BLS - JOLTS - Example

Datasets

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Contents

Preamble

```
rm(list = ls())
pklist <- c("curl", "tidyverse", "rvest", "fredr", "lubridate")
source("https://fgeerolf.github.io/code/load-packages.R")
options(tibble.print_max = 100)
```

Introduction

Source of JOLTS

The data for the CEX is available here: https://www.bls.gov/jt/
The flat data files of the CEX are: https://download.bls.gov/pub/time.series/jt/

Load Series

```
for (file in list.files(pattern = "\\.RData$")) load(file)
```

List of industries

```
jt.industry %>%
  select(starts_with("industry")) %>%
  as.tibble
```

```
## # A tibble: 28 x 2
##    industry_code industry_text
##            <int> <fct>
## 1              0 Total nonfarm
## 2         100000 Total private
## 3         110099 Mining and logging
## 4         230000 Construction
## 5         300000 Manufacturing
## 6         320000 Durable goods manufacturing
## 7         340000 Nondurable goods manufacturing
## 8         400000 Trade, transportation, and utilities
## 9         420000 Wholesale trade
## 10        440000 Retail trade
## 11        480099 Transportation, warehousing, and utilities
## 12        510000 Information
## 13        510099 Financial activities
## 14        520000 Finance and insurance
## 15        530000 Real estate and rental and leasing
## 16        540099 Professional and business services
## 17        600000 Education and health services
## 18        610000 Educational services
## 19        620000 Health care and social assistance
## 20        700000 Leisure and hospitality
## 21        710000 Arts, entertainment, and recreation
## 22        720000 Accommodation and food services
## 23        810000 Other services
## 24        900000 Government
## 25        910000 Federal
## 26        920000 State and local
## 27        923000 State and local government education
## 28        929000 State and local government, excluding education
```

By age

From Hires and Separations as Two Sides of the Same Coin Edward P. Lazear, James R. Spletzer
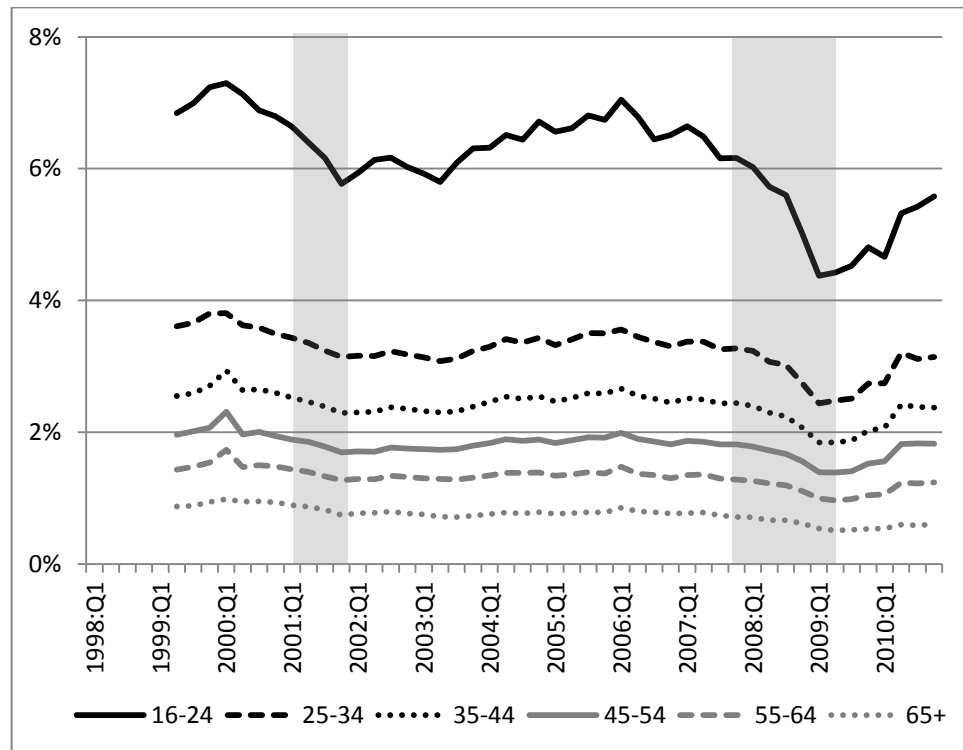
It seems that `0.05/2` = 0.025

