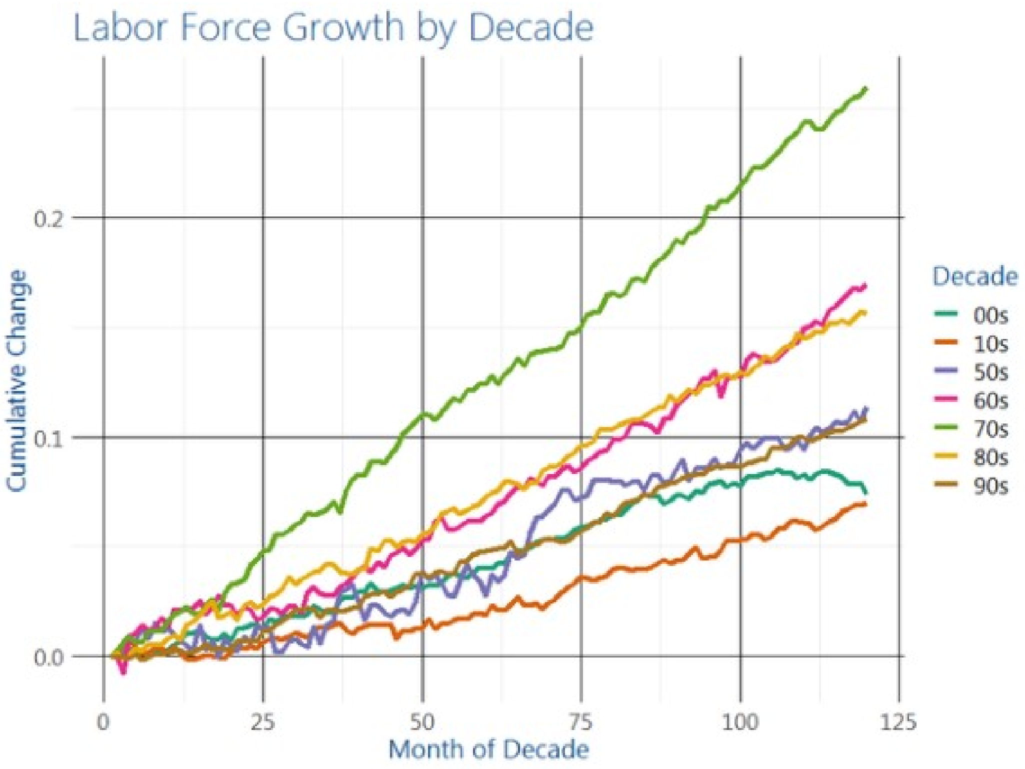
I just posted an interesting look at the growth of the labor force by decade. Given that I used R to produce it, I thought it interesting to share the R code and method. Just for reference, here is the chart:



First, we will need the following libraries

```
library(quantmod)
library(tidyverse)
library(extrafont)
```

The quantmod library is a significant reason that I keep using R, and you are about to see why. This retrieves the civilian labor force from the Federal Reserve's data API.

```
getSymbols('CLF16OV', src = 'FRED')
```

From here we will break the levels into decades using the `window()` function.

```
labor_force_50s <- window( CLF16OV, start='1950-01-01', end='1959-12-31' )
labor_force_60s <- window( CLF16OV, start='1960-01-01', end='1969-12-31' )
labor_force_70s <- window( CLF16OV, start='1970-01-01', end='1979-12-31' )
labor_force_80s <- window( CLF16OV, start='1980-01-01', end='1989-12-31' )
labor_force_90s <- window( CLF16OV, start='1990-01-01', end='1999-12-31' )
labor_force_00s <- window( CLF16OV, start='2000-01-01', end='2009-12-31' )
labor_force_10s <- window( CLF16OV, start='2010-01-01', end='2019-12-31' )
```

It would be prettier to use a loop to generate these variables, but I didn't do that because I was being mentally lazy…

From here its time to organize the data. We ultimately want to convert the values to rates of change by decade. To do that, we'll need to

1. extract each decade, then
2. convert the value to a percent change, and
3. sum the change.

At the end, we need to combine it all back into one data frame (or tibble, since I am trying to use tidyverse now).

