Exploring Youth NEET

2025-12-01

R Markdown

```
#Setting the working directory, loading all necessary libraries and data

library(sf)
```

```
## Linking to GEOS 3.13.0, GDAL 3.8.5, PROJ 9.5.1; sf_use_s2() is TRUE
```

```
library(rnaturalearth)
library(rnaturalearthdata)
```

```
##
## Attaching package: 'rnaturalearthdata'
```

```
## The following object is masked from 'package:rnaturalearth':
##
##     countries110
```

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.6
## v forcats   1.0.1     v stringr   1.6.0
## v ggplot2   4.0.1     v tibble    3.3.0
## v lubridate 1.9.4     v tidyr     1.3.1
## v purrr     1.2.0
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
setwd("~/Desktop/Uni/Intro to Data Science")

youth_neet <- read_csv("Group project/data sets/Youth_neet_final.csv")
```

```
## Rows: 1908 Columns: 6
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (3): Entity, Code, Continent
```

```
## dbl (3): Year, Share.of.youth.not.in.education..employment.or.training..tota...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
#checking the data has loaded
head(youth_neet)
```

```
## # A tibble: 6 x 6
##   Entity      Code   Year Share.of.youth.not.in.education.~1 pop_15_24 Continent
##   <chr>       <chr> <dbl>                              <dbl>     <dbl> <chr>
## 1 Afghanistan AFG    2014                               35.1   6914571 Asia
## 2 Afghanistan AFG    2017                               42.8   7704034 Asia
## 3 Afghanistan AFG    2020                               53.8   8444268 Asia
## 4 Afghanistan AFG    2021                               62.8   8621571 Asia
## 5 Albania     ALB    2002                               41.8    548992 Europe
## 6 Albania     ALB    2005                               35.2    546133 Europe
## # i abbreviated name:
## #   1: Share.of.youth.not.in.education..employment.or.training..total....of.youth.population.
```

```
#changing the column names for simplification
youth_neet <- youth_neet %>%
  rename(
    NEET = "Share.of.youth.not.in.education..employment.or.training..total....of.youth.population.",
    population = "pop_15_24"
  )
colnames(youth_neet)
```

```
## [1] "Entity"     "Code"       "Year"       "NEET"       "population"
## [6] "Continent"
```

```
#checking for missing values
sum(is.na(youth_neet))
```

```
## [1] 324
```

```
#checking where missing values occur
colSums(is.na(youth_neet))
```

```
##     Entity       Code       Year       NEET population  Continent
##          0        108          0          0        108        108
```

```
#calculating average NEET rates by year and continent
avg_NEET_by_continent_year <- youth_neet %>%
  group_by(Continent, Year) %>%
  summarise(
    avg_NEET = mean(NEET,
                    na.rm = TRUE)
  )
```

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