Figure 1: Quarterly Employment Entry Rates, by Age LEHD Data (Source: Lazear & Spletzer, 2013)

United States, All Industries

```
jt.series %>%
  filter(region_code == "00",
         ratelevel_code == "L",
         seasonal == "S",
         industry_code == 0)
```

```
##          series_id seasonal industry_code region_code dataelement_code
## 1 JTS00000000HIL        S             0          00               HI
## 2 JTS00000000JOL        S             0          00               JO
## 3 JTS00000000LDL        S             0          00               LD
## 4 JTS00000000OSL        S             0          00               OS
## 5 JTS00000000QUL        S             0          00               QU
## 6 JTS00000000TSL        S             0          00               TS
##   ratelevel_code footnote_codes begin_year begin_period end_year
## 1            L              NA       2000          M12     2018
## 2            L              NA       2000          M12     2018
## 3            L              NA       2000          M12     2018
## 4            L              NA       2000          M12     2018
## 5            L              NA       2000          M12     2018
## 6            L              NA       2000          M12     2018
##   end_period
## 1        M07
## 2        M07
## 3        M07
```
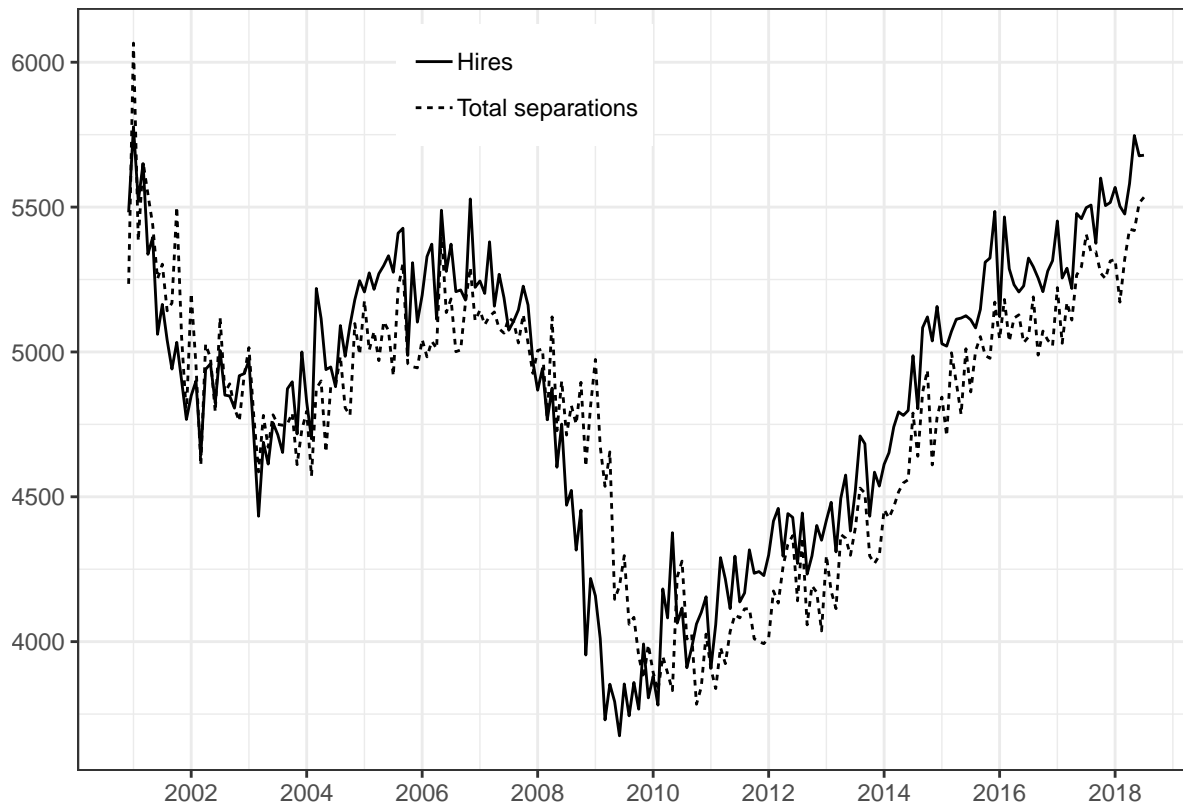
```
## 4          M07
## 5          M07
## 6          M07
```

