Phoenix_housing_data_cleaning

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R Markdown

```
# load data

# demographic data
sex_by_age <- read_csv("phoenix-az-sex-by-age.csv", show_col_types = FALSE)
sex_by_edu <- read_csv("phoenix-az-sex-by-educational-attainment-for-the-population-25-years-and-over.cs

# housing data
tenure <- read_csv("phoenix-az-tenure.csv", show_col_types = FALSE)
occupancy_status <- read_csv("phoenix-az-occupancy-status.csv", show_col_types = FALSE)

# economic data
poverty_status <- read_csv("phoenix-az-poverty-status.csv", show_col_types = FALSE)
median_gross_rent <- read_csv("phoenix-az-median-gross-rent.csv", show_col_types = FALSE)
median_income <- read_csv("phoenix-az-median-household-income.csv", show_col_types = FALSE)
```

Data Cleaning:

- The `poverty_status` table contains many unnecessary columns
  - only include information for male/female age 18+
  - split information for male and female
  - rename columns for easy view

```
poverty_status_male <- subset(poverty_status, select=c("geoid",
                                                       "year",
                                                       "Income at or above poverty level - Male",
                                                      "Income below poverty level - Male",
                                                      "Income at or above poverty level - Male - 18 to 1
                                                      "Income at or above poverty level - Male - 25 to 3
                                                      "Income at or above poverty level - Male - 35 to 4
                                                      "Income at or above poverty level - Male - 45 to 5
                                                      "Income at or above poverty level - Male - 55 to 6
                                                      "Income at or above poverty level - Male - 75 yea
                                                      "Income below poverty level - Male - 18 to 24 yea
                                                      "Income below poverty level - Male - 25 to 34 yea
                                                      "Income below poverty level - Male - 35 to 44 yea
                                                      "Income below poverty level - Male - 45 to 54 yea
```

```
                                                    "Income below poverty level - Male - 55 to 64 yea
                                                    "Income below poverty level - Male - 75 years and
names(poverty_status_male) <- c("geoid",
                                "year",
                                "male_income_above_total",
                                "male_income_below_total",
                                "male_income_above_18_24",
                                "male_income_above_25_34",
                                "male_income_above_35_44",
                                "male_income_above_45_54",
                                "male_income_above_55_64",
                                "male_income_above_75_and_above",
                                "male_income_below_18_24",
                                "male_income_below_25_34",
                                "male_income_below_35_44",
                                "male_income_below_45_54",
                                "male_income_below_55_64",
                                "male_income_below_75_and_above")

poverty_status_female <- subset(poverty_status, select=c("geoid",
                                                         "year",
                                                         "Income at or above poverty level - Female",
                                                        "Income below poverty level - Female",
                                                        "Income at or above poverty level - Female - 18 to
                                                        "Income at or above poverty level - Female - 25 to
                                                        "Income at or above poverty level - Female - 35 to
                                                        "Income at or above poverty level - Female - 45 to
                                                        "Income at or above poverty level - Female - 55 to
                                                        "Income at or above poverty level - Female - 75 ye
                                                        "Income below poverty level - Female - 18 to 24 ye
                                                        "Income below poverty level - Female - 25 to 34 ye
                                                        "Income below poverty level - Female - 35 to 44 ye
                                                        "Income below poverty level - Female - 45 to 54 ye
                                                        "Income below poverty level - Female - 55 to 64 ye
                                                        "Income below poverty level - Female - 75 years an
names(poverty_status_female) <- c("geoid",
                                "year",
                                "female_income_above_total",
                                "female_income_below_total",
                                "female_income_above_18_24",
                                "female_income_above_25_34",
                                "female_income_above_35_44",
                                "female_income_above_45_54",
                                "female_income_above_55_64",
                                "female_income_above_75_and_above",
                                "female_income_below_18_24",
                                "female_income_below_25_34",
                                "female_income_below_35_44",
                                "female_income_below_45_54",
                                "female_income_below_55_64",
                                "female_income_below_75_and_above")
poverty_status_male[1:3,2:6]
```

```
## # A tibble: 3 x 5
##    year male_income_above~ male_income_belo~ male_income_abov~ male_income_abov~
##   <dbl>              <dbl>             <dbl>             <dbl>             <dbl>
## 1  2008             636294            136103             59832            114681
## 2  2009             648683            163961             57172            125406
## 3  2010             560991            157292             54666             93651
```

- The `sex_by_age` table contains unnecessary columns as well
  - add people, 17 and below, into one column `sex_17_and_below`
  - group people by age brackets similar to `poverty_status` (e.g., 18-24, 25-34, 45-54)
  - split information by sex

```
sex_by_age_temp <- sex_by_age
names(sex_by_age_temp) <- str_replace_all(names(sex_by_age_temp), c(" " = "_")) # replace spaces with u

# re-categorizing age brackets
sex_by_age_temp$male_17_and_below <- (sex_by_age_temp$Male_Under_5_years + sex_by_age_temp$Male_5_to_9_y
                                      + sex_by_age_temp$Male_10_to_14_years + sex_by_age_temp$Male_15_to_1
sex_by_age_temp$male_18_24 <- (sex_by_age_temp$Male_18_and_19_years + sex_by_age_temp$Male_20_years
                               + sex_by_age_temp$Male_21_years + sex_by_age_temp$Male_22_to_24_years)
sex_by_age_temp$male_25_34 <- (sex_by_age_temp$Male_25_to_29_years + sex_by_age_temp$Male_30_to_34_years
sex_by_age_temp$male_35_44 <- (sex_by_age_temp$Male_35_to_39_years + sex_by_age_temp$Male_40_to_44_years
sex_by_age_temp$male_45_54 <- (sex_by_age_temp$Male_45_to_49_years + sex_by_age_temp$Male_50_to_54_years
sex_by_age_temp$male_55_64 <- (sex_by_age_temp$Male_55_to_59_years + sex_by_age_temp$Male_60_and_61_yea
                               + sex_by_age_temp$Male_62_to_64_years)
sex_by_age_temp$male_65_74 <- (sex_by_age_temp$Male_65_and_66_years + sex_by_age_temp$Male_67_to_69_yea
                              + sex_by_age_temp$Male_70_to_74_years)
sex_by_age_temp$male_75_and_above <- (sex_by_age_temp$Male_75_to_79_years + sex_by_age_temp$Male_80_to_8
                                      + sex_by_age_temp$Male_85_years_and_over)

sex_by_age_temp$female_17_and_below <- (sex_by_age_temp$Female_Under_5_years + sex_by_age_temp$Female_5_
                                      + sex_by_age_temp$Female_10_to_14_years + sex_by_age_temp$Female_15_
sex_by_age_temp$female_18_24 <- (sex_by_age_temp$Female_18_and_19_years + sex_by_age_temp$Female_20_yea
                               + sex_by_age_temp$Female_21_years + sex_by_age_temp$Female_22_to_24_years)
sex_by_age_temp$female_25_34 <- (sex_by_age_temp$Female_25_to_29_years + sex_by_age_temp$Female_30_to_3
sex_by_age_temp$female_35_44 <- (sex_by_age_temp$Female_35_to_39_years + sex_by_age_temp$Female_40_to_4
sex_by_age_temp$female_45_54 <- (sex_by_age_temp$Female_45_to_49_years + sex_by_age_temp$Female_50_to_5
sex_by_age_temp$female_55_64 <- (sex_by_age_temp$Female_55_to_59_years + sex_by_age_temp$Female_60_and_
                              + sex_by_age_temp$Female_62_to_64_years)
sex_by_age_temp$female_65_74 <- (sex_by_age_temp$Female_65_and_66_years + sex_by_age_temp$Female_67_to_
                              + sex_by_age_temp$Female_70_to_74_years)
sex_by_age_temp$female_75_and_above <- (sex_by_age_temp$Female_75_to_79_years + sex_by_age_temp$Female_8
                                      + sex_by_age_temp$Female_85_years_and_over)

# subset only necessary columns
sex_by_age_cleaned <- subset(sex_by_age_temp, select=c("geoid",
                                                       "year",
                                                       "male_17_and_below",
                                                       "male_18_24",
                                                       "male_25_34",
                                                       "male_35_44",
                                                       "male_45_54",
                                                       "male_55_64",
```

```
                                                    "male_65_74",
                                                    "male_75_and_above",
                                                    "female_17_and_below",
                                                    "female_18_24",
                                                    "female_25_34",
                                                    "female_35_44",
                                                    "female_45_54",
                                                    "female_55_64",
                                                    "female_65_74",
                                                    "female_75_and_above"))

# split info by sex
sex_by_age_male <- subset(sex_by_age_cleaned, select=c("geoid",
                                                    "year",
                                                    "male_17_and_below",
                                                    "male_18_24",
                                                    "male_25_34",
                                                    "male_35_44",
                                                    "male_45_54",
                                                    "male_55_64",
                                                    "male_65_74",
                                                    "male_75_and_above"))

sex_by_age_female <- subset(sex_by_age_cleaned, select=c("geoid",
                                                      "year",
                                                      "female_17_and_below",
                                                      "female_18_24",
                                                      "female_25_34",
                                                      "female_35_44",
                                                      "female_45_54",
                                                      "female_55_64",
                                                      "female_65_74",
                                                      "female_75_and_above"))
sex_by_age_cleaned[1:3,2:6]
```

```
## # A tibble: 3 x 5
##    year male_17_and_below male_18_24 male_25_34 male_35_44
##   <dbl>             <dbl>      <dbl>      <dbl>      <dbl>
## 1  2008            224813      75502     138210     121379
## 2  2009            237092      76628     152226     126297
## 3  2010            211246      76656     118987     107214
```

