+# Rapport d'Analyse de Données

Introduction

Ce rapport documente l'analyse approfondie des données de l'Indice de Développement Humain (IDH) collectées. L'objectif est de comprendre les tendances de développement humain à travers différents pays et régions du monde sur une période de temps donnée, allant de 1960 à 2021. Nous utiliserons diverses techniques de nettoyage, transformation et visualisation de données pour explorer ces informations de manière exhaustive.

Auteurs

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Description du Jeu de Données

Source des Données

- **Nom du jeu de données**: Indice de Développement Humain (IDH)
- **Source**: UNDP
- **Date de collecte**: 2024

Contenu des Données

- **Nombre de lignes**: 189 (pays)
- **Nombre de colonnes**: Plusieurs colonnes couvrant diverses années et indicateurs
- **Aperçu des colonnes**:
  - `iso3`: Code ISO 3 lettres du pays
  - `country`: Nom du pays
  - `hdicode`: Catégorie de l'IDH (Low, Medium, High, Very High)
  - `region`: Région géographique
  - `hdi_rank_2021`: Rang de l'IDH en 2021
  - `hdi_1990` à `hdi_2000`: Valeurs de l'IDH pour chaque année de 1990 à 2000
  - `le_1990`: Espérance de vie en 1990
  - `le_m_1990`: Espérance de vie pour les hommes en 1990
  - `le_f_1990`: Espérance de vie pour les femmes en 1990
  - `le_pc_1990`: Variation en pourcentage de l'espérance de vie en 1990
  - `mf_1990`: Ratio hommes-femmes en 1990
  - `phdi_1990`: Indice potentiel de développement humain en 1990
  - `eys_1990`: Années de scolarisation attendues en 1990
  - `mys_1990`: Nombre moyen d'années de scolarisation en 1990
  - `gnipc_1990`: Revenu national brut par habitant en 1990
  - `gdi_1990`: Indice de développement lié au genre en 1990

Variables d'Intérêt

Variables Qualitatives

hdicode (Catégorie de l'IDH) - Description: Cette variable indique la catégorie de l'Indice de Développement Humain (IDH) du pays. - Modalités: - Low: Pays à faible IDH - Medium: Pays à IDH moyen - High: Pays à IDH élevé - Very High: Pays à IDH très élevé - Données manquantes: Si présentes, elles indiqueront que l'IDH de ce pays n'est pas catégorisé.

region (Région géographique) - Description: Cette variable représente la région géographique où se trouve le pays. - Modalités: - SA: Asie du Sud - SSA: Afrique subsaharienne - ECA: Europe et Asie centrale - AS: Asie - (Autres modalités possibles correspondant à d'autres régions) - Données manquantes: Indiqueront qu'aucune région géographique n'est attribuée au pays.

Variables Quantitatives

hdi_2021 (IDH en 2021) - Description: Cette variable représente l'Indice de Développement Humain pour l'année 2021. - Unité de mesure: L'IDH est un nombre décimal entre 0 et 1, où 0 représente un développement humain très faible et 1 un développement humain très élevé. - Données manquantes: Si présentes, indiqueront que l'IDH pour l'année 2021 n'est pas disponible pour ce pays.

gnipc_1990 (Revenu National Brut par habitant en 1990) - Description: Cette variable indique le Revenu National Brut (RNB) par habitant pour l'année 1990. - Unité de mesure: Le RNB par habitant est généralement exprimé en dollars américains ($) constants pour une comparaison internationale. - Données manquantes: Si présentes, indiqueront que le RNB par habitant pour l'année 1990 n'est pas disponible pour ce pays.

1. Quels sont les pays qui ont connu la plus forte croissance de leur IDH de 2000 à 2021? Description : Cette question explore les pays qui ont réalisé les plus grandes améliorations dans leur développement humain au cours du 21e siècle. Analyse : Calculer la croissance de l'IDH pour chaque pays entre 2000 et 2021 et identifier ceux avec la plus forte croissance. Variables Utilisées : hdi_2000, hdi_2021.
2. Quelles sont les régions qui ont connu la plus forte croissance de l'IDH au 21e siècle ?
3. Comment la distribution de l'espérance de vie (le_1990) varie-t-elle entre les différentes catégories d'IDH (hdicode)? Description : Cette question explore comment l'espérance de vie en 1990 varie en fonction de la catégorie de développement humain d'un pays. Analyse : Utiliser des boxplots ou des diagrammes en barres pour comparer l'espérance de vie moyenne entre les différentes catégories d'IDH.
4. Existe-t-il une corrélation entre le Revenu National Brut par habitant (gnipc_1990) et l'IDH (hdi_2021)? Description : Cette question examine la relation entre le revenu d'un pays en 1990 et son développement humain en 2021. Analyse : Utiliser des outils statistiques pour analyser la corrélation entre gnipc_1990 et hdi_2021. Variables Utilisées : gnipc_1990, hdi_2021.

```
library(ggplot2)
library(dplyr)
```

