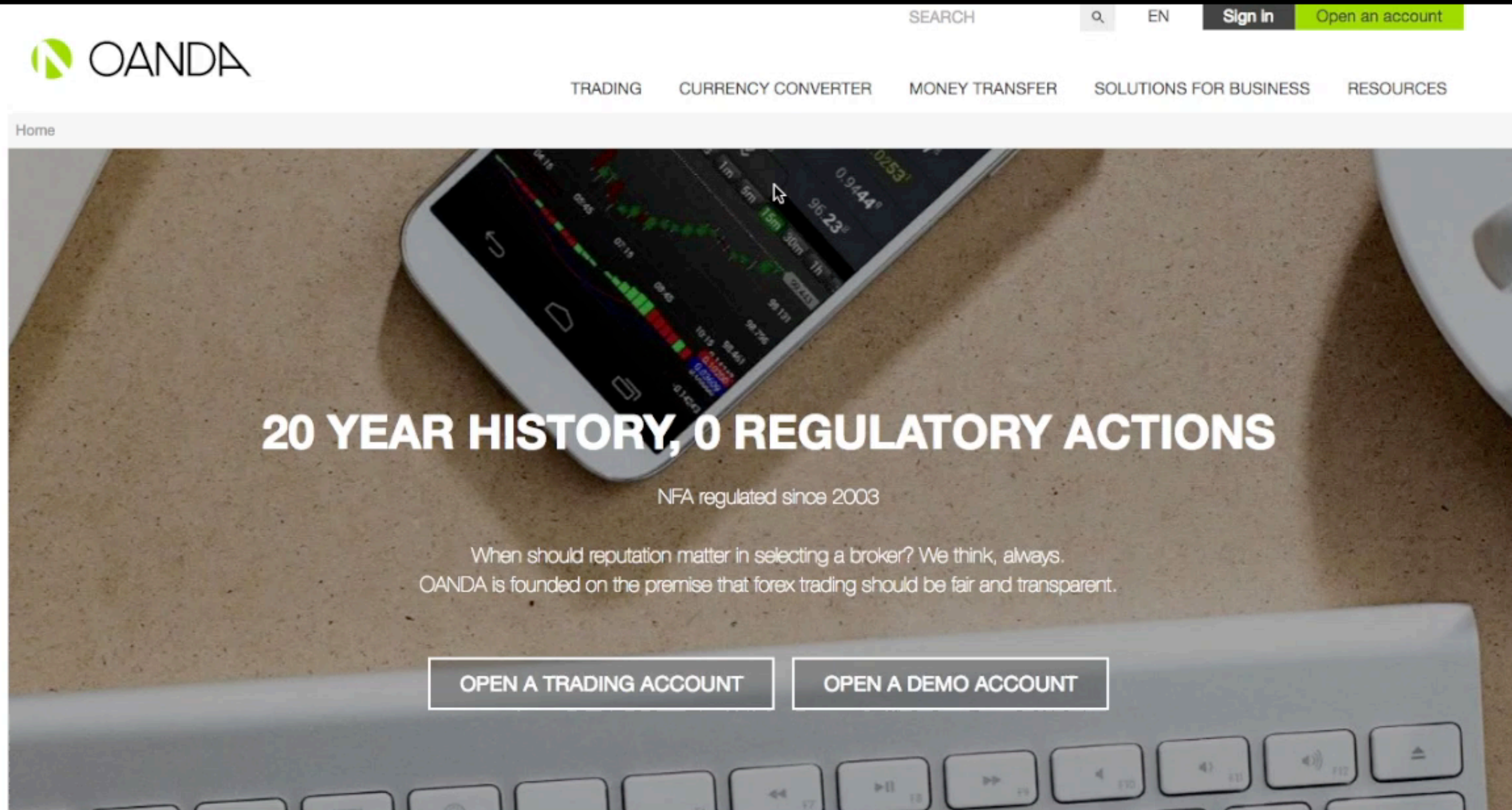
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Oanda



The screenshot shows the Oanda website homepage. At the top, there is a navigation bar with a search bar, language selector (EN), and links for 'Sign In' and 'Open an account'. Below this is a secondary navigation bar with links for 'TRADING', 'CURRENCY CONVERTER', 'MONEY TRANSFER', 'SOLUTIONS FOR BUSINESS', and 'RESOURCES'. The main content area features a large background image of a smartphone displaying a forex trading chart. Overlaid on this image is the text '20 YEAR HISTORY, 0 REGULATORY ACTIONS' in large, bold, white letters. Below this, in smaller text, it says 'NFA regulated since 2003'. Further down, a paragraph reads: 'When should reputation matter in selecting a broker? We think, always. OANDA is founded on the premise that forex trading should be fair and transparent.' At the bottom of the main content area, there are two buttons: 'OPEN A TRADING ACCOUNT' and 'OPEN A DEMO ACCOUNT'.