- The `sex_by_edu` table contains unnecessary columns as well
  - only include education from highshcool and above
  - split information by sex

```
sex_by_edu_cleaned <- subset(sex_by_edu, select=c("geoid",
                                                  "year",
                                                  "Male - 12th grade, no diploma",
                                                  "Male - High school graduate, GED, or alternative",
                                                  "Male - Some college, less than 1 year",
                                                  "Male - Some college, 1 or more years, no degree",
```

```
                                                  "Male - Associate's degree",
                                                  "Male - Bachelor's degree",
                                                  "Male - Master's degree",
                                                  "Male - Professional school degree",
                                                  "Male - Doctorate degree",
                                                  "Female - 12th grade, no diploma",
                                                  "Female - High school graduate, GED, or alternative",
                                                  "Female - Some college, less than 1 year",
                                                  "Female - Some college, 1 or more years, no degree",
                                                  "Female - Associate's degree",
                                                  "Female - Bachelor's degree",
                                                  "Female - Master's degree",
                                                  "Female - Professional school degree",
                                                  "Female - Doctorate degree"))
names(sex_by_edu_cleaned) <- c("geoid",
                               "year",
                               "male_12th_grade_no_diploma",
                               "male_hs_graduate_ged_alt",
                               "male_college_less_than_1_year",
                               "male_college_1_or_more_year",
                               "male_associate_degree",
                               "male_bachelor_degree",
                               "male_master_degree",
                               "male_professional_school_degree",
                               "male_doctorate_degree",
                               "female_12th_grade_no_diploma",
                               "female_hs_graduate_ged_alt",
                               "female_college_less_than_1_year",
                               "female_college_1_or_more_year",
                               "female_associate_degree",
                               "female_bachelor_degree",
                               "female_master_degree",
                               "female_professional_school_degree",
                               "female_doctorate_degree")

# seperate info by sex
sex_by_edu_male <- subset(sex_by_edu_cleaned, select=c("geoid",
                                                       "year",
                                                       "male_12th_grade_no_diploma",
                                                       "male_hs_graduate_ged_alt",
                                                       "male_college_less_than_1_year",
                                                       "male_college_1_or_more_year",
                                                       "male_associate_degree",
                                                       "male_bachelor_degree",
                                                       "male_master_degree",
                                                       "male_professional_school_degree",
                                                       "male_doctorate_degree"))
sex_by_edu_female <- subset(sex_by_edu_cleaned, select=c("geoid",
                                                         "year",
                                                         "female_12th_grade_no_diploma",
                                                         "female_hs_graduate_ged_alt",
                                                         "female_college_less_than_1_year",
                                                         "female_college_1_or_more_year",
```

```
                                                    "female_associate_degree",
                                                    "female_bachelor_degree",
                                                    "female_master_degree",
                                                    "female_professional_school_degree",
                                                    "female_doctorate_degree"))
sex_by_edu_cleaned[1:3,2:6]
```

```
## # A tibble: 3 x 5
##    year male_12th_grade_n~ male_hs_graduate~ male_college_les~ male_college_1_o~
##   <dbl>              <dbl>             <dbl>             <dbl>             <dbl>
## 1  2008              14376            123068             27130             79088
## 2  2009              14127            123980             28856             83834
## 3  2010               9926            116295             27368             69395
```

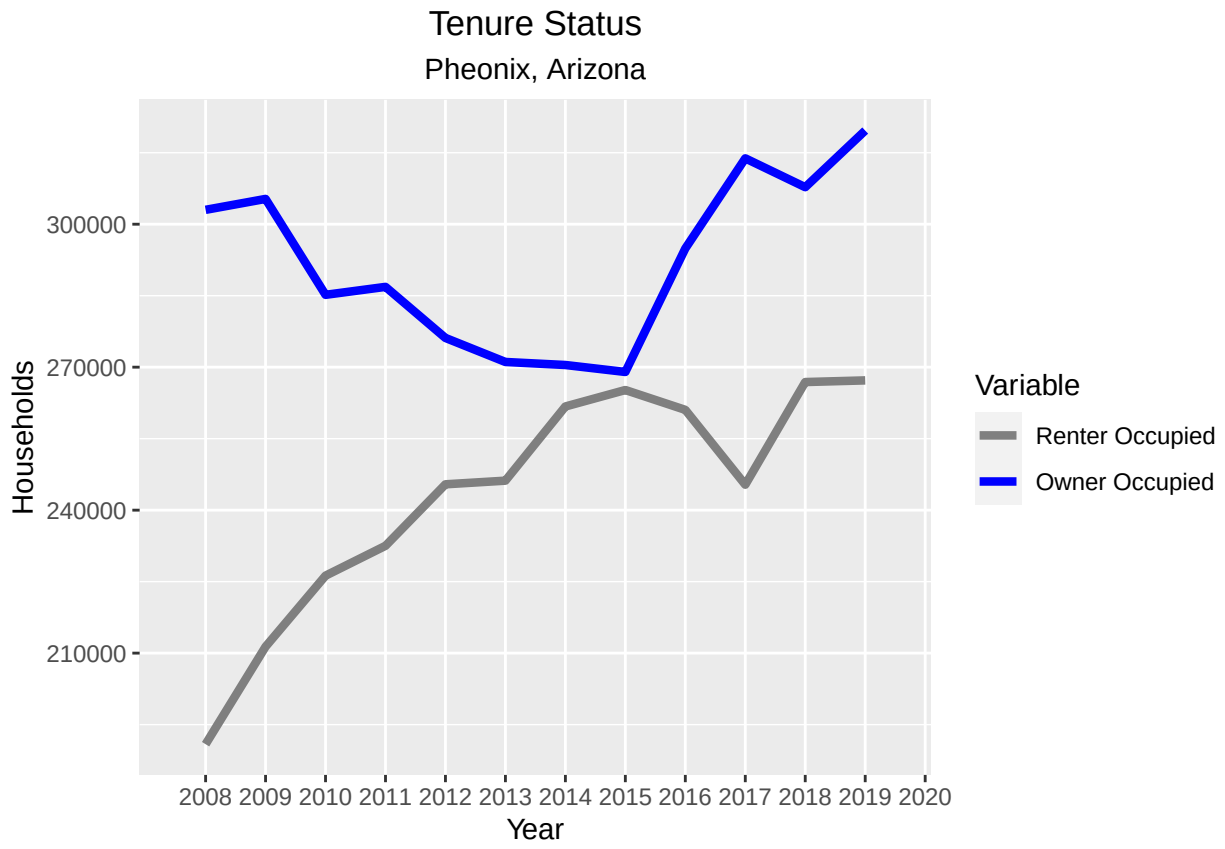
- Renaming column names for `tenure`, `median_gross_rent`, and `median_income`. Mainly removing spaces

```
# Renaming columns (i.e., removing spaces)
tenure_cleaned <- tenure
names(tenure_cleaned) <- c("geoid", "year", "owner_occupied", "renter_occupied")

median_gross_rent_cleaned <- median_gross_rent
names(median_gross_rent_cleaned) <- c("geoid","year","median_gross_rent")

median_income_cleaned <- median_income
names(median_income_cleaned) <- c("geoid","year","median_income")

occupancy_status_cleaned <- occupancy_status
names(occupancy_status_cleaned) <- c("geoid", "year", "total_housing_units", "occupied_housing_units",
```