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

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

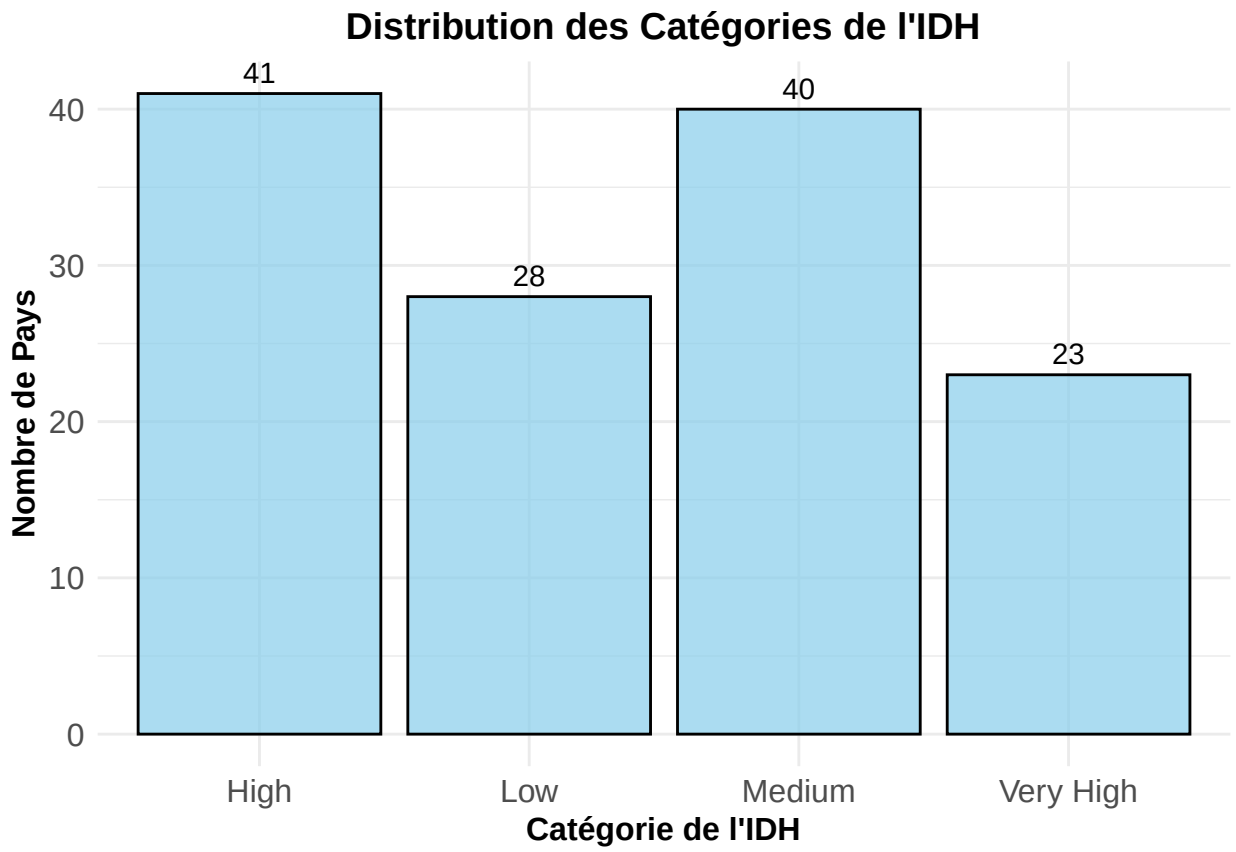
```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
# Load the data
hdi_data <- read.csv('HDI.csv')

# Remplacement des abréviations des régions par leurs noms complets
hdi_data$region <- gsub("EAP", "East Asia and Pacific", hdi_data$region)
hdi_data$region <- gsub("ECA", "Europe and Central Asia", hdi_data$region)
hdi_data$region <- gsub("LAC", "Latin America & the Caribbean", hdi_data$region)
hdi_data$region <- gsub("MNA.", "Middle East and North Africa", hdi_data$region)
hdi_data$region <- gsub("SAR", "South Asia", hdi_data$region)
hdi_data$region <- gsub("SSA", "Sub-Saharan Africa", hdi_data$region)
hdi_data$region <- gsub("SA", "South Asia", hdi_data$region)
hdi_data$region <- gsub("AS", "Asia", hdi_data$region)

# Supprimer les lignes avec des valeurs manquantes dans les colonnes qualitatives
hdi_data <- hdi_data %>%
  filter(!is.na(hdicode) & hdicode != "" & !is.na(region) & region != "")

# Calculate the HDI growth for each country from 2000 to 2021
hdi_data <- hdi_data %>%
  mutate(hdi_growth_2000_2021 = hdi_2021 - hdi_2000)

# Remove non-finite values in hdi_growth_2000_2021
hdi_data <- hdi_data %>%
  filter(is.finite(hdi_growth_2000_2021))

# Part 1: Countries with the Highest HDI Growth from 2000 to 2021

# Identify top countries with highest HDI growth
top_countries_hdi_growth <- hdi_data %>%
  arrange(desc(hdi_growth_2000_2021)) %>%
  select(country, hdi_2000, hdi_2021, hdi_growth_2000_2021) %>%
  head(10)

# Check the data to ensure it's correct
print(top_countries_hdi_growth)
```

```
##         country hdi_2000 hdi_2021 hdi_growth_2000_2021
## 1      Ethiopia    0.287    0.498                0.211
## 2        Angola    0.375    0.586                0.211
## 3        Rwanda    0.340    0.534                0.194
## 4         China    0.584    0.768                0.184
## 5    Bangladesh    0.485    0.661                0.176
## 6       Myanmar    0.410    0.585                0.175
## 7      Cambodia    0.425    0.593                0.168
## 8        Turkey    0.670    0.838                0.168
## 9       Morocco    0.521    0.683                0.162
## 10 Sierra Leone    0.318    0.477                0.159
```