Here we go. First, let's do the thing I was too lazy to do before: list the decades as characters in a list.

```
names <- c('50s', '60s', '70s', '80s', '90s', '00s', '10s')
```

Then, we'll run a loop that pulls the data by decade. Note the `change` variable. It takes the values, converts it to a percent change using the `Delt()` function. Here we encounter a problem, because getting the cumulative sum cannot happen if there is an `NA` in the data. We know for sure there will be because the `Delt()` function returns `NA` in the first position. So after pushing it through the `Delt()` funciton, we are telling R to replace `NA` with `0`. Finally, we get the cumulative sum of the result and store it as `change`. Last, we store the result in a tibble (data frame) and save it as the variable name we had before.

```
for(i in 1:length(names))
{
  data <- get( paste( 'labor_force_', names[i], sep='' ) ) # Load the data
  dates <- index(data) # Seperate dates
  values <- coredata(data) # Seperate values
  month_of_decade <- seq(1, 12*10, 1) #
  change <- values %>% # Take the values
    Delt() %>% # Convert to rate of change
    ifelse( is.na(.) == TRUE, 0, .) %>% # Replace NA with 0
    cumsum() # Return the cumulative sum

  # Store it all in a tibble
  data1 <- tibble( Date = dates,
                   Value = values,
                   Change = change,
                   Decade = names[i],
                   Month = month_of_decade )
  # Write it to the variable name it had before
  assign( paste('labor_force_', names[i], sep=''),
          data1 )

}
```

Now, we bind it all together using `bind_rows()`.

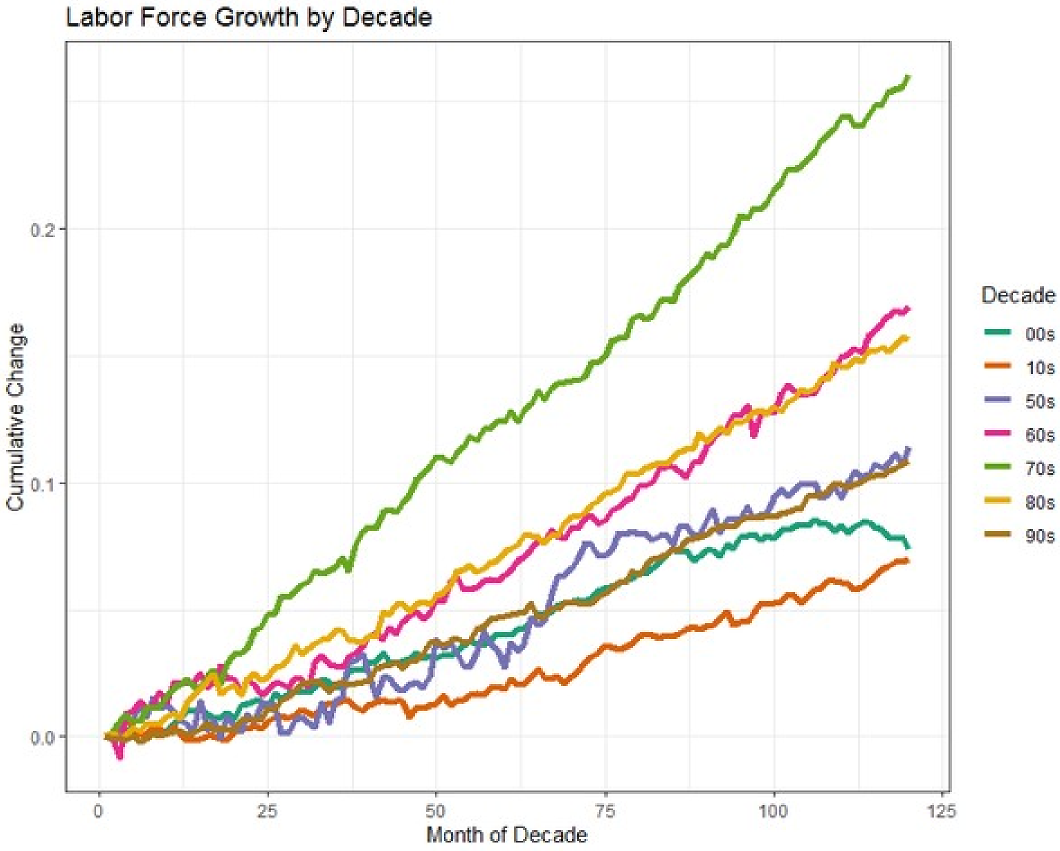
```
labor_force <- bind_rows( labor_force_50s,
                          labor_force_60s,
                          labor_force_70s,
                          labor_force_80s,
                          labor_force_90s,
                          labor_force_00s,
                          labor_force_10s )
```

Again, this could be done more efficiently, but I'm lazy today.

Lastly, we push it into `ggplot` and generate our custom visualization!

```
ggplot(labor_force, aes(x=Month, y=Change, col=Decade))+
  geom_line( size = 1.5 )+
  scale_color_brewer(palette='Dark2')+
  ggtitle("Labor Force Growth by Decade")+
  ylab("Cumulative Change")+
  xlab("Month of Decade")+
  theme_bw()
```

Yielding



Okay… so I cheated a little and didn’t give you my custom theme. That’s okay. You could probably figure it out if you wanted to…