Visual Graphics

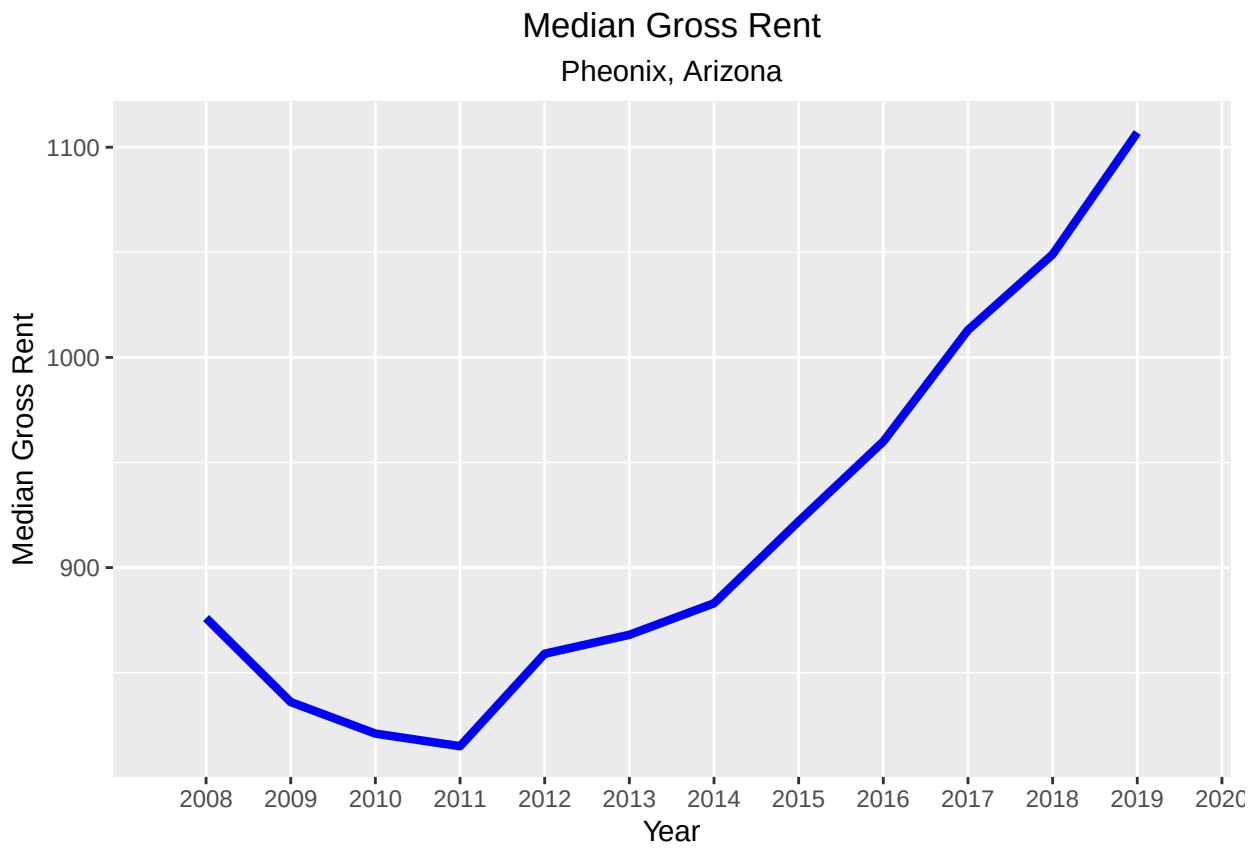
```
# plot of tenure status
legends_tenure <- c("Renter Occupied"="#808080","Owner Occupied"="#0000FF")
ggplot(data=tenure_cleaned, aes(x=year)) +
       geom_line(aes(y =owner_occupied,colour="#0000FF"),colour="#0000FF", size=1.5) +
       geom_line(aes(y=renter_occupied,colour="#808080"), size=1.5) +
       scale_x_discrete(limits = c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019, 2020),
                        expand=expansion(mult=c(0.1, .1))) +
       scale_colour_manual(name="Variable",values = legends_tenure) +
       labs(title="Tenure Status", subtitle="Pheonix, Arizona", x="Year", y="Households") +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

```
## Warning: Continuous limits supplied to discrete scale.
## Did you mean `limits = factor(...)` or `scale_*_continuous()`?
```



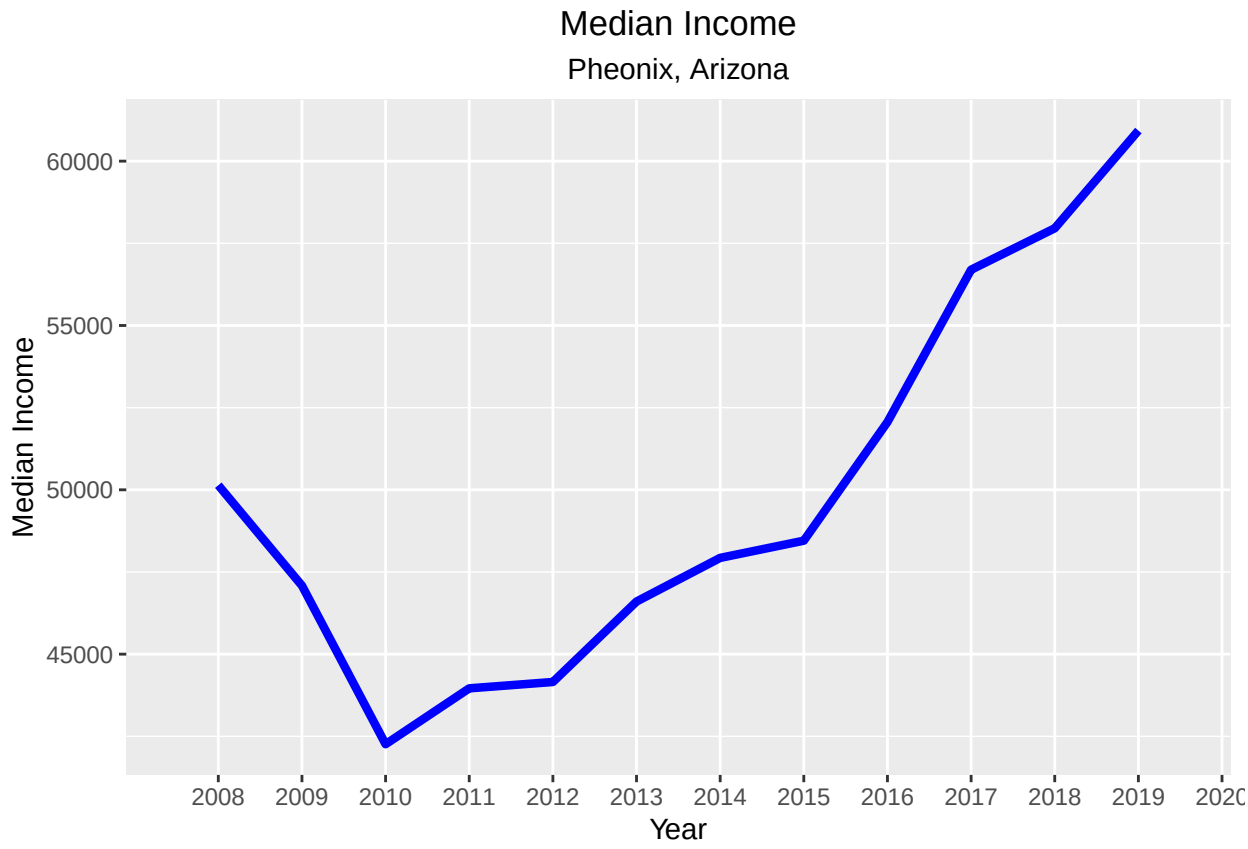

```
# plot of median gross rent
ggplot(data=median_gross_rent_cleaned, aes(x=year,y=median_gross_rent)) +
       geom_line(colour='blue', size=1.5) +
       scale_x_discrete(limits = c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019, 2020),
                        expand=expansion(mult=c(0.1, .1))) +
       labs(title="Median Gross Rent", subtitle="Pheonix, Arizona", x="Year", y="Median Gross Rent") +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

```
## Warning: Continuous limits supplied to discrete scale.
## Did you mean `limits = factor(...)` or `scale_*_continuous()`?
```




```
# plot of median income
ggplot(data=median_income_cleaned, aes(x=year,y=median_income)) +
       geom_line(colour='blue', size=1.5) +
       scale_x_discrete(limits = c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019, 2020),
                        expand=expansion(mult=c(0.1, .1))) +
       labs(title="Median Income", subtitle="Pheonix, Arizona", x="Year", y="Median Income") +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

