

Jobs Report

Import data from Fred

```
fred_codes <- c(
  "CIVPART",
  "EMRATIO",
  "NROU",
  "UNRATE",
  "CES0500000003",
  "AWHAETP",
  "PAYEMS",
  "USCONS",
  "USTRADE",
  "USPBS",
  "MANEMP",
  "USFIRE",
  "USMINE",
  "USEHS",
  "USWTRADE",
  "CES4349300001",
  "USINFO",
  "USLAH",
  "USGOVT",
  "USSERV")

column_names <- c(
  "date",
  "Labor Force Part Rate",
  "Employment-to-Pop Ratio",
  "Nat Rate Unemployment",
  "Unemployment Rate",
  "Avg Hourly Earnings",
  "Avg Weekly Hours",
  "Nonfarm Employment",
  "Construction",
  "Retail/Trade",
  "Prof/Bus Serv",
  "Manufact",
  "Financial",
  "Mining",
  "Health Care",
  "Wholesale Trade",
  "Transportation",
  "Info Sys",
  "Leisure",
  "Gov",
  "Other Services")

# download data via FRED
fred_empl_data <-
```

```
tq_get(fred_codes,
      get = "economic.data",
      from = "1980-01-01")
```

Chop up the Fred data into sectors and hours/wages objects

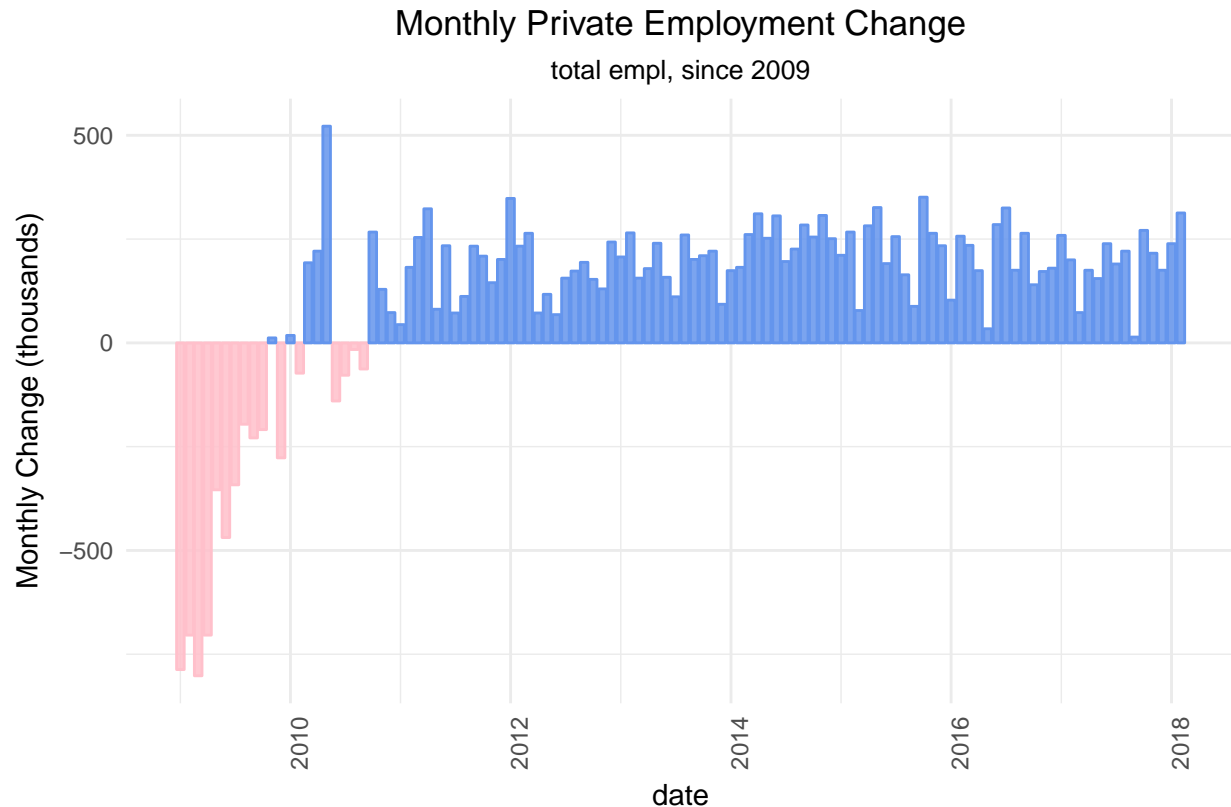
```
labor_sector_data <-
  fred_empl_data %>%
  spread(symbol, price) %>%
  select(date, fred_codes) %>%
  `colnames<-`(column_names) %>%
  filter(date >= "1990-01-01") %>%
  select(1, 8:21) %>%
  gather(sector, employees, -date) %>%
  group_by(sector) %>%
  mutate(monthly_change = employees - lag(employees, 1),
         yearly_change = employees - lag(employees, 12)) %>%
  na.omit()

hours_wages_data <-
  fred_empl_data %>%
  spread(symbol, price) %>%
  select(date, fred_codes) %>%
  `colnames<-`(column_names) %>%
  select(date, `Avg Hourly Earnings`, `Avg Weekly Hours`) %>%
  na.omit()
```

