

# FRED - Example

Datasets

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## Introduction

```
rm(list = ls())
pklist <- c("tidyverse", "fredr")
source("https://fgeerolf.github.io/datasets/load-packages.R")
options(tibble.print_max = 30)
```

## Set Key: FRED

Here you need to insert a code chunk showing (that's the only part of the R-Markdown file that I did not include):

```
fredr__set__key("your key")
```

You may get a key on this website: <https://research.stlouisfed.org/useraccount/login/secure/>

# Unemployment Rate and Fed Funds

## Modern Data

```
fredr(series_id = "UNRATE")
```

```
## # A tibble: 848 x 3
##   date      series_id value
##   <date>    <chr>    <dbl>
## 1 1948-01-01 UNRATE      3.4
## 2 1948-02-01 UNRATE      3.8
## 3 1948-03-01 UNRATE      4
## 4 1948-04-01 UNRATE      3.9
## 5 1948-05-01 UNRATE      3.5
## 6 1948-06-01 UNRATE      3.6
## 7 1948-07-01 UNRATE      3.6
## 8 1948-08-01 UNRATE      3.9
## 9 1948-09-01 UNRATE      3.8
## 10 1948-10-01 UNRATE      3.7
## # ... with 838 more rows
```

```
fredr(series_id = "UNRATE",
      observation_start = as.Date("1990-01-01"))
```

```
## # A tibble: 344 x 3
##   date      series_id value
##   <date>    <chr>    <dbl>
## 1 1990-01-01 UNRATE      5.4
## 2 1990-02-01 UNRATE      5.3
## 3 1990-03-01 UNRATE      5.2
## 4 1990-04-01 UNRATE      5.4
## 5 1990-05-01 UNRATE      5.4
## 6 1990-06-01 UNRATE      5.2
## 7 1990-07-01 UNRATE      5.5
## 8 1990-08-01 UNRATE      5.7
## 9 1990-09-01 UNRATE      5.9
## 10 1990-10-01 UNRATE      5.9
## # ... with 334 more rows
```

What are other data series for unemployment?

```
unemp.1929.1942 <- fredr(series_id = "M0892AUSM156SNBR")
unemp.1947.1966 <- fredr(series_id = "M0892CUSM156NNBR")
unemp.1948.now <- fredr(series_id = "UNRATE")
```

```
unemp.1929.1942 %>%
  head
```

```
## # A tibble: 6 x 3
##   date      series_id      value
##   <date>    <chr>    <dbl>
## 1 1929-04-01 M0892AUSM156SNBR  0.69
## 2 1929-05-01 M0892AUSM156SNBR  1.65
## 3 1929-06-01 M0892AUSM156SNBR  2.06
## 4 1929-07-01 M0892AUSM156SNBR  0.79
```

```
## 5 1929-08-01 M0892AUSM156SNBR 0.04
## 6 1929-09-01 M0892AUSM156SNBR 0.91
```

```
fredr_series_search_text(search_text = "unemployment",
                          order_by = "popularity",
                          sort_order = "desc") %>%
  select(id, observation_start, title) %>%
  as.tibble %>%
  head(20)
```

```
## # A tibble: 20 x 3
##   id          observation_start title
##   <chr>         <chr>          <chr>
## 1 CPIAUCSL      1947-01-01      Consumer Price Index for All Urban Consu~
## 2 UNRATE        1948-01-01      Civilian Unemployment Rate
## 3 PAYEMS        1939-01-01      All Employees: Total Nonfarm Payrolls
## 4 USSSLIND      1982-01-01      Leading Index for the United States
## 5 NROU          1949-01-01      Natural Rate of Unemployment (Long-Term)
## 6 LNS14000024   1948-01-01      Unemployment Rate: 20 years and over
## 7 UNEMPLOY      1948-01-01      Unemployment Level
## 8 U6RATE        1994-01-01      Total unemployed, plus all marginally at~
## 9 M0892AUSM1~   1929-04-01      Unemployment Rate for United States
## 10 UNRATENSA    1948-01-01      Civilian Unemployment Rate
## 11 LNS14000031   1972-01-01      Unemployment Rate: 20 years and over, Bl~
## 12 NROUST       1949-01-01      Natural Rate of Unemployment (Short-Term)
## 13 USPHCI       1979-01-01      Coincident Economic Activity Index for t~
## 14 LNU04027662  1992-01-01      Unemployment Rate: College Graduates: Ba~
## 15 CCSA         1967-01-07      Continued Claims (Insured Unemployment)
## 16 UEMPMEAN     1948-01-01      Average (Mean) Duration of Unemployment
## 17 PAYNSA       1939-01-01      All Employees: Total Nonfarm Payrolls
## 18 LNS14000006   1972-01-01      Unemployment Rate: Black or African Amer~
## 19 Q0892BUSQ1~  1940-04-01      Unemployment Rate for United States
## 20 CALOSA7URN   1990-01-01      Unemployment Rate in Los Angeles County,~
```