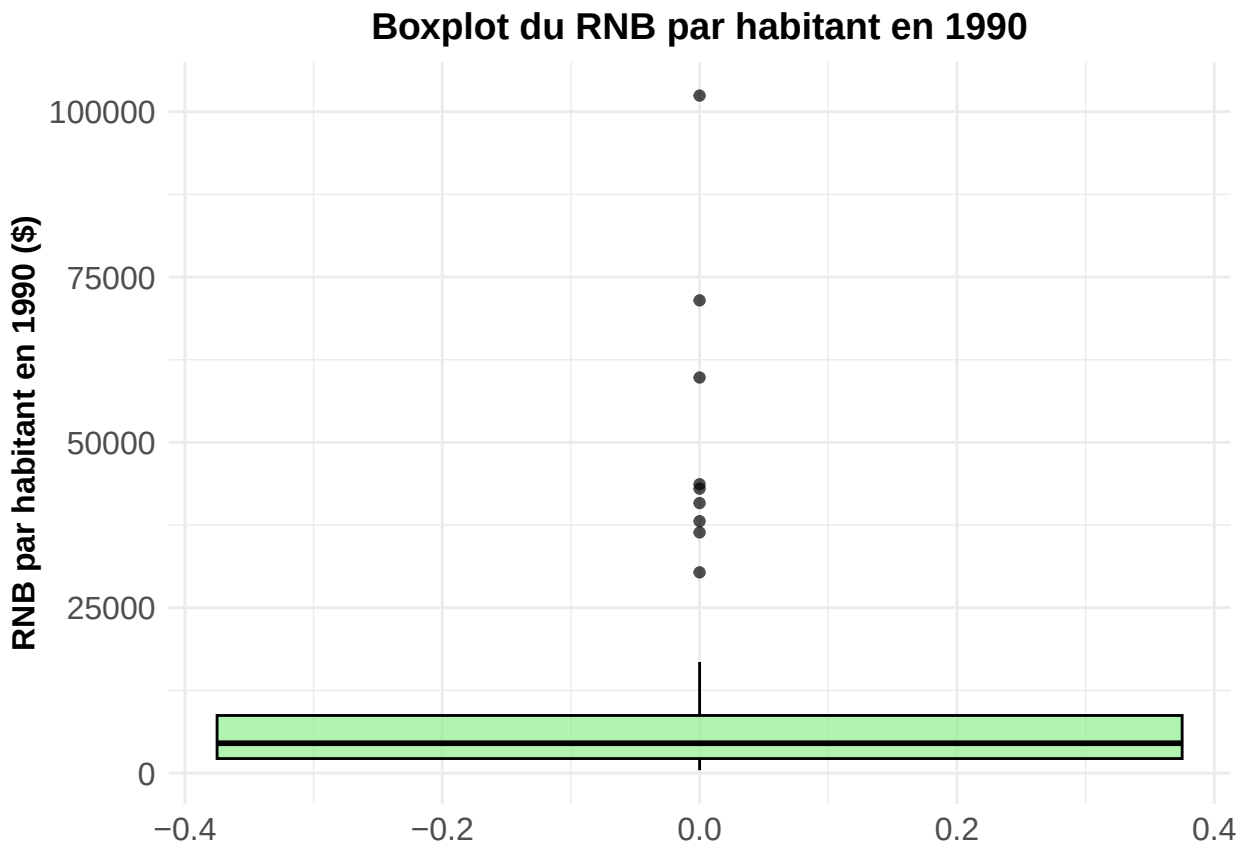
```r
# Diagramme en barres pour la distribution des catégories de l'IDH
ggplot(hdi_data, aes(x = hdicode)) +
  geom_bar(fill = "skyblue", color = "black", alpha = 0.7) +
  labs(title = "Distribution des Catégories de l'IDH", x = "Catégorie de l'IDH", y = "Nombre de Pays") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  ) +
  geom_text(stat='count', aes(label=..count..), vjust=-0.5)
```

```
## Warning: The dot-dot notation (‘..count..‘) was deprecated in ggplot2 3.4.0.
## i Please use ‘after_stat(count)‘ instead.
```



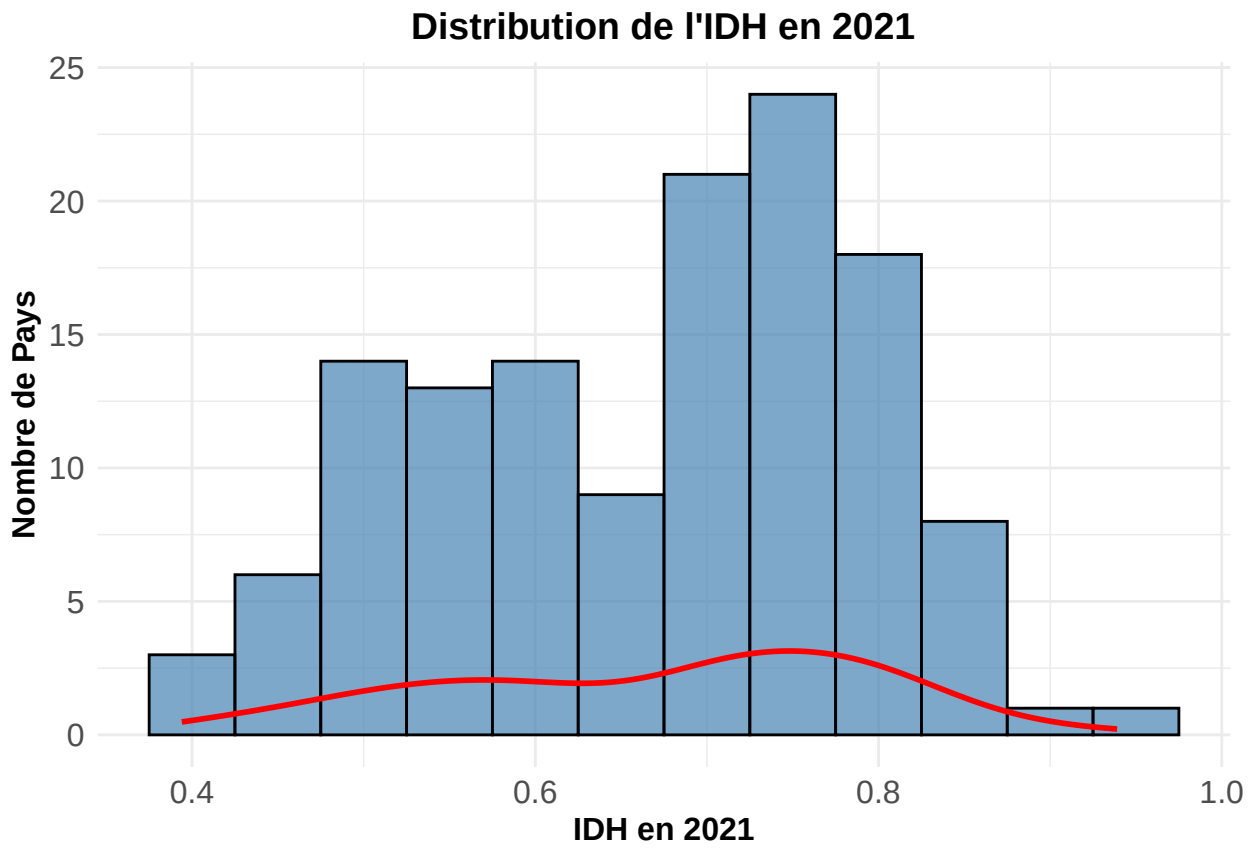

```r
# Boxplot pour le RNB par habitant en 1990
ggplot(hdi_data, aes(y = gnipc_1990)) +
  geom_boxplot(fill = "lightgreen", color = "black", alpha = 0.7) +
  labs(title = "Boxplot du RNB par habitant en 1990", y = "RNB par habitant en 1990 ($)") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  )
```

```
## Warning: Removed 4 rows containing non-finite values (`stat_boxplot()`).
```