Hires and Separations

```r
jt.data.1.AllItems %>%
  mutate(series_id = series_id %>% paste %>% gsub(" ", "", .)) %>%
  filter(series_id %in% c("JTS00000000HIL",
                          "JTS00000000TSL")) %>%
  mutate(dataelement_code = series_id %>% substr(12, 13),
         month = period %>% paste %>% substr(2, 3) %>% as.numeric,
         date = year + (month-1)/12) %>%
  left_join(jt.dataelement,
            by = "dataelement_code") %>%
  select(series_id, dataelement_text, date, value) %>%
  ggplot(aes(x = date, y = value, linetype = dataelement_text)) + geom_line() + theme_bw() +
  theme(legend.title = element_blank(),
        legend.position = c(0.4, 0.9)) +
  scale_x_continuous(breaks = seq(1920, 2025, 2)) + xlab("") + ylab("")
```
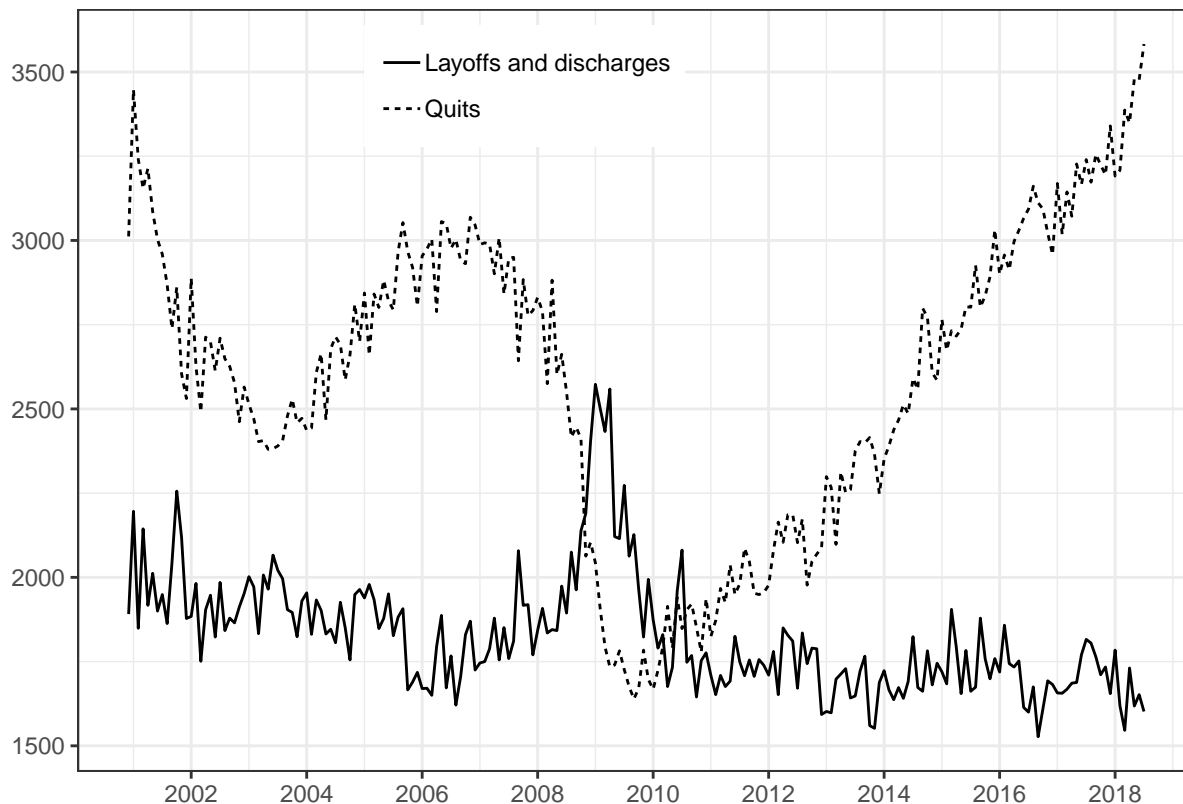
```
## Warning: Column `dataelement_code` joining character vector and factor,
## coercing into character vector
```