## Integrate with tidyverse package

```
fredr_series_search_text(search_text = "federal funds",
                          order_by = "popularity",
                          sort_order = "desc",
                          limit = 1) %>%
  pull(id) %>%
  fredr(series_id = .) %>%
  ggplot(data = ., mapping = aes(x = date, y = value, linetype = series_id)) +
  geom_line() +
  labs(x = "Observation Date", y = "Rate", color = "Series") +
  theme_bw() + xlab("") + ylab("") + theme(legend.title = element_blank())
```



Look for series: debt and gross domestic product

```
fredr_series_search_text(search_text = "debt",
                          order_by = "popularity",
                          sort_order = "desc",
                          limit = 5) %>%
  as.tibble %>%
  arrange(observation_start)
```

```
## # A tibble: 5 x 16
##   id      realtime_start realtime_end title observation_start observation_end
##   <chr> <chr>           <chr>    <chr> <chr>           <chr>
## 1 FEDF~ 2018-09-25      2018-09-25 Effe~ 1954-07-01      2018-08-01
## 2 DFF~ 2018-09-25      2018-09-25 Effe~ 1954-07-01      2018-09-21
## 3 GFDE~ 2018-09-25      2018-09-25 Fede~ 1966-01-01      2018-01-01
## 4 BAML~ 2018-09-25      2018-09-25 ICE ~ 1996-12-31    2018-09-24
## 5 BAML~ 2018-09-25      2018-09-25 ICE ~ 1996-12-31    2018-09-24
## # ... with 10 more variables: frequency <chr>, frequency_short <chr>,
## #   units <chr>, units_short <chr>, seasonal_adjustment <chr>,
## #   seasonal_adjustment_short <chr>, last_updated <chr>, popularity <int>,
## #   group_popularity <int>, notes <chr>
```

```
fredr_series_search_text(search_text = "gross domestic product",
                          order_by = "popularity",
                          sort_order = "desc",
                          limit = 5) %>%
  as.tibble %>%
  arrange(observation_start)
```

```
## # A tibble: 5 x 16
##   id      realtime_start realtime_end title observation_start observation_end
##   <chr> <chr>           <chr>    <chr> <chr>           <chr>
## 1 PAYE~ 2018-09-25      2018-09-25 All ~ 1939-01-01    2018-08-01
## 2 GDPC1 2018-09-25      2018-09-25 Real~ 1947-01-01      2018-04-01
## 3 GDP~ 2018-09-25      2018-09-25 Gros~ 1947-01-01      2018-04-01
## 4 A191~ 2018-09-25      2018-09-25 Real~ 1947-04-01      2018-04-01
```

```
## 5 GFDE~ 2018-09-25      2018-09-25  Fede~ 1966-01-01      2018-01-01
## # ... with 10 more variables: frequency <chr>, frequency_short <chr>,
## #   units <chr>, units_short <chr>, seasonal_adjustment <chr>,
## #   seasonal_adjustment_short <chr>, last_updated <chr>, popularity <int>,
## #   group_popularity <int>, notes <chr>
```

```
fredr_series_observations(series_id = "UNRATE",
                          observation_start = as.Date("1990-01-01"),
                          frequency = "q",
                          units = "chg")
```

```
## # A tibble: 115 x 3
##   date      series_id  value
##   <date>    <chr>    <dbl>
## 1 1990-01-01 UNRATE    -0.0667
## 2 1990-04-01 UNRATE     0.0333
## 3 1990-07-01 UNRATE     0.367
## 4 1990-10-01 UNRATE     0.433
## 5 1991-01-01 UNRATE     0.467
## 6 1991-04-01 UNRATE     0.233
## 7 1991-07-01 UNRATE     0.0333
## 8 1991-10-01 UNRATE     0.233
## 9 1992-01-01 UNRATE     0.267
## 10 1992-04-01 UNRATE     0.233
## # ... with 105 more rows
```