```
## Warning: Continuous limits supplied to discrete scale.
## Did you mean `limits = factor(...)` or `scale_*_continuous()`?
```



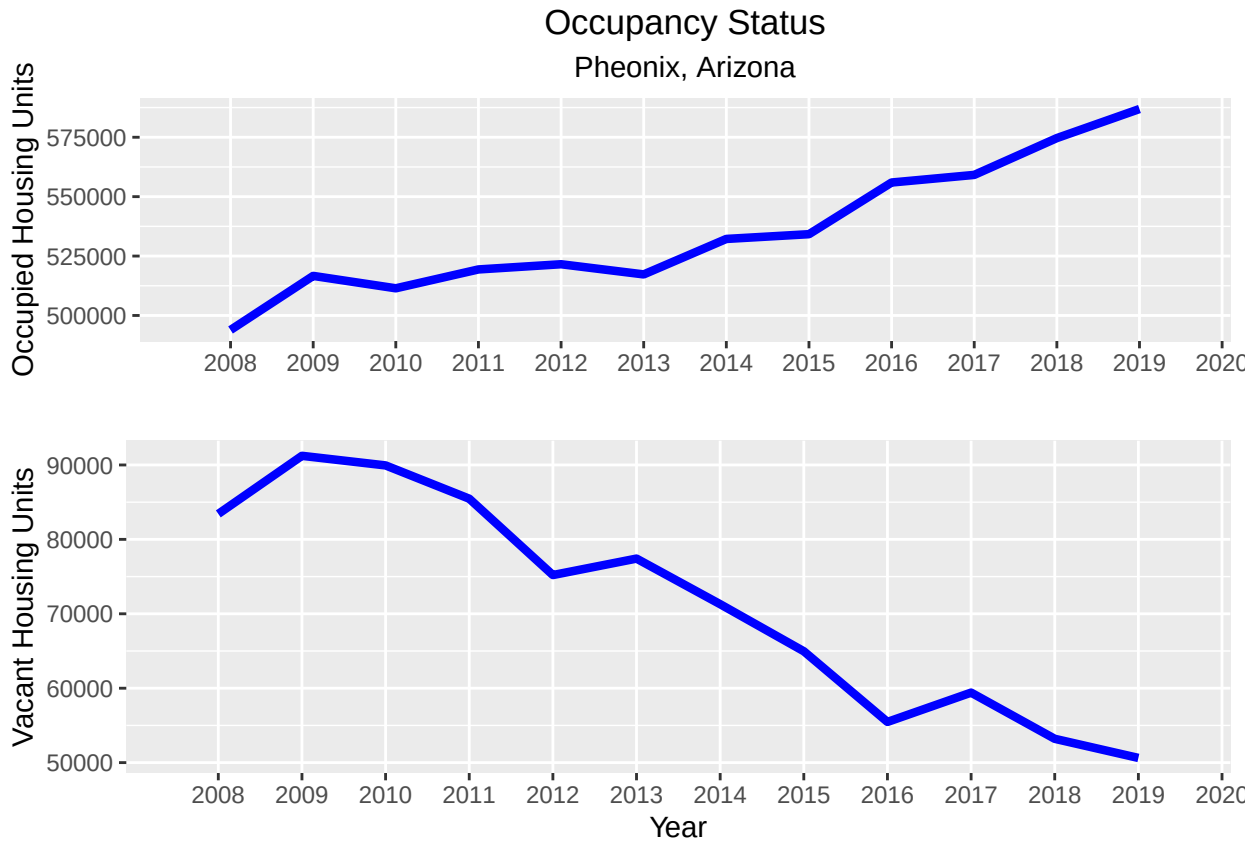

```
# plot of occupancy status
occupied_plot <- ggplot(data=occupancy_status_cleaned, aes(x=year,y=occupied_housing_units)) +
                      geom_line(colour='blue', size=1.5) +
                      scale_x_discrete(limits = c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,20
                                       expand=expansion(mult=c(0.1, .1))) +
                      labs(title="Occupancy Status", subtitle="Pheonix, Arizona", x="", y="Occupied Hou
                      theme(plot.title = element_text(hjust = 0.5),
                            plot.subtitle = element_text(hjust = 0.5))
```

```
## Warning: Continuous limits supplied to discrete scale.
## Did you mean `limits = factor(...)` or `scale_*_continuous()`?
```

```
vacant_plot <- ggplot(data=occupancy_status_cleaned, aes(x=year,y=vacant_housing_units)) +
                      geom_line(colour='blue', size=1.5) +
                      scale_x_discrete(limits = c(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018
                                       expand=expansion(mult=c(0.1, .1))) +
                      labs(x="Year", y="Vacant Housing Units") +
                      theme(plot.title = element_text(hjust = 0.5),
                            plot.subtitle = element_text(hjust = 0.5))
```

```
## Warning: Continuous limits supplied to discrete scale.
## Did you mean `limits = factor(...)` or `scale_*_continuous()`?
```

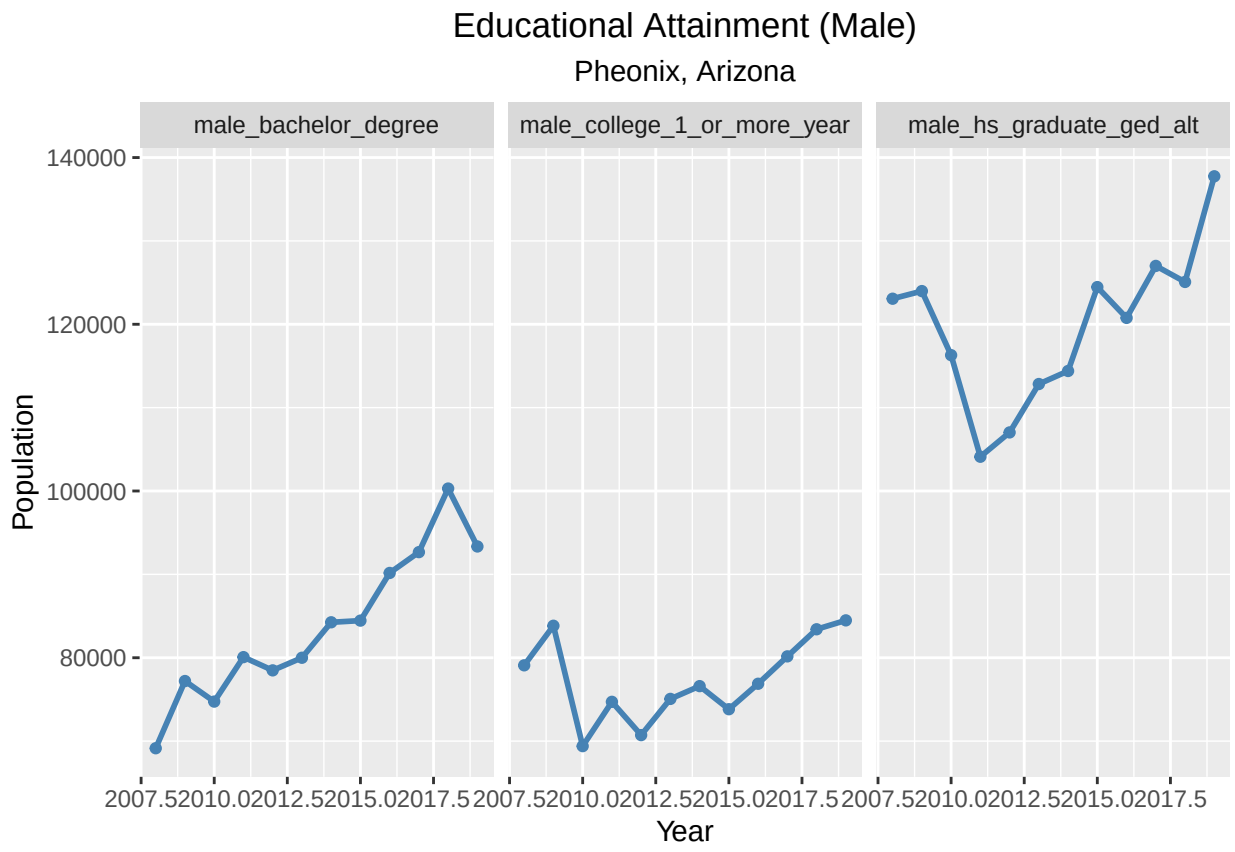
```
# plot side by side
grid.arrange(occupied_plot, vacant_plot)
```



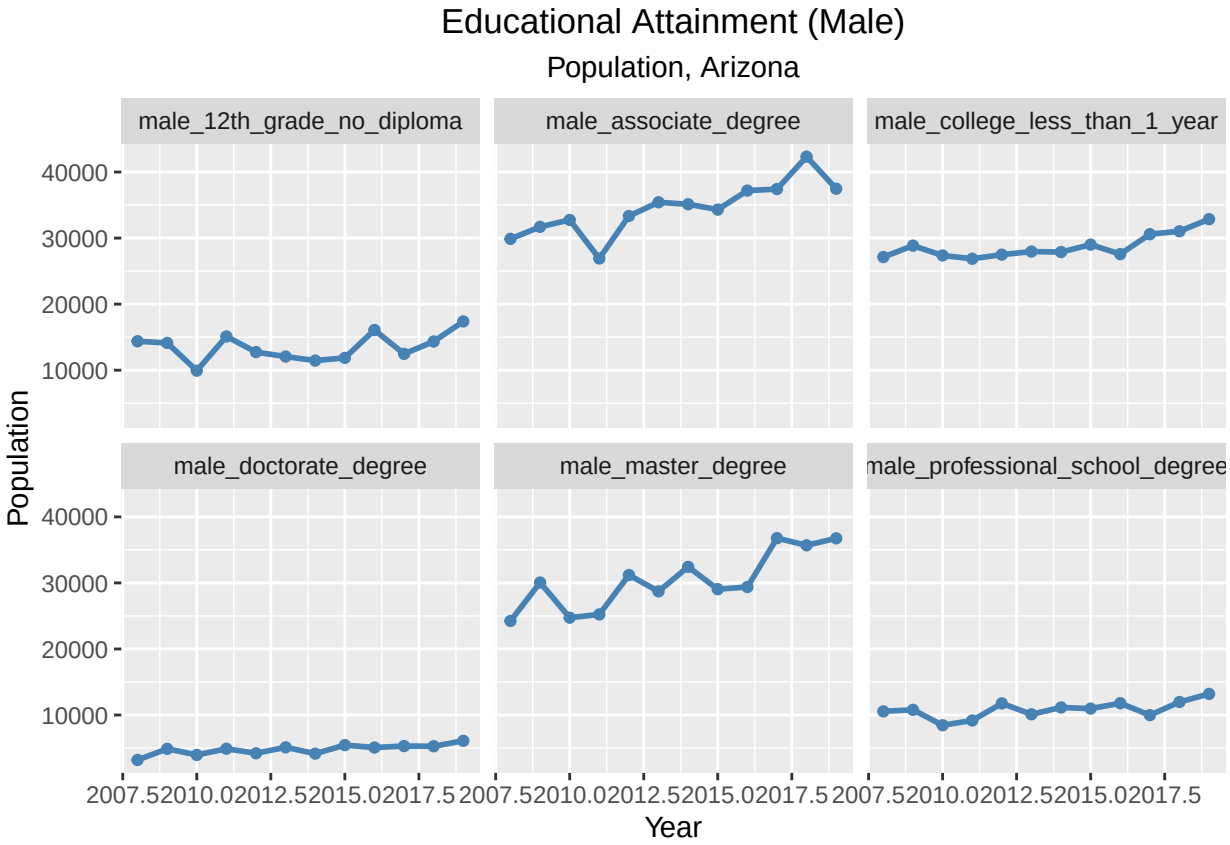
Sex by Education