Layoffs and Quits

```r
jt.data.1.AllItems %>%
  mutate(series_id = series_id %>% paste %>% gsub(" ", "", .)) %>%
  filter(series_id %in% c("JTS00000000LDL",
                          "JTS00000000QUL")) %>%
  mutate(dataelement_code = series_id %>% substr(12, 13),
         month = period %>% paste %>% substr(2, 3) %>% as.numeric,
         date = year + (month-1)/12) %>%
  left_join(jt.dataelement,
            by = "dataelement_code") %>%
  select(series_id, dataelement_text, date, value) %>%
  ggplot(aes(x = date, y = value, linetype = dataelement_text)) + geom_line() + theme_bw() +
  theme(legend.title = element_blank(),
        legend.position = c(0.4, 0.9)) +
  scale_x_continuous(breaks = seq(1920, 2025, 2)) + xlab("") + ylab("")
```

```
## Warning: Column `dataelement_code` joining character vector and factor,
## coercing into character vector
```


Job Openings and Other Separations

```r
jt.data.1.AllItems %>%
  mutate(series_id = series_id %>% paste %>% gsub(" ", "", .)) %>%
  filter(series_id %in% c("JTS00000000JOL",
                          "JTS00000000OSL")) %>%
```

```
mutate(dataelement_code = series_id %>% substr(12, 13),
       month = period %>% paste %>% substr(2, 3) %>% as.numeric,
       date = year + (month-1)/12) %>%
left_join(jt.dataelement,
          by = "dataelement_code") %>%
select(series_id, dataelement_text, date, value) %>%
ggplot(aes(x = date, y = value, linetype = dataelement_text)) + geom_line() + theme_bw() +
theme(legend.title = element_blank(),
      legend.position = c(0.4, 0.9)) +
scale_x_continuous(breaks = seq(1920, 2025, 2)) + xlab("") + ylab("")
```

```
## Warning: Column `dataelement_code` joining character vector and factor,
## coercing into character vector
```


United States, Manufacturing

```
jt.series %>%
  filter(region_code == "00",
         ratelevel_code == "L",
         seasonal == "S",
         industry_code == "230000")
```

```
##           series_id seasonal industry_code region_code dataelement_code
## 1 JTS23000000HIL        S         230000          00               HI
## 2 JTS23000000JOL        S         230000          00               JO
## 3 JTS23000000LDL        S         230000          00               LD
```
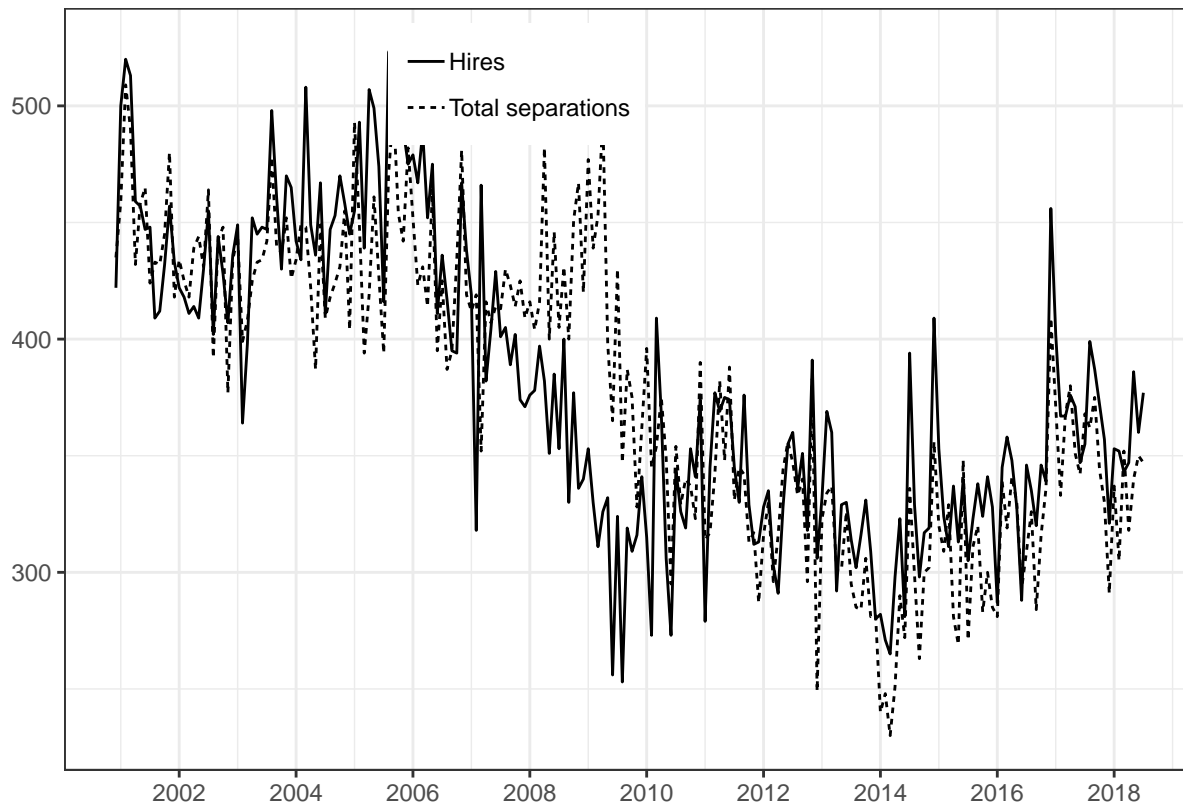
```
## 4 JTS230000000SL         S         230000         00                 OS
## 5 JTS23000000QUL         S         230000         00                 QU
## 6 JTS23000000TSL         S         230000         00                 TS
##   ratelevel_code footnote_codes begin_year begin_period end_year
## 1             L             NA       2000          M12     2018
## 2             L             NA       2000          M12     2018
## 3             L             NA       2000          M12     2018
## 4             L             NA       2000          M12     2018
## 5             L             NA       2000          M12     2018
## 6             L             NA       2000          M12     2018
##   end_period
## 1        M07
## 2        M07
## 3        M07
## 4        M07
## 5        M07
## 6        M07
```