```r
#confirming the output
head(avg_NEET_by_continent_year)
```

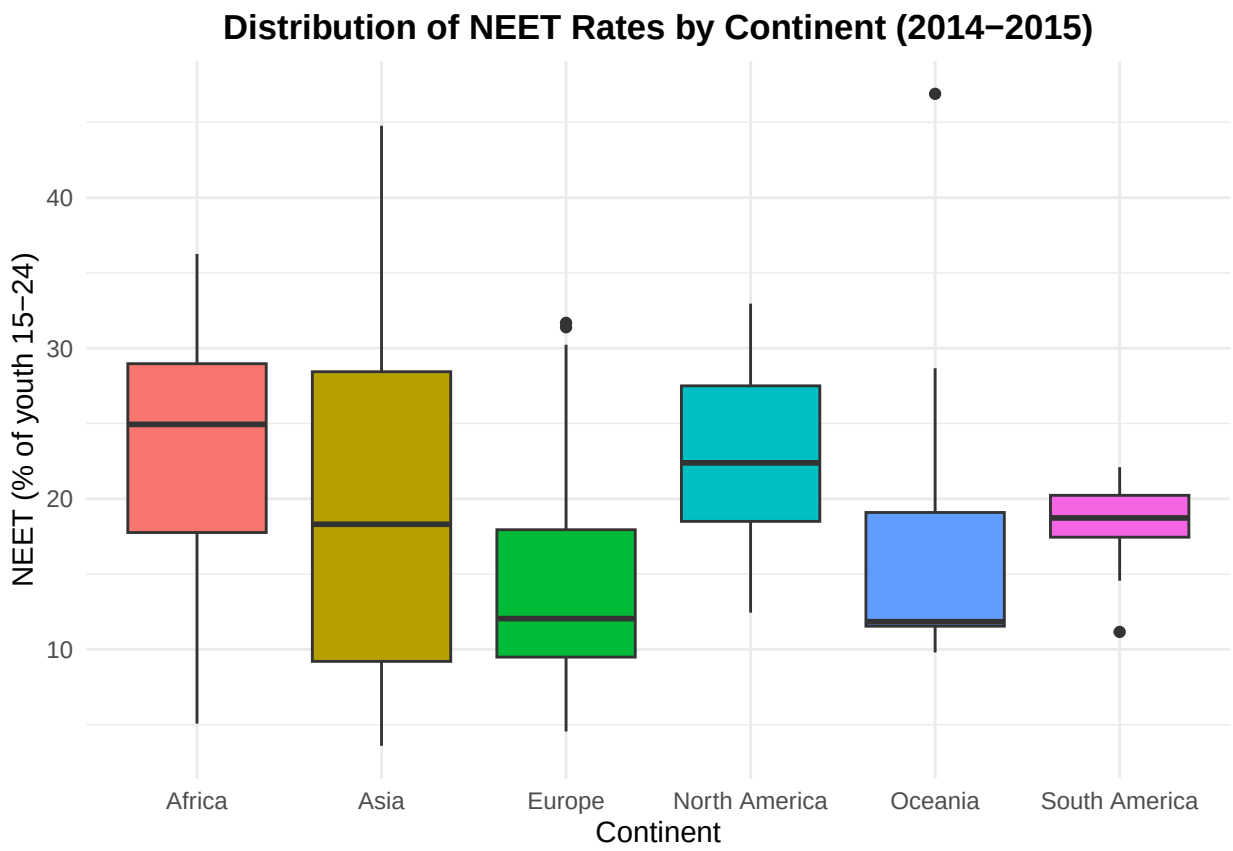
```
## # A tibble: 6 x 3
## # Groups:   Continent [1]
##   Continent  Year avg_NEET
##   <chr>     <dbl>    <dbl>
## 1 Africa     1991     21.3
## 2 Africa     1994     25.1
## 3 Africa     1996     43.4
## 4 Africa     1999     32.4
## 5 Africa     2000     31.1
## 6 Africa     2001     26.9
```

