

# UsualWeeklyWages\_ByPCE

2023-07-19

## Introduction to Usual Weekly Wages

This is an analysis of the Usual Weekly Earnings of Wage and Salary Workers from the Bureau of Labor Statistics (BLS), which is data that comes from the Current Population Survey (CPS). Earnings data is collected from 1/4 of the CPS monthly sample. Full time workers are defined as working 35 or more hours per week. All wages in this analysis are for full-time workers only.

In order to improve the reliability of the estimates, a 4 quarter moving average (12-month moving average) for all the data is used. Otherwise, the data is simply too noisy, since the sample size of the CPS monthly survey that includes earnings data (just 1/4 of the sample) is too small.

The analysis includes all of the available data from Table 5, includes data from the 1st quarter of 2000 to the 2nd quarter of 2023: <https://www.bls.gov/webapps/legacy/cpswktab5.htm>

Wages are adjusted for inflation using the CPIAUCSL, which is the Consumer Price Index for Urban Consumers. <https://fred.stlouisfed.org/series/CPIAUCSL>

Important notice about race and ethnicity: “White”, “Black”, and “Asian” includes workers of all ethnicities, including those who are Hispanic or Latino. Most Hispanic or Latino workers are included under the “White” category (in many data sets many Hispanic or Latino are included under the “Some Other Race” category, but there isn’t such a category here). Hispanic or Latino may be of any race.

Takeaways from the following charts:

- 1) Wage growth from 2019-2022 were stronger for lower wage workers than higher wage workers.
- 2) The gender wage gap has declined for all percentiles from 2000-2022.
- 3) The growth of female full-time workers with advanced degrees is much faster than the growth of male full-time workers with advanced degrees.
- 4) Hispanic and Asian wages have been growing faster than average. Black and White wages have not grown faster than average or slower than average.

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.2.3
```

```
##
```

```
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
```

```
##
```

```
## filter, lag
```

```
## The following objects are masked from 'package:base':  
##  
## intersect, setdiff, setequal, union
```

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.2.3
```

```
library(tidyr)
```

```
## Warning: package 'tidyr' was built under R version 4.2.3
```

```
data = readxl::read_excel("Data/SeriesReport-20231018190926_47011d.xlsx", skip = 3)  
inflation = read.csv("Data/PCEPI.csv",  
                     col.names = c("Date", "Factor"))  
inflation$Date = as.Date(inflation$Date)  
names(data) = c("ID", as.character(seq(as.Date("2000/1/1"), as.Date("2023/12/1"), by="quarter")))  
names
```

```
## function (x) .Primitive("names")
```

```
recode_names = expand.grid(Type = c("Count", "P10", "P25", "P50", "P75", "P90"), Next = c("Total", "Male", "Female"))
```

```
recode_names_v2 = expand.grid(Type = c("Count", "P10", "P25", "P50", "P75", "P90"), Race =  
c("Total25", "LessThanHS", "HS", "SomeCollege", "Bachelor's+", "Bachelor'sOnly", "AdvancedDegree"), Next =  
c("Total", "Male", "Female"))
```

```
names = bind_rows(recode_names, recode_names_v2)
```

```
data$Type = names$Type  
data$Race = names$Race  
data$Sex = names$Next
```

```
data = data %>%  
  pivot_longer(cols = 2:97, names_to = "Date", values_to = "Value")  
data$Date = as.Date(data$Date)
```

```
data = data %>%  
  left_join(inflation, by = "Date") %>%  
  mutate(InflationAdj = Value/as.numeric(Factor))
```

```
## Warning: There was 1 warning in 'mutate()'.  
## i In argument: 'InflationAdj = Value/as.numeric(Factor)'.  
## Caused by warning:  
## ! NAs introduced by coercion
```

```
data = data %>%  
  mutate(InflationAdj = ifelse(Type == "Count", Value, InflationAdj)) %>%  
  group_by(Type, Race, Sex) %>%  
  mutate(MovAverage = zoo::rollapply(InflationAdj, 4, mean, align = 'right', fill = NA))
```

## Relative Growth of Wages by Percentile

```
relative_to_white = data %>%
  filter(!is.na(MovAverage)) %>%
  group_by(Type, Sex, Date) %>%
  summarize(Asian = 100*MovAverage[Race == "Asian"]/MovAverage[Race == "White"],
            Black = 100*MovAverage[Race == "Black"]/MovAverage[Race == "White"],
            All = 100*MovAverage[Race == "All"]/MovAverage[Race == "White"],
            Hispanic = 100*MovAverage[Race == "Hispanic"]/MovAverage[Race == "White"])
```

## 'summarise()' has grouped output by 'Type', 'Sex'. You can override using the  
## '.groups' argument.

```
relative_to_date = data %>%
  filter(!is.na(MovAverage)) %>%
  group_by(Type, Sex, Race) %>%
  summarize(Index = MovAverage[Date == "2023-07-01"]/MovAverage[Date == "2019-10-01"])
```

## 'summarise()' has grouped output by 'Type', 'Sex'. You can override using the  
## '.groups' argument.

```
growth = relative_to_date %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Race %in% c("White", "Asian", "Black", "Hispanic", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Race, linetype = Sex,
             group = interaction(Race, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2019 = 100%)") +
  scale_y_continuous(breaks = seq(0.96, 1.10, 0.02), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) as a Percent of 2019 by Race and Sex")

growth_education = relative_to_date %>%
  mutate(Education = Race) %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
             group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2019 = 100%)") +
  scale_y_continuous(breaks = seq(0.92, 1.10, 0.02), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) Percent of 2019 by Education and Sex")

growth_education_men = relative_to_date %>%
  mutate(Education = Race) %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
             group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2019 = 100%)") +
  scale_y_continuous(breaks = seq(0.92, 1.10, 0.02), labels = scales::label_percent()) + theme_bw() +
```

```

ggtitle("Real Wages (2022 Q4-2023 Q3) % of 2019 by Education for Men")

growth_education_women = relative_to_date %>%
  mutate(Education = Race) %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All"))
ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
           group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2019 = 100%)") +
  scale_y_continuous(breaks = seq(0.92, 1.10, 0.02), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) % of 2019 by Education for Women")

relative_to_date2 = data %>%
  filter(!is.na(MovAverage)) %>%
  group_by(Type, Sex, Race) %>%
  summarize(Index = MovAverage[Date == "2023-07-01"]/MovAverage[Date == "2007-10-01"])

```

## 'summarise()' has grouped output by 'Type', 'Sex'. You can override using the  
## '.groups' argument.

```

growth2 = relative_to_date2 %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Race %in% c("White", "Asian", "Black", "Hispanic", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Race, linetype = Sex,
            group = interaction(Race, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2007 = 100%)") +
  scale_y_continuous(breaks = seq(0.96, 1.30, 0.04), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) as a Percent of 2007 by Race and Sex")

relative_to_date3 = data %>%
  filter(!is.na(MovAverage)) %>%
  group_by(Type, Sex, Race) %>%
  summarize(Index = MovAverage[Date == "2023-07-01"]/MovAverage[Date == "2016-10-01"])

```

## 'summarise()' has grouped output by 'Type', 'Sex'. You can override using the  
## '.groups' argument.

```

growth3 = relative_to_date3 %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Race %in% c("White", "Asian", "Black", "Hispanic", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Race, linetype = Sex,
            group = interaction(Race, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2016 = 100%)") +
  scale_y_continuous(breaks = seq(0.96, 1.20, 0.04), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) as a Percent of 2016 by Race and Sex")

growth_education3 = relative_to_date3 %>%
  mutate(Education = Race) %>%

```

```

filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
       Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All"))
ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
           group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
geom_point(size = 2) + xlab("Percentile") +
ylab("Index of Usual Weekly Wages (2019 = 100%)") +
scale_y_continuous(breaks = seq(0.92, 1.20, 0.02), labels = scales::label_percent()) + theme_bw() +
ggtitle("Real Wages (2022 Q4-2023 Q3) Percent of 2016 by Education and Sex")

growth_education3_men = relative_to_date3 %>%
mutate(Education = Race) %>%
filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
       Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All"))
ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
           group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
geom_point(size = 2) + xlab("Percentile") +
ylab("Index of Usual Weekly Wages (2019 = 100%)") +
scale_y_continuous(breaks = seq(0.92, 1.20, 0.02), labels = scales::label_percent()) + theme_bw() +
ggtitle("Real Wages (2022 Q4-2023 Q3) % of 2016 by Education for Men")

growth_education3_women = relative_to_date3 %>%
mutate(Education = Race) %>%
filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
       Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All"))
ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
           group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
geom_point(size = 2) + xlab("Percentile") +
ylab("Index of Usual Weekly Wages (2019 = 100%)") +
scale_y_continuous(breaks = seq(0.92, 1.20, 0.02), labels = scales::label_percent()) + theme_bw() +
ggtitle("Real Wages (2022 Q4-2023 Q3) % of 2016 by Education for Women")

relative_to_date4 = data %>%
filter(!is.na(MovAverage)) %>%
group_by(Type, Sex, Race) %>%
summarize(Index = MovAverage[Date == "2023-07-01"]/MovAverage[Date == "2001-10-01"])

```

## 'summarise()' has grouped output by 'Type', 'Sex'. You can override using the  
## '.groups' argument.

```

growth4 = relative_to_date4 %>%
filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
       Race %in% c("White", "Asian", "Black", "Hispanic", "All")) %>%
ggplot(aes(x = Type, y = Index, color = Race, linetype = Sex,
           group = interaction(Race, Sex))) + geom_line(linewidth = 1) +
geom_point(size = 2) + xlab("Percentile") +
ylab("Index of Usual Weekly Wages (2001 = 100%)") +
scale_y_continuous(breaks = seq(0.96, 1.52, 0.08), labels = scales::label_percent()) + theme_bw() +
ggtitle("Real Wages (2022 Q4-2023 Q3) as a Percent of 2001 by Race and Sex")

relative_to_date5 = data %>%
filter(!is.na(MovAverage)) %>%
group_by(Type, Sex, Race) %>%
summarize(Index = MovAverage[Date == "2023-07-01"]/MovAverage[Date == "2022-04-01"])

```

```
## 'summarise()' has grouped output by 'Type', 'Sex'. You can override using the
## '.groups' argument.
```

```
growth5 = relative_to_date5 %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Race %in% c("White", "Asian", "Black", "Hispanic", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Race, linetype = Sex,
             group = interaction(Race, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2021 = 100%)") +
  scale_y_continuous(breaks = seq(0.96, 1.10, 0.02), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) as a Percent of 2021 Q3-2022 Q2 \n by Race and Sex")

growth_education5 = relative_to_date5 %>%
  mutate(Education = Race) %>%
  filter(Type %in% c("P10", "P25", "P50", "P75", "P90") & Sex != "Total" &
         Education %in% c("LessThanHS", "HS", "SomeCollege", "Bachelor'sOnly", "AdvancedDegree", "All")) %>%
  ggplot(aes(x = Type, y = Index, color = Education, linetype = Sex,
             group = interaction(Education, Sex))) + geom_line(linewidth = 1) +
  geom_point(size = 2) + xlab("Percentile") +
  ylab("Index of Usual Weekly Wages (2019 = 100%)") +
  scale_y_continuous(breaks = seq(0.92, 1.20, 0.02), labels = scales::label_percent()) + theme_bw() +
  ggtitle("Real Wages (2022 Q4-2023 Q3) as a Percent of 2021 Q3-2022 Q2 \n by Education and Sex")
```

```
okay = expand.grid(Type = c("P10", "P25", "P50", "P75", "P90"), Race = c("Asian", "Black", "Hispanic", "All"))
nice = list()

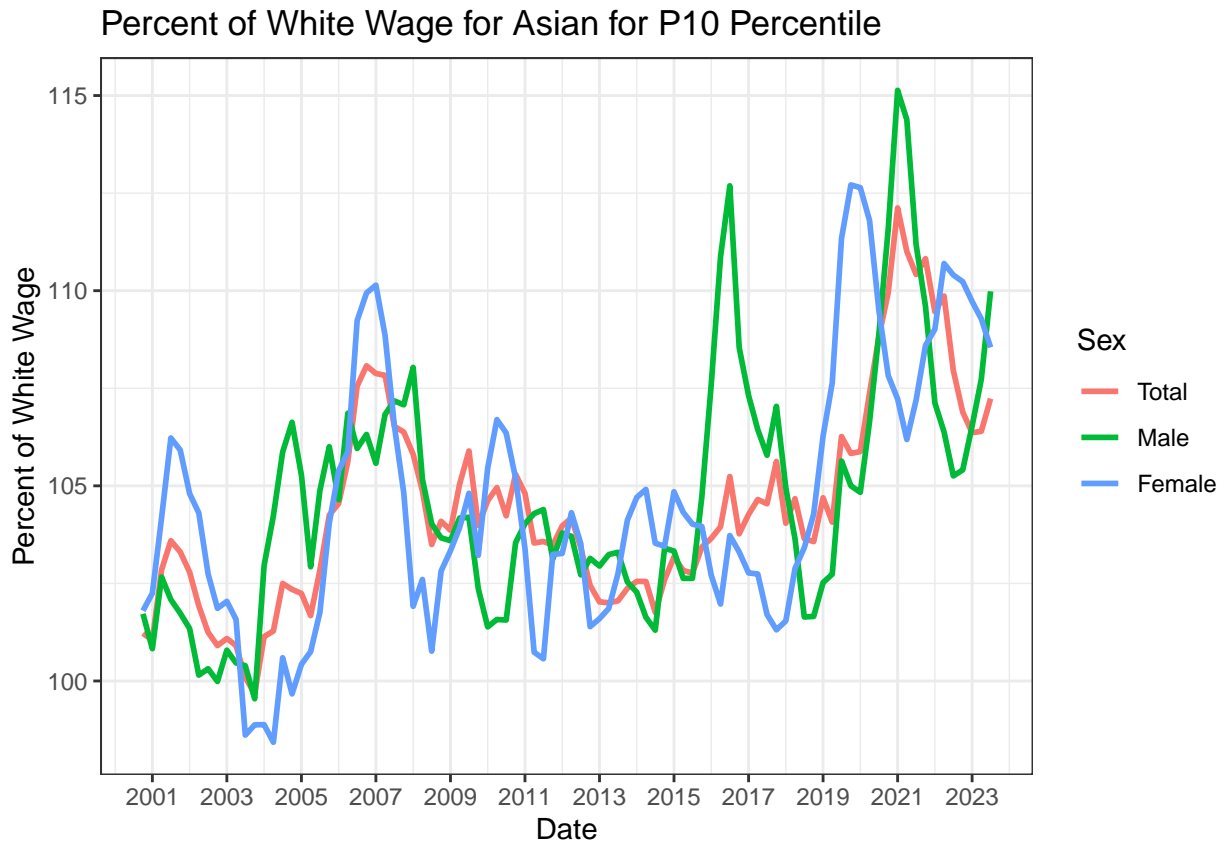
plot_this = function(type, race){
  title = paste0("Percent of White Wage for ", race, " for ", type, " Percentile")
  relative_to_white %>%
  filter(Type == type) %>%
  ggplot(aes(x = Date, y = !!sym(race), color = Sex)) +
  geom_line(size = 1) + theme_bw() + scale_x_date(date_breaks = "2 years", date_labels = "%Y") +
  xlab("Date") + ylab("Percent of White Wage") +
  ggtitle(title)
}

for(i in seq_along(okay[[1]])){
  nice[[i]] = plot_this(as.character(okay[i, 1]), as.character(okay[i, 2]))
}
```

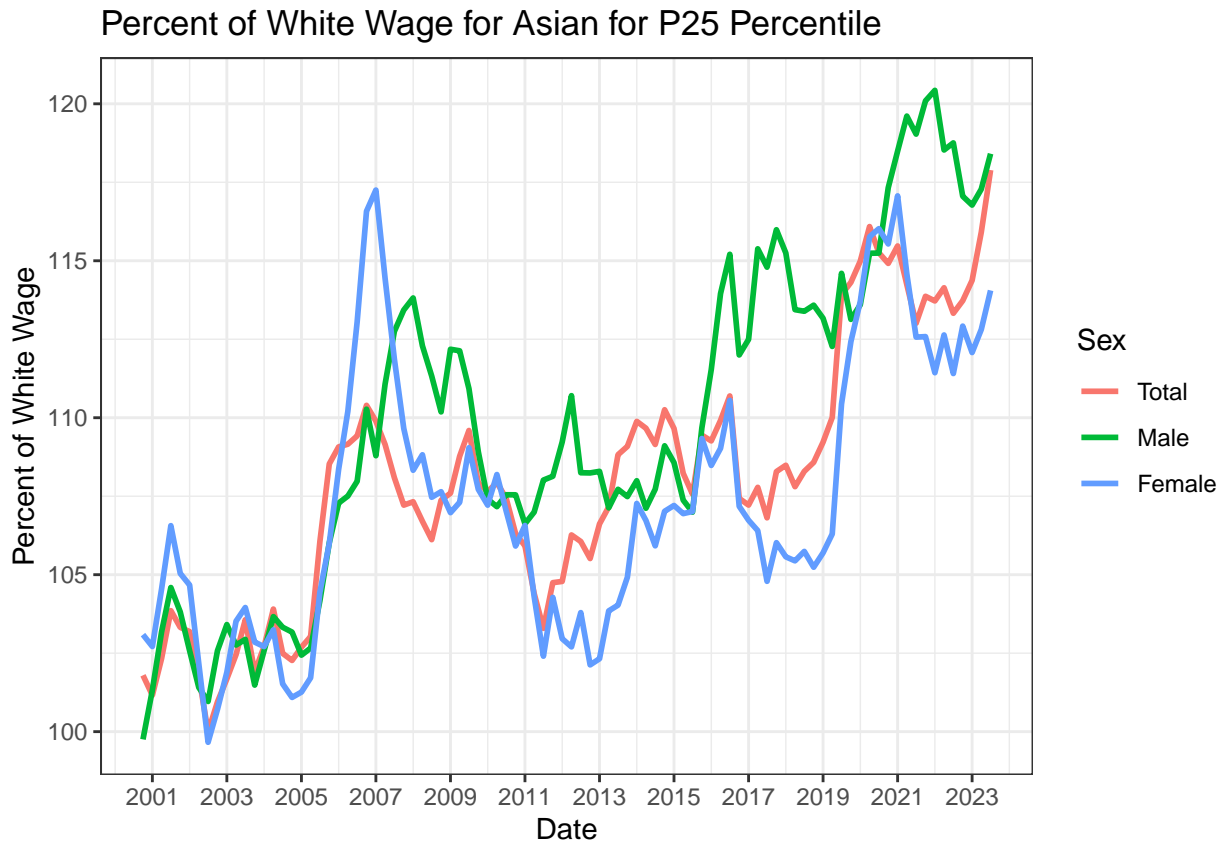
```
## Warning: Using 'size' aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use 'linewidth' instead.
## This warning is displayed once every 8 hours.
## Call 'lifecycle::last_lifecycle_warnings()' to see where this warning was
## generated.
```

```
nice
```

```
## [[1]]
```



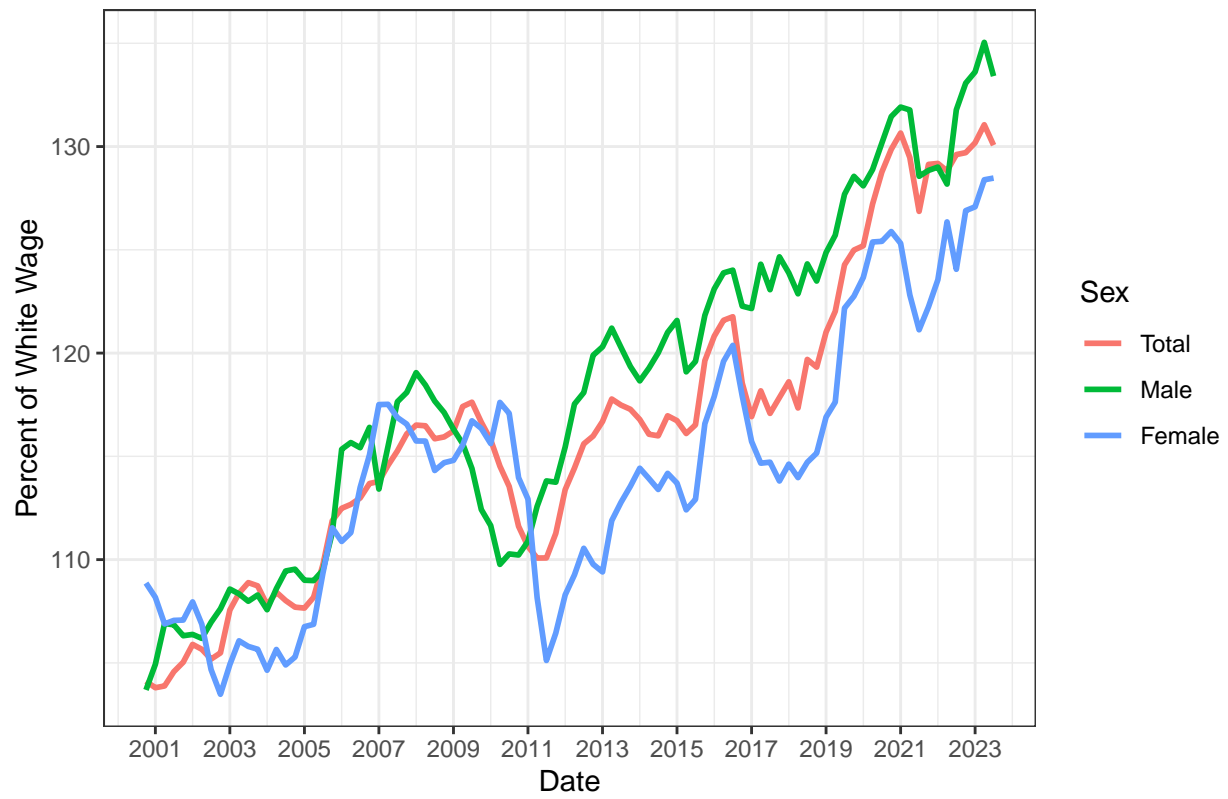
```
##  
## [[2]]
```



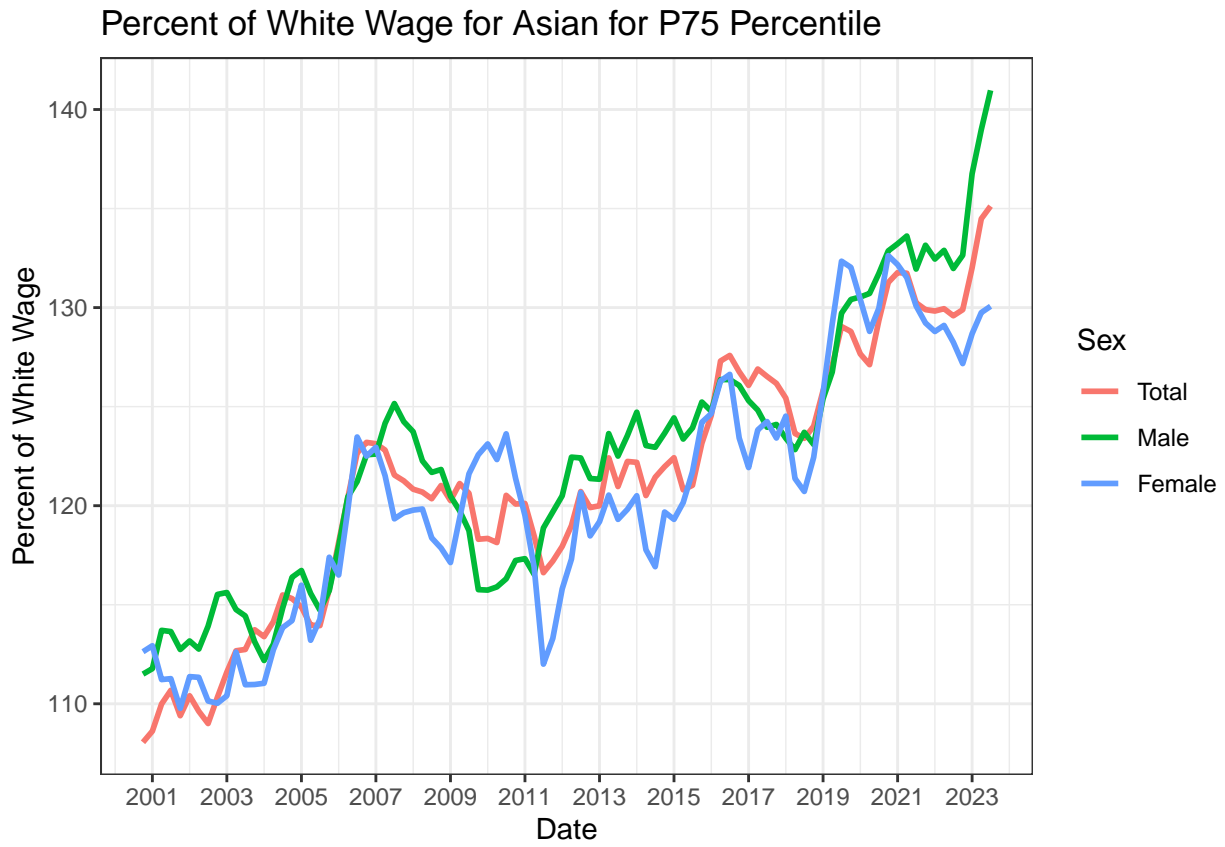
```
##  
## [[3]]
```



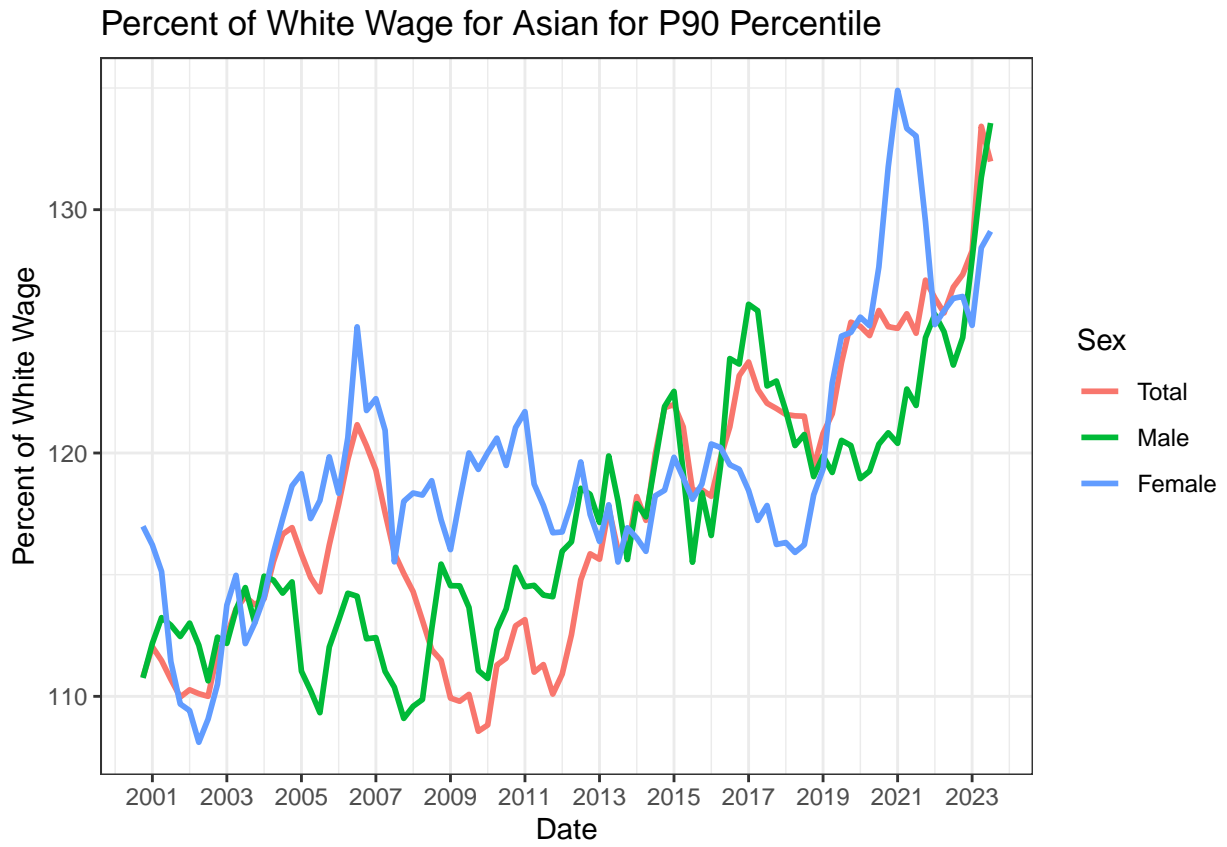
Percent of White Wage for Asian for P50 Percentile



```
##  
## [[4]]
```