## Integrate the purrr package

This is how to create a wide database with various FRED Databases:

```
map_dfr(c("FEDFUNDS", "UNRATE"), fredr) %>%
  spread(series_id, value) %>%
  top_n(10)
```

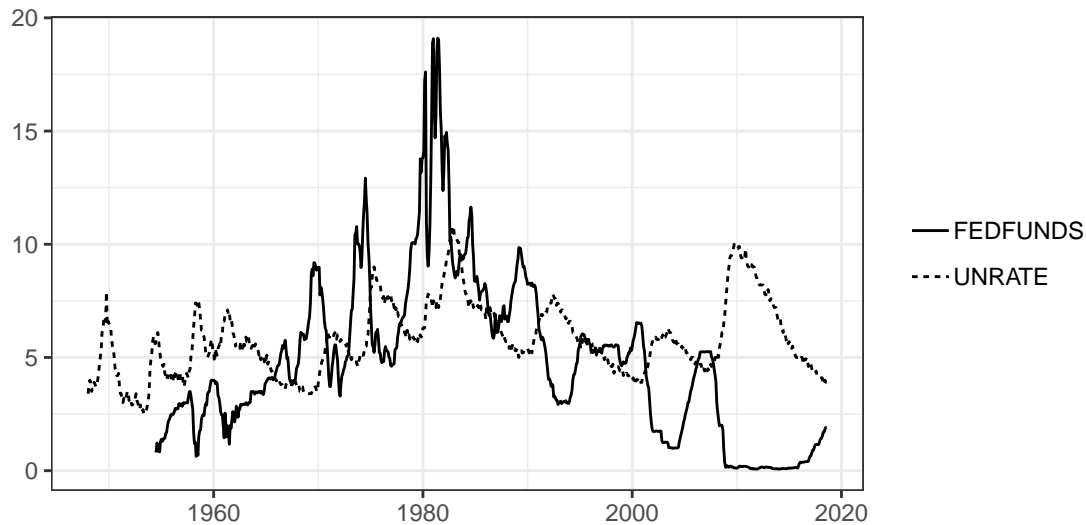
```
## Selecting by UNRATE
```

```
## # A tibble: 10 x 3
##   date      FEDFUNDS UNRATE
##   <date>    <dbl> <dbl>
## 1 1982-09-01    10.3   10.1
## 2 1982-10-01     9.71   10.4
## 3 1982-11-01     9.2    10.8
## 4 1982-12-01     8.95   10.8
## 5 1983-01-01     8.68   10.4
## 6 1983-02-01     8.51   10.4
## 7 1983-03-01     8.77   10.3
## 8 1983-04-01     8.8    10.2
## 9 1983-05-01     8.63   10.1
## 10 1983-06-01     8.98   10.1
```

This is how to map them:

```
map_dfr(c("UNRATE", "FEDFUNDS"), fredr) %>%
  ggplot(data = ., mapping = aes(x = date, y = value, linetype = series_id)) +
  geom_line() +
```

```
labs(x = "Observation Date", y = "Rate", linetype = "Series") +
theme_bw() + xlab("") + ylab("") + theme(legend.title = element_blank())
```