```
# format data
# Format Data to convert each education degree as a categorical variable
sex_by_edu_male_long <- sex_by_edu_male %>%
  pivot_longer(male_12th_grade_no_diploma:male_doctorate_degree, names_to = "education", values_to = "p

# subsetting data because population differences is too wide between some degrees
sex_by_edu_male_long1 <- subset(sex_by_edu_male_long, education %in% c("male_bachelor_degree",
                                                                       "male_college_1_or_more_year",
                                                                       "male_hs_graduate_ged_alt") )
sex_by_edu_male_long2 <- subset(sex_by_edu_male_long, education %in% c("male_12th_grade_no_diploma",
                                                                       "male_college_less_than_1_year",
                                                                       "male_associate_degree",
                                                                       "male_professional_school_degree",
                                                                       "male_master_degree",
                                                                       "male_doctorate_degree") )

# plot graph
ggplot(data = sex_by_edu_male_long1, aes(year, population)) +
```

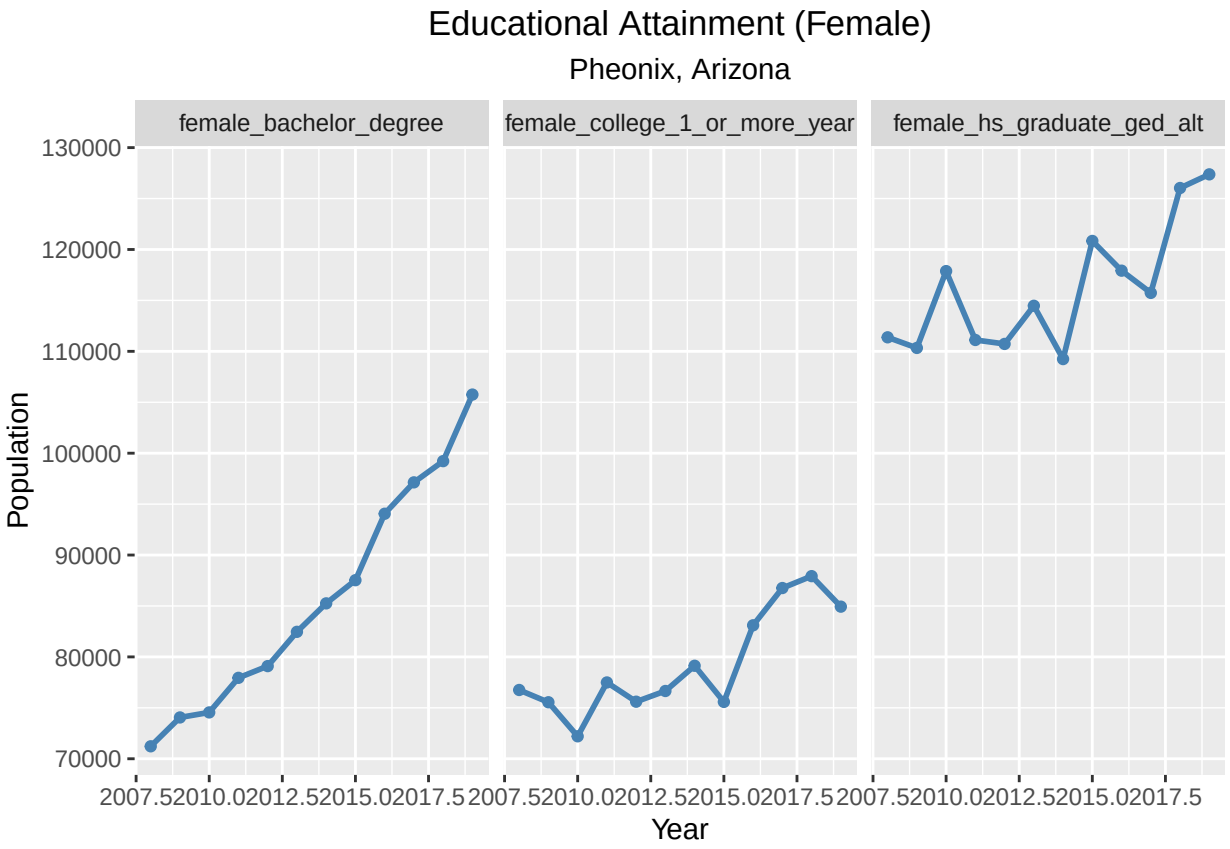
```
      geom_line(color = "steelblue", size = 1) +
      geom_point(color="steelblue") +
      labs(title = "Educational Attainment (Male)",
           subtitle = "Pheonix, Arizona",
           y = "Population", x = "Year") +
      facet_wrap(~ education) +
      theme(plot.title = element_text(hjust = 0.5),
            plot.subtitle = element_text(hjust = 0.5))
```



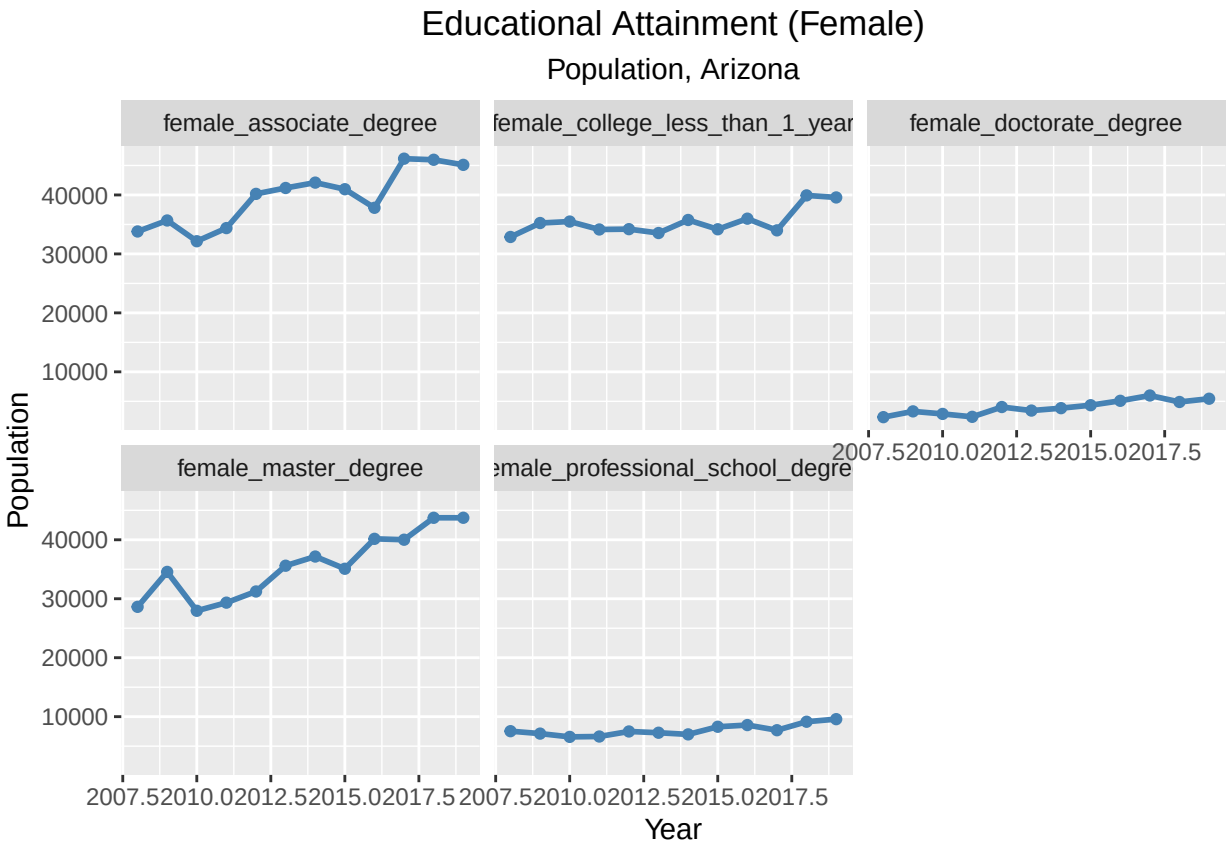