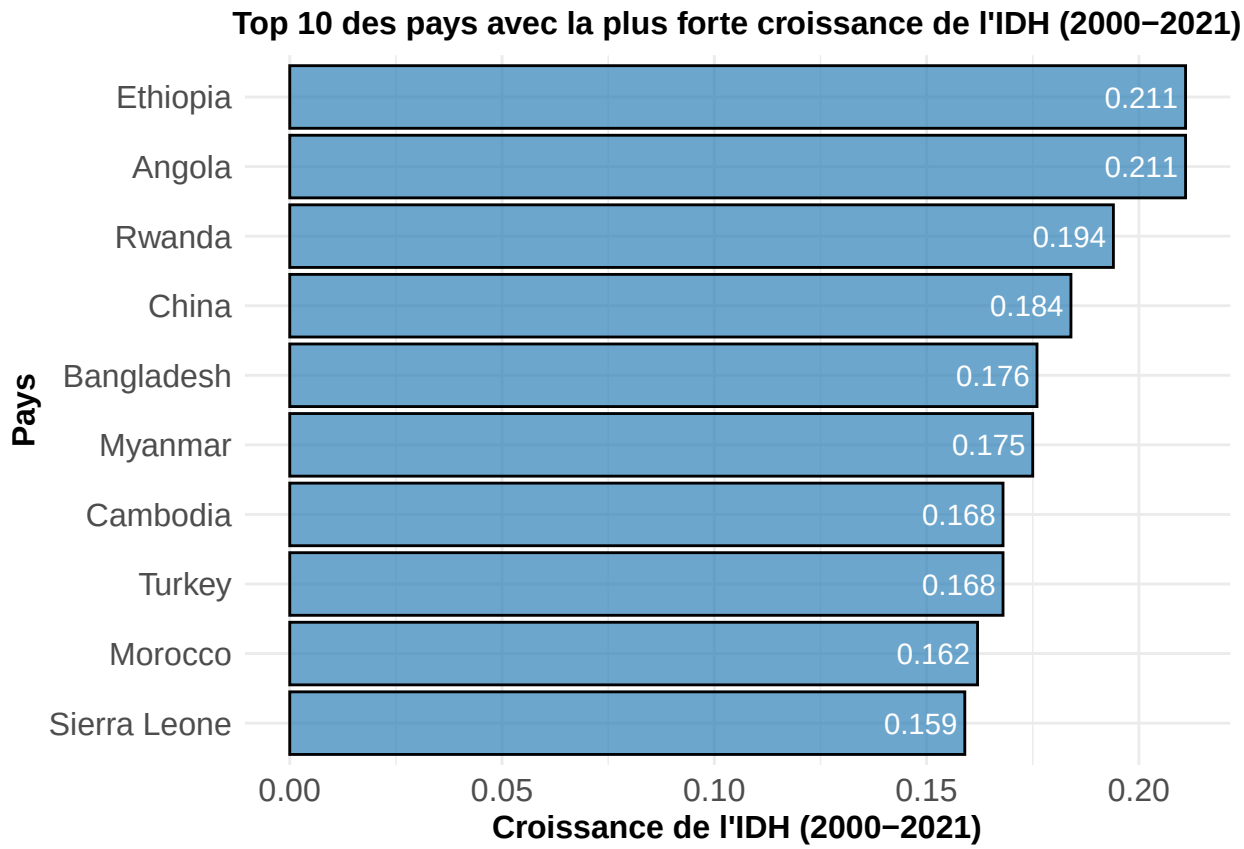



```
# Histogramme pour la distribution de l'IDH en 2021
ggplot(hdi_data, aes(x = hdi_2021)) +
  geom_histogram(binwidth = 0.05, fill = "steelblue", color = "black", alpha = 0.7) +
  labs(title = "Distribution de l'IDH en 2021", x = "IDH en 2021", y = "Nombre de Pays") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  ) +
  geom_density(aes(y = ..density..), color = "red", size = 1, alpha = 0.7)
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
```

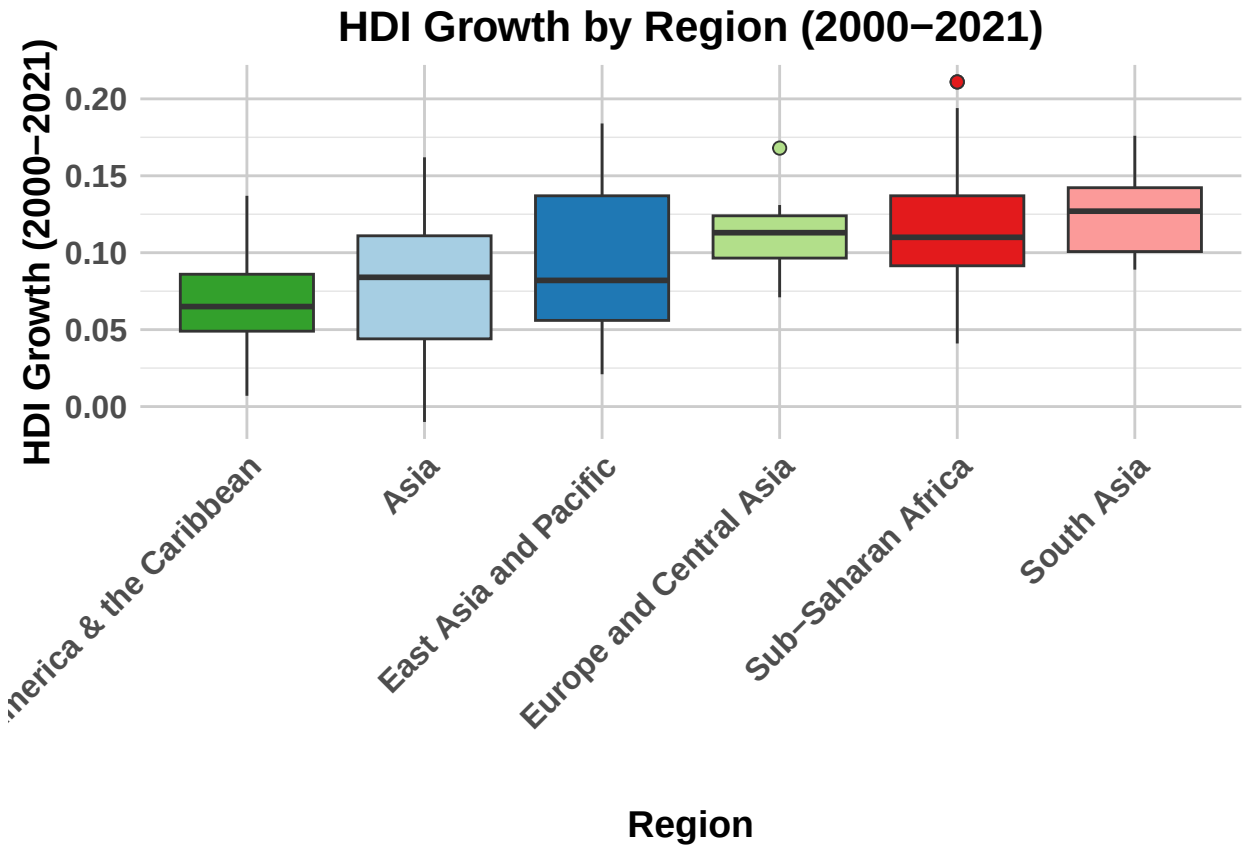



```r
# Diagramme en barres pour les 10 pays ayant la plus forte croissance de l'IDH
ggplot(top_countries_hdi_growth, aes(x = reorder(country, hdi_growth_2000_2021), y = hdi_growth_2000_20
  geom_bar(stat = "identity", fill = "#2c7fb8", color = "black", alpha = 0.7) +
  coord_flip() +
  xlab("Pays") +
  ylab("Croissance de l'IDH (2000-2021)") +
  ggtitle("Top 10 des pays avec la plus forte croissance de l'IDH (2000-2021)") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 12),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  ) +
  geom_text(aes(label=round(hdi_growth_2000_2021, 3)), hjust=1.1, color="white")
```