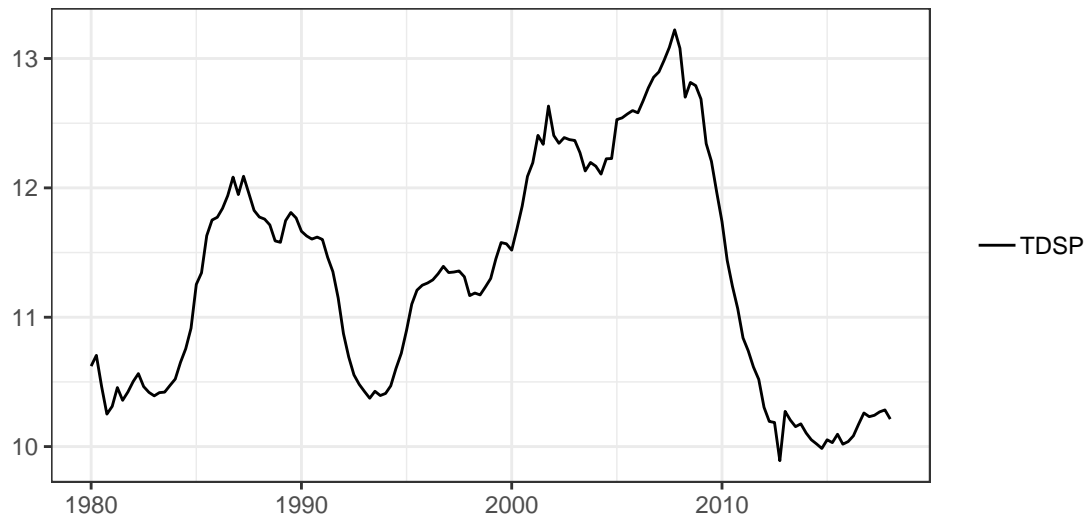
```
params <- list(series_id = c("UNRATE", "OILPRICE"),
               frequency = c("m", "q"))

pmap_dfr(.l = params,
         .f = ~ fredr(series_id = .x, frequency = .y))
```

```
## # A tibble: 1,119 x 3
##   date      series_id value
##   <date>    <chr>    <dbl>
## 1 1948-01-01 UNRATE      3.4
## 2 1948-02-01 UNRATE      3.8
## 3 1948-03-01 UNRATE      4
## 4 1948-04-01 UNRATE      3.9
## 5 1948-05-01 UNRATE      3.5
## 6 1948-06-01 UNRATE      3.6
## 7 1948-07-01 UNRATE      3.6
## 8 1948-08-01 UNRATE      3.9
## 9 1948-09-01 UNRATE      3.8
## 10 1948-10-01 UNRATE      3.7
## # ... with 1,109 more rows
```

## Household Debt Service Payments as a Percent of Disposable Income

```
map_dfr(c("TDSP"), fredr) %>%
  ggplot(data = ., mapping = aes(x = date, y = value, linetype = series_id)) +
  geom_line() +
  labs(x = "Observation Date", y = "Rate", color = "Series") +
  theme_bw() + xlab("") + ylab("") + theme(legend.title = element_blank())
```