```r
#exploring the NEET rates by calculating summary data
continent_summary <- youth_neet %>%
  filter(!is.na(Continent), !is.na(NEET)) %>%
  group_by(Continent) %>%
  summarise(
    mean_neet     = mean(NEET, na.rm = TRUE),
    weighted_mean = sum(NEET * population, na.rm = TRUE) /
                    sum(population, na.rm = TRUE),
    median_neet   = median(NEET, na.rm = TRUE),
    min_neet      = min(NEET, na.rm = TRUE),
    max_neet      = max(NEET, na.rm = TRUE),
    sd_neet       = sd(NEET, na.rm = TRUE),
    iqr_neet      = IQR(NEET, na.rm = TRUE)
  )
continent_summary
```

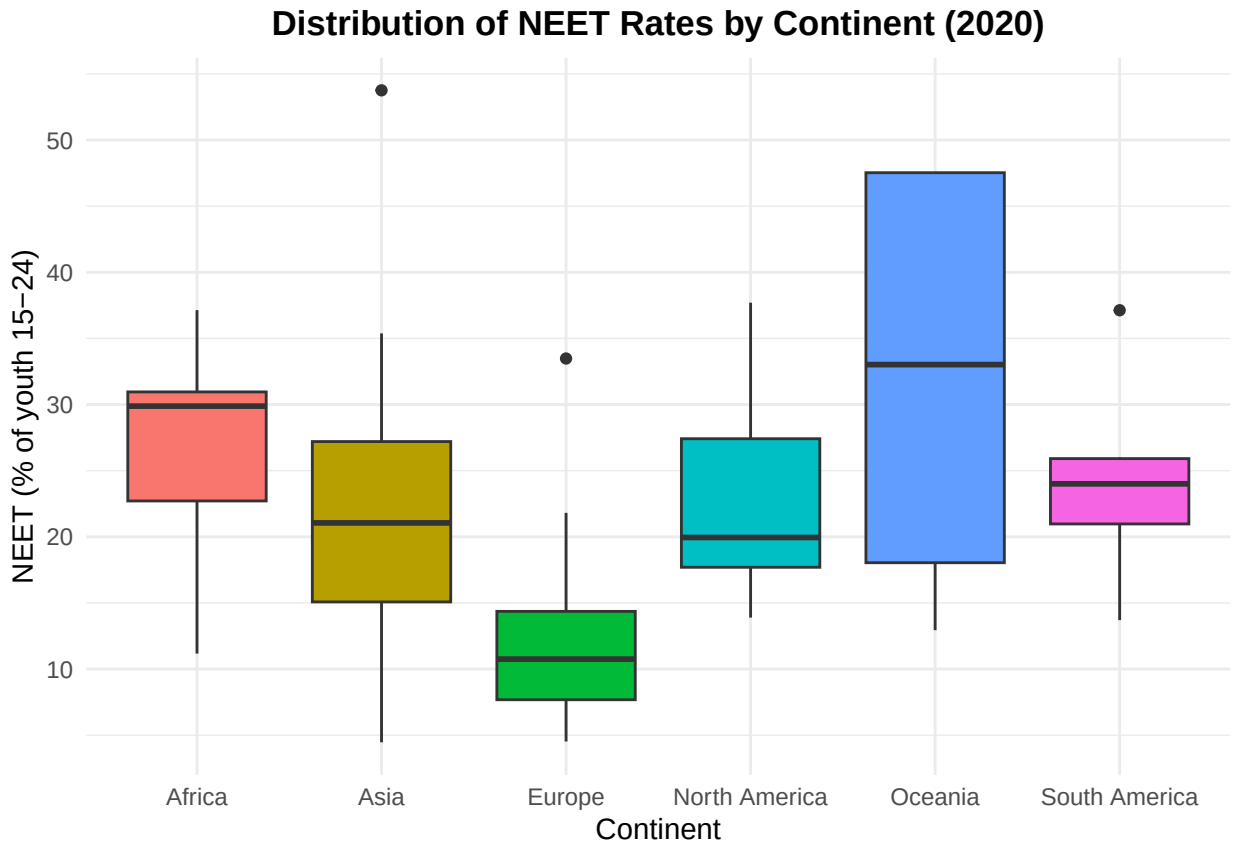
```
## # A tibble: 6 x 8
##   Continent     mean_neet weighted_mean median_neet min_neet max_neet sd_neet
##   <chr>             <dbl>         <dbl>       <dbl>    <dbl>    <dbl>   <dbl>
## 1 Africa             25.8          26.1        26.9     3.79     68.7    9.04
## 2 Asia               21.4          27.3        21.4     2.97     62.8   11.0
## 3 Europe             13.1          12.6        11.5     0.38     41.8    6.73
## 4 North America      20.6          15.7        19.9     5.06     52.0    6.50
## 5 Oceania            21.5          12.1        14.0     7.04     52.0   12.7
## 6 South America      19.6          20.6        19.2     9.18     46.4    4.83
## # i 1 more variable: iqr_neet <dbl>
```

```r
#Boxplot: NEET by continent for 2014 & 2015
ggplot(
  youth_neet %>%
    filter(!is.na(Continent), Year %in% c(2014, 2015)),
  aes(x = Continent, y = NEET, fill = Continent)
) +
  geom_boxplot() +
  labs(
    title = "Distribution of NEET Rates by Continent (2014-2015)",
    x = "Continent",
    y = "NEET (% of youth 15-24)"
```