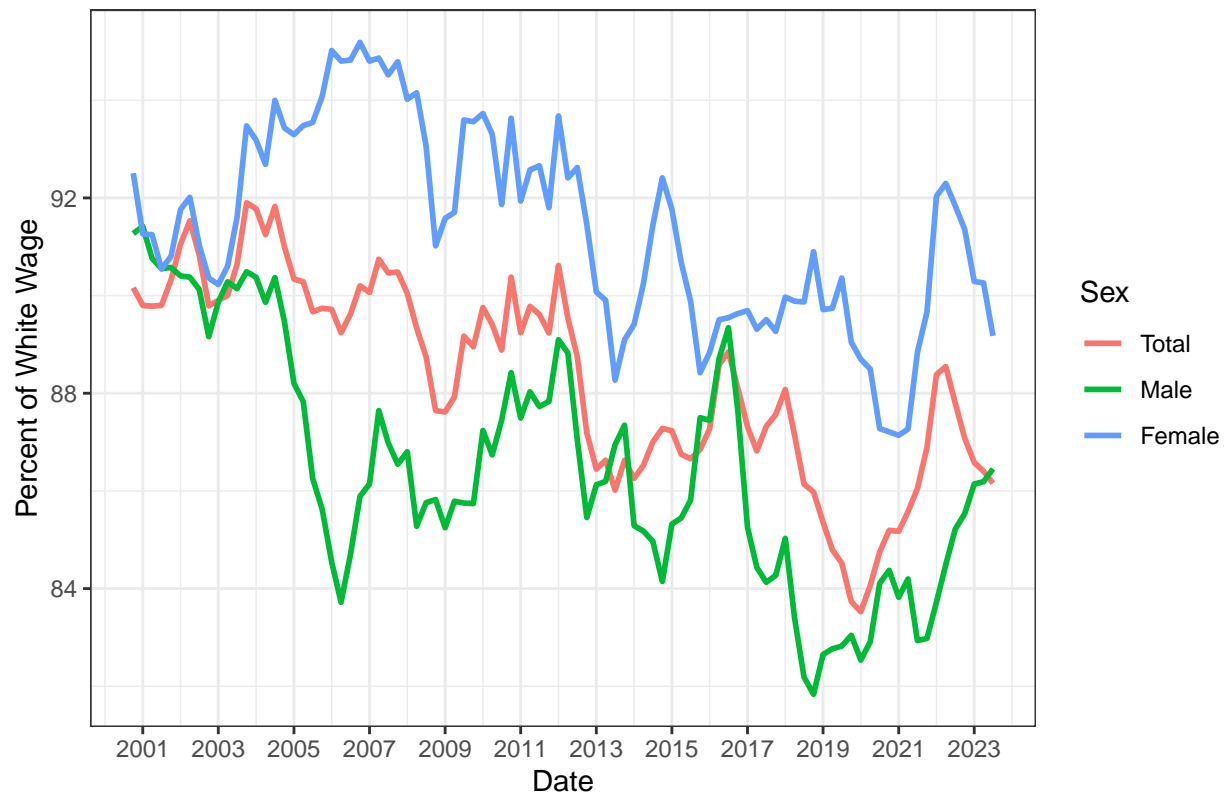


```
##  
## [[5]]
```



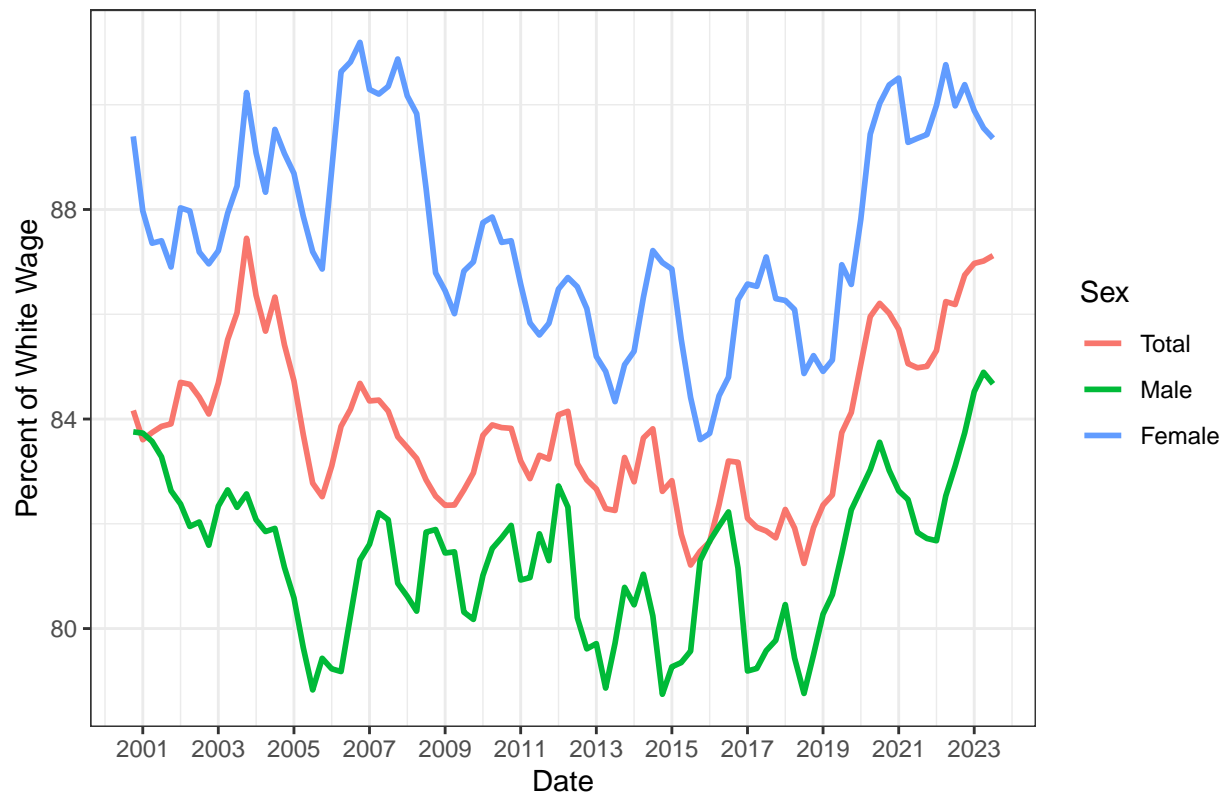
```
##  
## [[6]]
```

Percent of White Wage for Black for P10 Percentile



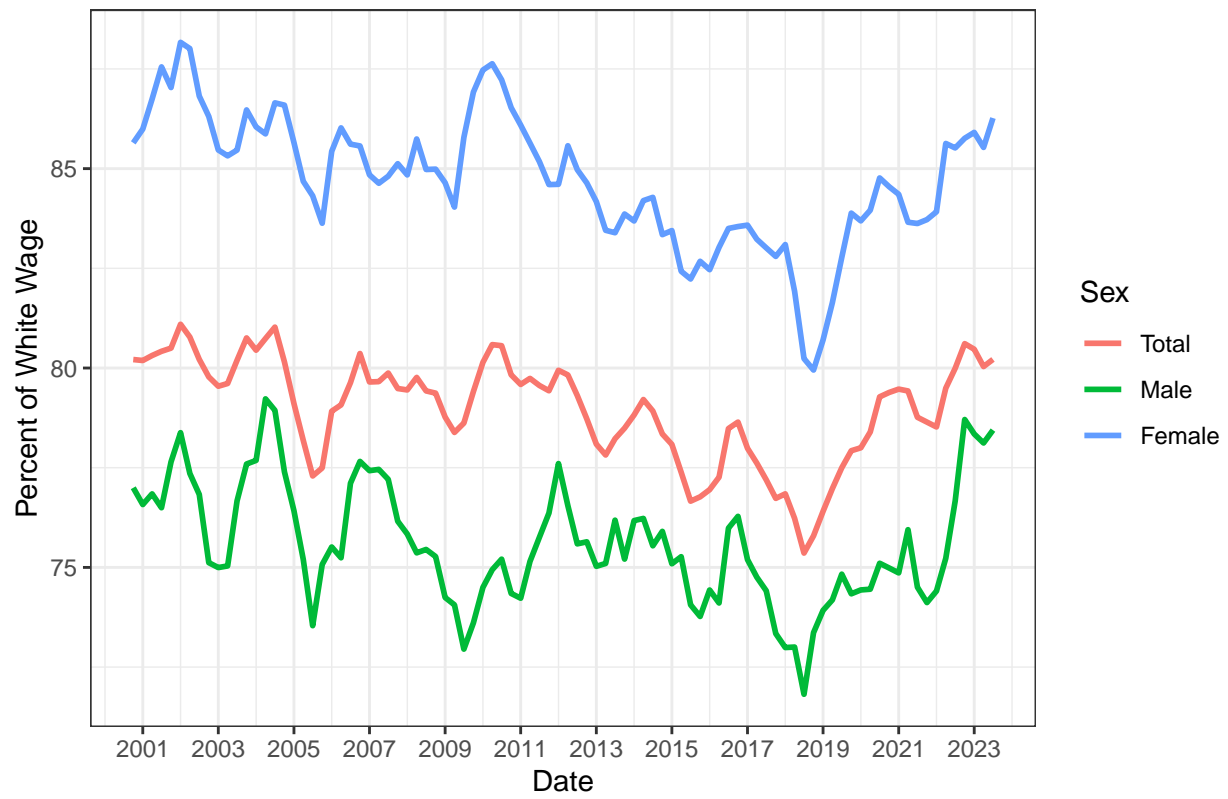
```
##  
## [[7]]
```

Percent of White Wage for Black for P25 Percentile



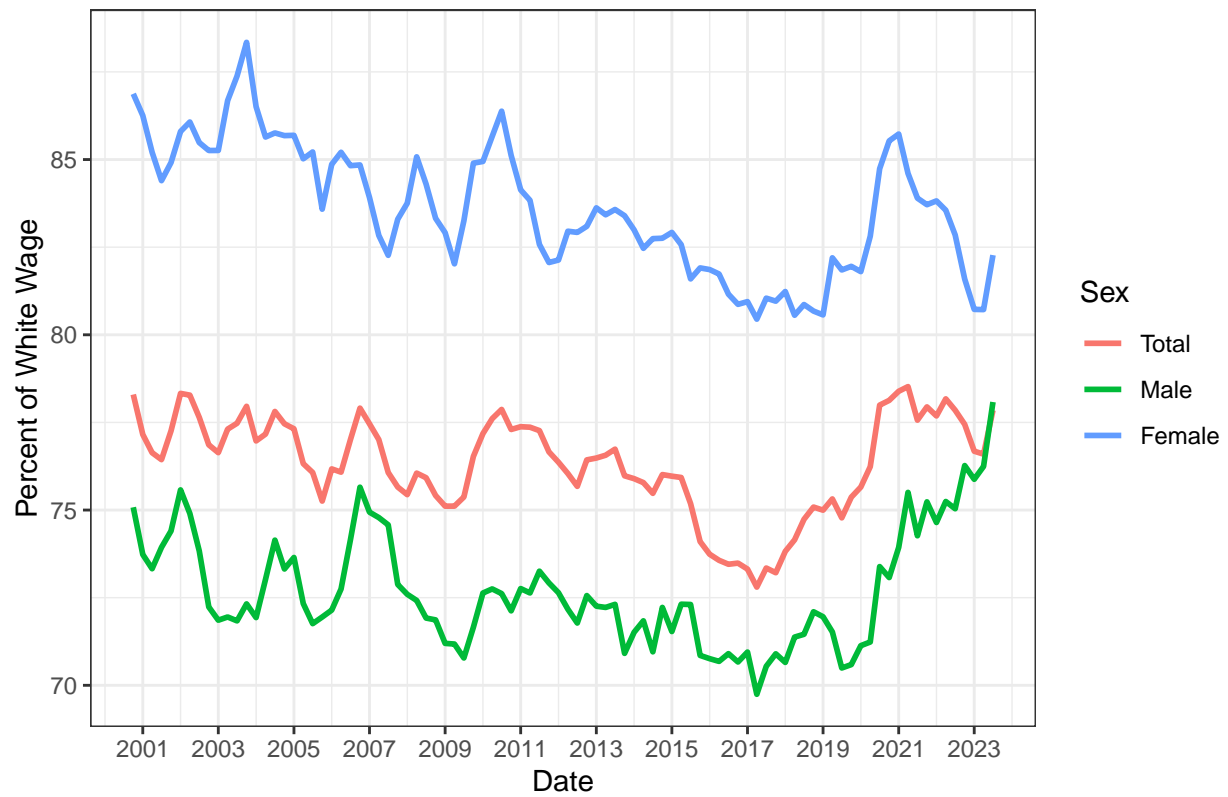
```
##  
## [[8]]
```

Percent of White Wage for Black for P50 Percentile

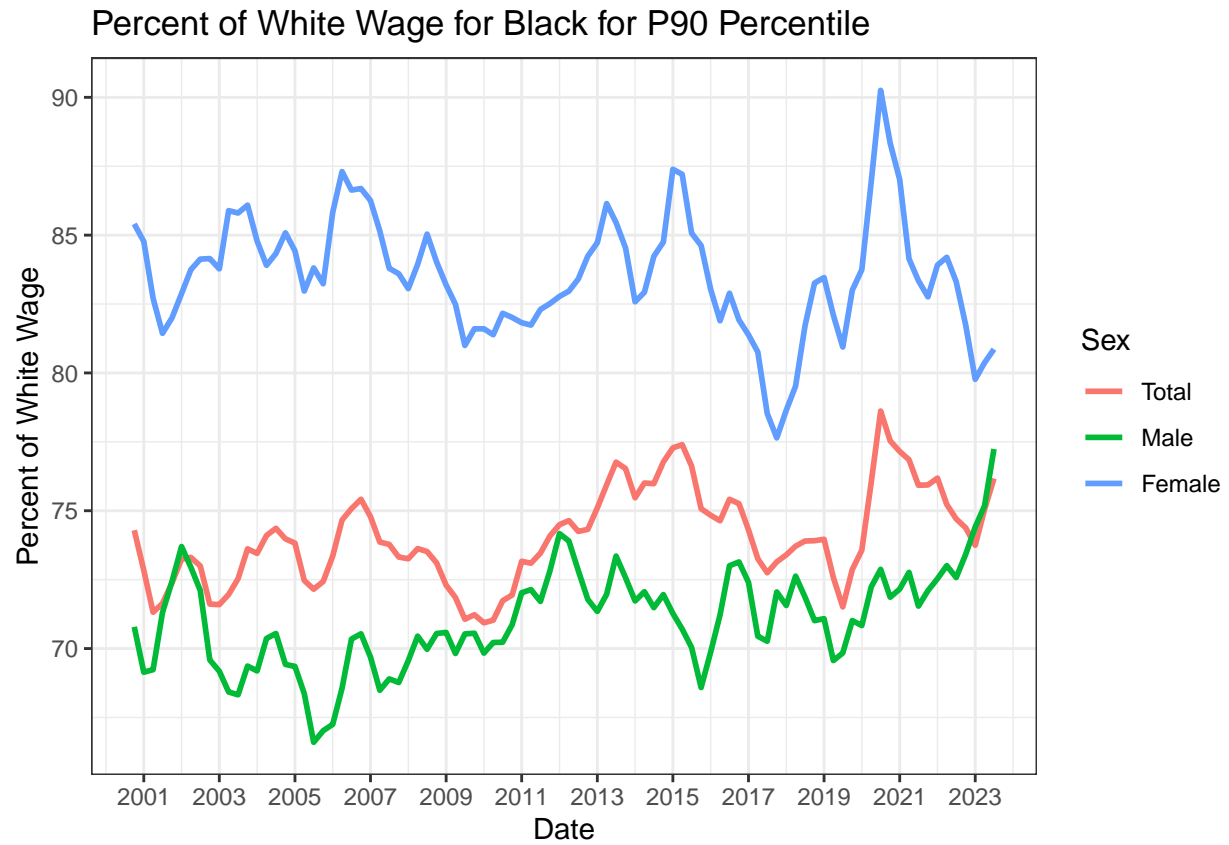


```
##  
## [[9]]
```

Percent of White Wage for Black for P75 Percentile

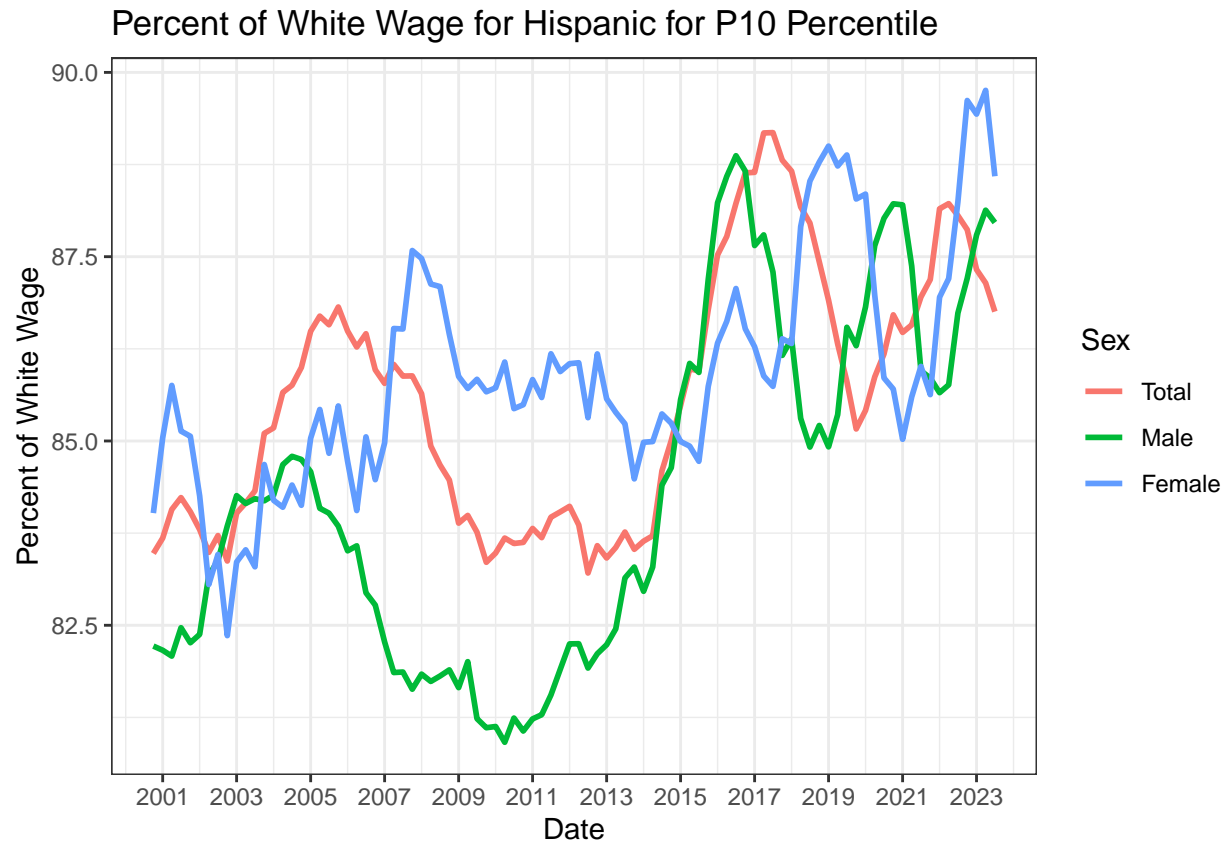


```
##  
## [[10]]
```



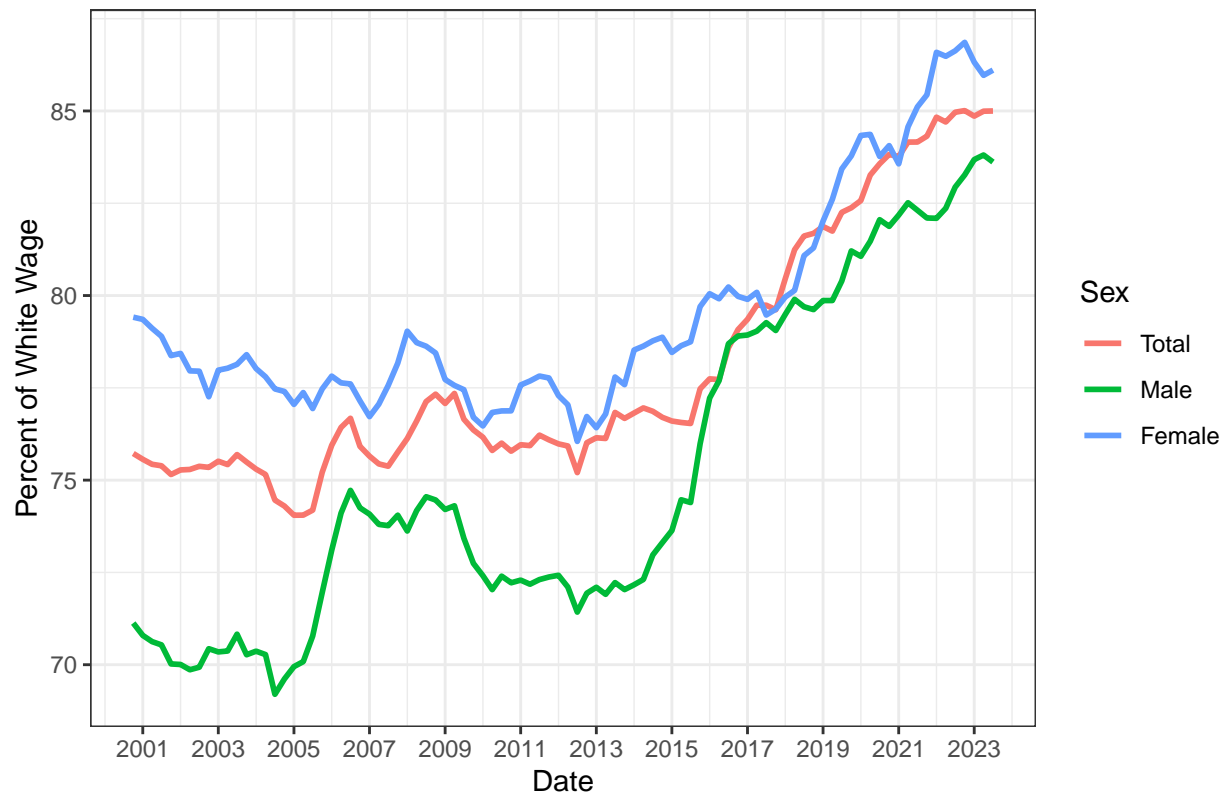
```
##  
## [[11]]
```





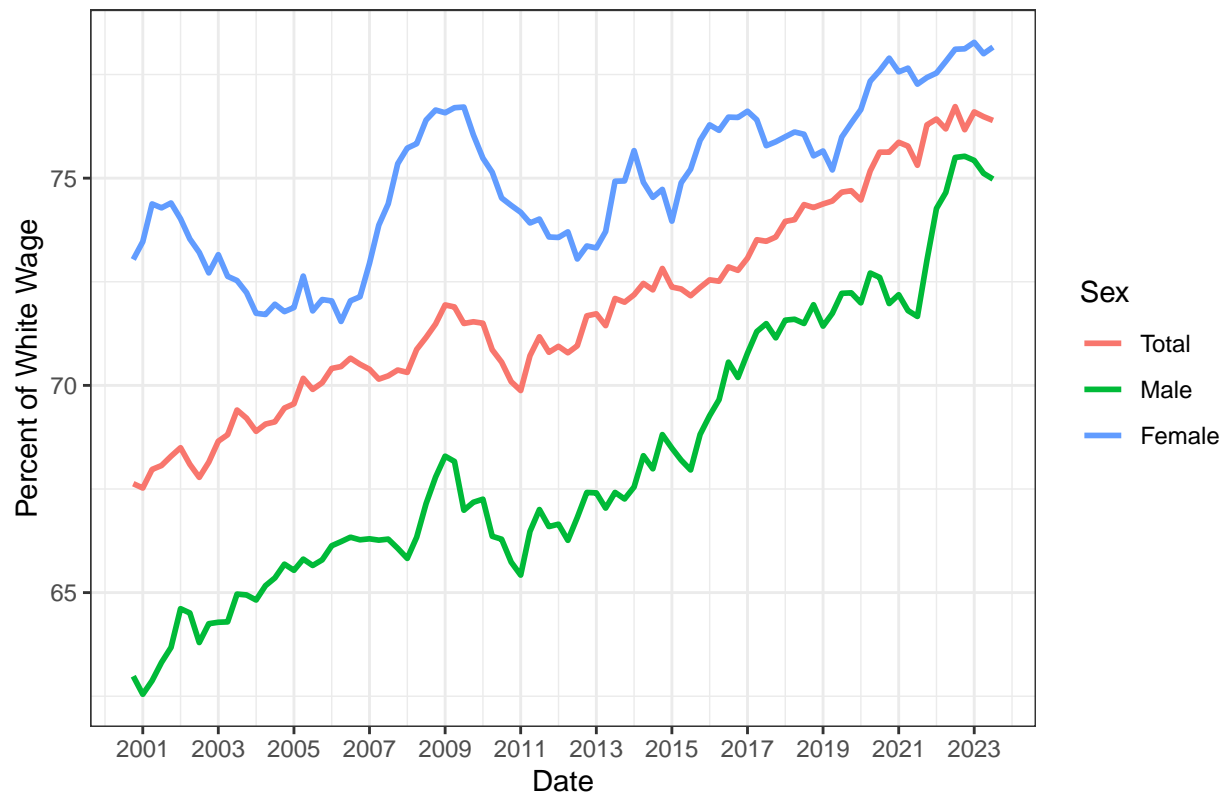