```
ggplot(data = sex_by_edu_male_long2, aes(year, population)) +
      geom_line(color = "steelblue", size = 1) +
      geom_point(color="steelblue") +
      labs(title = "Educational Attainment (Male)",
           subtitle = "Population, Arizona",
           y = "Population", x = "Year") +
      facet_wrap(~ education) +
      theme(plot.title = element_text(hjust = 0.5),
            plot.subtitle = element_text(hjust = 0.5))
```




```
# Format Data to convert each education degree as a categorical variable
sex_by_edu_female_long <- sex_by_edu_female %>%
  pivot_longer(female_12th_grade_no_diploma:female_doctorate_degree, names_to = "education", values_to =

# subsetting data because population differences is too wide between some degrees
sex_by_edu_female_long1 <- subset(sex_by_edu_female_long, education %in% c("female_bachelor_degree",
                                                                           "female_college_1_or_more_year",
                                                                           "female_hs_graduate_ged_alt") )
sex_by_edu_female_long2 <- subset(sex_by_edu_female_long, education %in% c("male_12th_grade_no_diploma"
                                                                           "female_college_less_than_1_year",
                                                                           "female_associate_degree",
                                                                           "female_professional_school_degree"
                                                                           "female_master_degree",
                                                                           "female_doctorate_degree") )


# plot graph
ggplot(data = sex_by_edu_female_long1, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Educational Attainment (Female)",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ education) +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

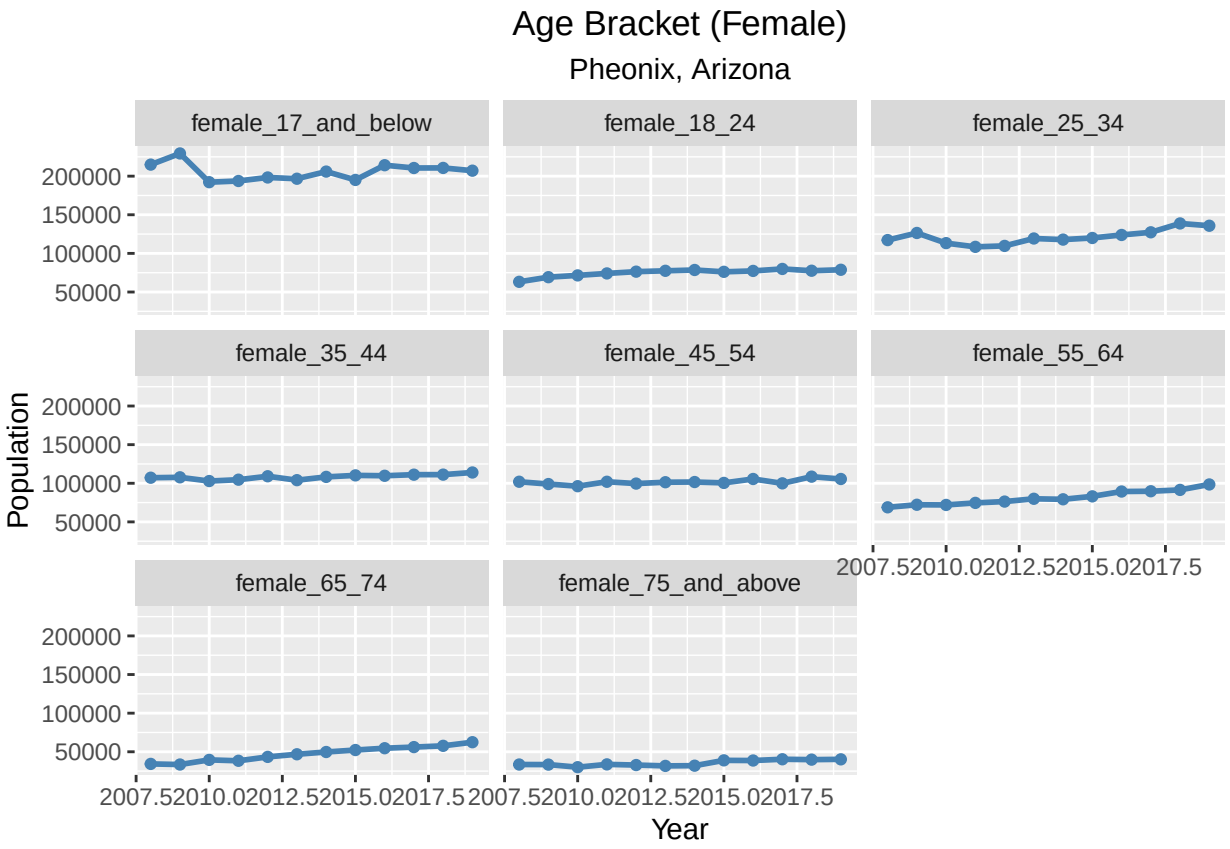



```
ggplot(data = sex_by_edu_female_long2, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Educational Attainment (Female)",
            subtitle = "Population, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ education)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

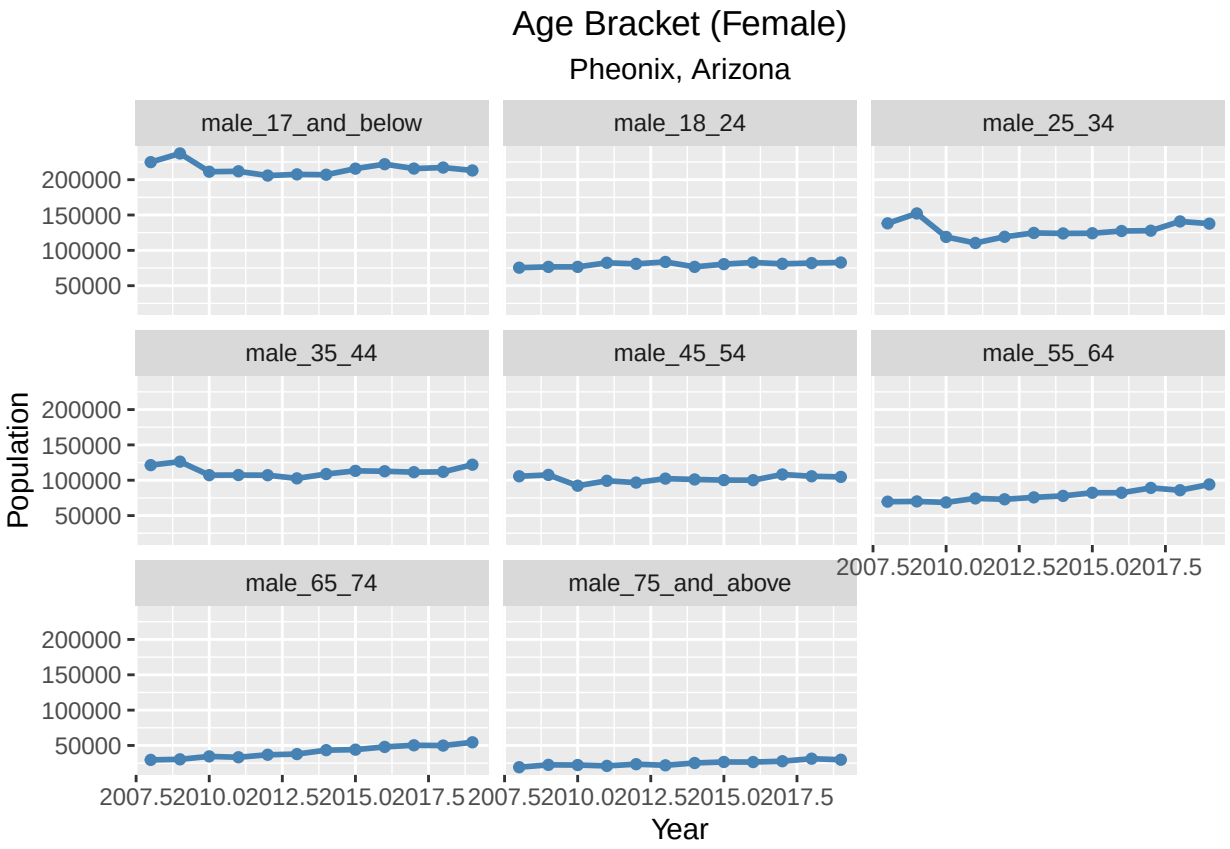


Sex by Education