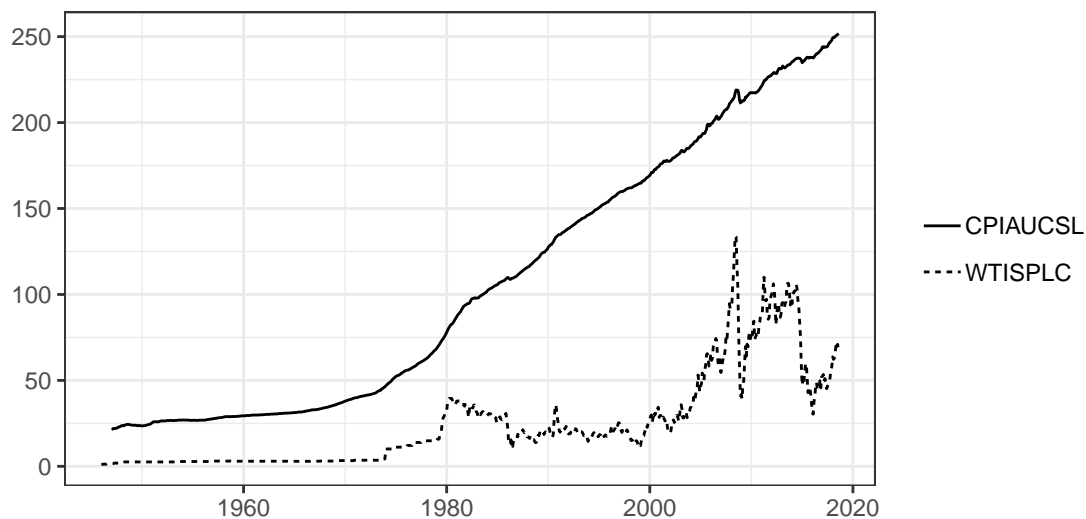
## Nominal and Real Oil Prices

### Oil Prices and Price Index

Data from FRED - Federal Reserve Bank of St. Louis:

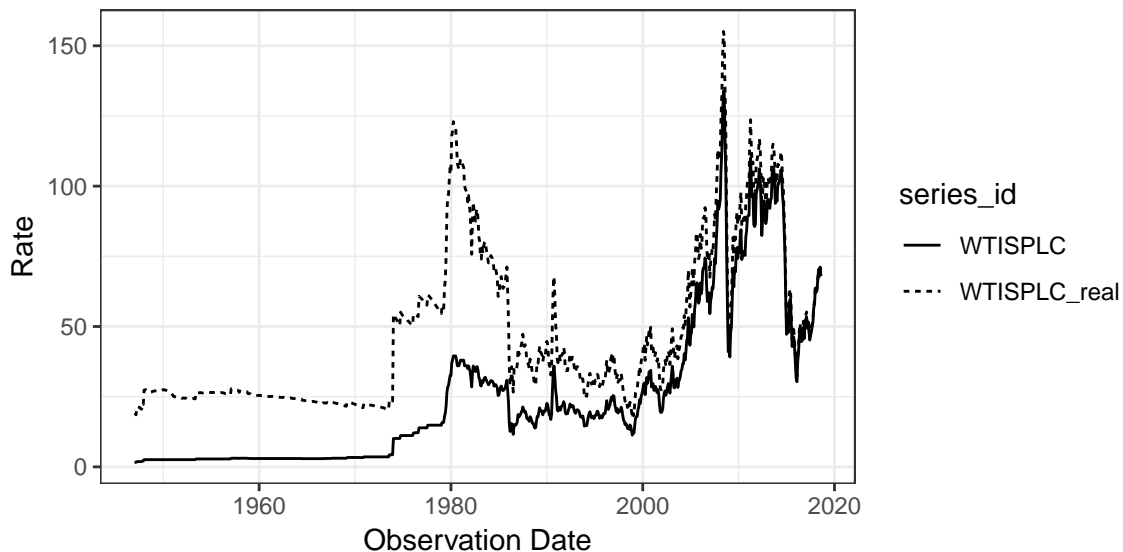
- **CPIAUCSL**: Consumer Price Index for All Urban Consumers: All Items. Available at: <https://fred.stlouisfed.org/series/CPIAUCSL>
- **WTISPLC**: Spot Crude Oil Price: West Texas Intermediate (WTI). Available at: <https://fred.stlouisfed.org/series/WTISPLC>

```
map_dfr(c("CPIAUCSL", "WTISPLC"), fredr) %>%
  ggplot(data = ., mapping = aes(x = date, y = value, linetype = series_id)) +
  geom_line() +
  labs(x = "Observation Date", y = "Rate", color = "Series") +
  theme_bw() + xlab("") + ylab("") + theme(legend.title = element_blank())
```



## Real Oil Prices

```
map_dfr(c("CPIAUCSL", "WTISPLC"), fredr) %>%
  spread(series_id, value) %>%
  # Current House Prices from August 2018
  na.omit %>%
  mutate(WTISPLC_real = CPIAUCSL[860]* WTISPLC / CPIAUCSL) %>%
  select(-CPIAUCSL) %>%
  gather(series_id, value, -date) %>%
  ggplot(data = ., mapping = aes(x = date, y = value, linetype = series_id)) +
  geom_line() +
  labs(x = "Observation Date", y = "Rate", color = "Series") +
  theme_bw()
```