Visualize Total Employment Since 2009

```
labor_sector_data %>%
  filter(sector == "Nonfarm Employment") %>%
  filter(date >= "2009-01-01") %>%
  mutate(col_blue =
    if_else(monthly_change > 0,
            monthly_change, as.numeric(NA)),
         col_red =
    if_else(monthly_change < 0,
            monthly_change, as.numeric(NA))) %>%
  ggplot(aes(x = date)) +
  geom_col(aes(y = col_red),
           alpha = .85,
           fill = "pink",
           color = "pink") +
  geom_col(aes(y = col_blue),
           alpha = .85,
           fill = "cornflowerblue",
           color = "cornflowerblue") +
  ylab("Monthly Change (thousands)") +
  labs(title = "Monthly Private Employment Change",
       subtitle = "total empl, since 2009",
       caption = "based on work by @lenkieferr") +
```

```
theme_minimal() +
theme(axis.text.x = element_text(angle = 90, hjust = 1),
      plot.title = element_text(hjust = 0.5),
      plot.subtitle = element_text(hjust = 0.5),
      plot.caption=element_text(hjust=0))
```

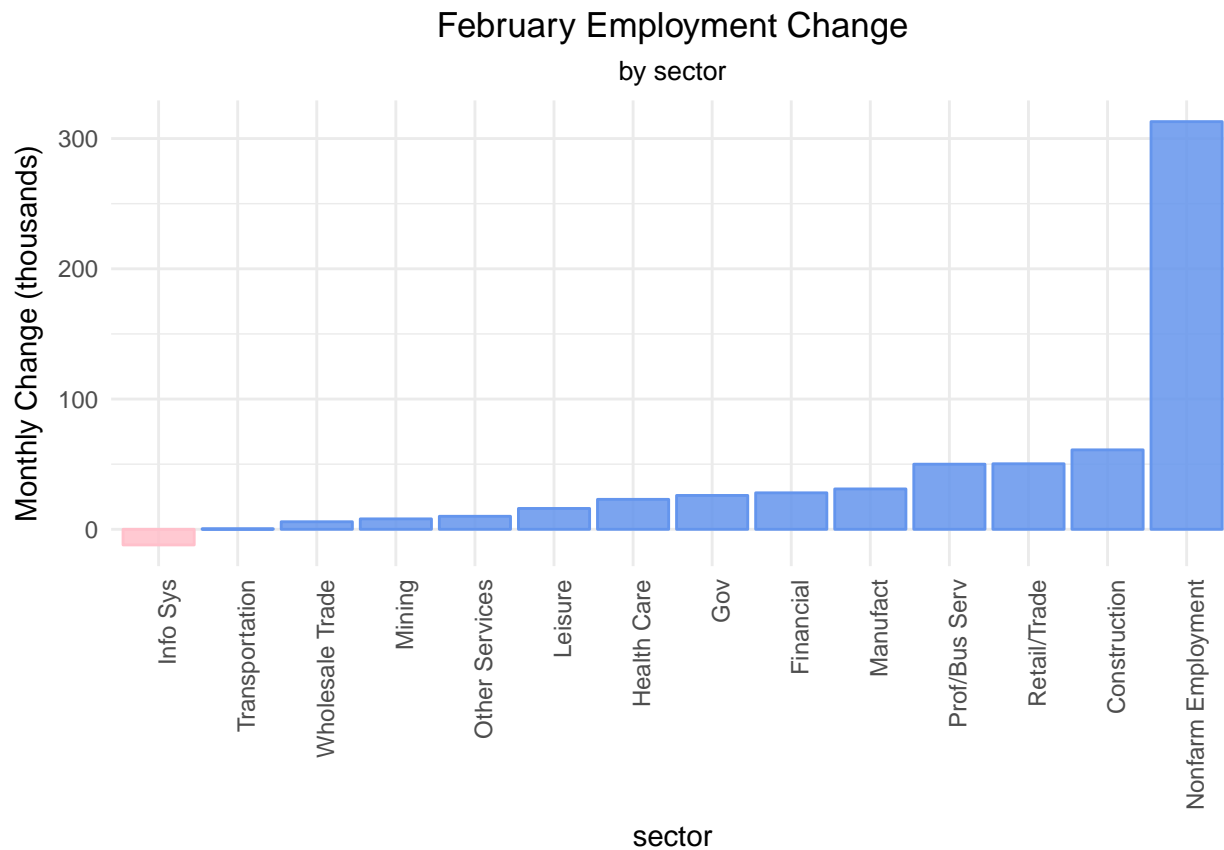


based on work by @lenkiefier

Visualize Sector by Sector Change Last Month

```
labor_sector_data %>%
  filter(date == (last(date))) %>%
  mutate(col_blue =
    if_else(monthly_change > 0,
            monthly_change, as.numeric(NA)),
         col_red =
    if_else(monthly_change < 0,
            monthly_change, as.numeric(NA))) %>%
  ggplot(aes(x = reorder(sector, monthly_change))) +
  geom_col(aes(y = col_red,
               alpha = .85,
               fill = "pink",
               color = "pink")) +
  geom_col(aes(y = col_blue,
               alpha = .85,
               fill = "cornflowerblue",
               color = "cornflowerblue")) +
```

```
labs(title = paste((lubridate::month(last(labor_sector_data$date),
                                label = TRUE, abbr = FALSE)),
                    "Employment Change",
                    sep=" "),
      subtitle = "by sector", x = "sector", y = "Monthly Change (thousands)") +
theme_minimal() +
theme(axis.text.x = element_text(angle = 90, hjust = 1),
      plot.title = element_text(hjust = 0.5),
      plot.subtitle = element_text(hjust = 0.5))
```