```
##  
## [[12]]
```

Percent of White Wage for Hispanic for P25 Percentile



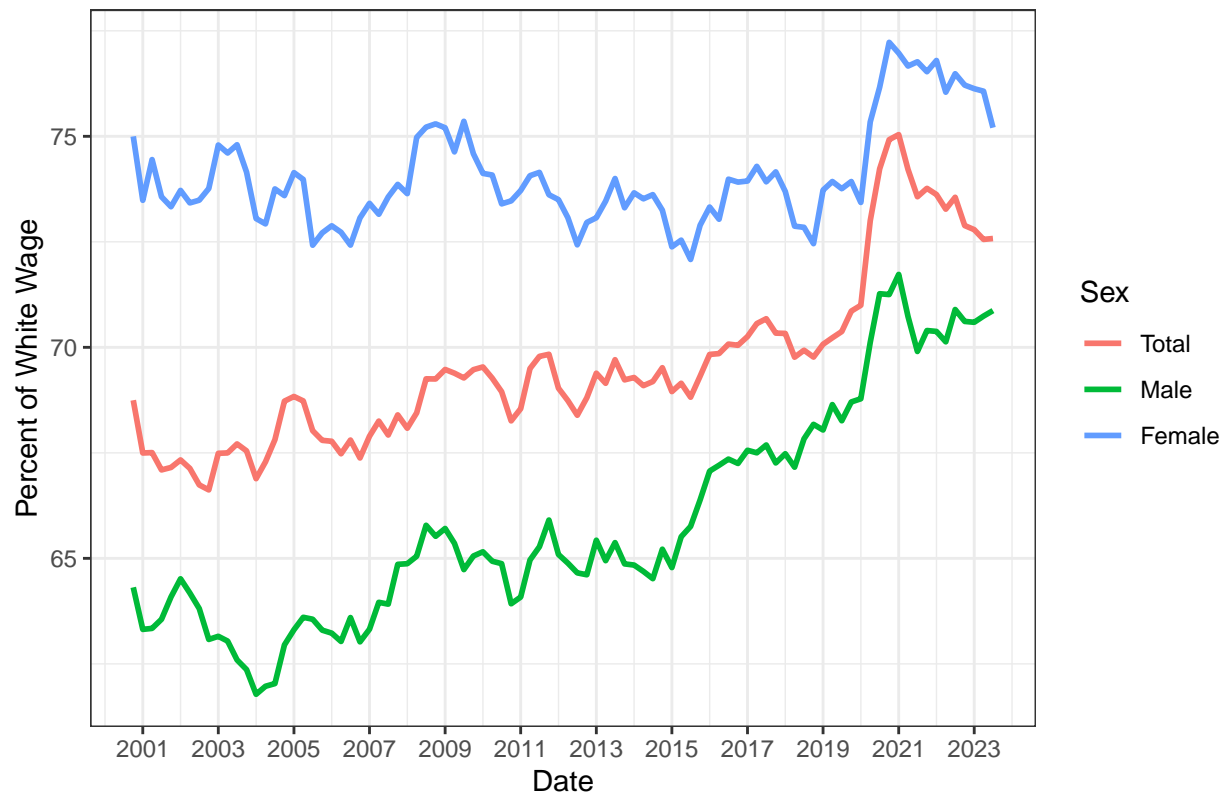
```
##  
## [[13]]
```

Percent of White Wage for Hispanic for P50 Percentile

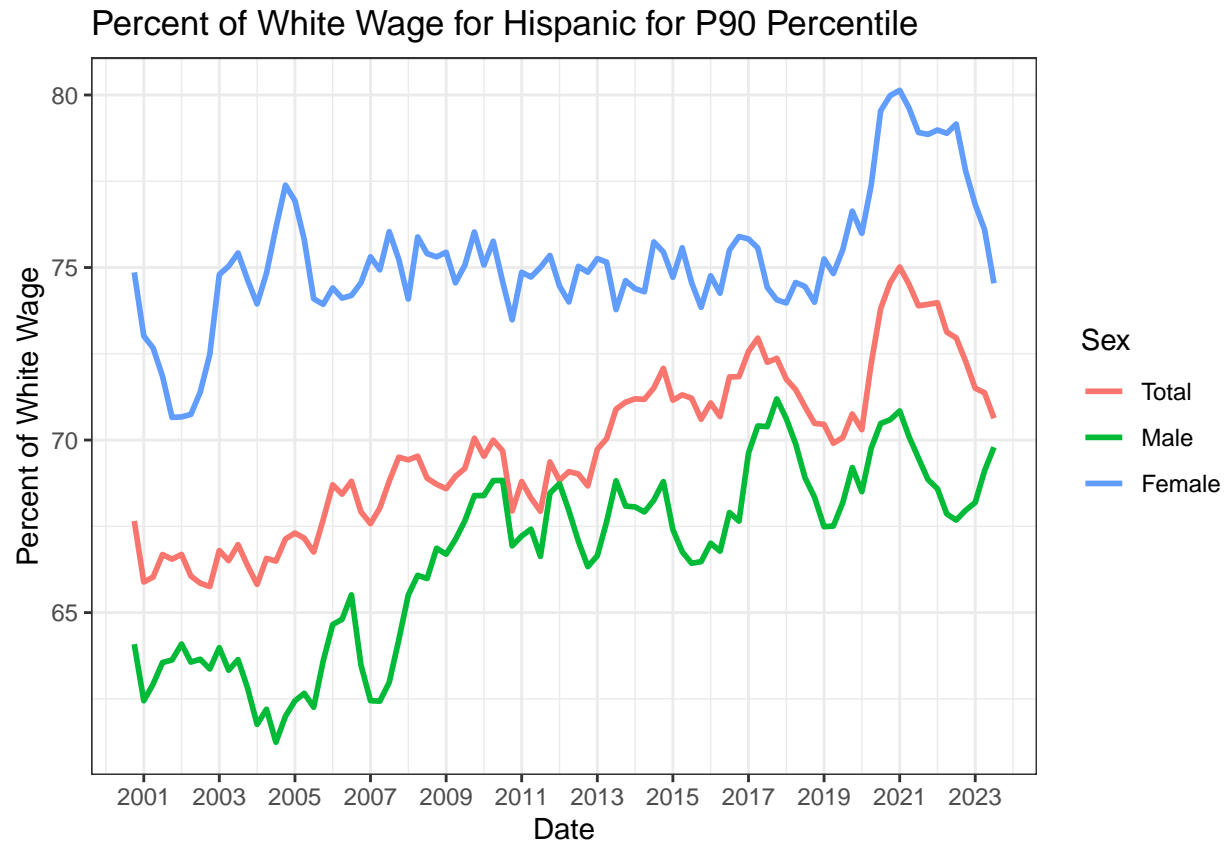


```
##  
## [[14]]
```

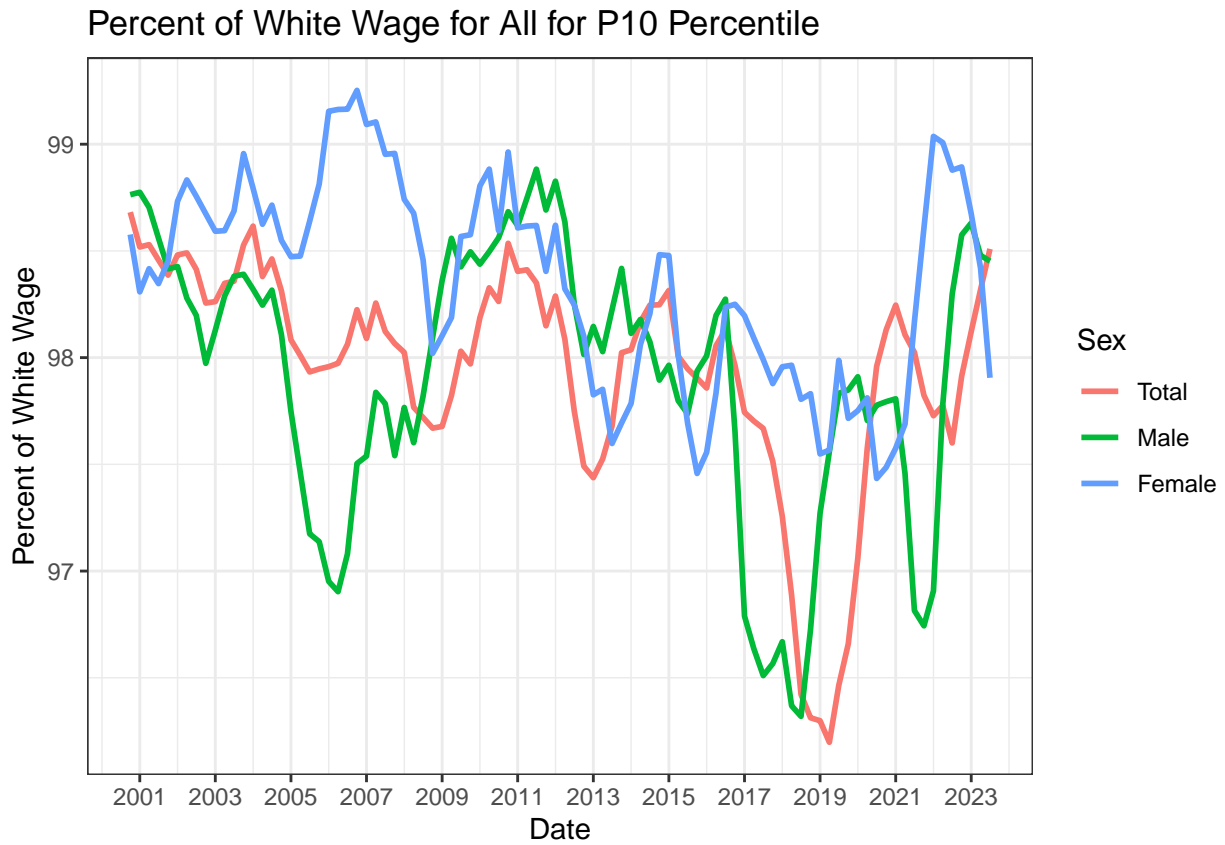
Percent of White Wage for Hispanic for P75 Percentile



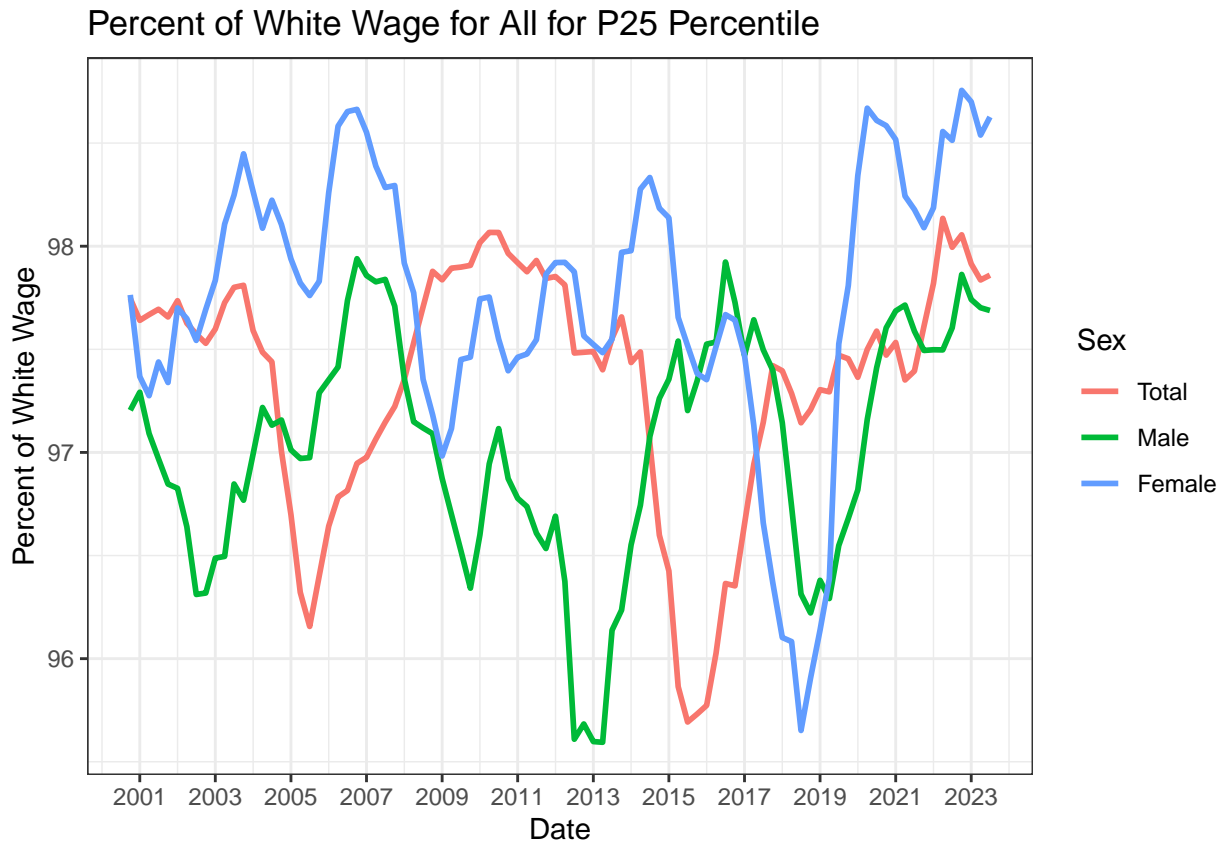
```
##
## [[15]]
```



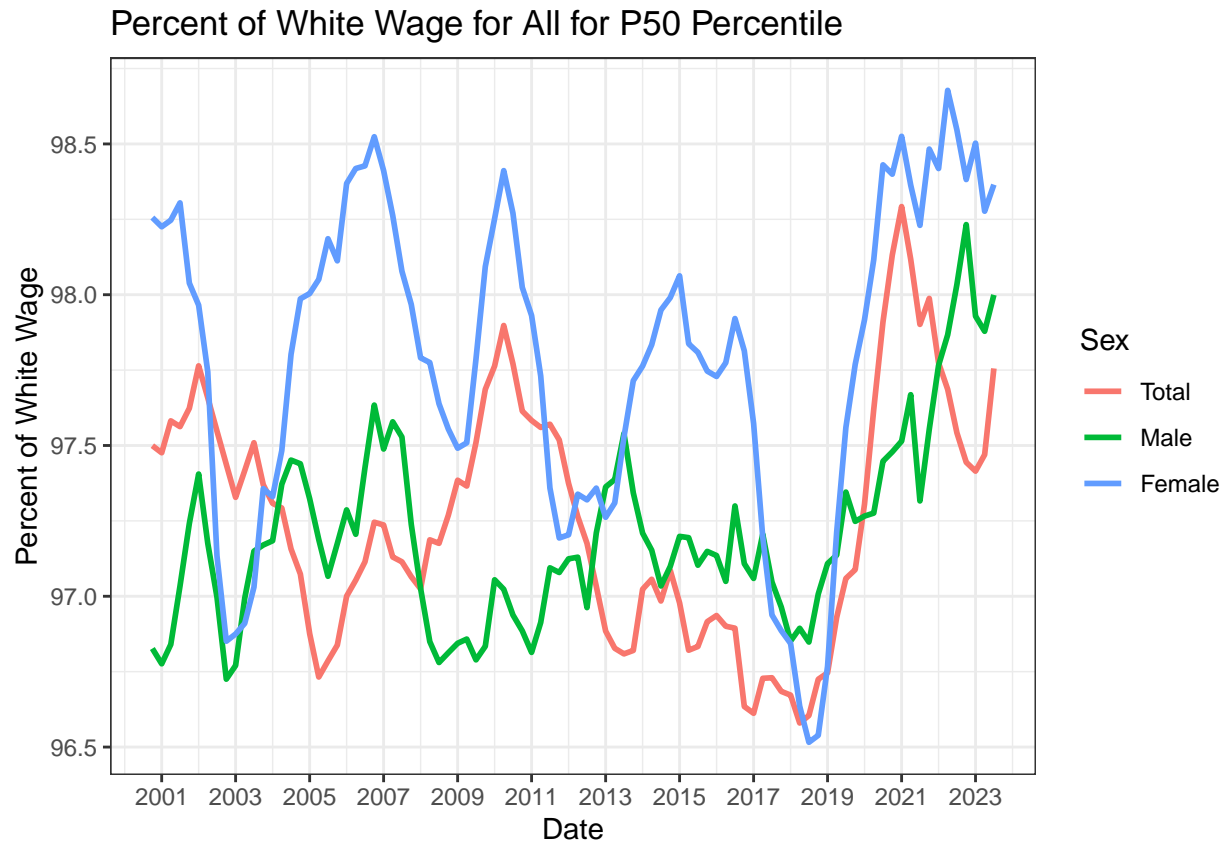
```
##  
## [[16]]
```



```
##  
## [[17]]
```

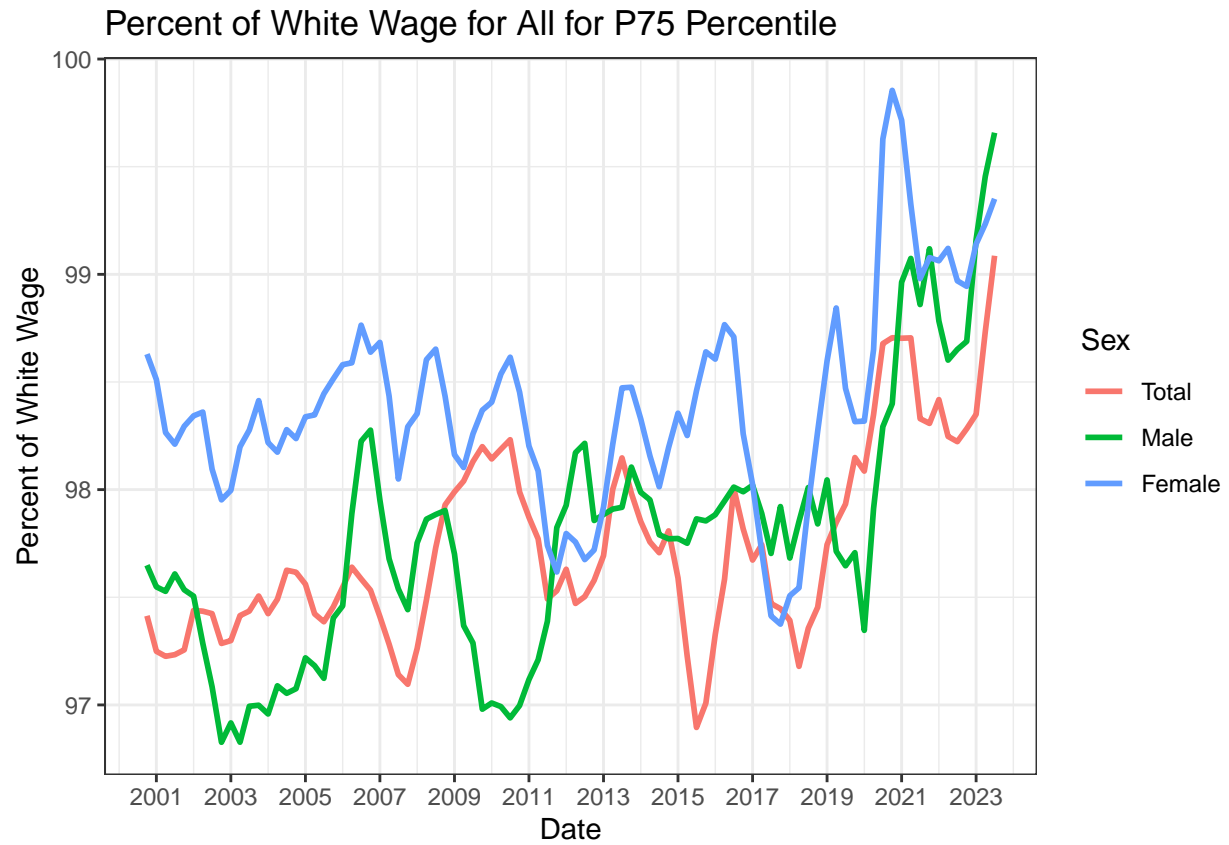


```
##  
## [[18]]
```



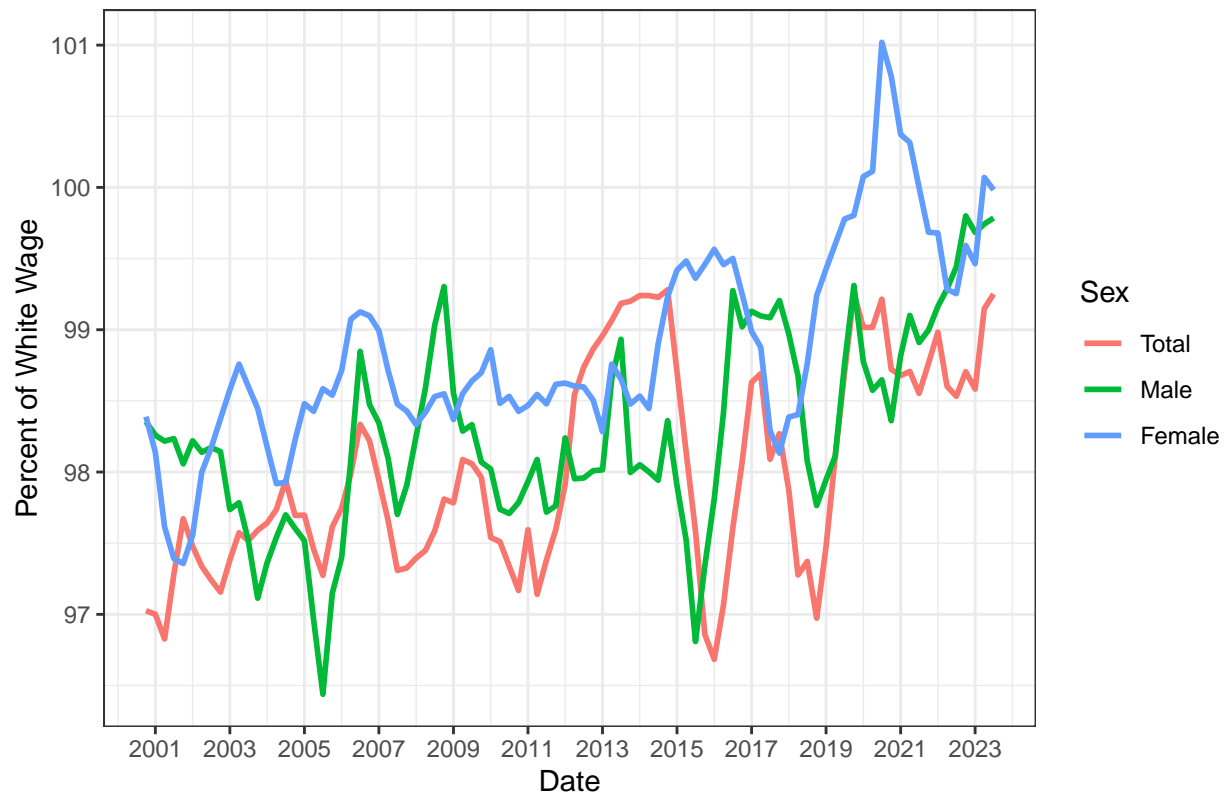
```
##
## [[19]]
```





```
##
## [[20]]
```