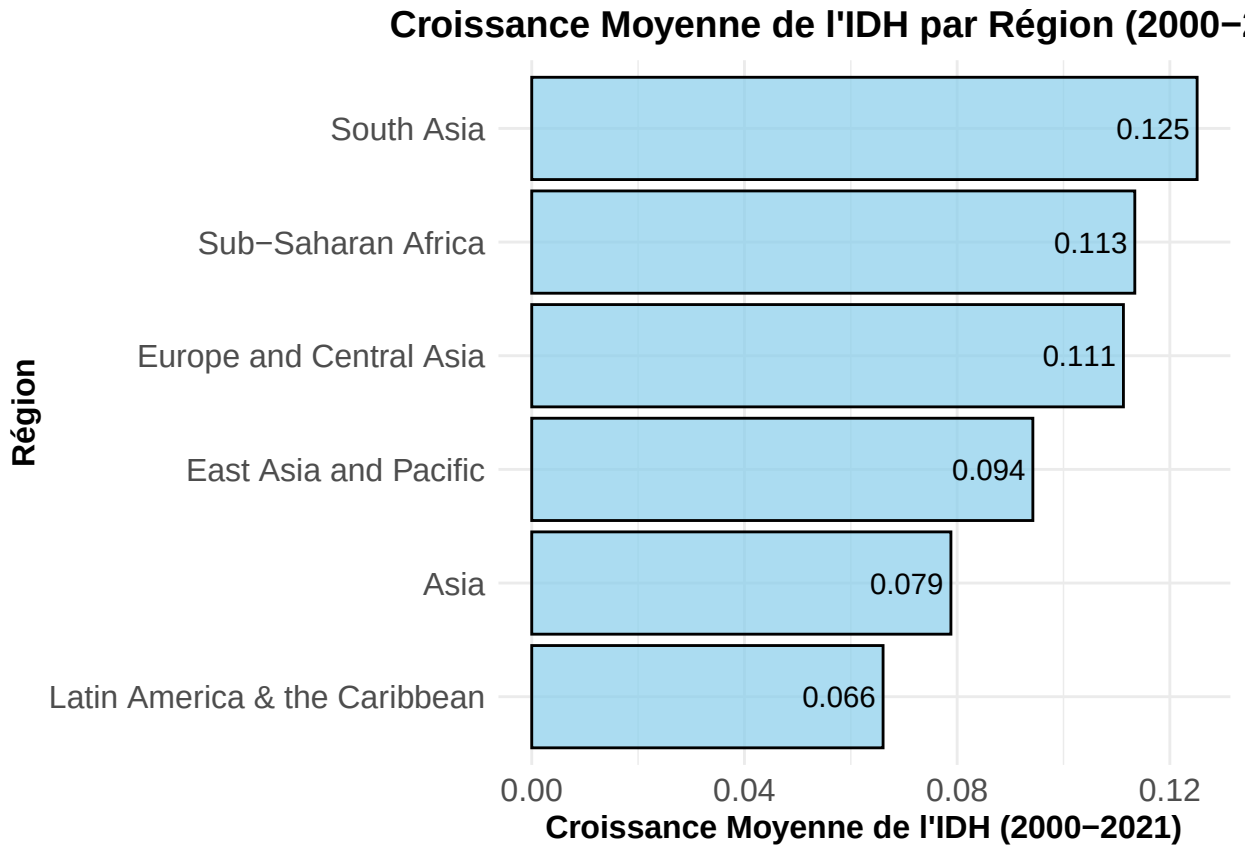



```r
# Part 2: Regions with the Highest HDI Growth in the 21st Century

# Calculate the average HDI growth for each region
region_hdi_growth <- hdi_data %>%
  group_by(region) %>%
  summarize(
    hdi_2000_mean = mean(hdi_2000, na.rm = TRUE),
    hdi_2021_mean = mean(hdi_2021, na.rm = TRUE)
  ) %>%
  mutate(hdi_growth_2000_2021 = hdi_2021_mean - hdi_2000_mean) %>%
  arrange(desc(hdi_growth_2000_2021))

# Calculer la croissance moyenne de l'IDH pour chaque région
region_hdi_growth2 <- hdi_data %>%
  group_by(region) %>%
  summarize(
    hdi_growth_mean = mean(hdi_growth_2000_2021, na.rm = TRUE)
  )

# Enhanced box plot for HDI growth by region
ggplot(hdi_data, aes(x = reorder(region, hdi_growth_2000_2021), y = hdi_growth_2000_2021, fill = region)
  geom_boxplot(outlier.shape = 21, outlier.size = 2) +
  ylab("HDI Growth (2000-2021)") +
  xlab("Region") +
  ggtitle("HDI Growth by Region (2000-2021)") +
  theme_minimal() +
```

```
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 16),
    axis.text = element_text(size = 12, face = "bold"),
    axis.title = element_text(size = 14, face = "bold"),
    axis.text.x = element_text(angle = 45, hjust = 1),
    legend.position = "none",
    panel.grid.major = element_line(color = "grey80"),
    panel.grid.minor = element_line(color = "grey90")
  ) +
  scale_fill_brewer(palette = "Paired")
```




```
# Histogramme de la croissance moyenne de l'IDH par région
ggplot(region_hdi_growth2, aes(x = reorder(region, hdi_growth_mean), y = hdi_growth_mean)) +
  geom_bar(stat = "identity", fill = "skyblue", color = "black", alpha = 0.7) +
  coord_flip() +
  xlab("Région") +
  ylab("Croissance Moyenne de l'IDH (2000-2021)") +
  ggtitle("Croissance Moyenne de l'IDH par Région (2000-2021)") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  ) +
  geom_text(aes(label=round(hdi_growth_mean, 3)), hjust=1.1, color="black")
```