## Passenger car registration

```
fredr_series_search_text(search_text = "Passenger Car Registrations",
  order_by = "popularity",
  sort_order = "desc",
  limit = 5) %>%
  as.tibble %>%
  select(observation_start, id, title, everything()) %>%
  arrange(observation_start)
```

```
## # A tibble: 5 x 16
##   observation_sta~ id      title realtime_start realtime_end observation_end
##   <chr>           <chr> <chr> <chr>          <chr>          <chr>
## 1 1895-01-01      A011~ Auto~ 2018-09-25 2018-09-25 1944-01-01
## 2 1925-01-01      M011~ New ~ 2018-09-25 2018-09-25 1966-12-01
## 3 1960-01-01      USAS~ Pass~ 2018-09-25 2018-09-25 2018-04-01
## 4 1960-01-01      SLRT~ Reta~ 2018-09-25 2018-09-25 2018-04-01
## 5 1960-01-01      USAS~ Pass~ 2018-09-25 2018-09-25 2018-06-01
## # ... with 10 more variables: frequency <chr>, frequency_short <chr>,
```



```
## # units <chr>, units_short <chr>, seasonal_adjustment <chr>,
## # seasonal_adjustment_short <chr>, last_updated <chr>, popularity <int>,
## # group_popularity <int>, notes <chr>

map_dfr(c("USASACRQISMEI"), fredr) %>%
  spread(series_id, value) %>%
  na.omit %>%
  # Current House Prices from August 2018
  gather(series_id, value, -date) %>%
  ggplot(data = ., mapping = aes(x = date, y = value, linetype = series_id)) +
  geom_line() +
  scale_y_continuous(breaks = seq(80, 220, 20)) + xlab("") + ylab("") +
  theme_bw() + theme(legend.title = element_blank())
```



## Computing Environment

```
Sys.time()
```

```
## [1] "2018-09-25 12:48:11 PDT"
```

```
sessionInfo()
```

```
## R version 3.5.1 (2018-07-02)
## Platform: x86_64-apple-darwin15.6.0 (64-bit)
## Running under: macOS High Sierra 10.13.6
##
## Matrix products: default
## BLAS: /Library/Frameworks/R.framework/Versions/3.5/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/3.5/Resources/lib/libRlapack.dylib
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets  methods   base
##
## other attached packages:
```

```
## [1] bindrcpp_0.2.2  fredr_1.0.0      forcats_0.3.0   stringr_1.3.1
## [5] dplyr_0.7.6     purrr_0.2.5     readr_1.1.1     tidyr_0.8.1
## [9] tibble_1.4.2    ggplot2_3.0.0   tidyverse_1.2.1
##
## loaded via a namespace (and not attached):
## [1] tidyselect_0.2.4 haven_1.1.2      lattice_0.20-35  colorspace_1.3-2
## [5] htmltools_0.3.6  yaml_2.2.0      utf8_1.1.4      rlang_0.2.2
## [9] pillar_1.3.0     glue_1.3.0      withr_2.1.2     modelr_0.1.2
## [13] readxl_1.1.0     bindr_0.1.1     plyr_1.8.4      munsell_0.5.0
## [17] gtable_0.2.0     cellranger_1.1.0 rvest_0.3.2     evaluate_0.11
## [21] labeling_0.3     knitr_1.20      curl_3.2        fansi_0.3.0
## [25] broom_0.5.0      Rcpp_0.12.18    scales_1.0.0    backports_1.1.2
## [29] jsonlite_1.5     hms_0.4.2       digest_0.6.15   stringi_1.2.4
## [33] grid_3.5.1       rprojroot_1.3-2 cli_1.0.0        tools_3.5.1
## [37] magrittr_1.5     lazyeval_0.2.1  crayon_1.3.4    pkgconfig_2.0.2
## [41] xml2_1.2.0       lubridate_1.7.4 assertthat_0.2.0 rmarkdown_1.10
## [45] httr_1.3.1       rstudioapi_0.7  R6_2.2.2        nlme_3.1-137
## [49] compiler_3.5.1
```