```
  ) +
  theme_minimal() +
  theme(
    legend.position = "none",
    plot.title = element_text(hjust = 0.5, face = "bold")
  )
```




```
#Boxplot: NEET by continent for 2020
ggplot(
  youth_neet %>%
    filter(!is.na(Continent), Year %in% c(2020)),
  aes(x = Continent, y = NEET, fill = Continent)
) +
  geom_boxplot() +
  labs(
    title = "Distribution of NEET Rates by Continent (2020)",
    x = "Continent",
    y = "NEET (% of youth 15-24)"
  ) +
  theme_minimal() +
  theme(
    legend.position = "none",
    plot.title = element_text(hjust = 0.5, face = "bold")
  )
```




```
#calculating population weighted NEET for each continent by year
neet_weighted <- youth_neet %>%
  group_by(Continent, Year) %>%
  summarise(
    weighted_NEET = weighted.mean(NEET, population, na.rm = TRUE),
    total_population = sum(population, na.rm = TRUE),
  )
```

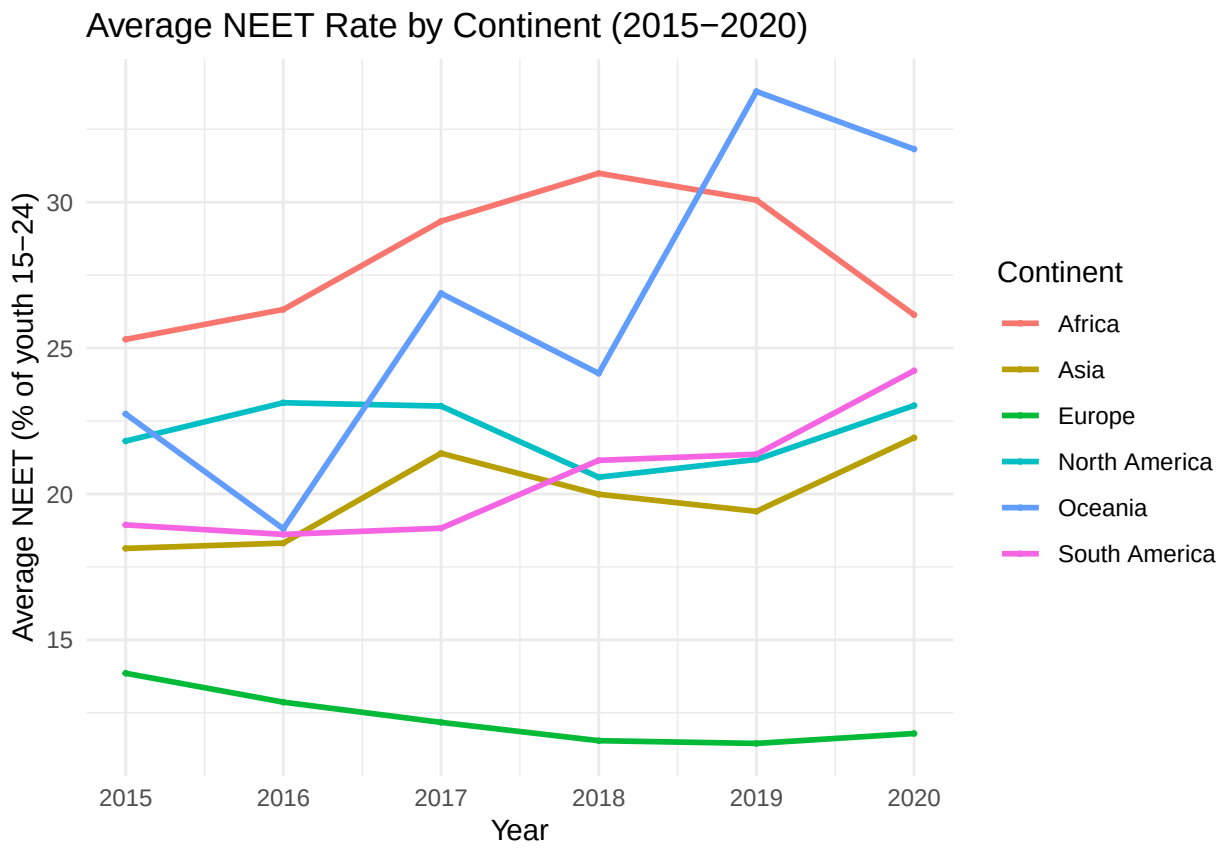
```
## `summarise()` has grouped output by 'Continent'. You can override using the
## `.groups` argument.
```