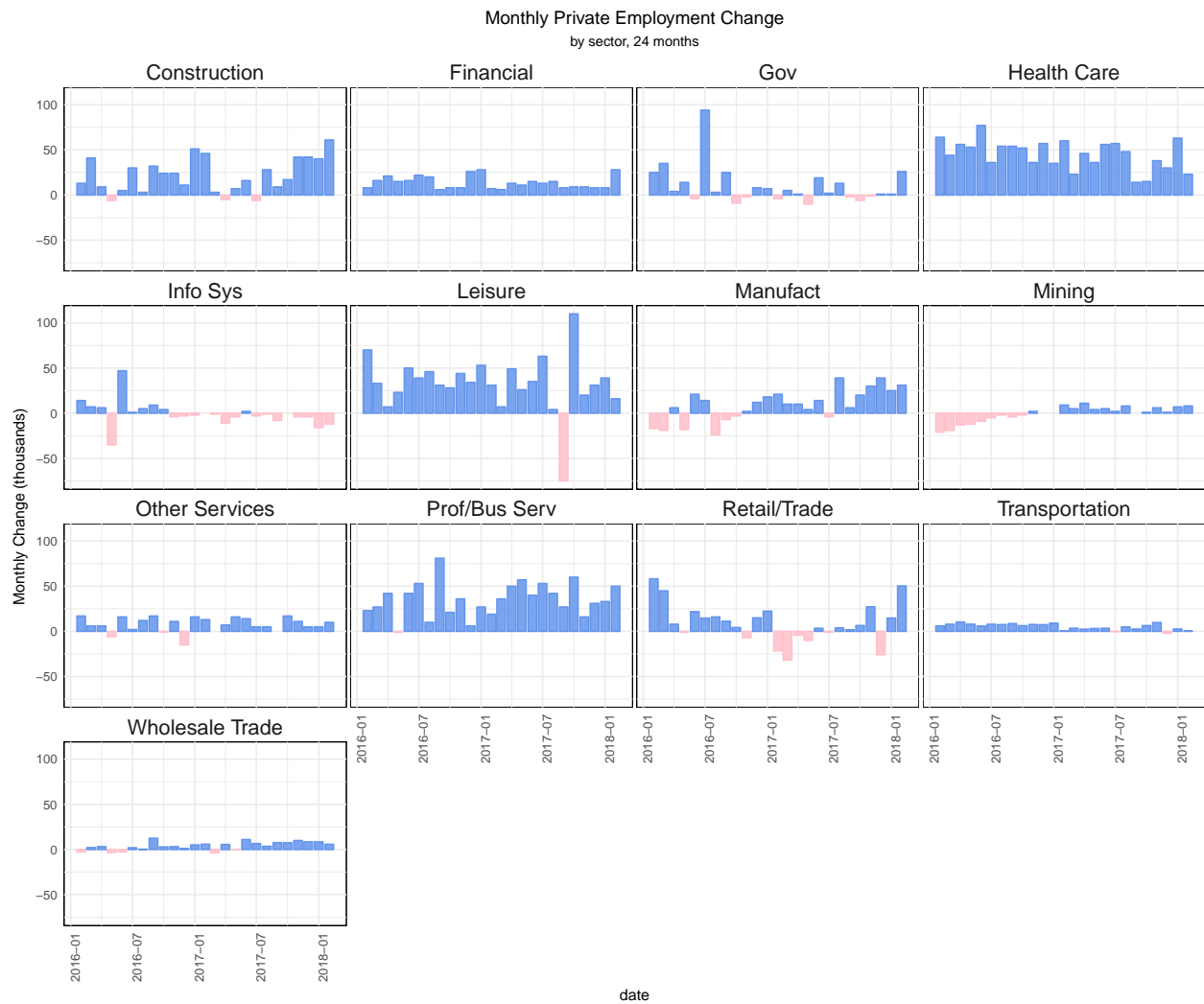
Visualize Sector by Sector Data over time

```
labor_sector_data %>%
  filter(sector != "Nonfarm Employment") %>%
  filter(date >= (last(date) - months(24))) %>%
  mutate(col_blue =
    if_else(monthly_change > 0,
            monthly_change, as.numeric(NA)),
    col_red =
    if_else(monthly_change < 0,
            monthly_change, as.numeric(NA))) %>%
  ggplot(aes(x = date)) +
  geom_col(aes(y = col_red),
           alpha = .85,
           fill = "pink",
```

```

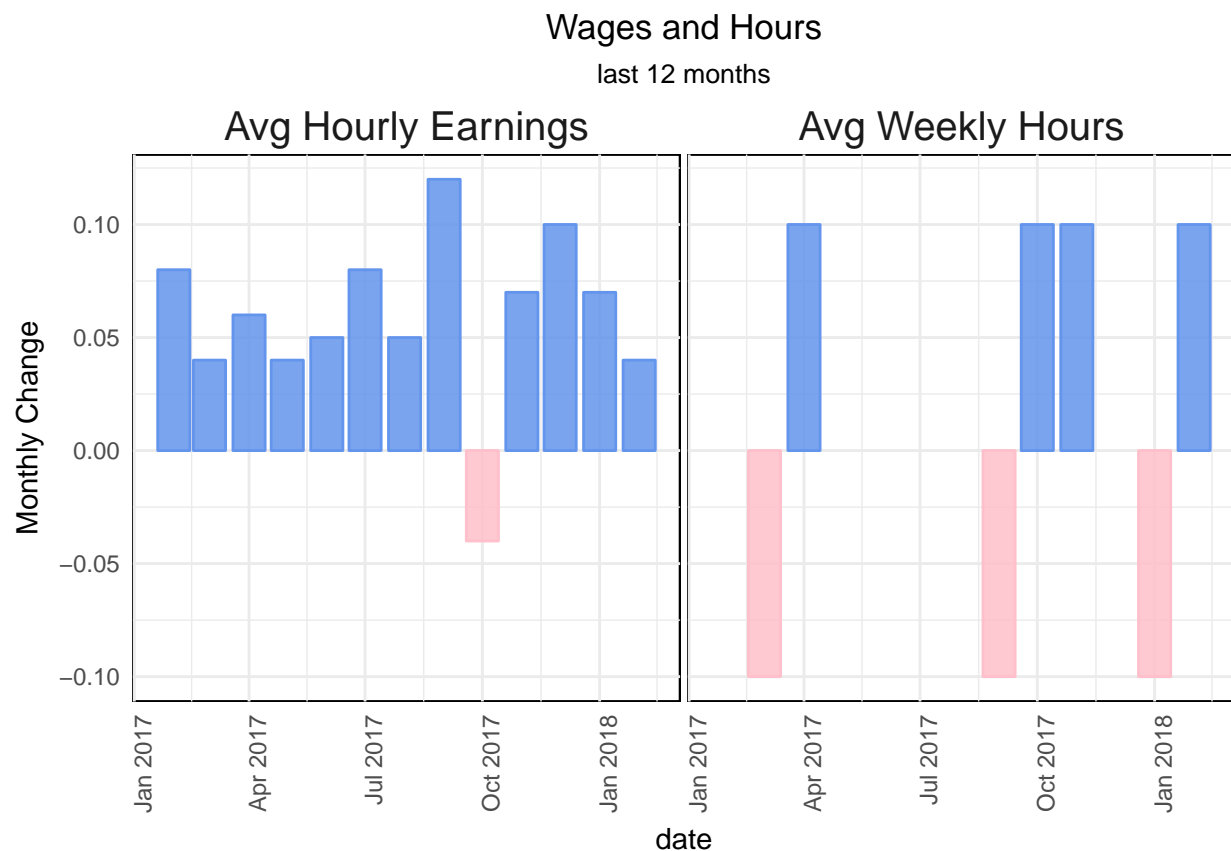
    color = "pink") +
geom_col(aes(y = col_blue),
    alpha = .85,
    fill = "cornflowerblue",
    color = "cornflowerblue") +
ylab("Monthly Change (thousands)") +
labs(title = "Monthly Private Employment Change",
    subtitle = "by sector, 24 months") +
theme_minimal() +
theme(axis.text.x = element_text(angle = 90, hjust = 1),
    plot.title = element_text(hjust = 0.5),
    plot.subtitle = element_text(hjust = 0.5),
    strip.background = element_blank(),
    strip.placement = "inside",
    strip.text = element_text(size=15),
    panel.spacing = unit(0.2, "lines"),
    panel.background=element_rect(fill="white")) +
facet_wrap(~sector, shrink = FALSE)