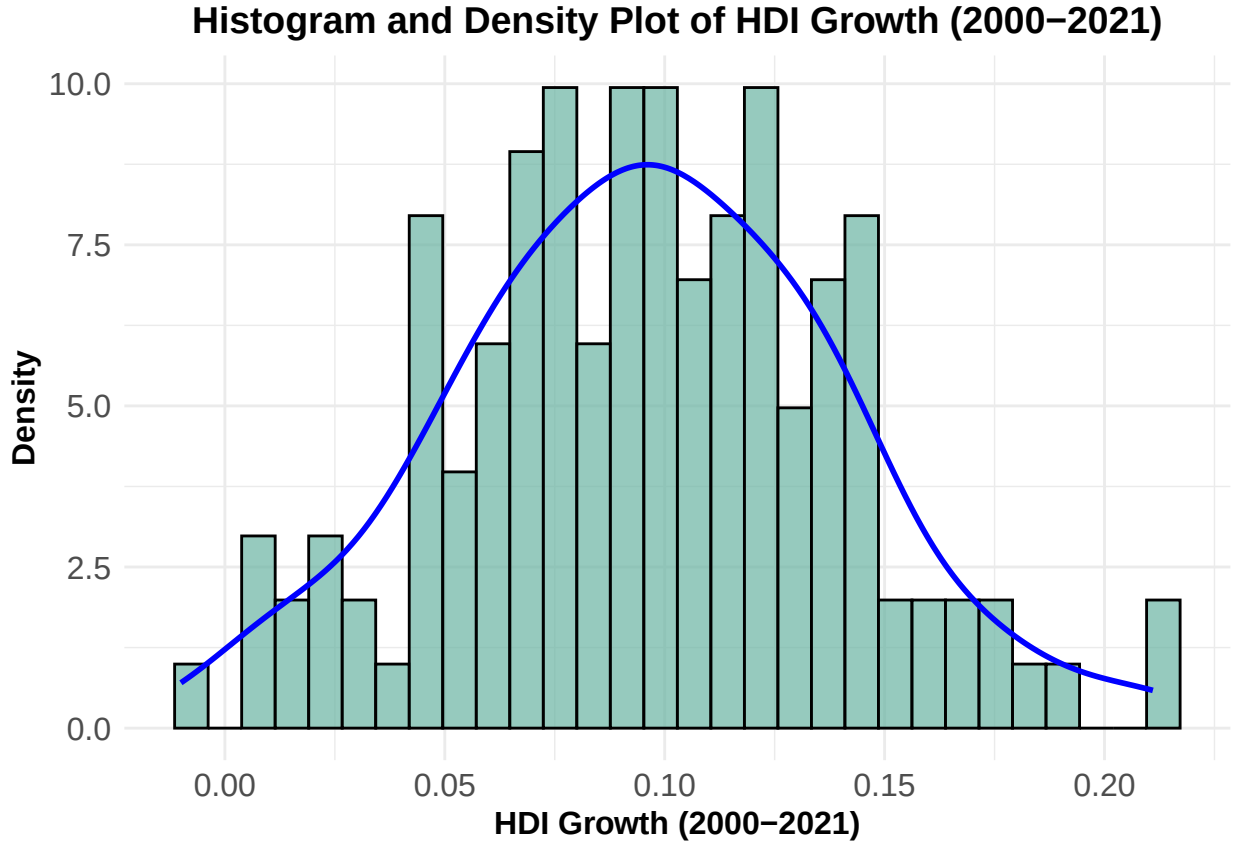

```r
# Résumé pour les  regions
region_summary <- hdi_data %>%
  group_by(region) %>%
  summarize(count = n())

print(region_summary)
```

```
## # A tibble: 6 x 2
##   region                         count
##   <chr>                          <int>
## 1 Asia                              17
## 2 East Asia and Pacific             21
## 3 Europe and Central Asia           15
## 4 Latin America & the Caribbean     29
## 5 South Asia                         8
## 6 Sub-Saharan Africa                42
```

```r
# Résumé statistiques pour la croissance de l'IDH
hdi_growth_summary <- hdi_data %>%
  summarize(
    mean = mean(hdi_growth_2000_2021, na.rm = TRUE),
    variance = var(hdi_growth_2000_2021, na.rm = TRUE),
    sd = sd(hdi_growth_2000_2021, na.rm = TRUE)
  )

print(hdi_growth_summary)
```