```
# plot for sex by age
# Format Data to convert each age bracket as a categorical variable
sex_by_age_female_long <- sex_by_age_female %>%
  pivot_longer(female_17_and_below:female_75_and_above, names_to = "age_bracket", values_to = "populati

# plot graph
ggplot(data = sex_by_age_female_long, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Age Bracket (Female)",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ age_bracket)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

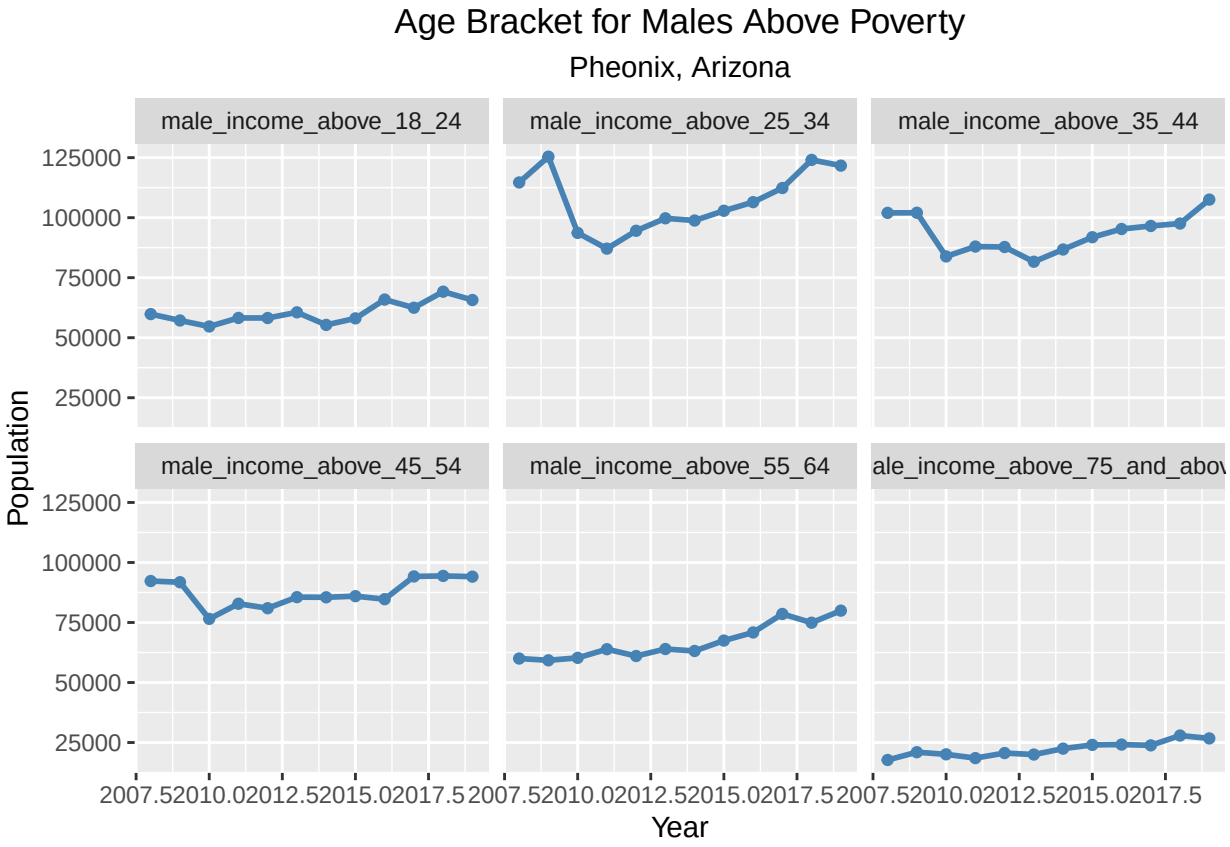



```
# plot for sex by age
# Format Data to convert each age bracket as a categorical variable
sex_by_age_male_long <- sex_by_age_male %>%
  pivot_longer(male_17_and_below:male_75_and_above, names_to = "age_bracket", values_to = "population")

# plot graph
ggplot(data = sex_by_age_male_long, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Age Bracket (Female)",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ age_bracket)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```

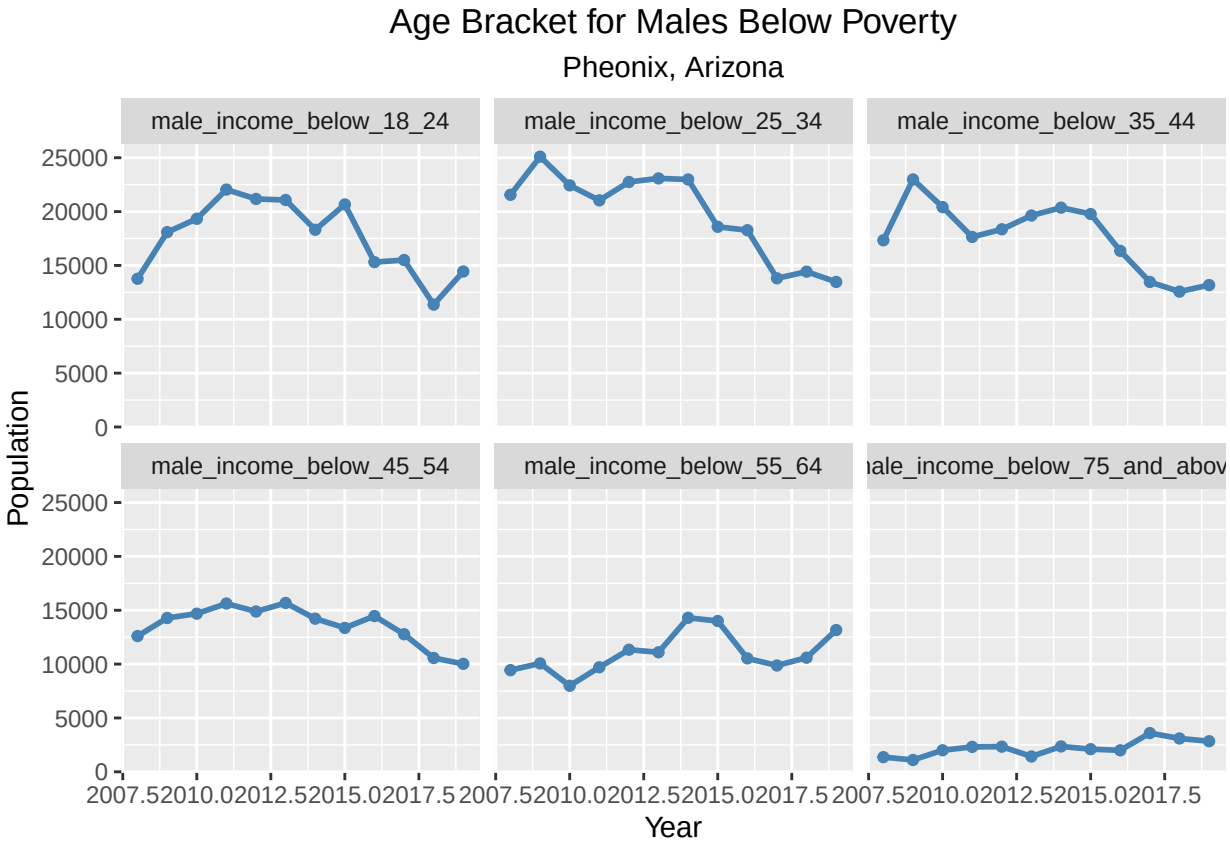


Poverty Status by Sex

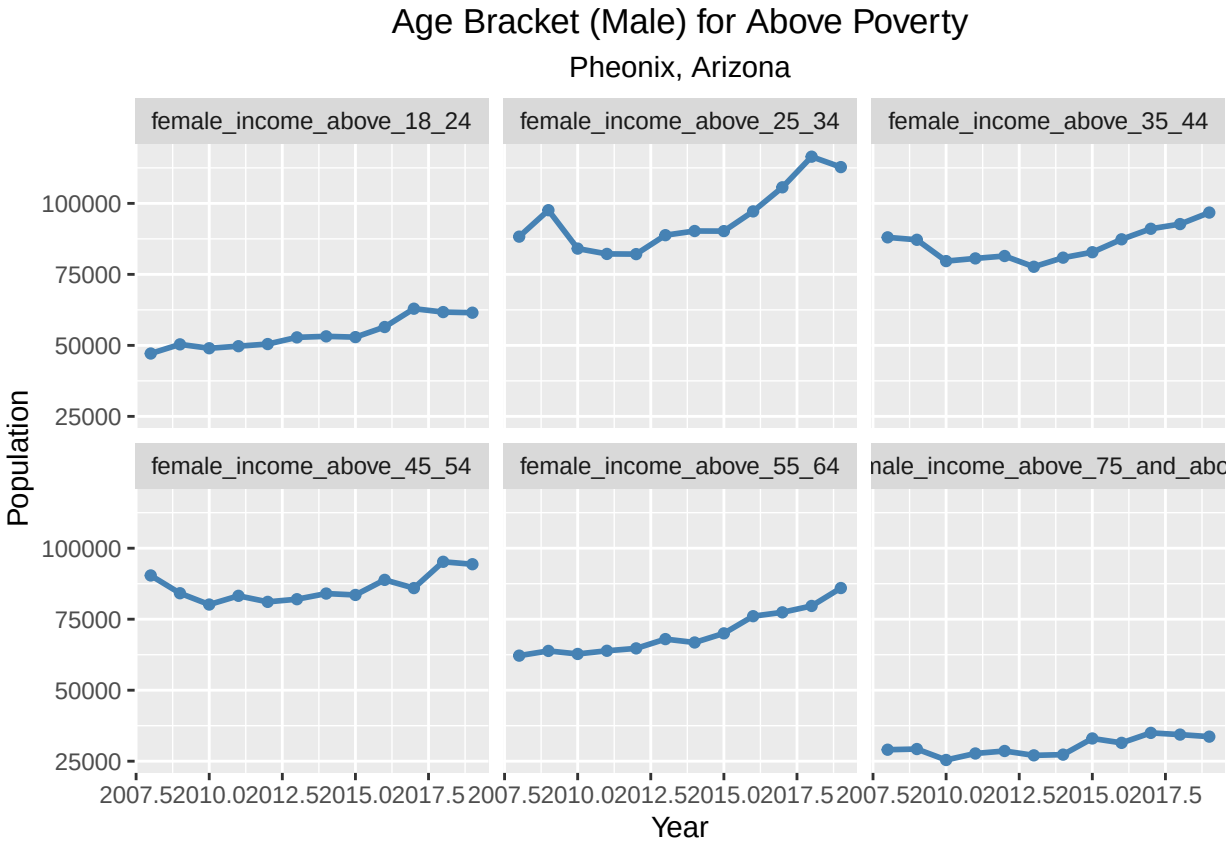
```
# plot for sex by poverty status (above poverty, below poverty)
# Format Data to convert each poverty status as a categorical variable
poverty_status_male_long_above <- poverty_status_male %>%
  pivot_longer(male_income_above_18_24:male_income_above_75_and_above, names_to = "age_bracket", values
poverty_status_male_long_below <- poverty_status_male %>%
  pivot_longer(male_income_below_18_24:male_income_below_75_and_above, names_to = "age_bracket", values