Percent of White Wage for All for P90 Percentile

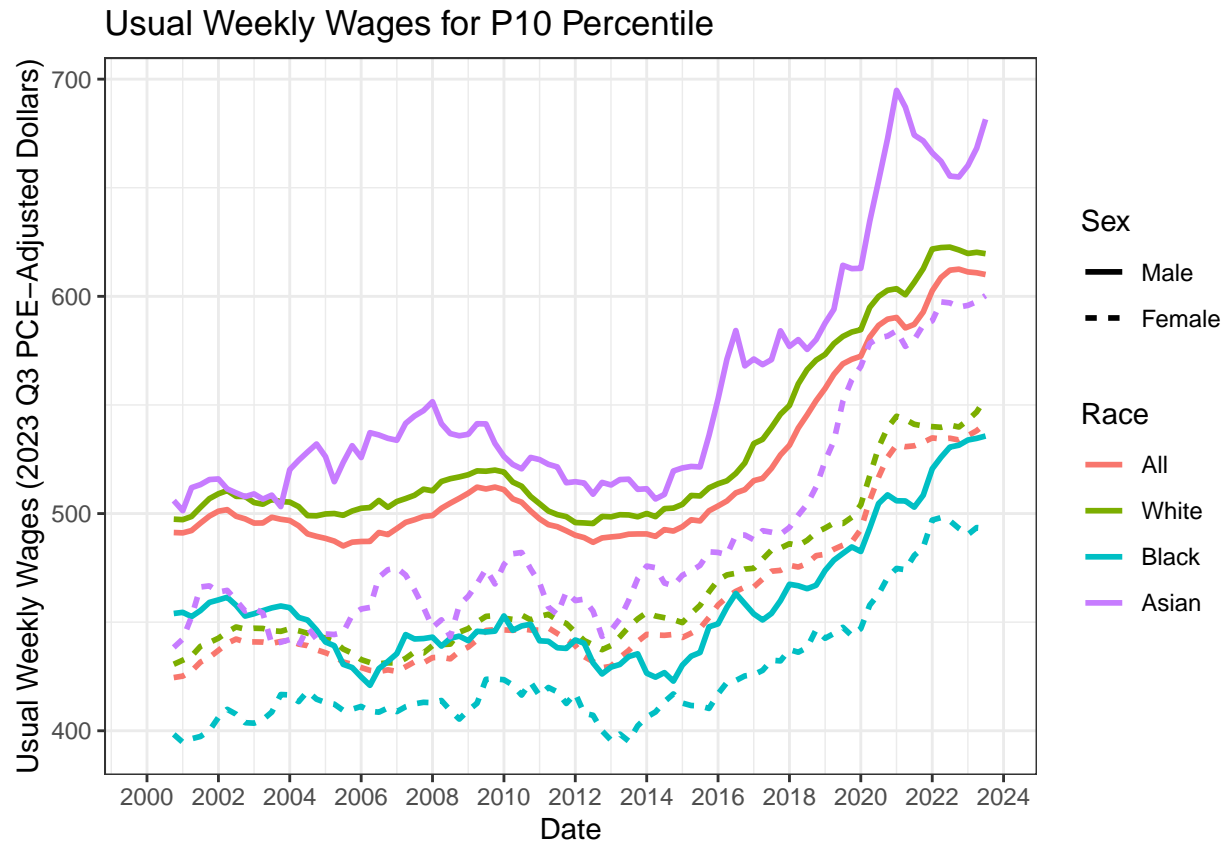


```
okay = c("P10","P25","P50","P75","P90")
plot_percentile = function(type){
  title = paste0("Usual Weekly Wages for ", type, " Percentile")
  data %>%
    filter(Sex != "Total" & Type == type & Race %in% c("White","All", "Asian","Black")) %>%
    ggplot(aes(x = Date, y = MovAverage, color = Race, linetype = Sex)) +
      geom_line(size = 1) + theme_bw() + scale_x_date(date_breaks = "2 years", date_labels = "%Y") +
      ylab("Usual Weekly Wages (2023 Q3 PCE-Adjusted Dollars)") +
      ggtitle(title)
}
percentile_plots = lapply(okay, plot_percentile)
```

```
percentile_plots
```

```
## [[1]]
```

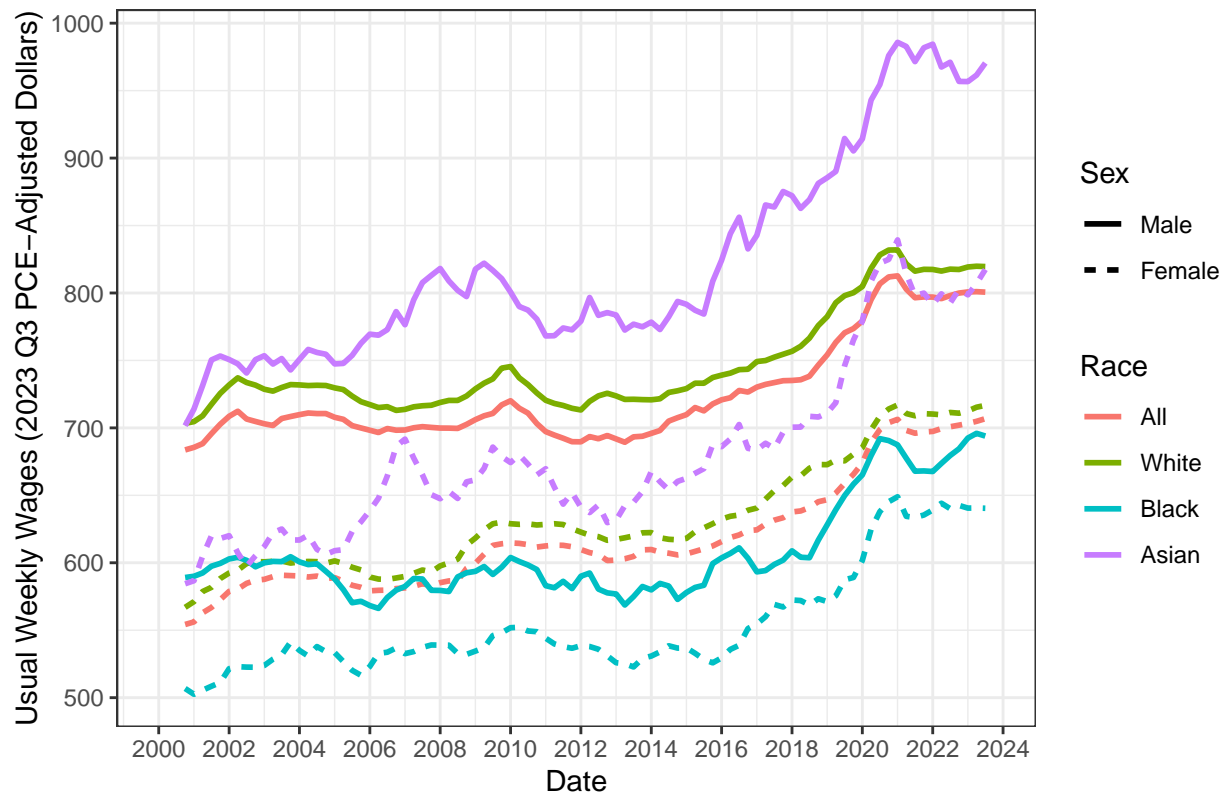
```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```



```
##
## [[2]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```

Usual Weekly Wages for P25 Percentile

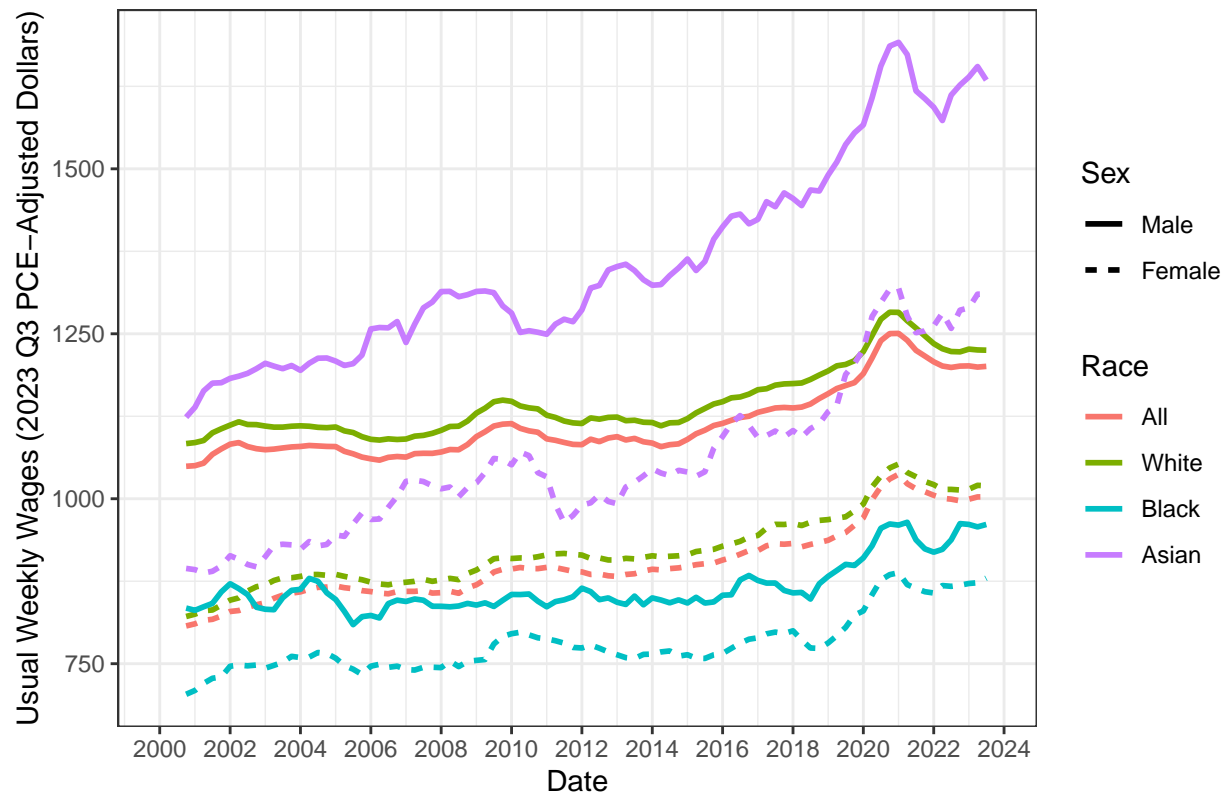


```
##
```

```
## [[3]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```

Usual Weekly Wages for P50 Percentile

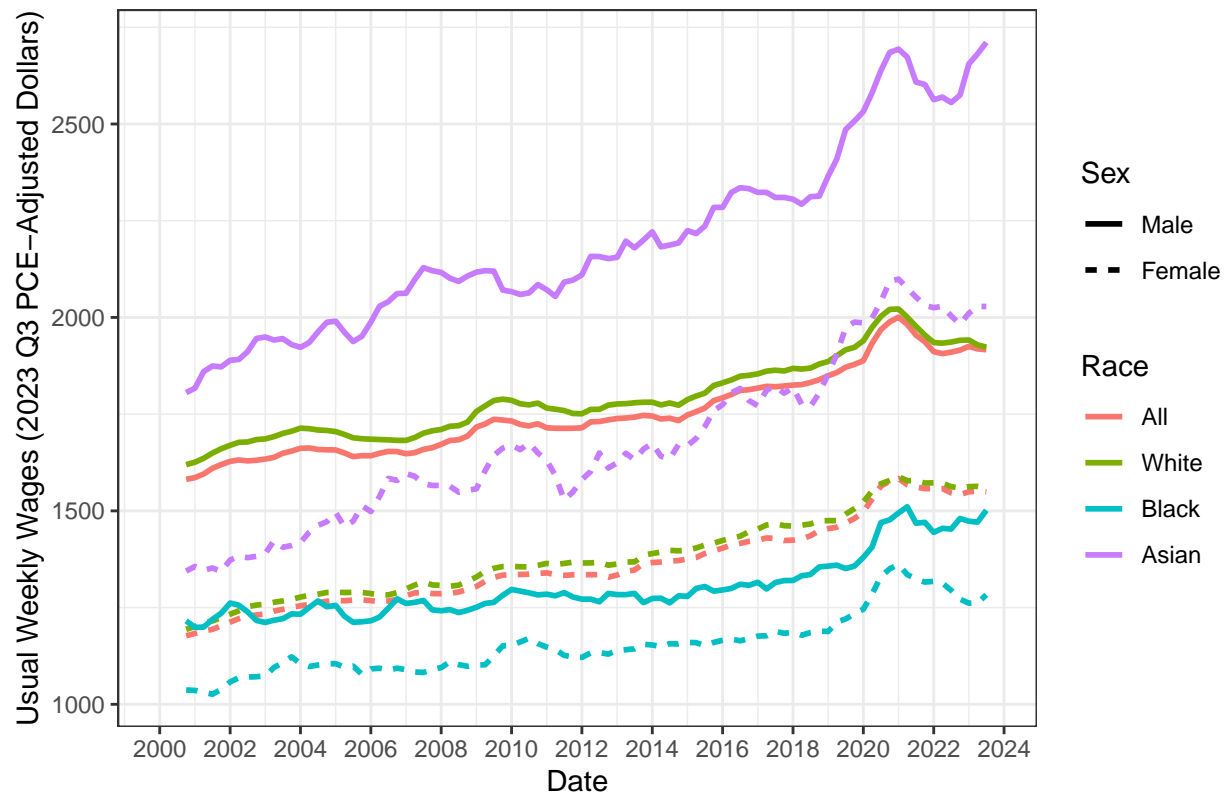


```
##
```

```
## [[4]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```

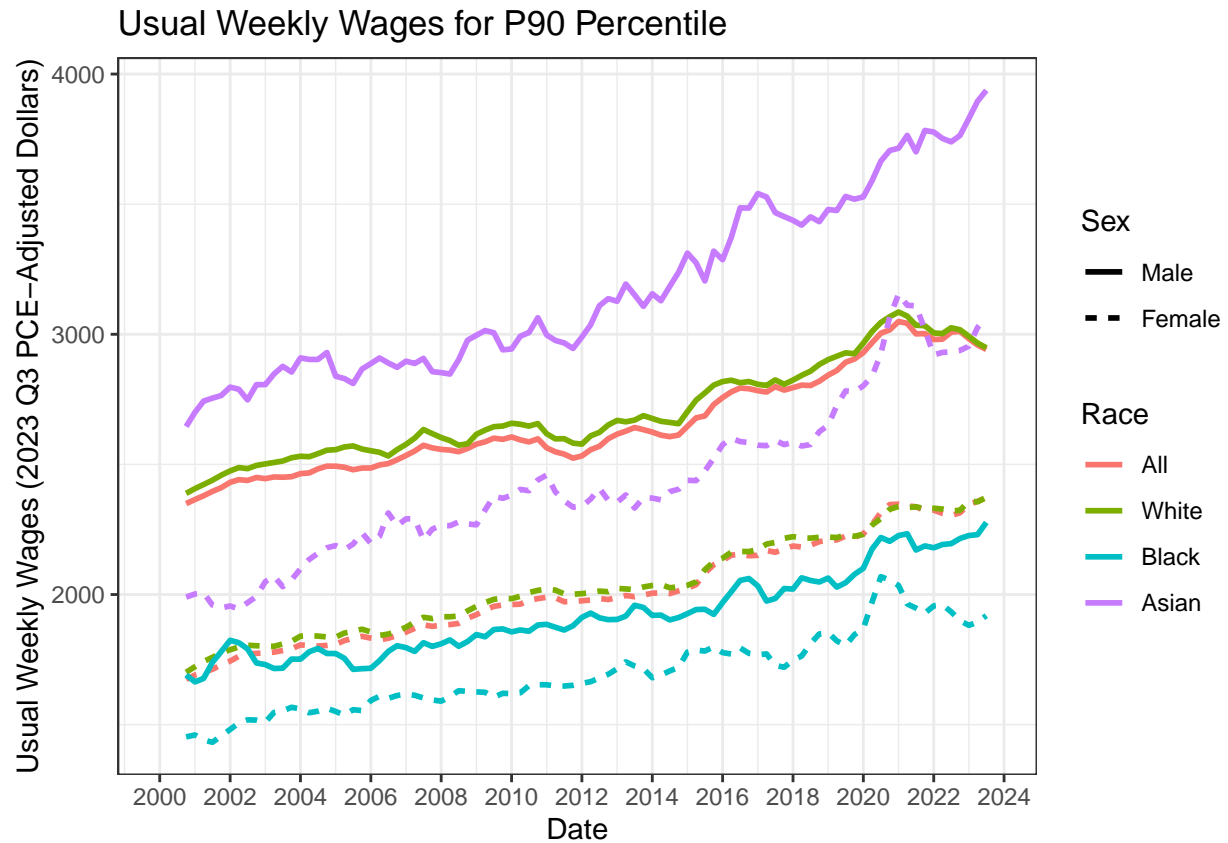
Usual Weekly Wages for P75 Percentile



```
##
```

```
## [[5]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```

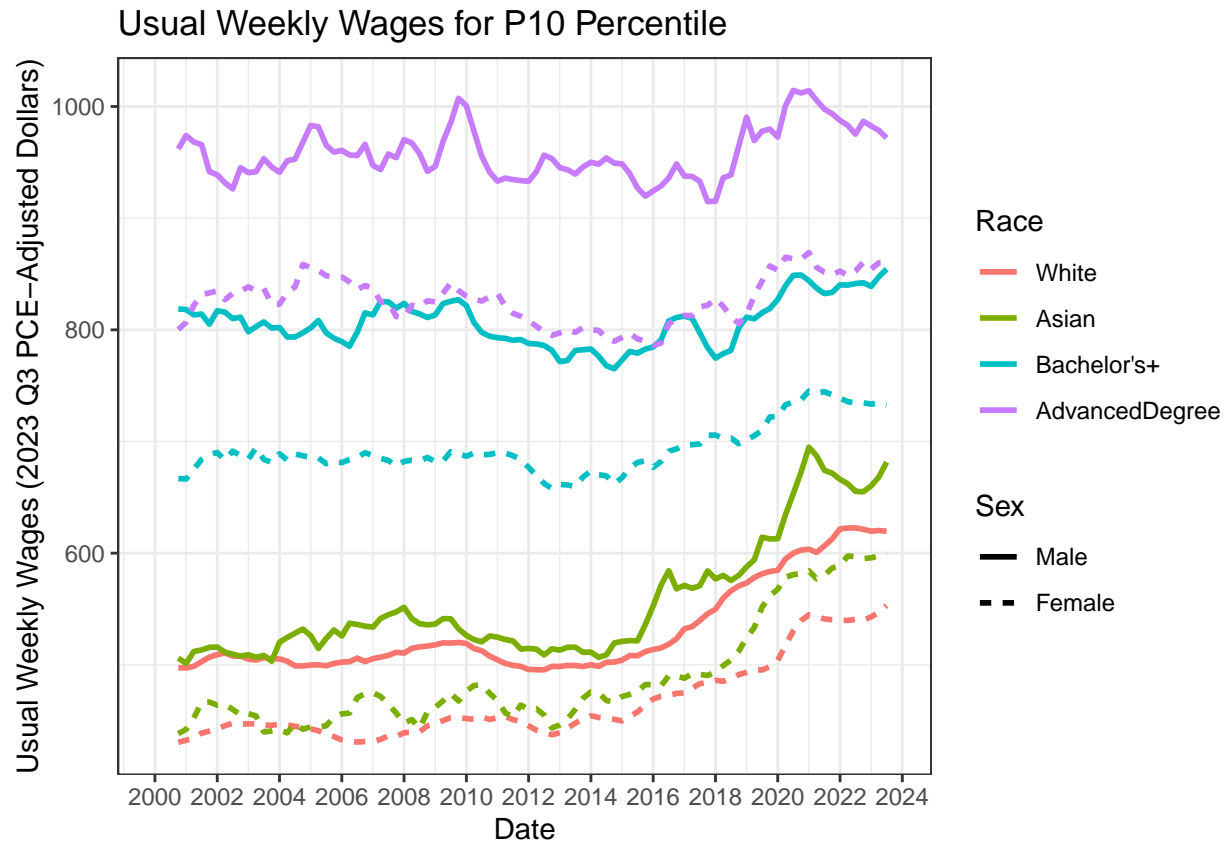


```
okay = c("P10","P25","P50","P75","P90")
plot_percentile2 = function(type){
  title = paste0("Usual Weekly Wages for ", type, " Percentile")
  data %>%
    filter(Sex != "Total" & Type == type & Race %in% c("White","Asian","Bachelor's+","AdvancedDegree"))
  ggplot(aes(x = Date, y = MovAverage, color = Race, linetype = Sex)) +
    geom_line(size = 1) + theme_bw() + scale_x_date(date_breaks = "2 years", date_labels = "%Y") +
    ylab("Usual Weekly Wages (2023 Q3 PCE-Adjusted Dollars)") +
    ggtitle(title)
}
percentile_plots2 = lapply(okay, plot_percentile2)
```

```
percentile_plots2
```

```
## [[1]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```

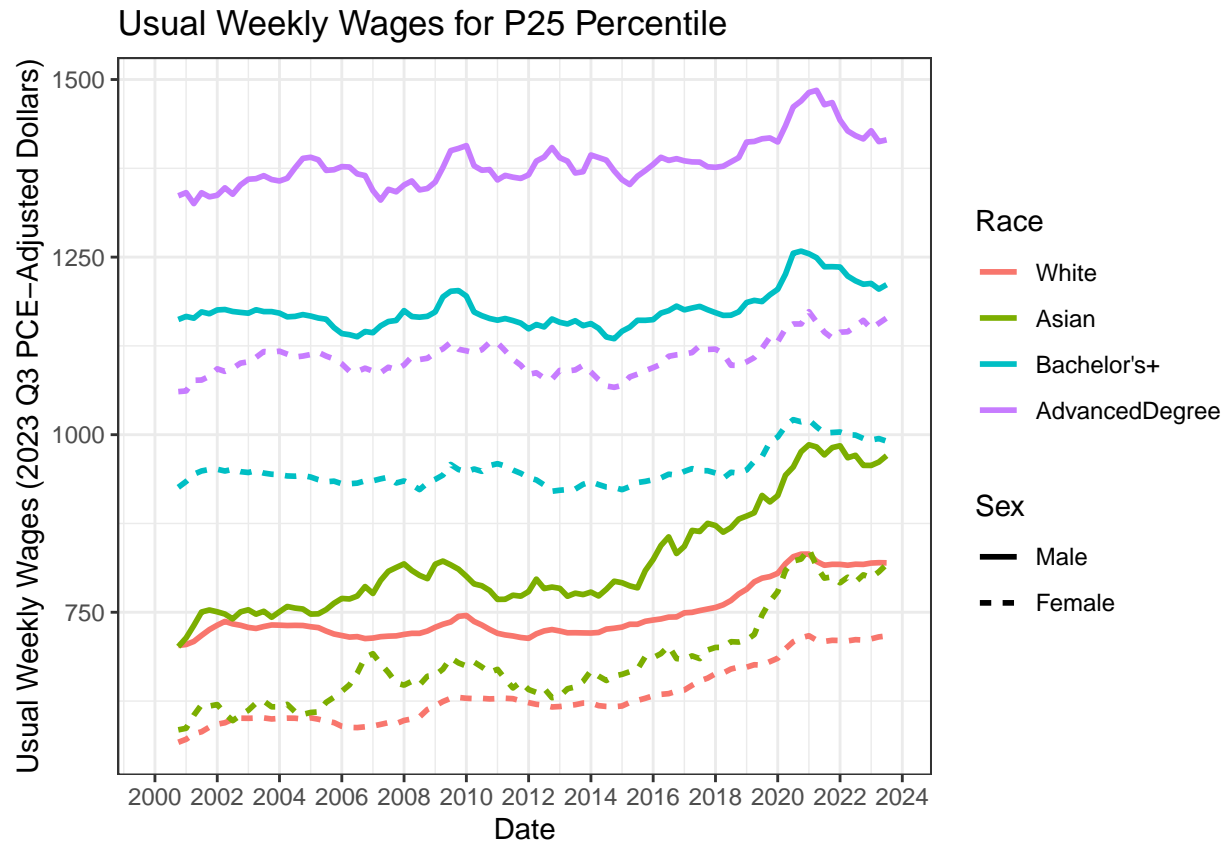


```
##
```

```
## [[2]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```

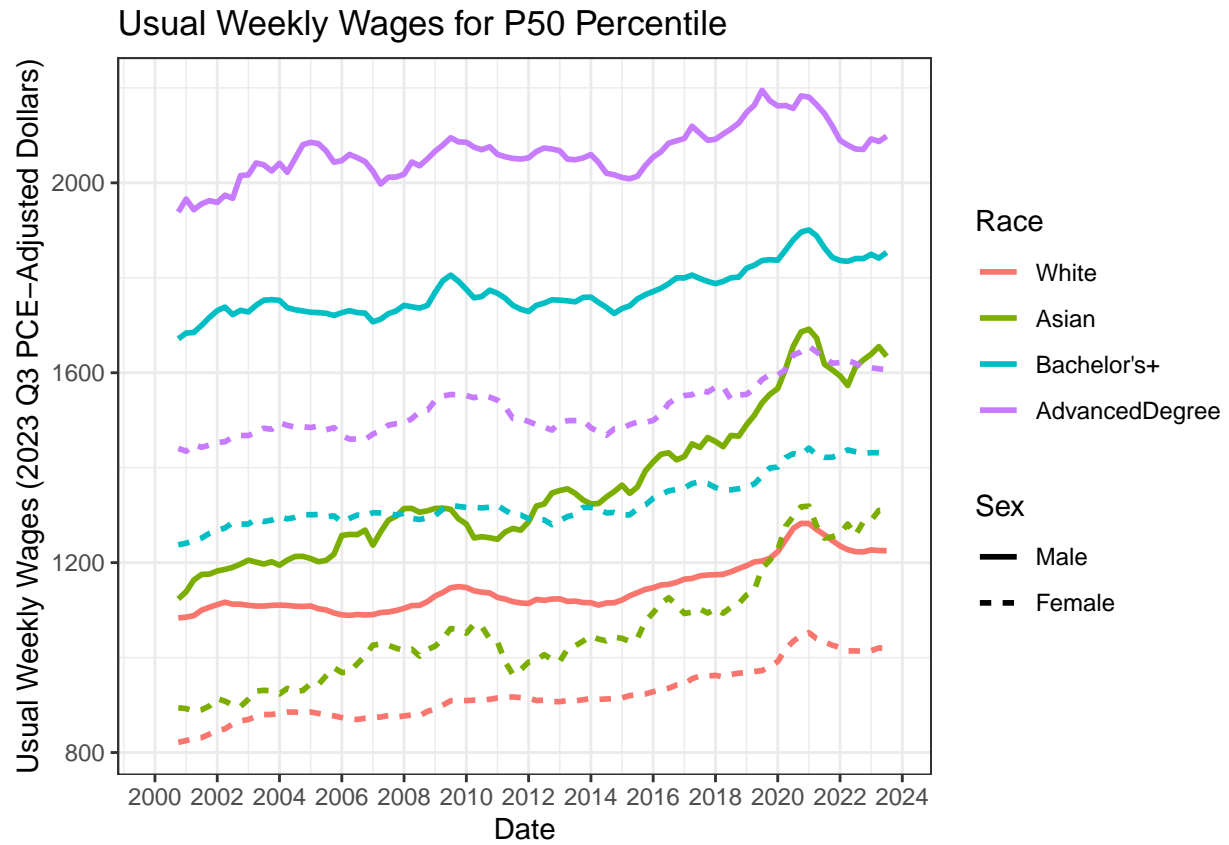