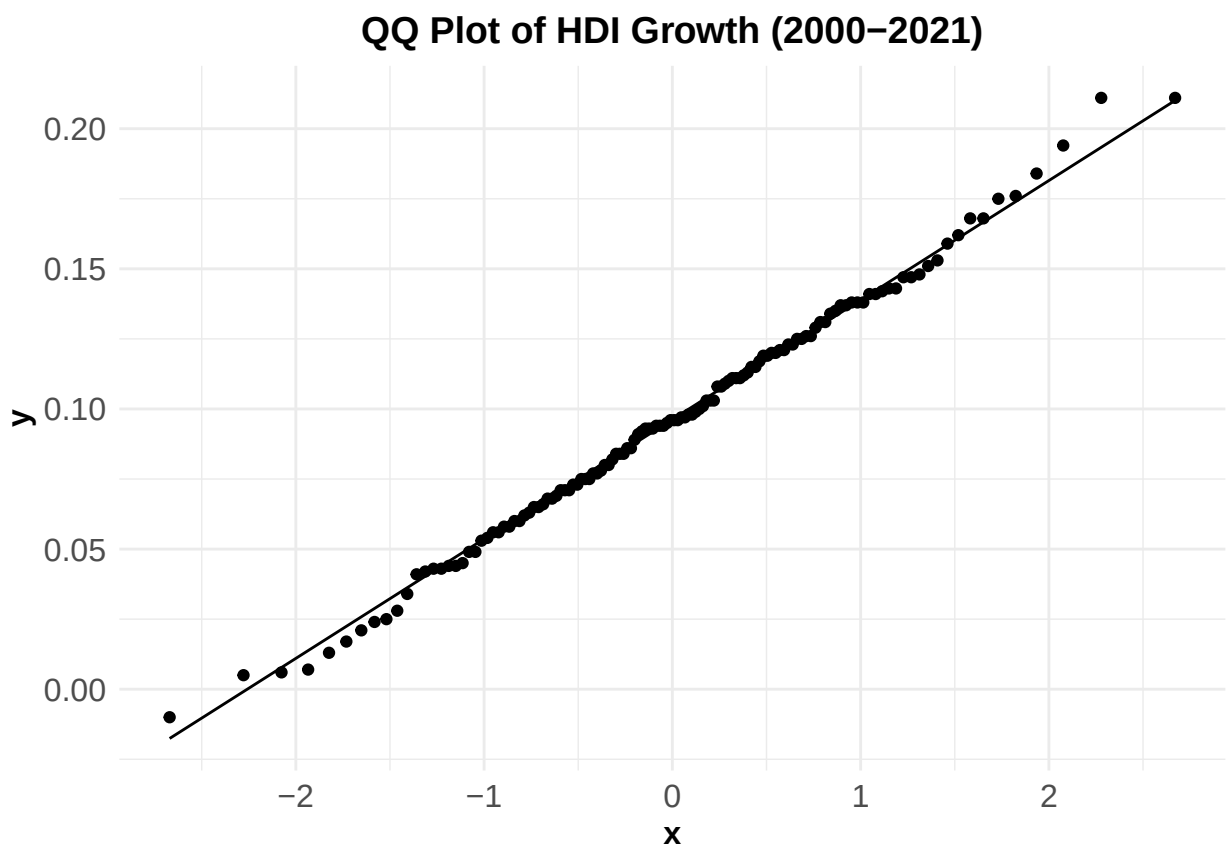
```
##        mean    variance         sd
## 1 0.0959697 0.001909144 0.04369375
```

```r
# Histogram and QQ plot for HDI growth
ggplot(hdi_data, aes(x = hdi_growth_2000_2021)) +
  geom_histogram(aes(y = ..density..), bins = 30, fill = "#69b3a2", color = "black", alpha = 0.7) +
  geom_density(color = "blue", size = 1) +
  ggtitle("Histogram and Density Plot of HDI Growth (2000-2021)") +
  xlab("HDI Growth (2000-2021)") +
  ylab("Density") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  )
```




```r
# QQ plot
ggplot(hdi_data, aes(sample = hdi_growth_2000_2021)) +
  stat_qq() +
  stat_qq_line() +
  ggtitle("QQ Plot of HDI Growth (2000-2021)") +
  theme_minimal() +
```

```
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  )
```




```
# Shapiro-Wilk test for normality
shapiro_test <- shapiro.test(hdi_data$hdi_growth_2000_2021)
print(shapiro_test)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  hdi_data$hdi_growth_2000_2021
## W = 0.99516, p-value = 0.9381
```

```
# Confidence interval for the mean of HDI growth
hdi_growth_mean <- mean(hdi_data$hdi_growth_2000_2021, na.rm = TRUE)
hdi_growth_sd <- sd(hdi_data$hdi_growth_2000_2021, na.rm = TRUE)
n <- nrow(hdi_data)

alpha <- 0.05
error_margin <- qt(1 - alpha/2, df = n - 1) * hdi_growth_sd / sqrt(n)
ci_lower <- hdi_growth_mean - error_margin
```