Hires and Separations

```r
jt.data.1.AllItems %>%
  mutate(series_id = series_id %>% paste %>% gsub(" ", "", .)) %>%
  filter(series_id %in% c("JTS23000000HIL",
                          "JTS23000000TSL")) %>%
  mutate(dataelement_code = series_id %>% substr(12, 13),
         month = period %>% paste %>% substr(2, 3) %>% as.numeric,
         date = year + (month-1)/12) %>%
  left_join(jt.dataelement,
            by = "dataelement_code") %>%
  select(series_id, dataelement_text, date, value) %>%
  ggplot(aes(x = date, y = value, linetype = dataelement_text)) + geom_line() + theme_bw() +
  theme(legend.title = element_blank(),
        legend.position = c(0.4, 0.9)) +
  scale_x_continuous(breaks = seq(1920, 2025, 2)) + xlab("") + ylab("")
```
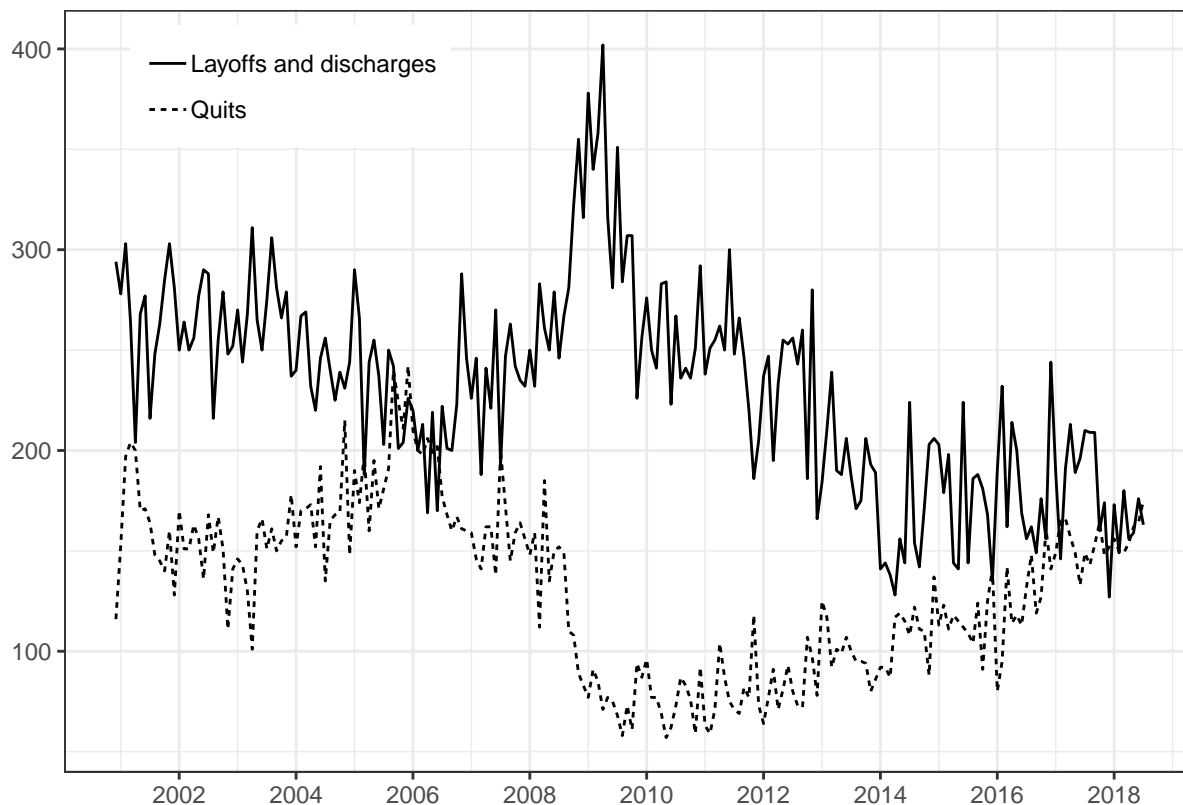
```
## Warning: Column `dataelement_code` joining character vector and factor,
## coercing into character vector
```