```
#checking the output
head(neet_weighted)
```

```
## # A tibble: 6 x 4
## # Groups:   Continent [1]
##   Continent  Year weighted_NEET total_population
##   <chr>     <dbl>         <dbl>            <dbl>
## 1 Africa     1991          21.3          3173483
## 2 Africa     1994          25.1           326596
## 3 Africa     1996          43.4           330806
## 4 Africa     1999          32.4          6357672
## 5 Africa     2000          31.4         13976220
## 6 Africa     2001          25.4         17649356
```

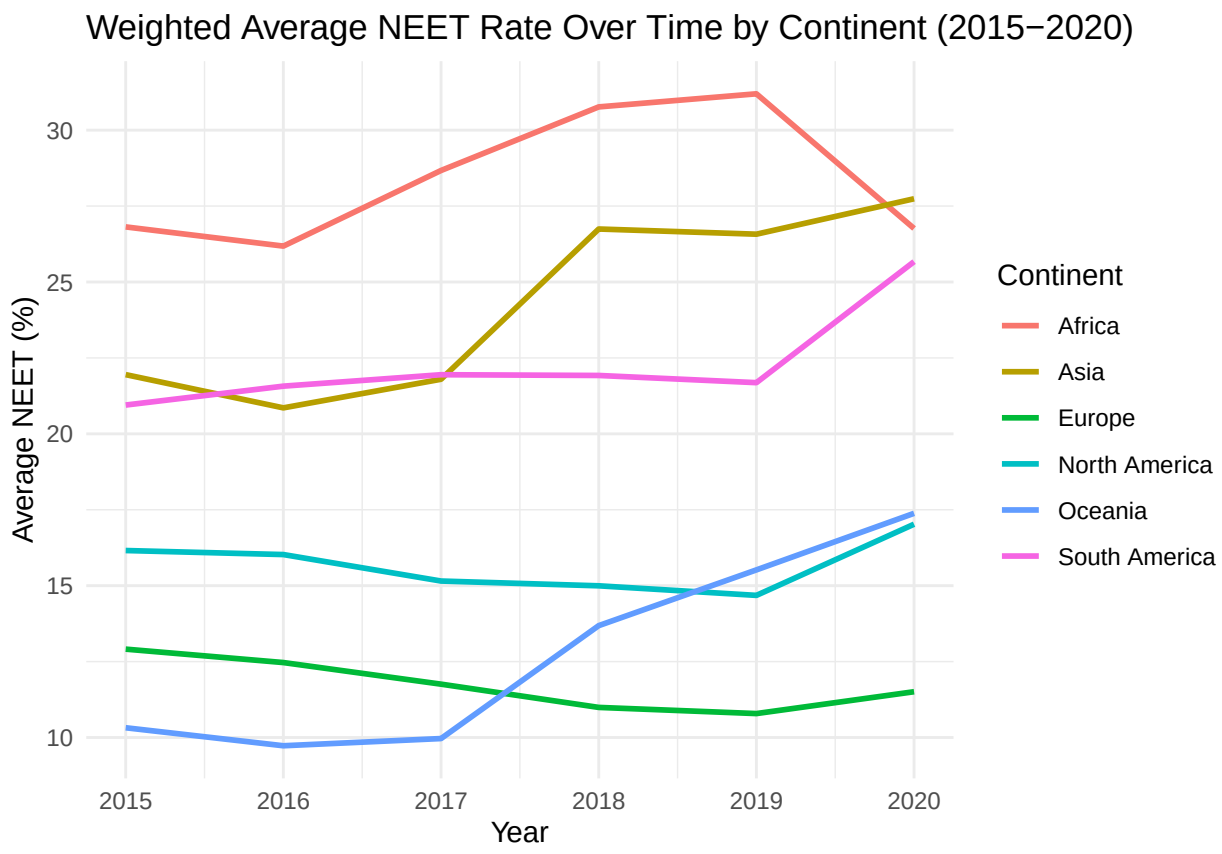
```r
#line graph of each continent between 2015 and 2020 showing the averge NEET
neet_plot_data <- avg_NEET_by_continent_year %>%
  filter(Year >= 2015, Year <= 2020) %>%
  filter(!is.na(Continent))    # <-- Remove NA continent