```
##
```

```
## [[3]]
```

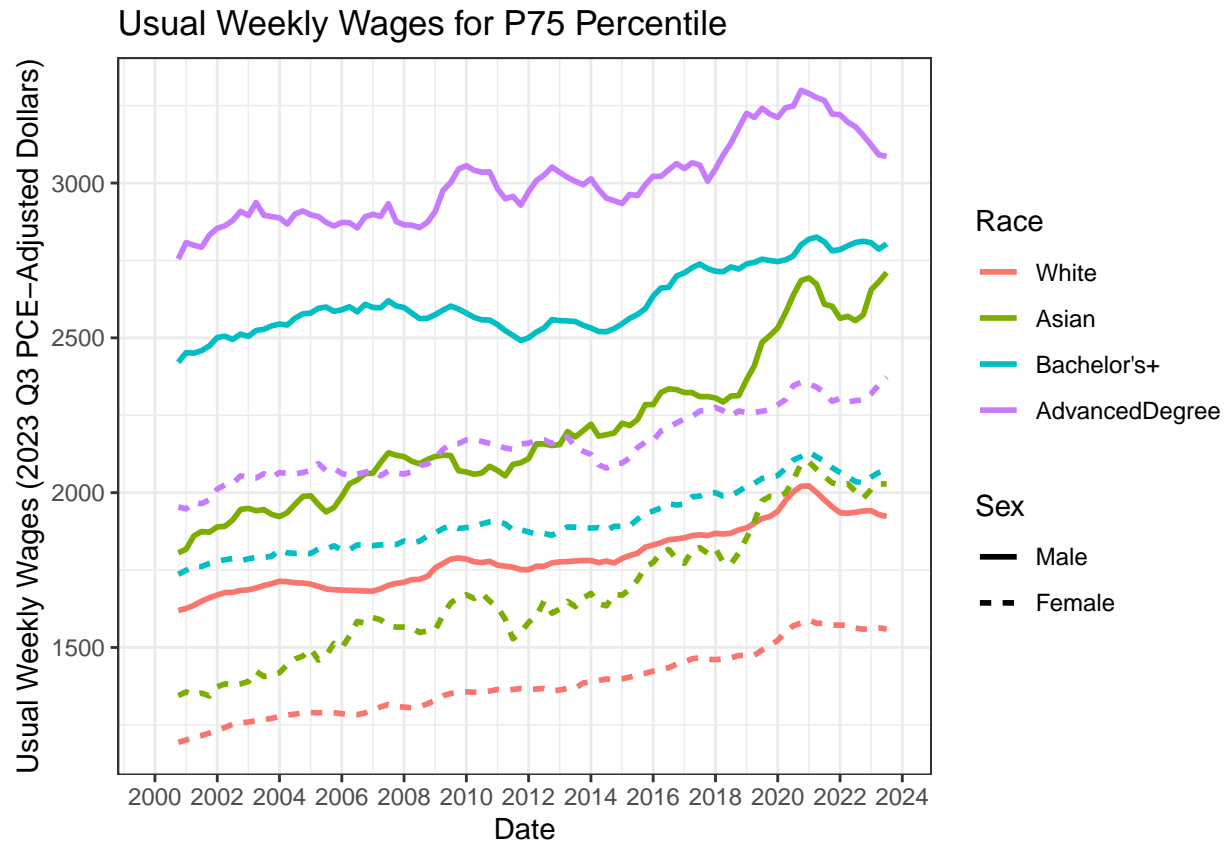
```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```



```
##
```

```
## [[4]]
```

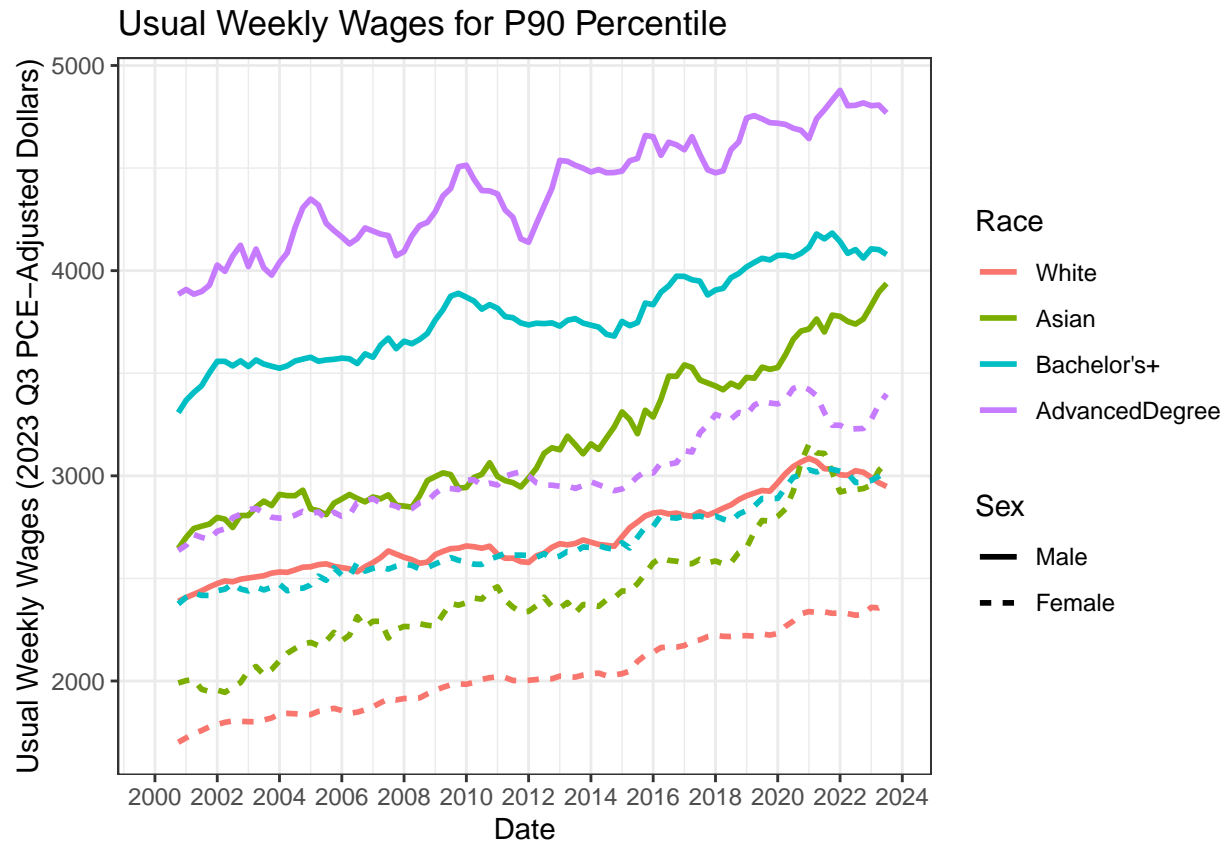
```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```



```
##
```

```
## [[5]]
```

```
## Warning: Removed 32 rows containing missing values ('geom_line()').
```



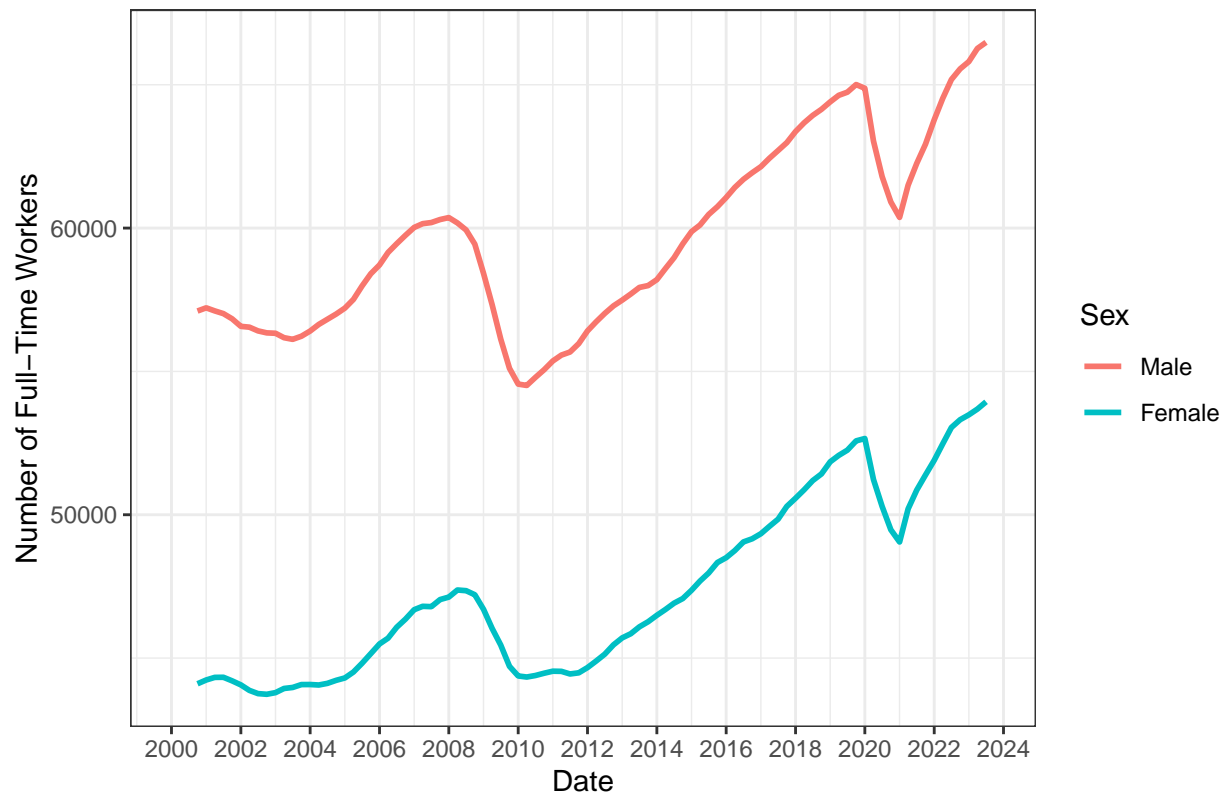
```
okay = unique(data$Race)
plot_count = function(race){
  title = paste0("Number of Full-Time Workers for ", race)
  data %>%
    filter(Sex != "Total" & Type == "Count" & Race == race) %>%
    ggplot(aes(x = Date, y = MovAverage, color = Sex)) +
      geom_line(size = 1) + theme_bw() + scale_x_date(date_breaks = "2 years", date_labels = "%Y") +
      ylab("Number of Full-Time Workers") +
      ggtitle(title)
}
count_plots = lapply(okay, plot_count)
```

```
count_plots
```

```
## [[1]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```

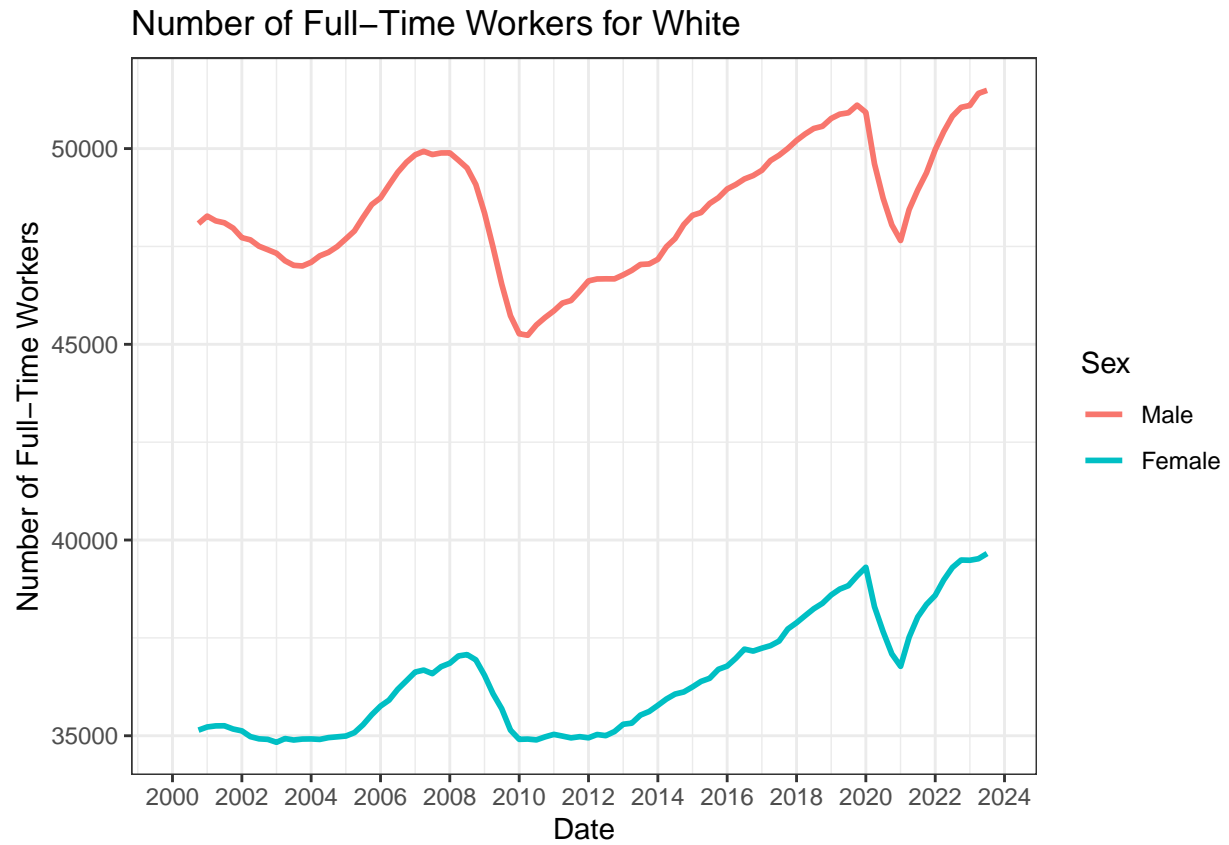
Number of Full-Time Workers for All



```
##
```

```
## [[2]]
```

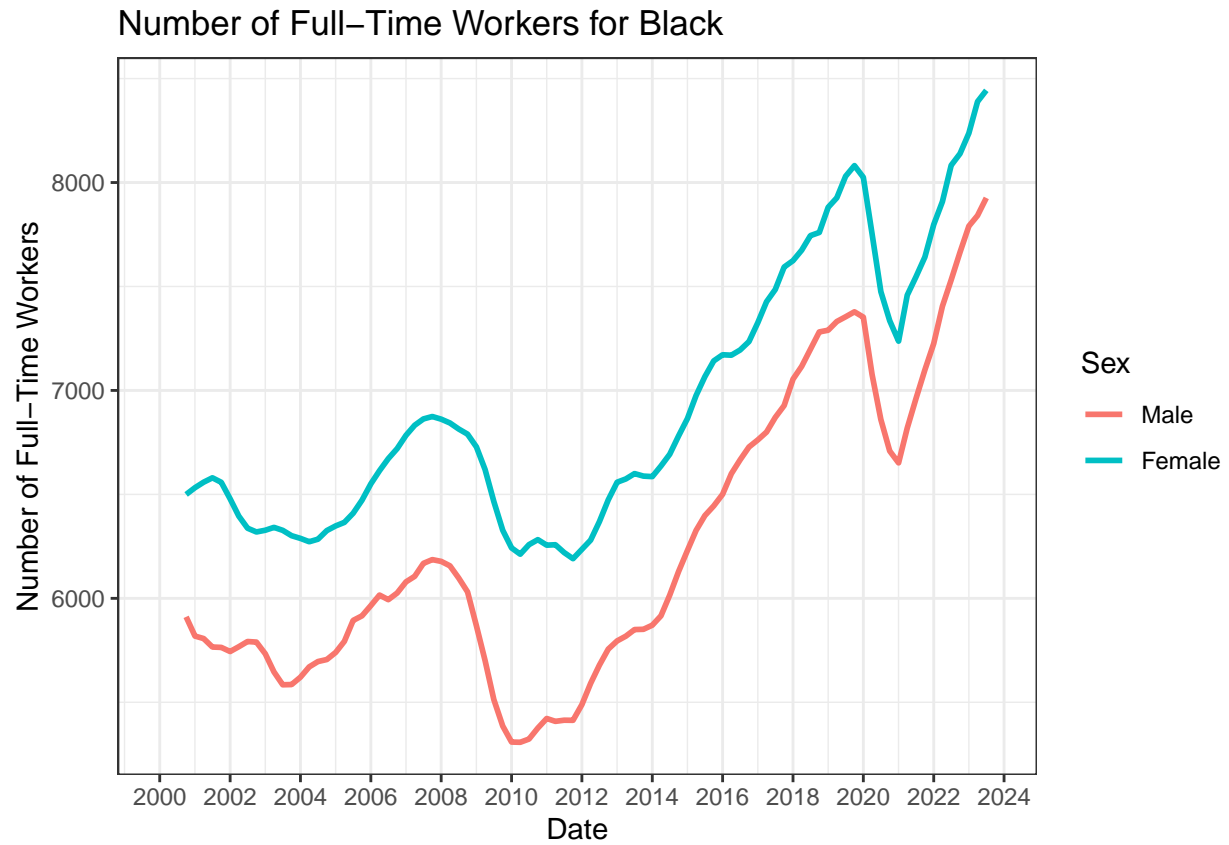
```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```



```
##
```

```
## [[3]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```

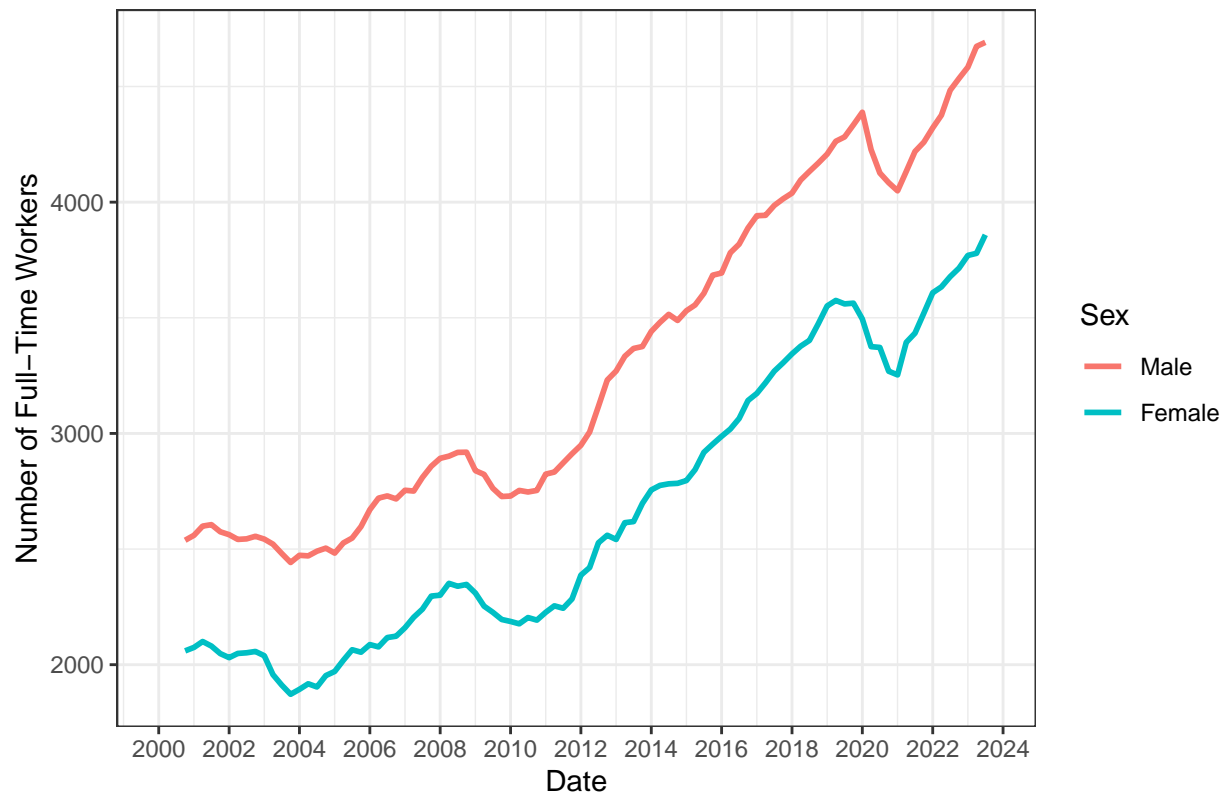


```
##
```

```
## [[4]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```

Number of Full-Time Workers for Asian



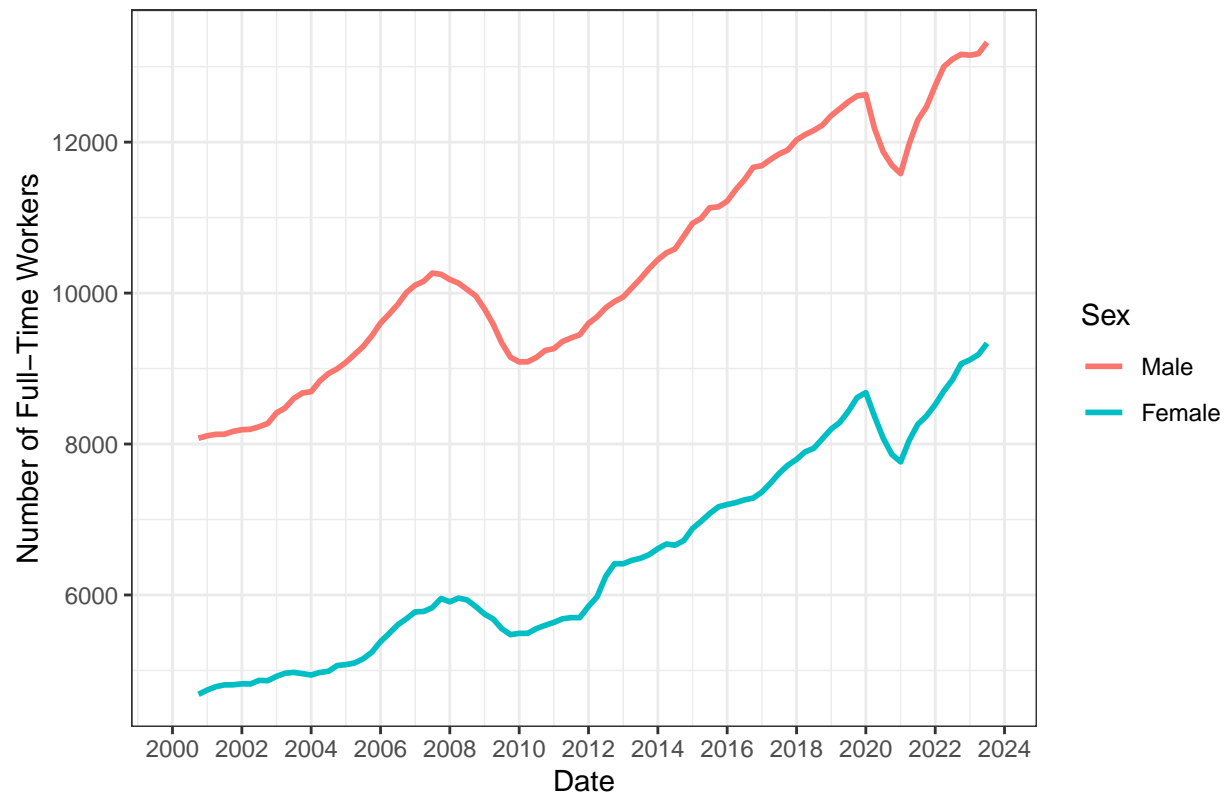
```
##
```