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Layoffs and Quits

```
jt.data.1.AllItems %>%
  mutate(series_id = series_id %>% paste %>% gsub(" ", "", .)) %>%
  filter(series_id %in% c("JTS23000000LDL",
                          "JTS23000000QUL")) %>%
  mutate(dataelement_code = series_id %>% substr(12, 13),
         month = period %>% paste %>% substr(2, 3) %>% as.numeric,
         date = year + (month-1)/12) %>%
  left_join(jt.dataelement,
            by = "dataelement_code") %>%
  select(series_id, dataelement_text, date, value) %>%
  ggplot(aes(x = date, y = value, linetype = dataelement_text)) + geom_line() + theme_bw() +
  theme(legend.title = element_blank(),
        legend.position = c(0.2, 0.9)) +
  scale_x_continuous(breaks = seq(1920, 2025, 2)) + xlab("") + ylab("")
```
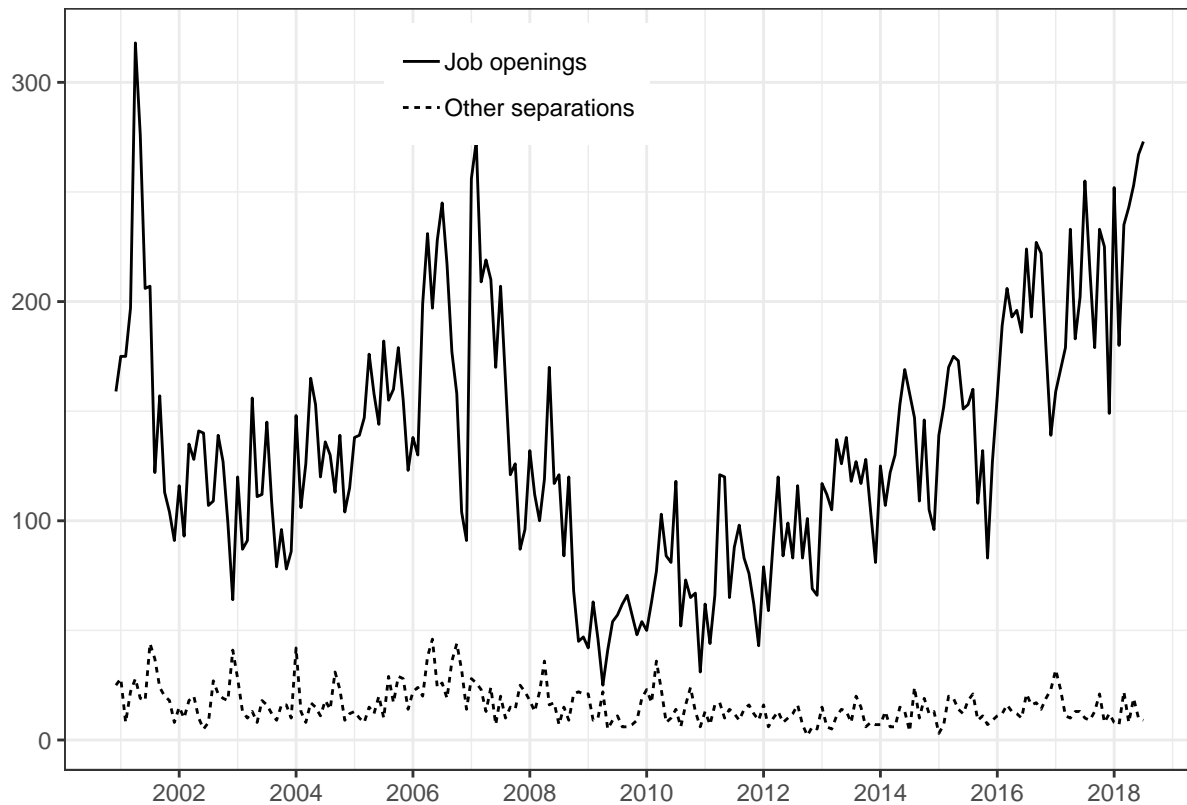
```
## Warning: Column `dataelement_code` joining character vector and factor,
## coercing into character vector
```