ggplot(neet_plot_data, aes(x = Year, y = avg_NEET, color = Continent)) +
  geom_line(size = 1) +
  geom_point(size = 0.5) +
  labs(
    title = "Average NEET Rate by Continent (2015-2020)",
    x = "Year",
    y = "Average NEET (% of youth 15-24)",
    color = "Continent"
  ) +
  theme_minimal()
```

```
## 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.
```




```r
#line graph of each continent between 2015 and 2020 showing the averge NEET wighted by the population o
ggplot(neet_weighted %>% filter(Year >= 2015, Year <= 2020) %>%
  filter(!is.na(Continent)) ,
```

```
      aes(x = Year, y = weighted_NEET, color = Continent)) +
  geom_line(size = 1) +
  labs(
    title = "Weighted Average NEET Rate Over Time by Continent (2015-2020)",
    x = "Year",
    y = "Average NEET (%)"
  ) +
  theme_minimal()
```




```
#calculating the percentage point change between 2010 to 2015 average and the 2020 average
neet_change_continent <- avg_NEET_by_continent_year %>%
  filter(!is.na(Continent),
         Year >= 2010, Year <= 2020) %>%          # keep only 2010-2020
  group_by(Continent) %>%
  summarise(
    avg_2010_2015 = mean(avg_NEET[Year >= 2010 & Year <= 2015], na.rm = TRUE),
    neet_2020 = avg_NEET[Year == 2020][1],   # NEET value in 2020
    .groups = "drop"
  ) %>%
  mutate(
    percentage_point_change = neet_2020 -avg_2010_2015
  )

#checking the output
head(neet_change_continent)
```

```
## # A tibble: 6 x 4
##   Continent     avg_2010_2015 neet_2020 percentage_point_change
##   <chr>                 <dbl>     <dbl>                   <dbl>
## 1 Africa                 22.4      26.1                    3.73
## 2 Asia                   19.2      21.9                    2.72
## 3 Europe                 14.2      11.8                   -2.39
## 4 North America          22.1      23.0                    0.939
## 5 Oceania                18.9      31.8                   12.9
## 6 South America          18.1      24.2                    6.17
```

```r
#load world map as an simple features object
world <- ne_countries(scale = "medium", returnclass = "sf") %>%
  select(name, continent, geometry)

#keep only the 6 continents
world <- world %>%
  filter(continent %in% c("Africa", "Asia", "Europe",
                          "North America", "South America", "Oceania"))

#join NEET % difference data to every country by continent
world_neet <- world %>%
  left_join(neet_change_continent,
            by = c("continent" = "Continent"))
```

```r
#plotting the percentage point difference by continent on the world map
ggplot(world_neet) +
  geom_sf(aes(fill = percentage_point_change), color = "grey30", size = 0.1) +
  scale_fill_gradient2(
    low = "lightgreen",
    mid = "lightyellow",
    high = "red",
    midpoint = 0,
    name = "Percentage \nPoint Difference"
  ) +
  labs(
    title = "Percentage Point Difference in Average NEET Rates (2015-2020)",
    subtitle = "Colour shows change by continent and "
  ) +
  theme_minimal() +
  theme(
    axis.text = element_blank(),
    panel.grid = element_blank()
  )
```

Percentage Point Difference in Average NEET Rates (2015−2020)

Colour shows change by continent and