```
## [[5]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```



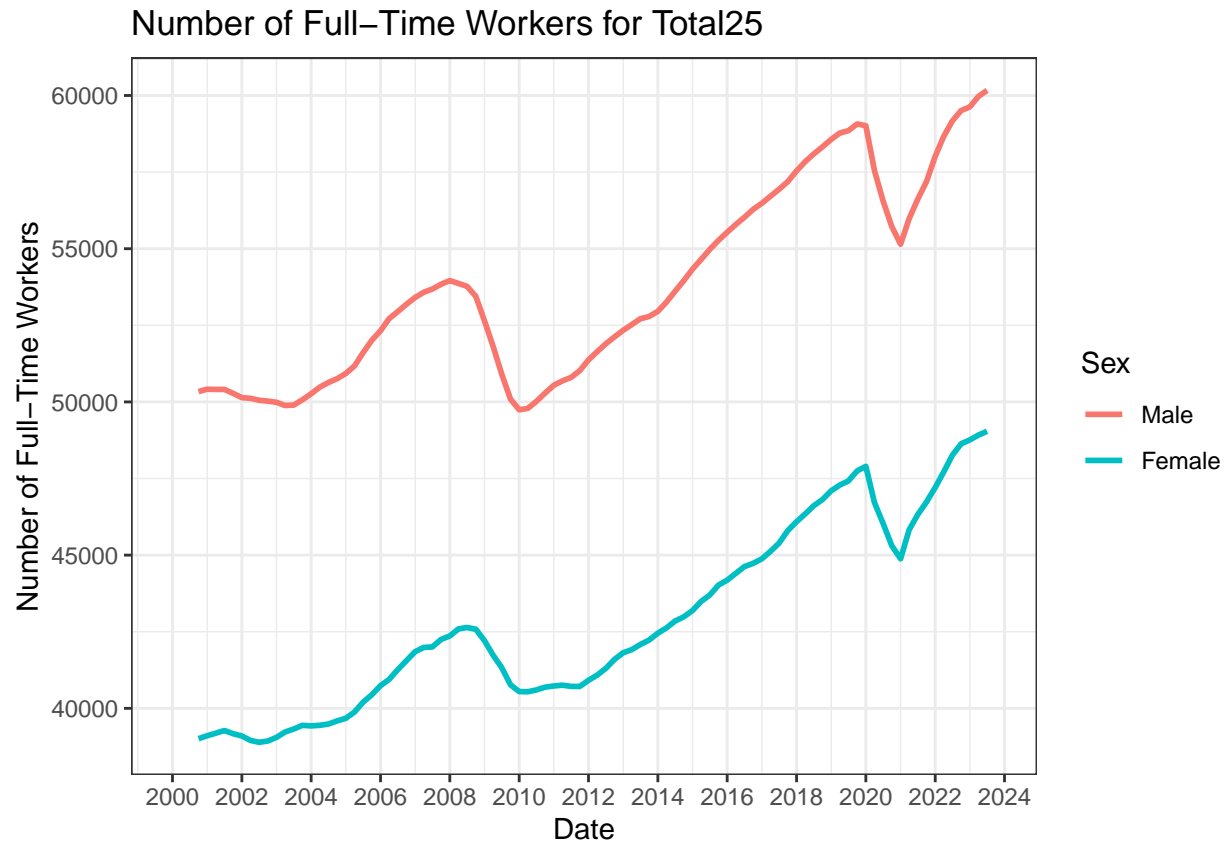
Number of Full-Time Workers for Hispanic



```
##
```

```
## [[6]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```

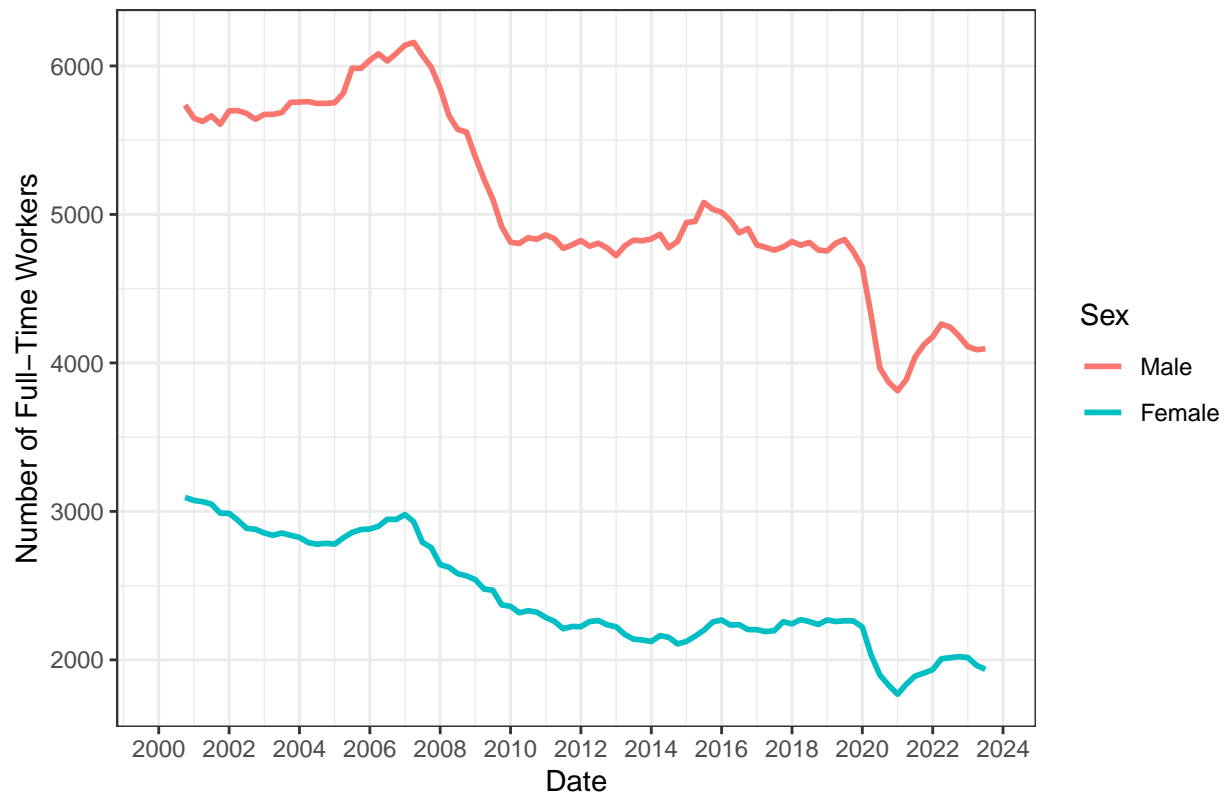


```
##
```

```
## [[7]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```

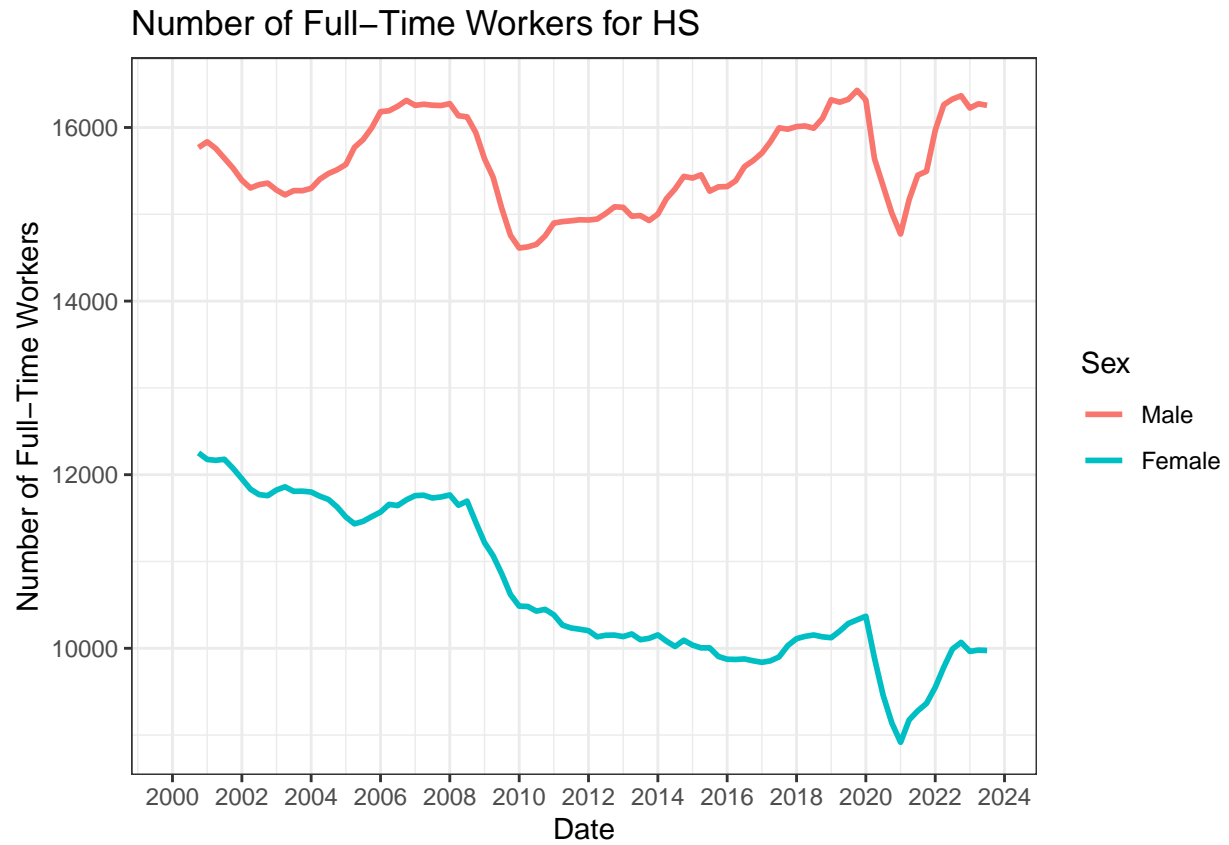
Number of Full-Time Workers for LessThanHS



```
##
```

```
## [[8]]
```

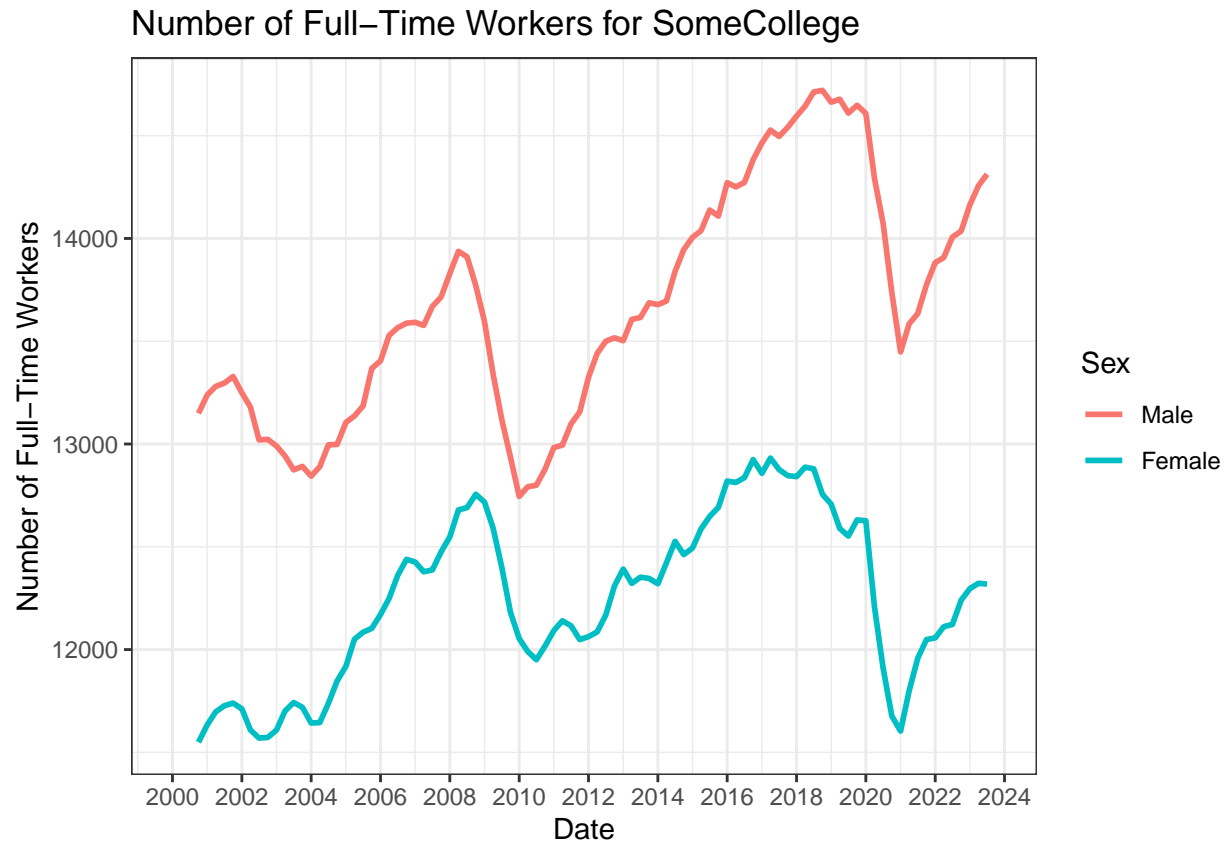
```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```



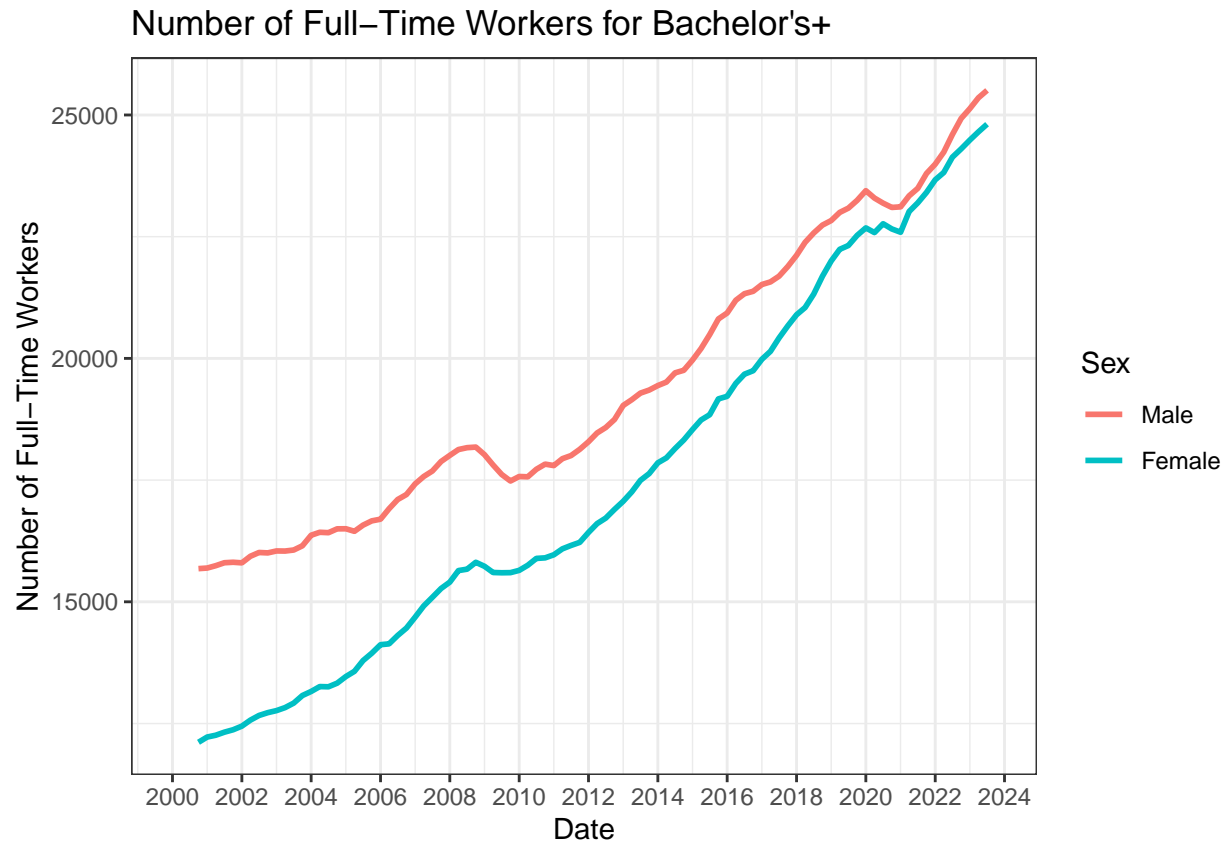
```
##
```

```
## [[9]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```



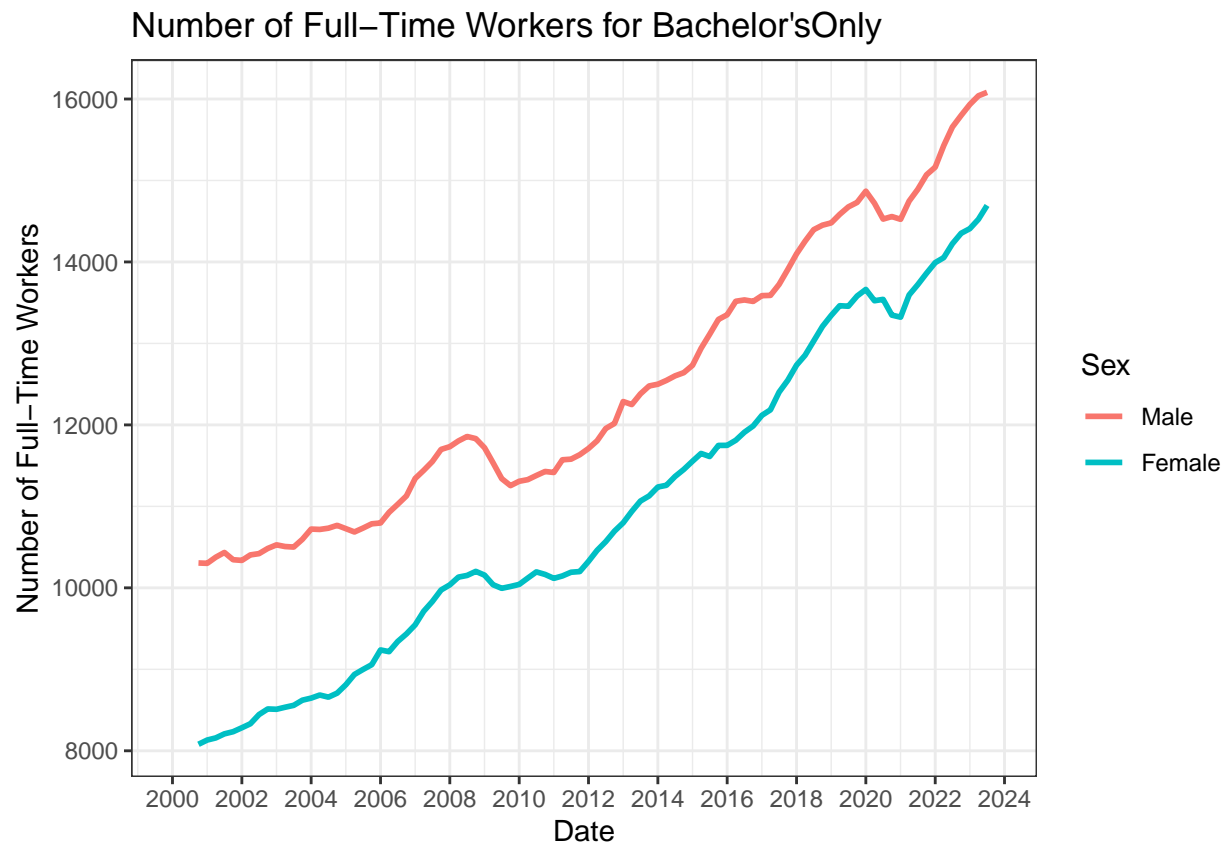
```
##  
## [[10]]  
  
## Warning: Removed 8 rows containing missing values ('geom_line()').
```



```
##
```

```
## [[11]]
```

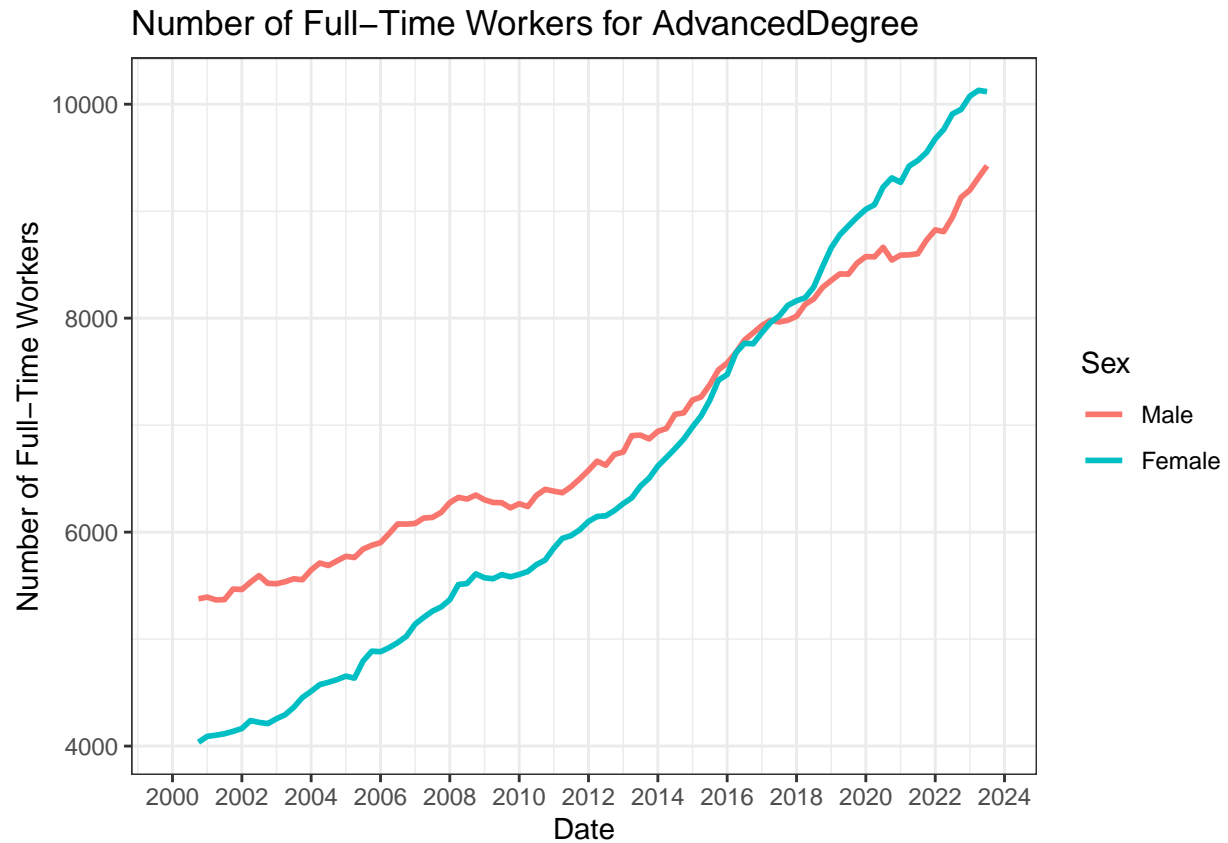
```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```



```
##
```

```
## [[12]]
```

```
## Warning: Removed 8 rows containing missing values ('geom_line()').
```

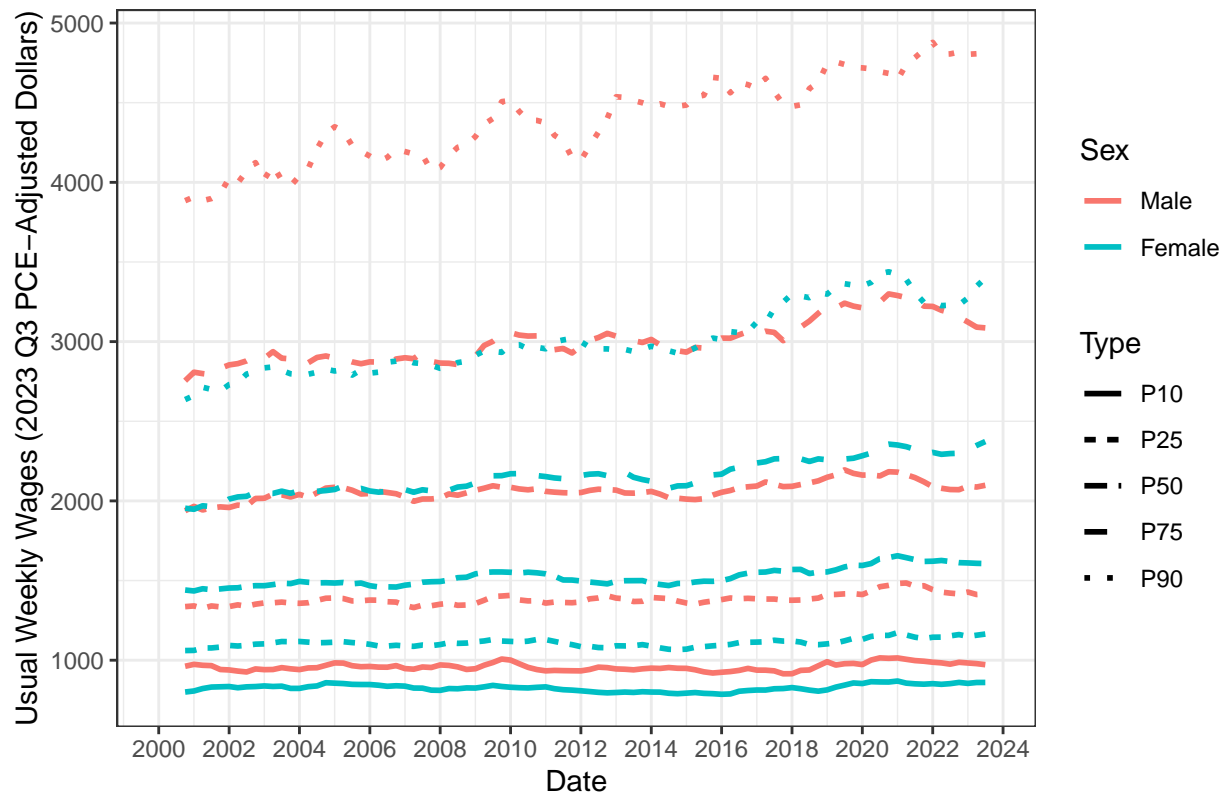