Job Openings and Other Separations

```r
jt.data.1.AllItems %>%
  mutate(series_id = series_id %>% paste %>% gsub(" ", "", .)) %>%
  filter(series_id %in% c("JTS23000000JOL",
                          "JTS23000000OSL")) %>%
  mutate(dataelement_code = series_id %>% substr(12, 13),
         month = period %>% paste %>% substr(2, 3) %>% as.numeric,
         date = year + (month-1)/12) %>%
  left_join(jt.dataelement,
            by = "dataelement_code") %>%
  select(series_id, dataelement_text, date, value) %>%
  ggplot(aes(x = date, y = value, linetype = dataelement_text)) + geom_line() + theme_bw() +
  theme(legend.title = element_blank(),
        legend.position = c(0.4, 0.9)) +
  scale_x_continuous(breaks = seq(1920, 2025, 2)) + xlab("") + ylab("")
```

```
## Warning: Column `dataelement_code` joining character vector and factor,
## coercing into character vector
```

FRED Data

Unemployment Rate

```
map_dfr(c("UNRATE"), fredr) %>%
  mutate(year = year(date),
         month = month(date),
         date = year + (month-1)/12,
         value = value / 100) %>%
  ggplot(data = ., aes(x = date, y = value)) +
  geom_line() +
  labs(x = "Observation Date", y = "Rate", color = "Series") +
  theme_bw() +
  scale_x_continuous(breaks = seq(1940, 2020, 5)) +
  scale_y_continuous(breaks = seq(0, 0.12, 0.01), labels = scales::percent) +
  xlab("") + ylab("")
```

```
map_dfr(c("UNEMPLOY"), fredr) %>%
  mutate(year = year(date),
         month = month(date),
         date = year + (month-1)/12) %>%
  ggplot(data = ., aes(x = date, y = value)) +
  geom_line() +
  labs(x = "Observation Date", y = "Rate", color = "Series") +
  theme_bw() +
  scale_x_continuous(breaks = seq(1940, 2020, 5)) +
  scale_y_continuous(breaks = seq(1000, 16000, 1000)) +
  xlab("") + ylab("")
```

Computing environment

```
Sys.time()
```

```
## [1] "2018-10-11 16:45:07 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  lubridate_1.7.4 fredr_1.0.0     rvest_0.3.2
##  [5] xml2_1.2.0      forcats_0.3.0   stringr_1.3.1   dplyr_0.7.6
##  [9] purrr_0.2.5     readr_1.1.1     tidyr_0.8.1     tibble_1.4.2
## [13] ggplot2_3.0.0   tidyverse_1.2.1 curl_3.2
##
```

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