# plot graph
ggplot(data = poverty_status_male_long_above, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Age Bracket for Males Above Poverty",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ age_bracket)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```



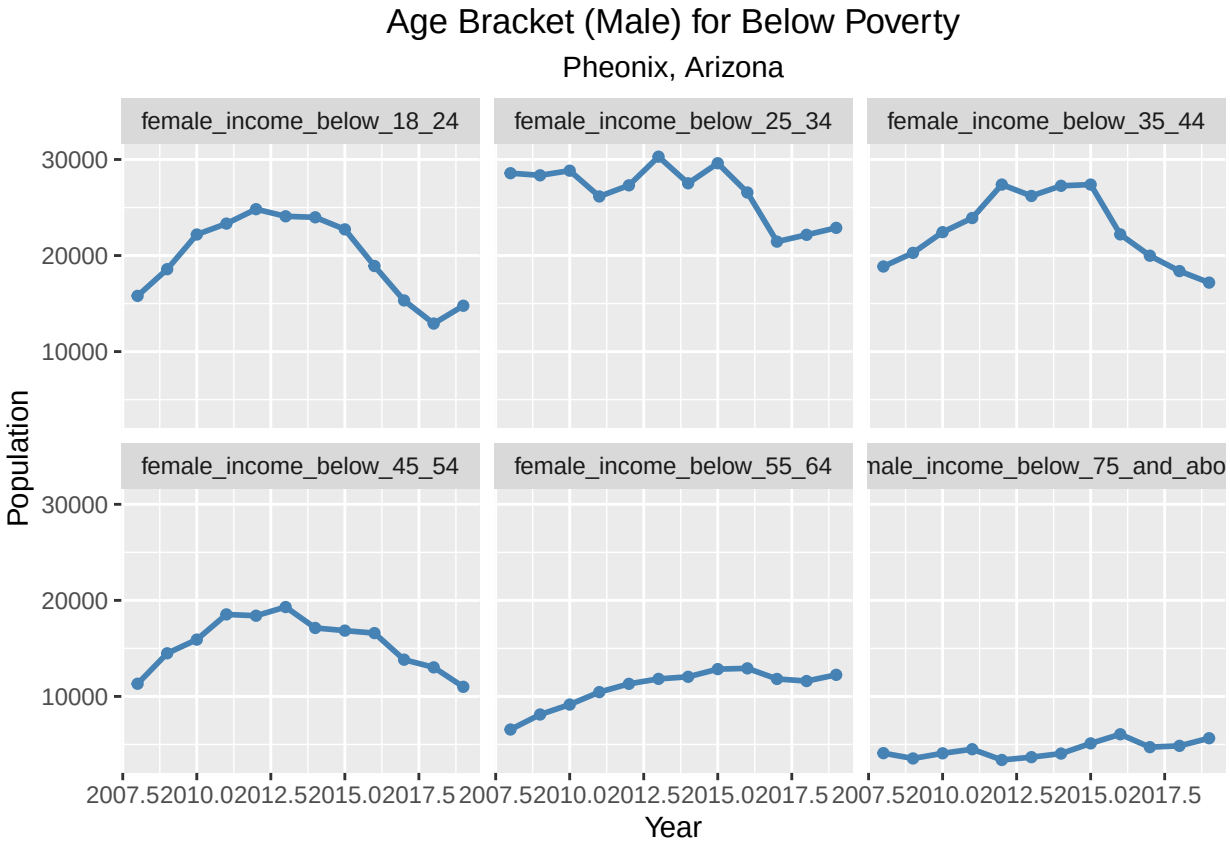

```
ggplot(data = poverty_status_male_long_below, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Age Bracket for Males Below Poverty",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ age_bracket)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```




```r
# plot for sex by poverty status (above poverty, below poverty)
# Format Data to convert each poverty status as a categorical variable
poverty_status_female_long_above <- poverty_status_female %>%
  pivot_longer(female_income_above_18_24:female_income_above_75_and_above, names_to = "age_bracket", val
poverty_status_female_long_below <- poverty_status_female %>%
  pivot_longer(female_income_below_18_24:female_income_below_75_and_above, names_to = "age_bracket", val


# plot graph
ggplot(data = poverty_status_female_long_above, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Age Bracket (Male) for Above Poverty",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ age_bracket)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```




```
ggplot(data = poverty_status_female_long_below, aes(year, population)) +
       geom_line(color = "steelblue", size = 1) +
       geom_point(color="steelblue") +
       labs(title = "Age Bracket (Male) for Below Poverty",
            subtitle = "Pheonix, Arizona",
            y = "Population", x = "Year") +
       facet_wrap(~ age_bracket)  +
       theme(plot.title = element_text(hjust = 0.5),
             plot.subtitle = element_text(hjust = 0.5))
```


Age Bracket (Male) for Below Poverty
Pheonix, Arizona
female_income_below_18_24
female_income_below_25_34
female_income_below_35_44
female_income_below_45_54
female_income_below_55_64
nale_income_below_75_and_abo
Population
30000
20000
10000
2007.5
2010.0
2012.5
2015.0
2017.5
Year