```
data %>%
  filter(Sex != "Total" & Type != "Count" & Race == "AdvancedDegree") %>%
  ggplot(aes(x = Date, y = MovAverage, color = Sex, linetype = Type)) +
    geom_line(size = 1) + theme_bw() + scale_x_date(date_breaks = "2 years", date_labels = "%Y") +
    ylab("Usual Weekly Wages (2023 Q3 PCE-Adjusted Dollars)") +
    ggtitle("Usual Weekly Wages for Workers with an Advanced Degree by Percentile")
```

```
## Warning: Removed 40 rows containing missing values ('geom_line()').
```



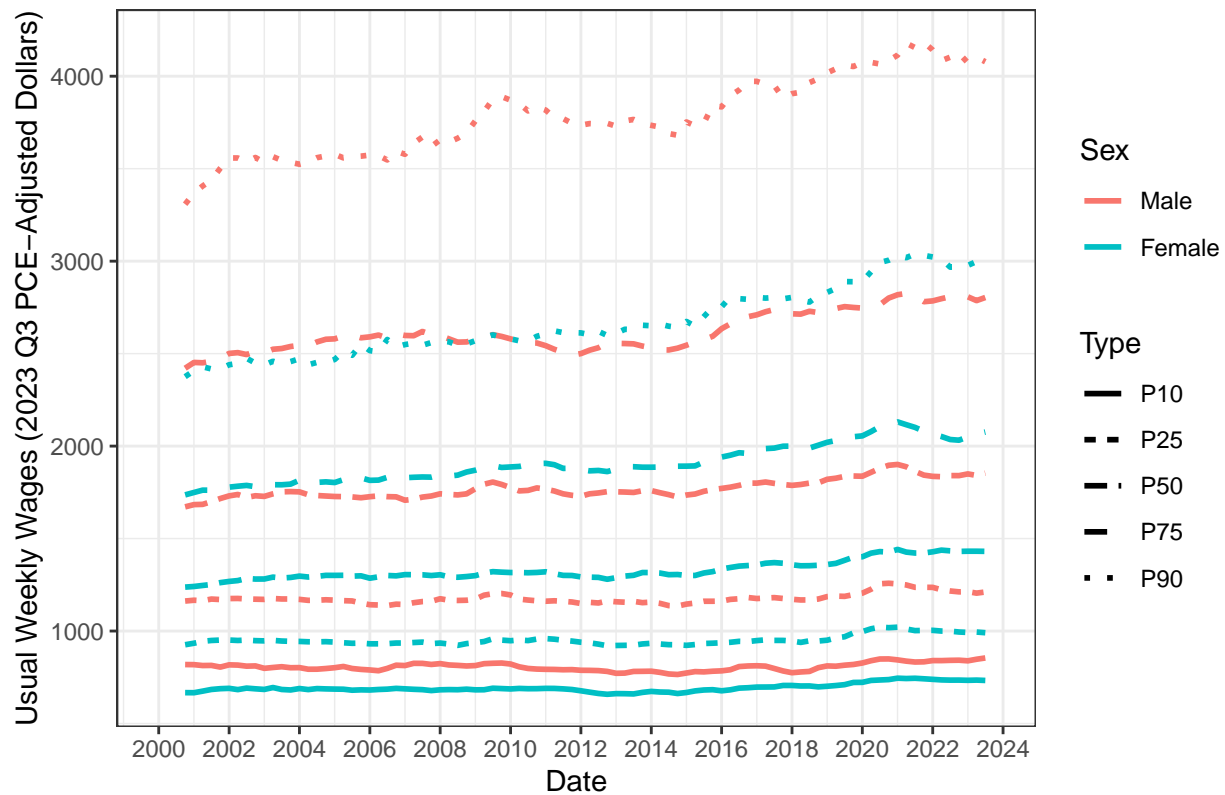
Usual Weekly Wages for Workers with an Advanced Degree by Percentile



```
data %>%
  filter(Sex != "Total" & Type != "Count" & Race == "Bachelor's+") %>%
  ggplot(aes(x = Date, y = MovAverage, color = Sex, linetype = Type)) +
    geom_line(size = 1) + theme_bw() + scale_x_date(date_breaks = "2 years", date_labels = "%Y") +
    ylab("Usual Weekly Wages (2023 Q3 PCE-Adjusted Dollars)") +
    ggtitle("Usual Weekly Wages for Workers with an Bachelor's Degree by Percentile")
```

## Warning: Removed 40 rows containing missing values (‘geom\_line()’).

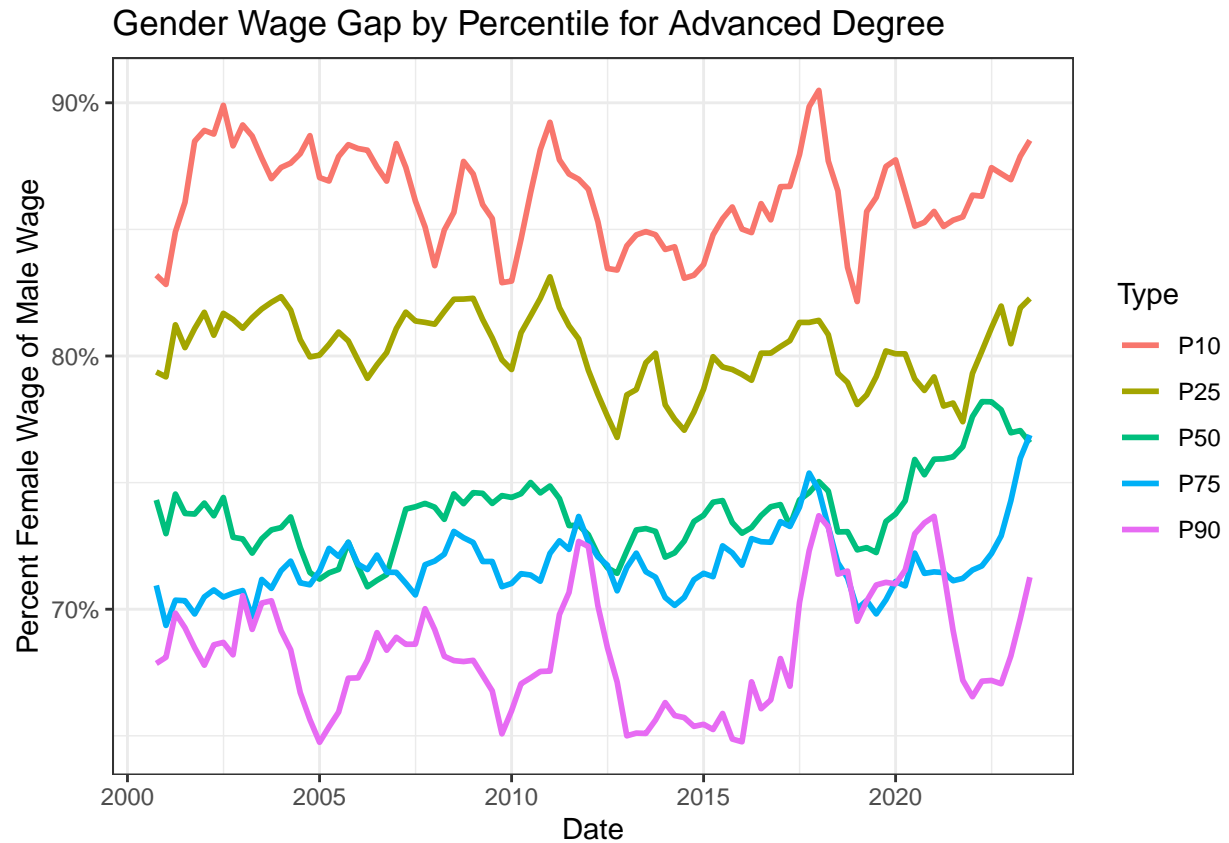
Usual Weekly Wages for Workers with an Bachelor's Degree by Percentile



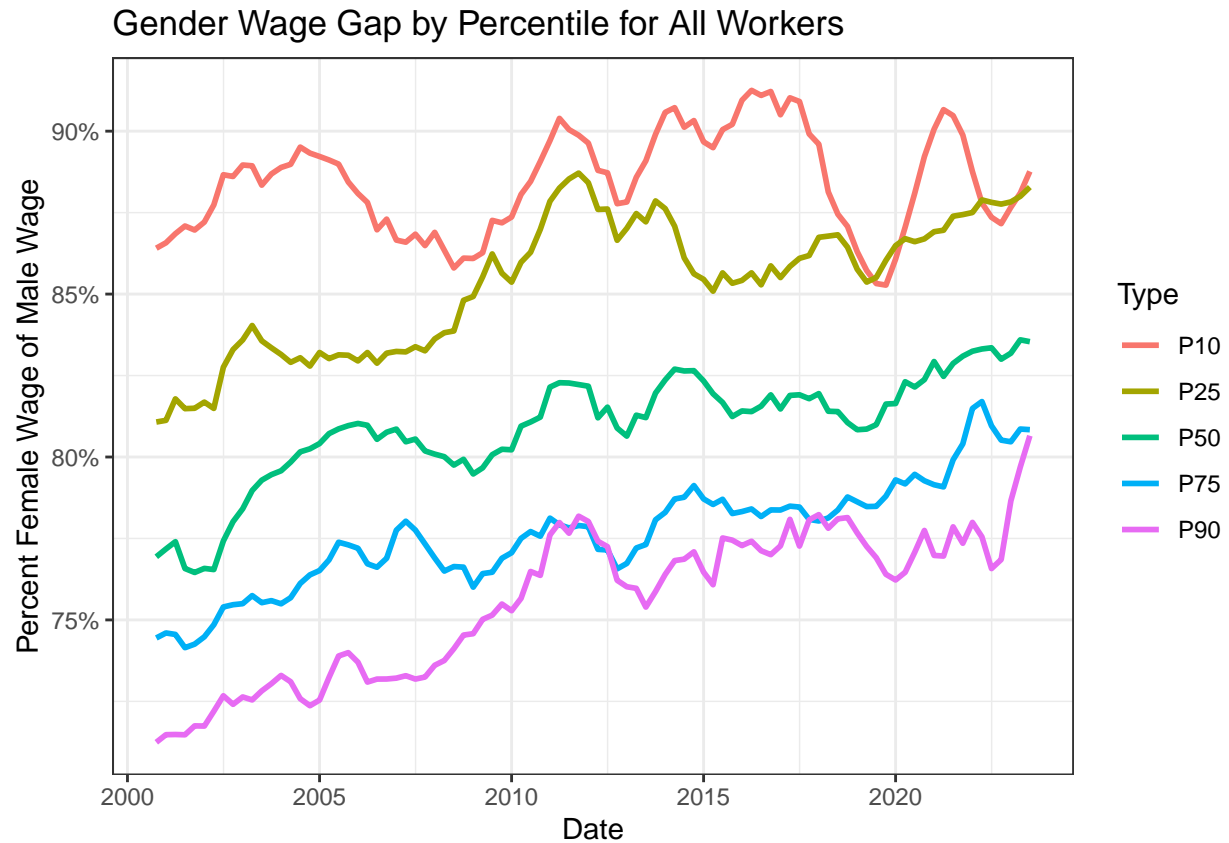
```
relative_to_male = data %>%
  ungroup() %>%
  filter(!is.na(MovAverage)) %>%
  group_by(Type, Race, Date) %>%
  summarize(Female = MovAverage[Sex == "Female"] / MovAverage[Sex == "Male"])
```

## 'summarise()' has grouped output by 'Type', 'Race'. You can override using the  
## '.groups' argument.

```
relative_to_male %>%
  filter(Race == "AdvancedDegree" & Type != "Count") %>%
  ggplot(aes(x = Date, y = Female, color = Type)) +
  geom_line(size = 1) + theme_bw() + scale_y_continuous(labels = scales::label_percent()) +
  ylab("Percent Female Wage of Male Wage") +
  ggtitle("Gender Wage Gap by Percentile for Advanced Degree")
```

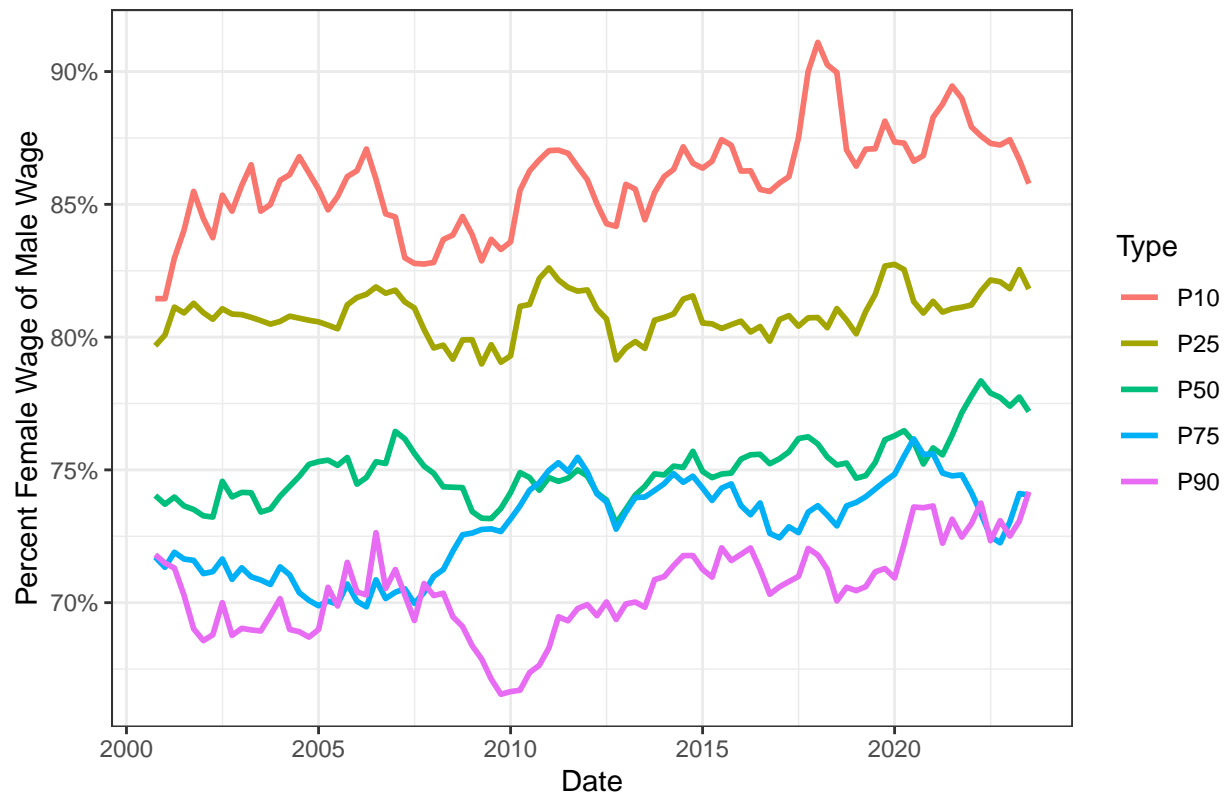