```



Visualize Wage and Hours Changes

```
hours_wages_data %>%
  gather(stat, obs, -date) %>%
  group_by(stat) %>%
  mutate(monthly_change = obs - lag(obs, 1)) %>%
  filter(date >= last(date) - months(12)) %>%
  mutate(col_blue =
    if_else(monthly_change > 0,
            monthly_change, as.numeric(NA)),
    col_red =
    if_else(monthly_change < 0,
            monthly_change, as.numeric(NA))) %>%
  ggplot(aes(x = date)) +
  geom_col(aes(y = col_red),
    alpha = .85,
    fill = "pink",
    color = "pink") +
  geom_col(aes(y = col_blue),
    alpha = .85,
    fill = "cornflowerblue",
    color = "cornflowerblue") +
  ylab("Monthly Change") +
  labs(title = "Wages and Hours",
    subtitle = "last 12 months") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 90, hjust = 1),
    plot.title = element_text(hjust = 0.5),
    plot.subtitle = element_text(hjust = 0.5),
    strip.background = element_blank(),
    strip.placement = "inside",
    strip.text = element_text(size=15),
    panel.spacing = unit(0.2, "lines"),
    panel.background=element_rect(fill="white")) +
  facet_wrap(~stat, shrink = FALSE)
```



Wrangle the macro economic data

```
fred_empl_data_wrangled <-
  fred_empl_data %>%
  spread(symbol, price) %>%
  select(date, fred_codes) %>%
  `colnames<-`(column_names) %>%
  select(date,
    `Nat Rate Unemployment`,
    `Unemployment Rate`,
    `Nonfarm Employment`,
    `Labor Force Part Rate`,
    `Employment-to-Pop Ratio`,
    `Nonfarm Employment`) %>%
  mutate(`Nat Rate Unemployment` = na.locf(`Nat Rate Unemployment`, na.rm = F)) %>%
  mutate(`Unemployment Gap` = `Unemployment Rate` - `Nat Rate Unemployment`,
    `Employment Monthly Change` = `Nonfarm Employment` - lag(`Nonfarm Employment`))
```

Create a recessions ggplot object

```
recessions.df <- read.table(textConnection(
  "Peak, Trough
  1948-11-01, 1949-10-01
  1953-07-01, 1954-05-01
```

```

1957-08-01, 1958-04-01
1960-04-01, 1961-02-01
1969-12-01, 1970-11-01
1973-11-01, 1975-03-01
1980-01-01, 1980-07-01
1981-07-01, 1982-11-01
1990-07-01, 1991-03-01
2001-03-01, 2001-11-01
2007-12-01, 2009-06-01"), sep=',',
colClasses = c('Date', 'Date'), header = TRUE)

recession_shade <-
  geom_rect(data = recessions.df,
            inherit.aes = F,
            aes(xmin = Peak,
                xmax = Trough,
                ymin = -Inf,
                ymax = +Inf),
            fill = 'darkgray',
            alpha = 0.4)

```

Vis Showing Above or Below Trend

```

fred_empl_data_wrangled %>%
  mutate(ribbon_pink =
    if_else(`Unemployment Rate` > `Nat Rate Unemployment`,
            `Unemployment Rate`, `Nat Rate Unemployment`),
    ribbon_blue =
    if_else(`Unemployment Rate` < `Nat Rate Unemployment`,
            `Unemployment Rate`, `Nat Rate Unemployment`)) %>%
  ggplot(aes(x = date, y = `Unemployment Rate`)) +
  geom_line(color = "black") +
  geom_line(linetype = 2, aes(y = `Nat Rate Unemployment`)) +
  recession_shade +
  geom_ribbon(aes(ymin = `Nat Rate Unemployment`,
                  ymax = ribbon_pink),
              fill = "pink",
              alpha = 0.5) +
  geom_ribbon(aes(ymin = `Nat Rate Unemployment`,
                  ymax = ribbon_blue),
              fill = "cornflowerblue",
              alpha = 0.5) +
  xlim(ymd("1980-01-01"), ymd("2018-03-01"))

```