SEARCH EN [Sign In](#) [Open an account](#)

OANDA

TRADING CURRENCY CONVERTER MONEY TRANSFER SOLUTIONS FOR BUSINESS RESOURCES

Home

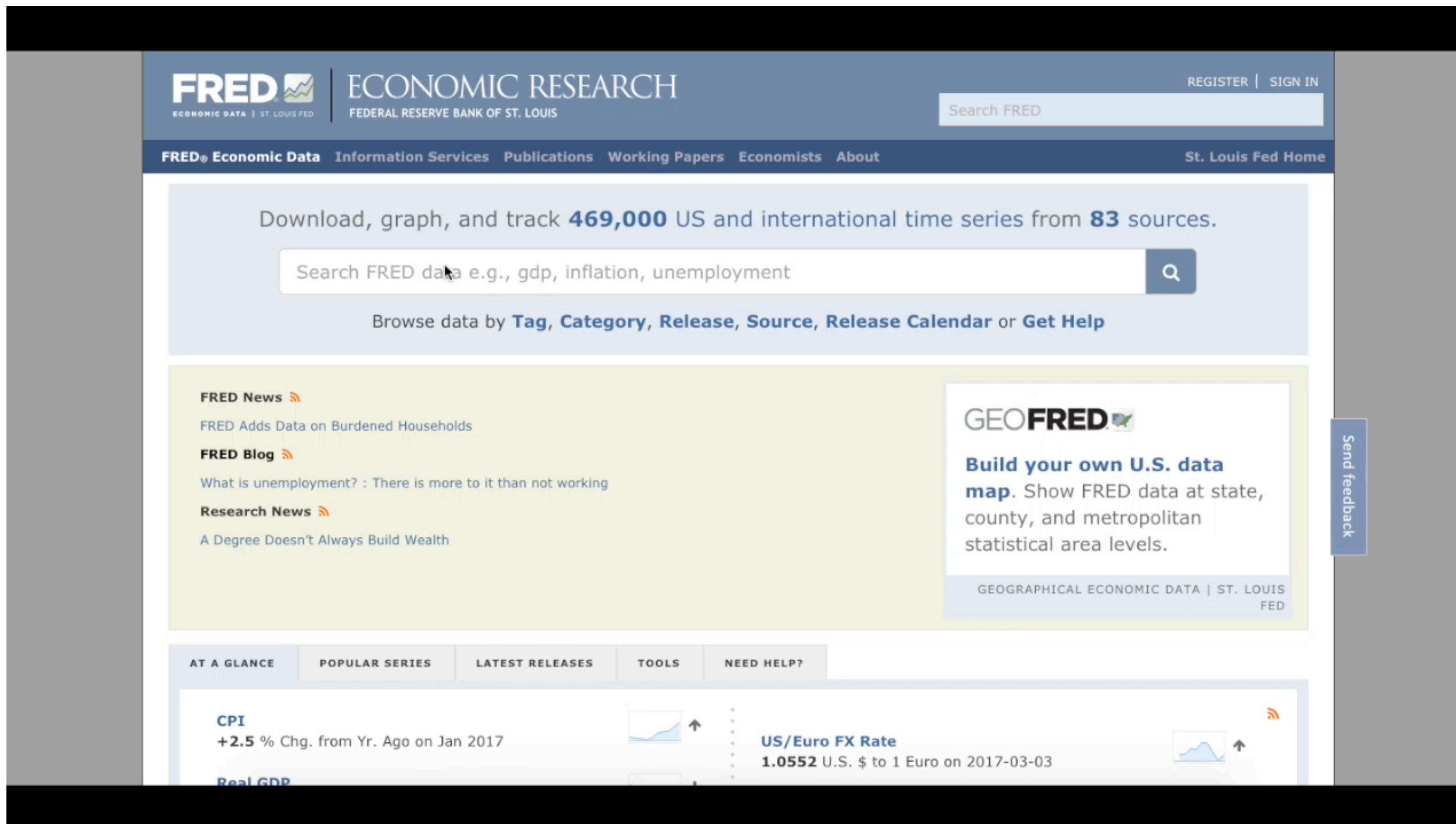
20 YEAR HISTORY, 0 REGULATORY ACTIONS

NFA regulated since 2003

When should reputation matter in selecting a broker? We think, always.
OANDA is founded on the premise that forex trading should be fair and transparent.

[OPEN A TRADING ACCOUNT](#) [OPEN A DEMO ACCOUNT](#)

FRED



The screenshot displays the FRED website, which is part of the Federal Reserve Bank of St. Louis. The header includes the FRED logo, the text "ECONOMIC RESEARCH" and "FEDERAL RESERVE BANK OF ST. LOUIS", and links for "REGISTER" and "SIGN IN". A search bar labeled "Search FRED" is positioned on the right. Below the header, a navigation bar lists various services: "FRED® Economic Data", "Information Services", "Publications", "Working Papers", "Economists", and "About", along with a link to "St. Louis Fed Home".

The main content area features a large banner stating: "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 button. A link to "Browse data by Tag, Category, Release, Source, Release Calendar or Get Help" is also present.

On the left side, there are sections for "FRED News" (with a link to "FRED Adds Data on Burdened Households"), "FRED Blog" (with a link to "What is unemployment? : There is more to it than not working"), and "Research News" (with a link to "A Degree Doesn't Always Build Wealth").

On the right side, there is a "GEOFRED" section titled "Build your own U.S. data map. Show FRED data at state, county, and metropolitan statistical area levels." with a link to "GEOGRAPHICAL ECONOMIC DATA | ST. LOUIS FED".

At the bottom, there is a navigation bar with tabs: "AT A GLANCE", "POPULAR SERIES", "LATEST RELEASES", "TOOLS", and "NEED HELP?". Below this, there are two data series displayed: "CPI" with a value of "+2.5 % Chg. from Yr. Ago on Jan 2017" and "US/Euro FX Rate" with a value of "1.0552 U.S. \$ to 1 Euro on 2017-03-03".

A vertical "Send feedback" button is located on the right side of the page.



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