```
relative_to_male %>%
  filter(Race == "All" & Type != "Count") %>%
  ggplot(aes(x = Date, y = Female, color = Type)) +
    geom_line(size = 1) + theme_bw() + scale_y_continuous(labels = scales::label_percent()) +
    ylab("Percent Female Wage of Male Wage") +
    ggtitle("Gender Wage Gap by Percentile for All Workers")
```



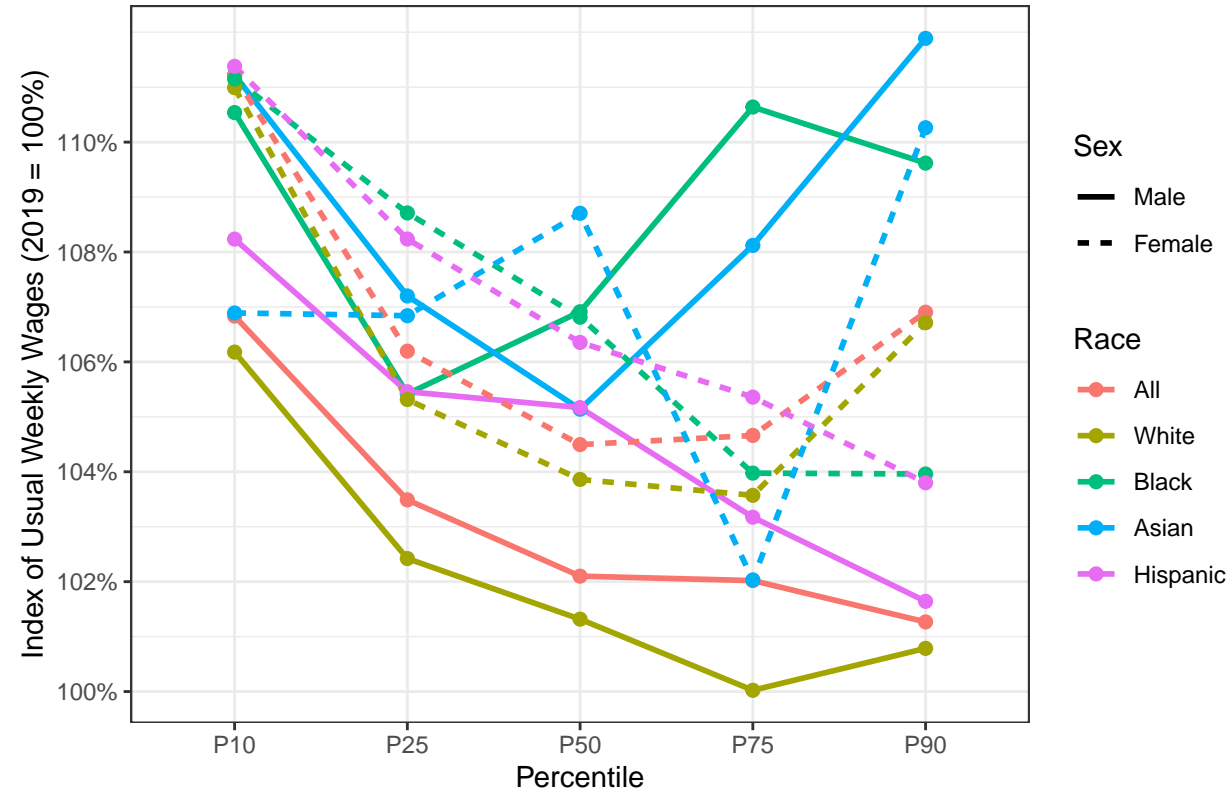
```
relative_to_male %>%
  filter(Race == "Bachelor's+" & Type != "Count") %>%
  ggplot(aes(x = Date, y = Female, color = Type)) +
    geom_line(size = 1) + theme_bw() + scale_y_continuous(labels = scales::label_percent()) +
    ylab("Percent Female Wage of Male Wage") +
    ggtitle("Gender Wage Gap by Percentile for Bachelor's Degree+")
```

Gender Wage Gap by Percentile for Bachelor's Degree+



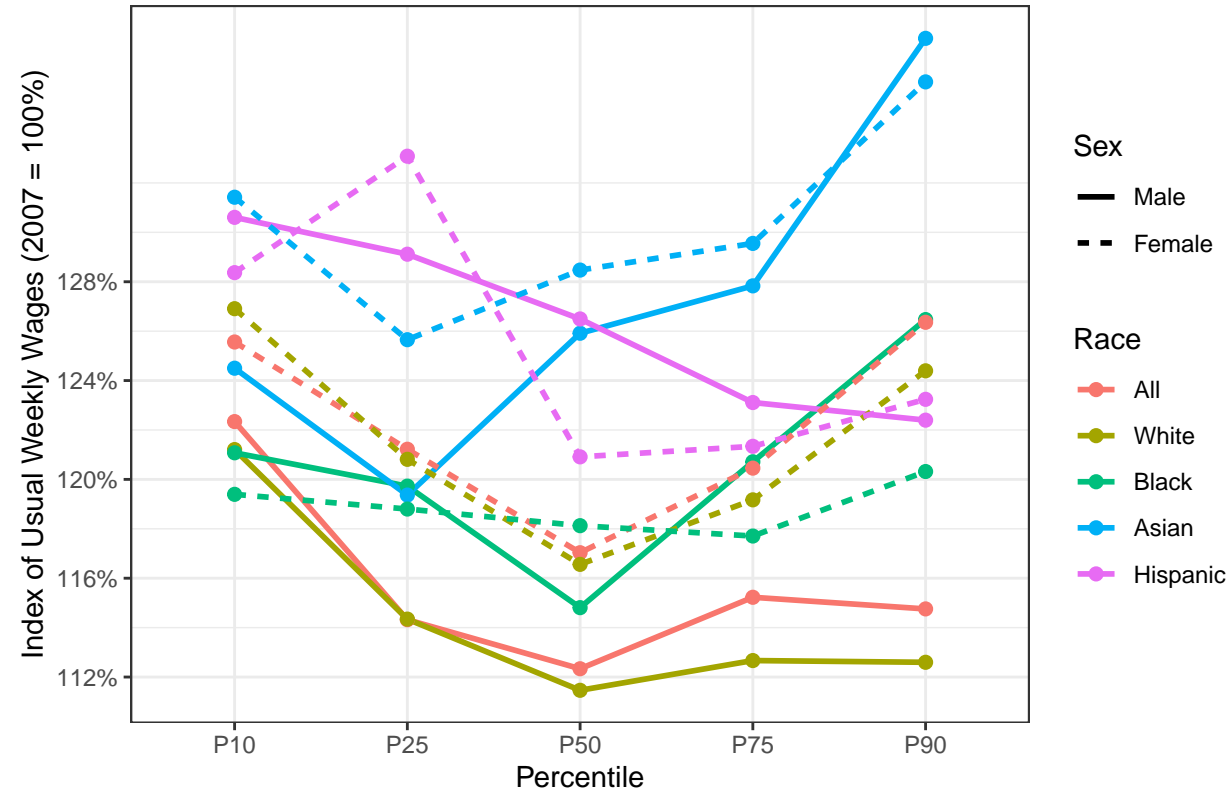
growth

Real Wages (2022 Q4–2023 Q3) as a Percent of 2019 by Race and Sex



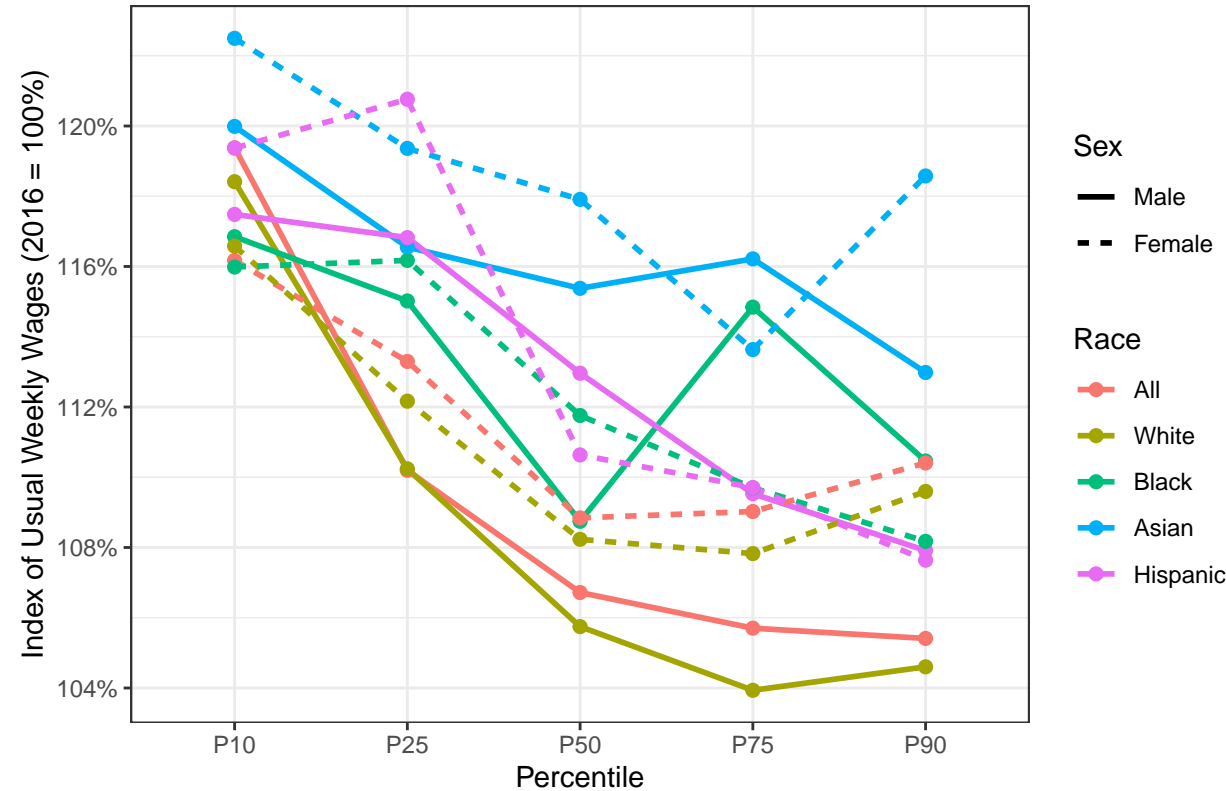
growth2

Real Wages (2022 Q4–2023 Q3) as a Percent of 2007 by Race and Sex



growth3

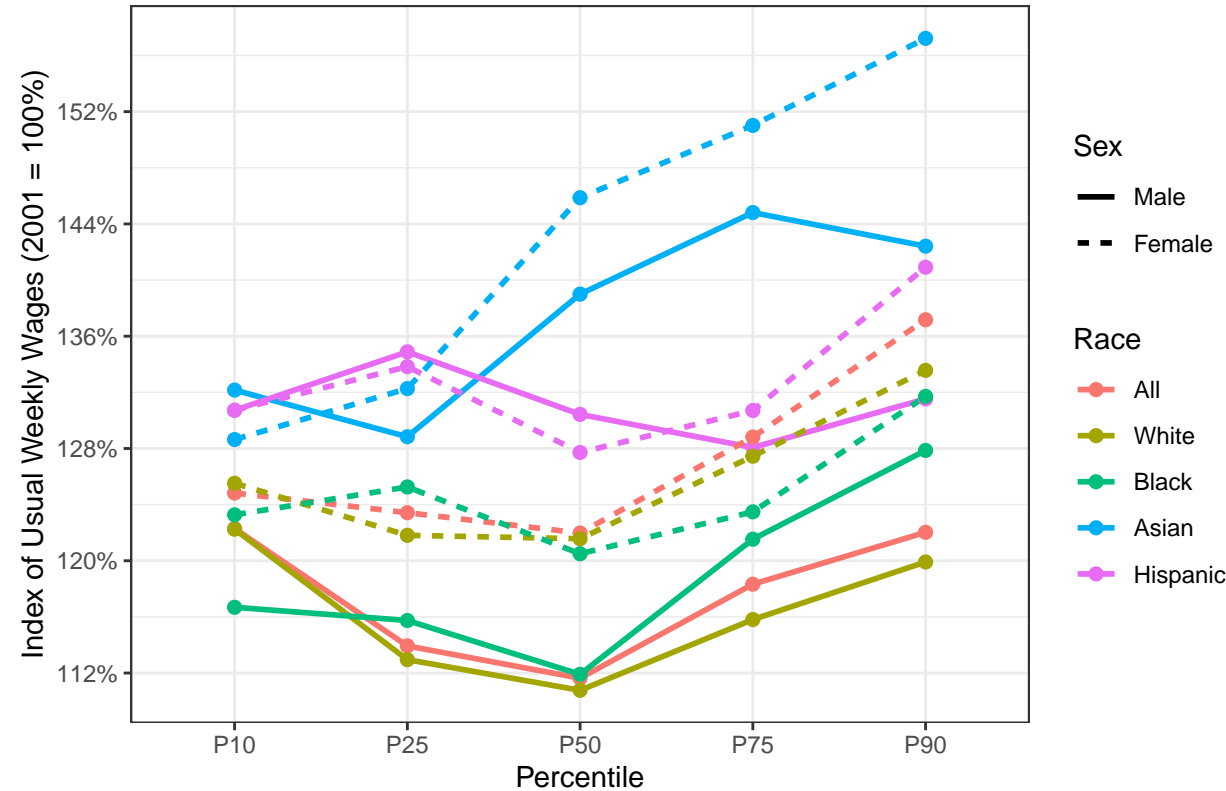
Real Wages (2022 Q4–2023 Q3) as a Percent of 2016 by Race and Sex



growth4

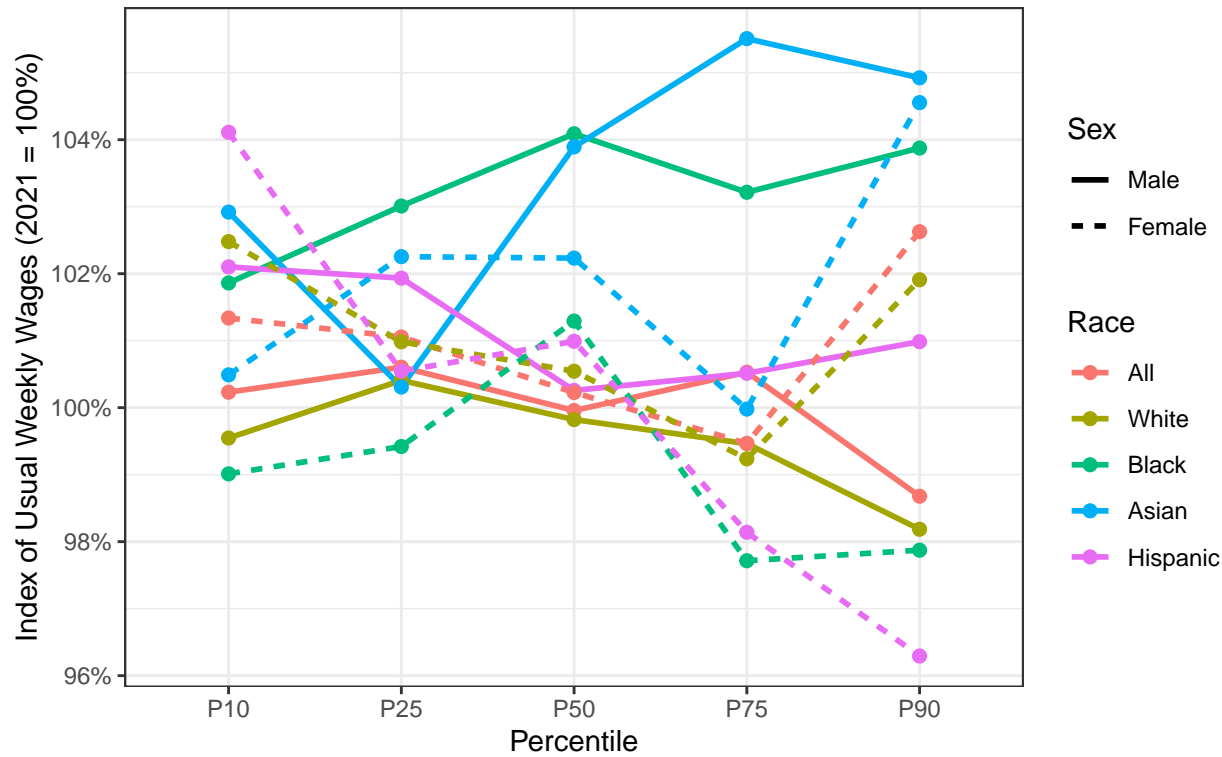


Real Wages (2022 Q4–2023 Q3) as a Percent of 2001 by Race and Sex



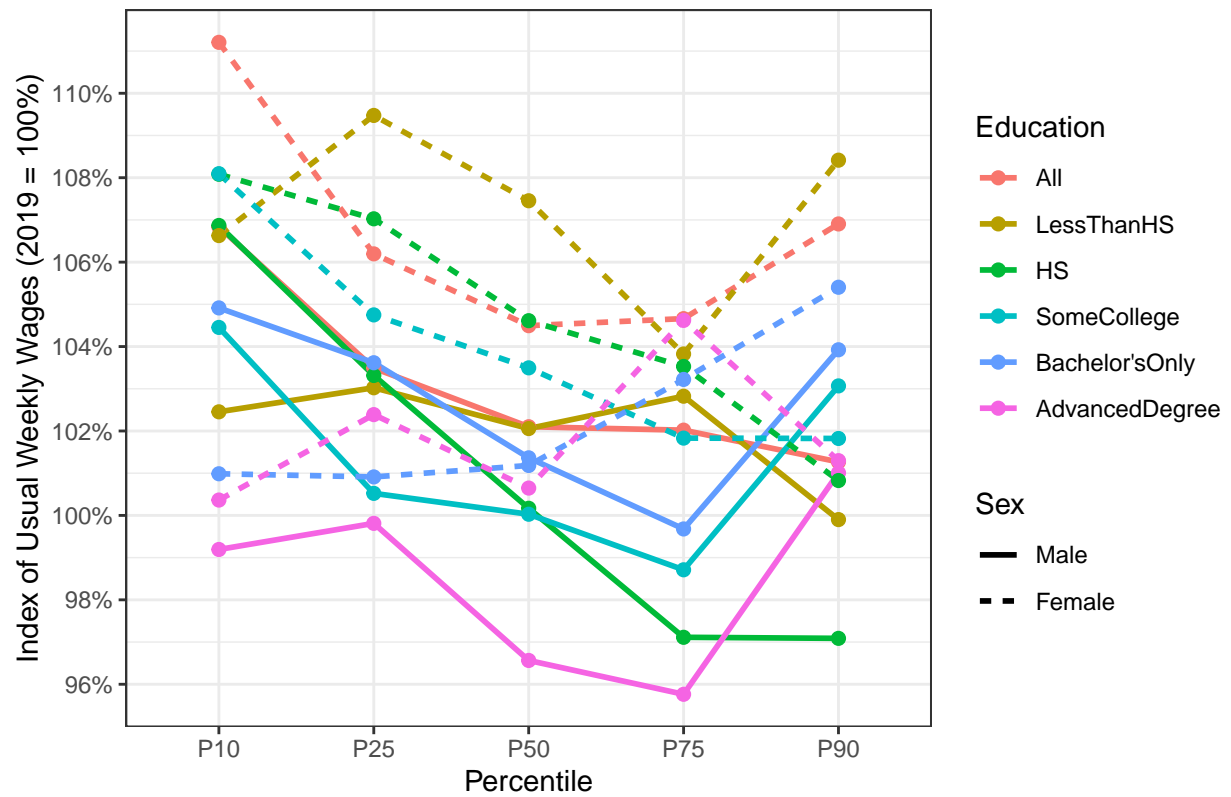
growth5

Real Wages (2022 Q4–2023 Q3) as a Percent of 2021 Q3–2022 Q2  
by Race and Sex



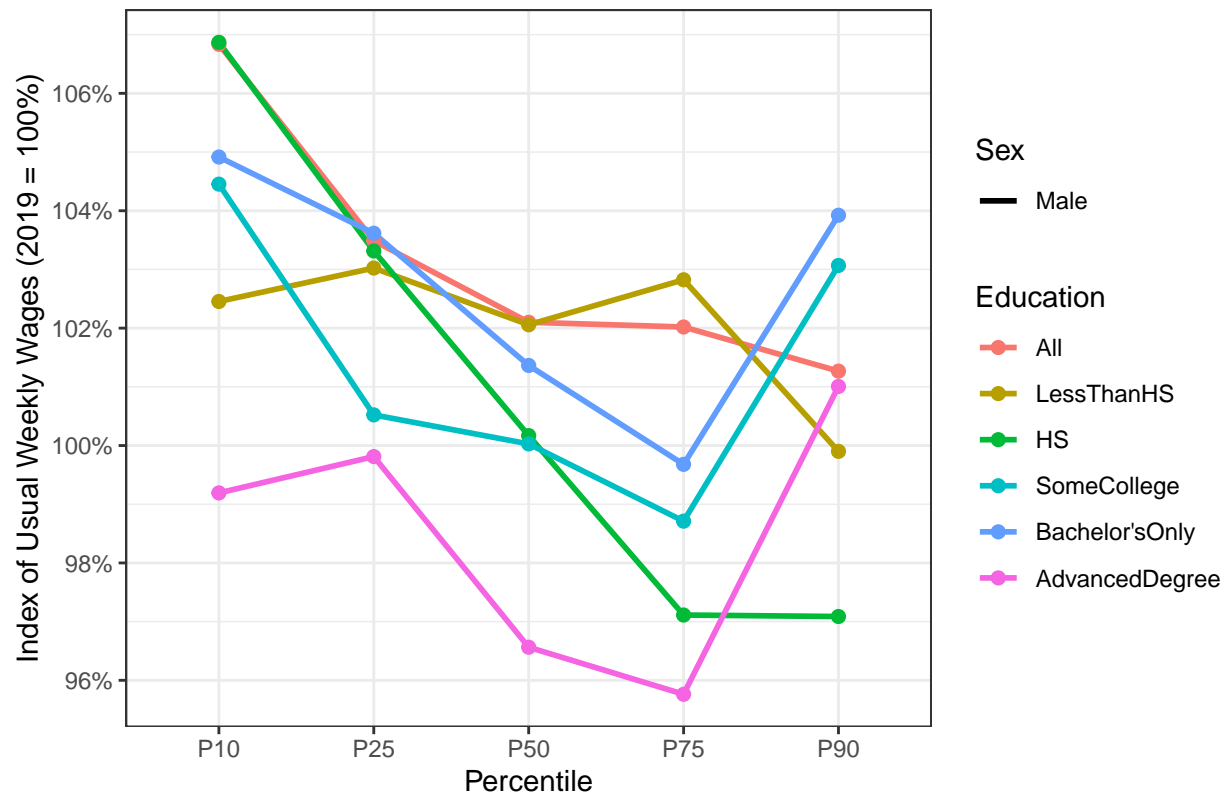
growth\_education

Real Wages (2022 Q4–2023 Q3) Percent of 2019 by Education and Sex



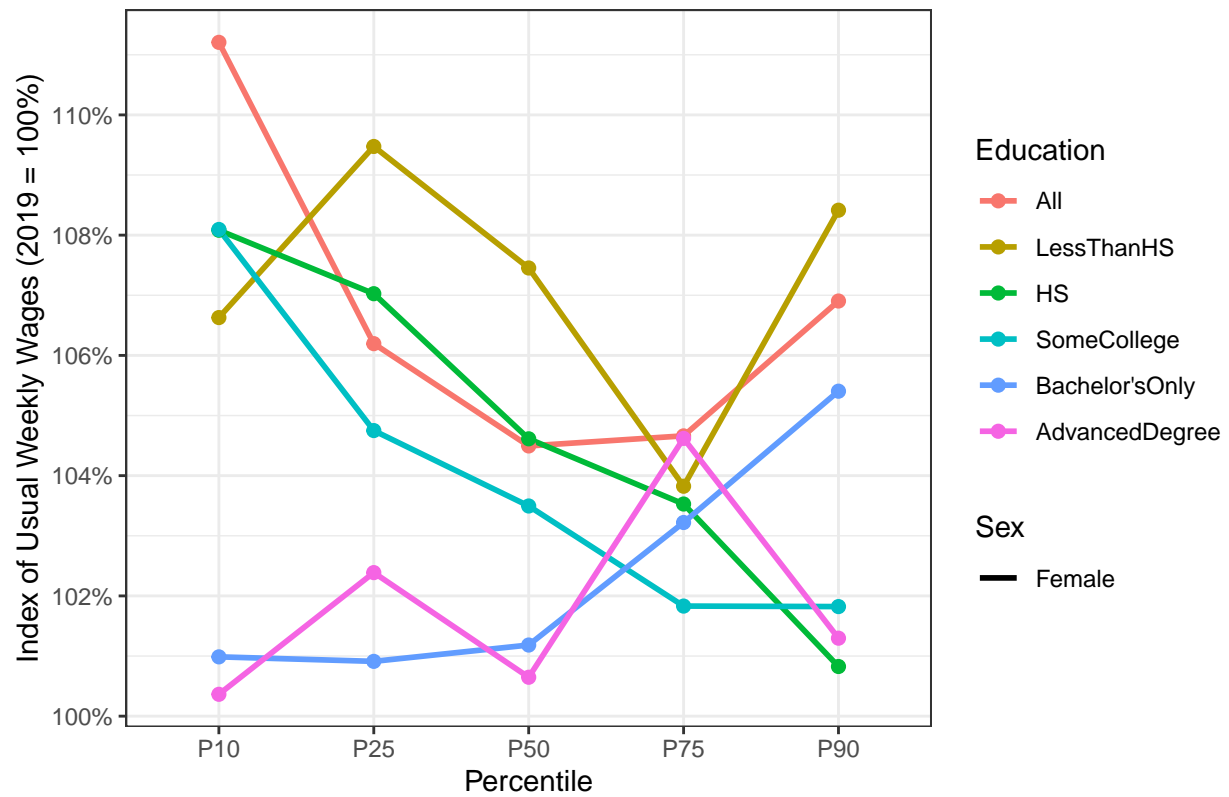
growth\_education\_men

Real Wages (2022 Q4–2023 Q3) % of 2019 by Education for Men



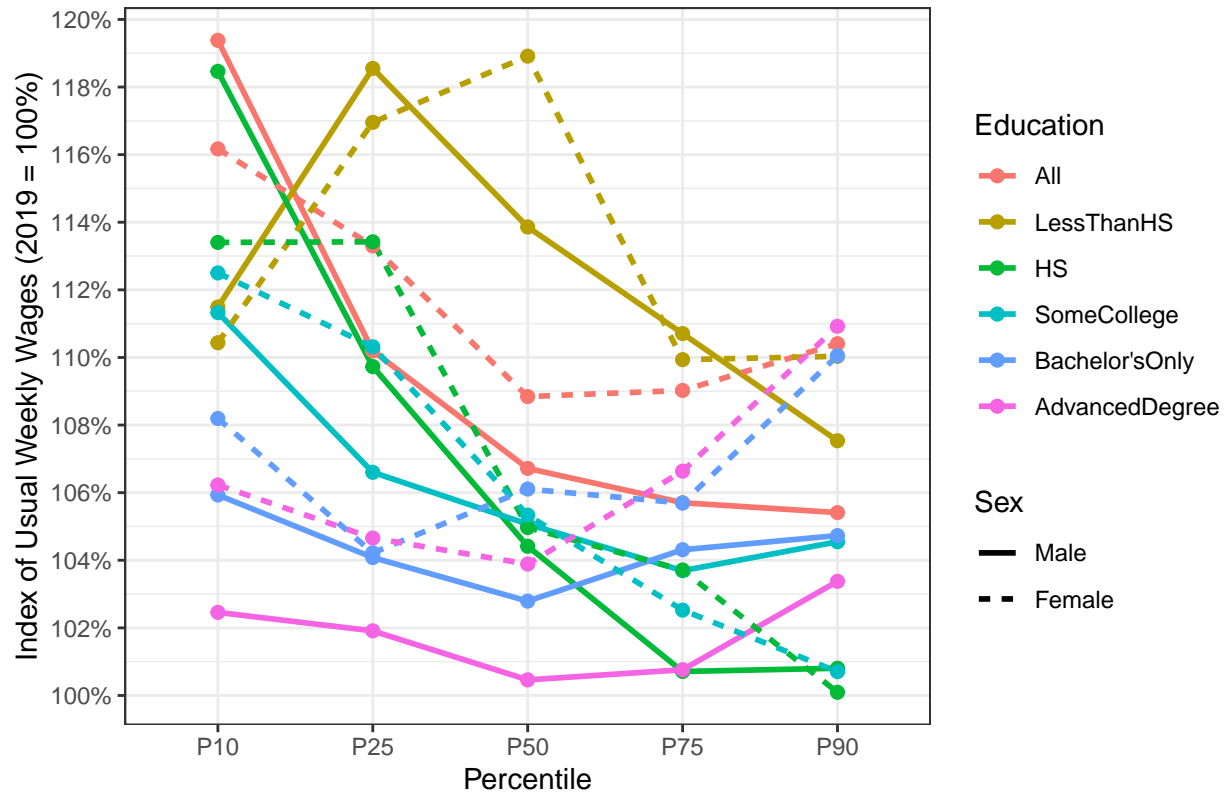
growth\_education\_women

Real Wages (2022 Q4–2023 Q3) % of 2019 by Education for Women



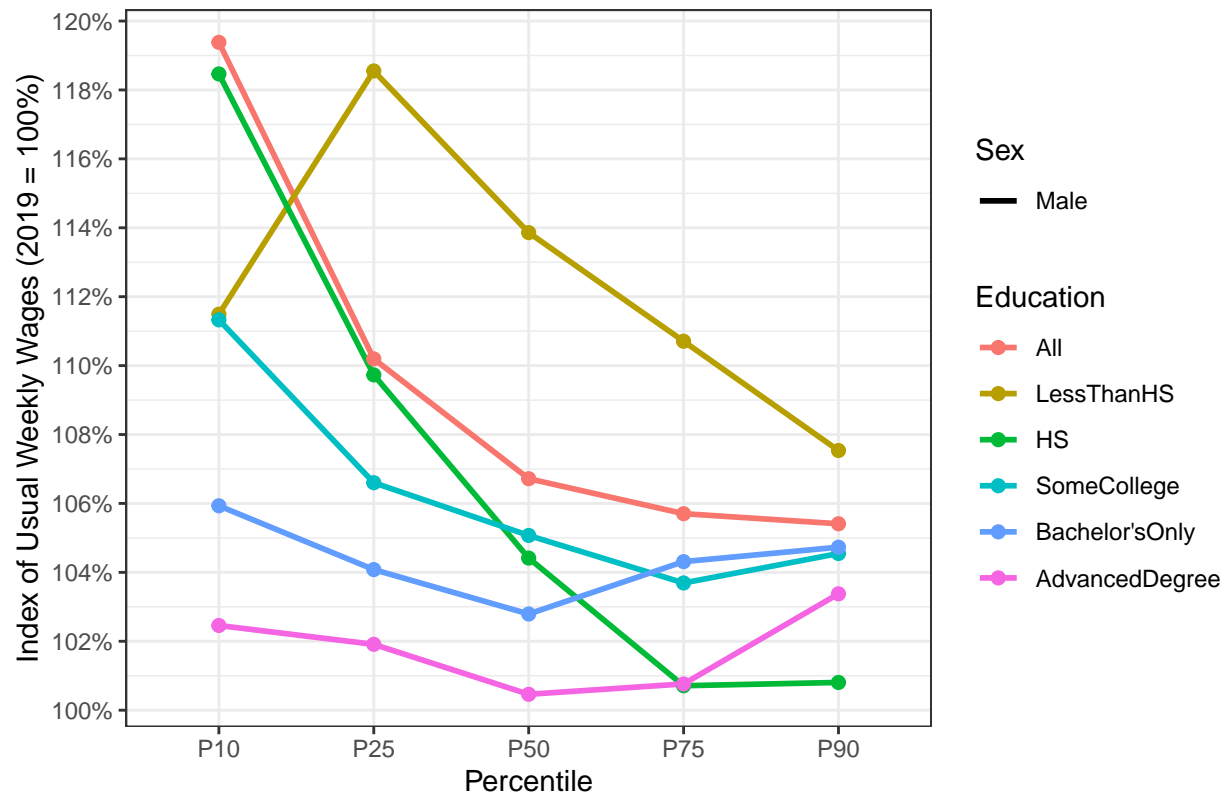
growth\_education3

Real Wages (2022 Q4–2023 Q3) Percent of 2016 by Education and Sex



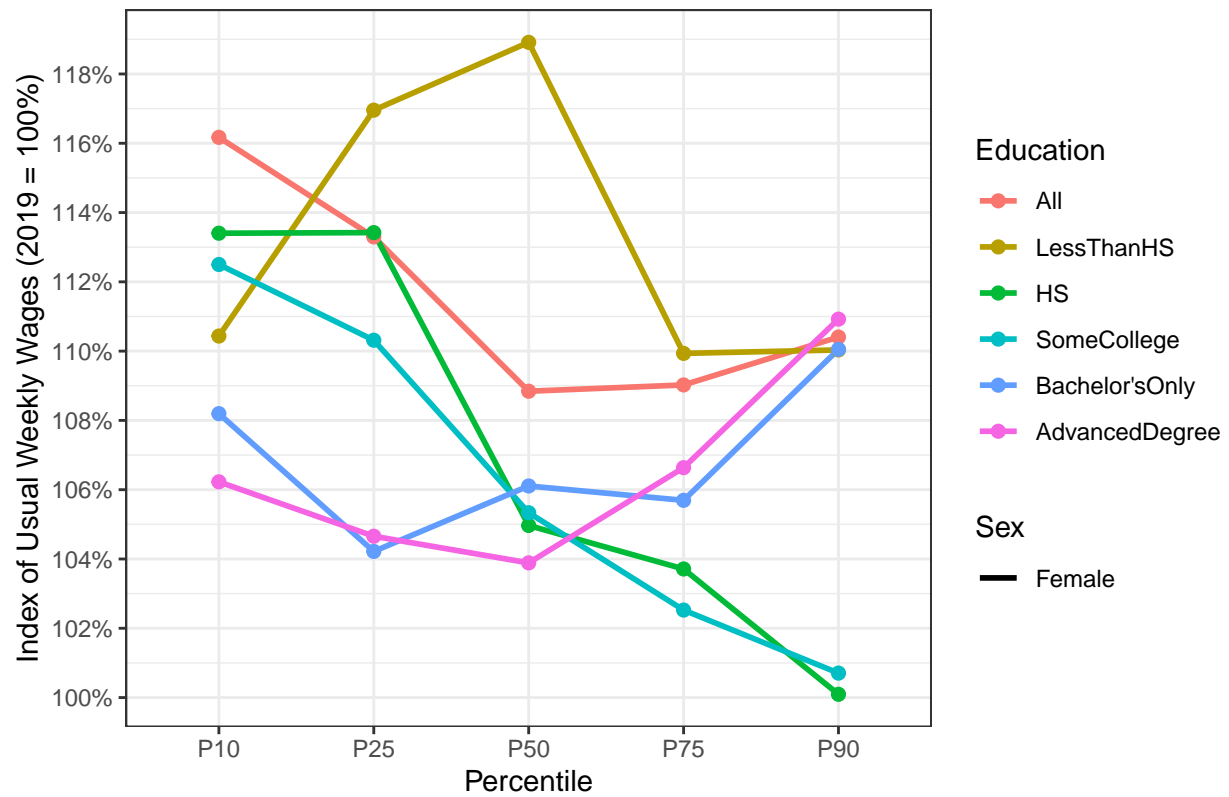
growth\_education3\_men

Real Wages (2022 Q4–2023 Q3) % of 2016 by Education for Men



growth\_education3\_women

Real Wages (2022 Q4–2023 Q3) % of 2016 by Education for Women



growth\_education5



Real Wages (2022 Q4–2023 Q3) as a Percent of 2021 Q3–2022 Q2  
by Education and Sex