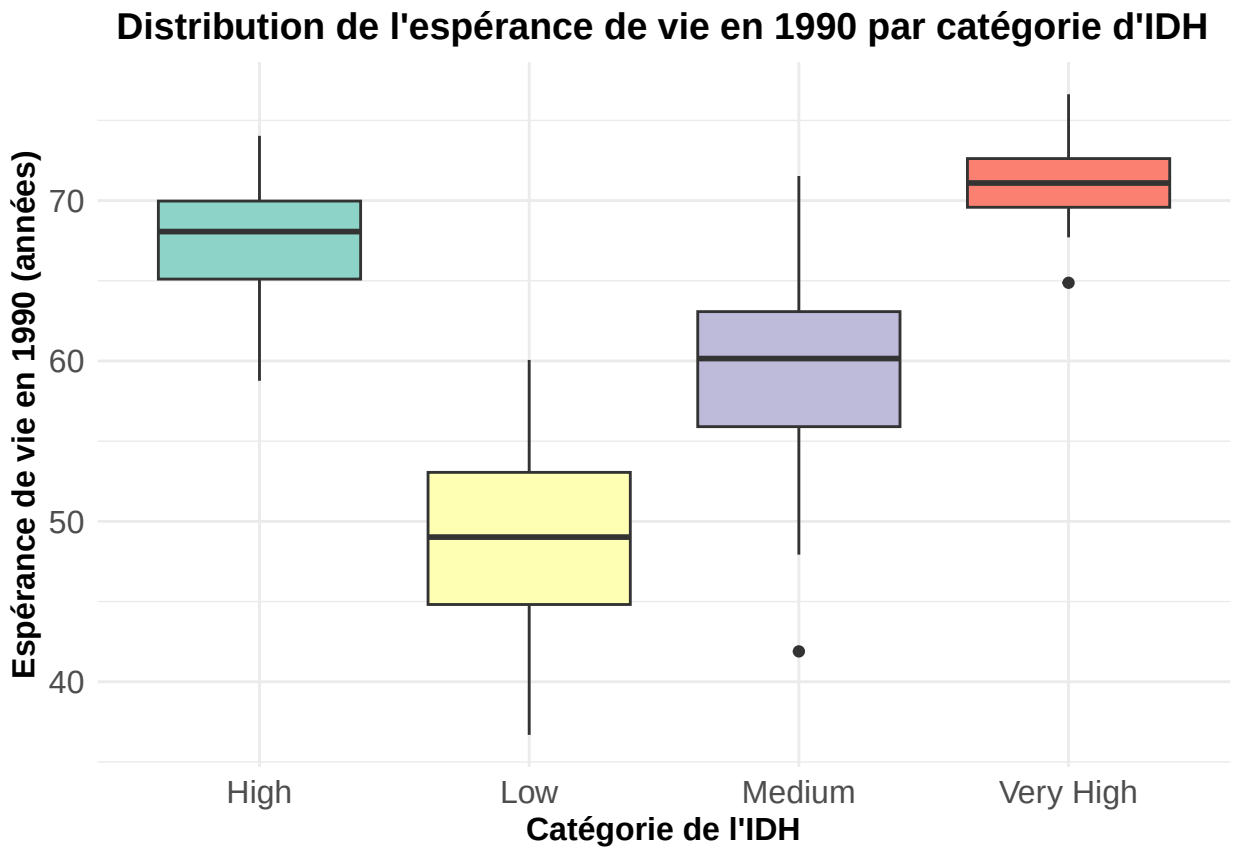
```r
ci_upper <- hdi_growth_mean + error_margin

cat("95% Confidence Interval for the mean of HDI Growth (2000-2021): [", ci_lower, ", ", ci_upper, "]\n
```

```
## 95% Confidence Interval for the mean of HDI Growth (2000-2021): [ 0.08844635 ,  0.103493 ]
```

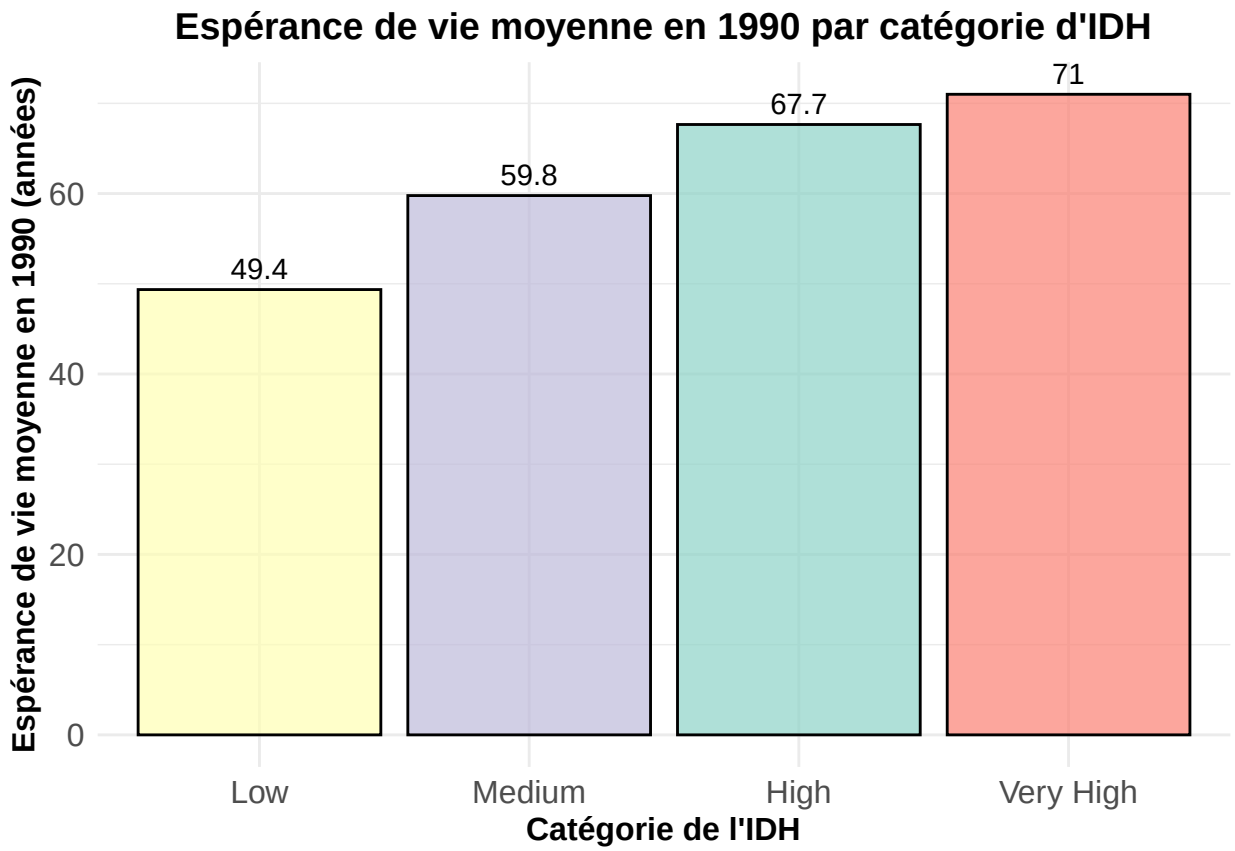
```r
# Proportion des pays de la région  Sub-Saharan Africa
prop_ssa <- sum(hdi_data$region == "Sub-Saharan Africa") / nrow(hdi_data)

# Interval de confiance pour la région Sub-Saharan Africa
prop_ci <- prop.test(sum(hdi_data$region == "Sub-Saharan Africa"), nrow(hdi_data), conf.level = 0.95)
print(prop_ci)
```

```
##
##  1-sample proportions test with continuity correction
##
## data:  sum(hdi_data$region == "Sub-Saharan Africa") out of nrow(hdi_data), null probability 0.5
## X-squared = 16.735, df = 1, p-value = 4.298e-05
## alternative hypothesis: true p is not equal to 0.5
## 95 percent confidence interval:
##  0.2413925 0.4057366
## sample estimates:
##         p
## 0.3181818
```

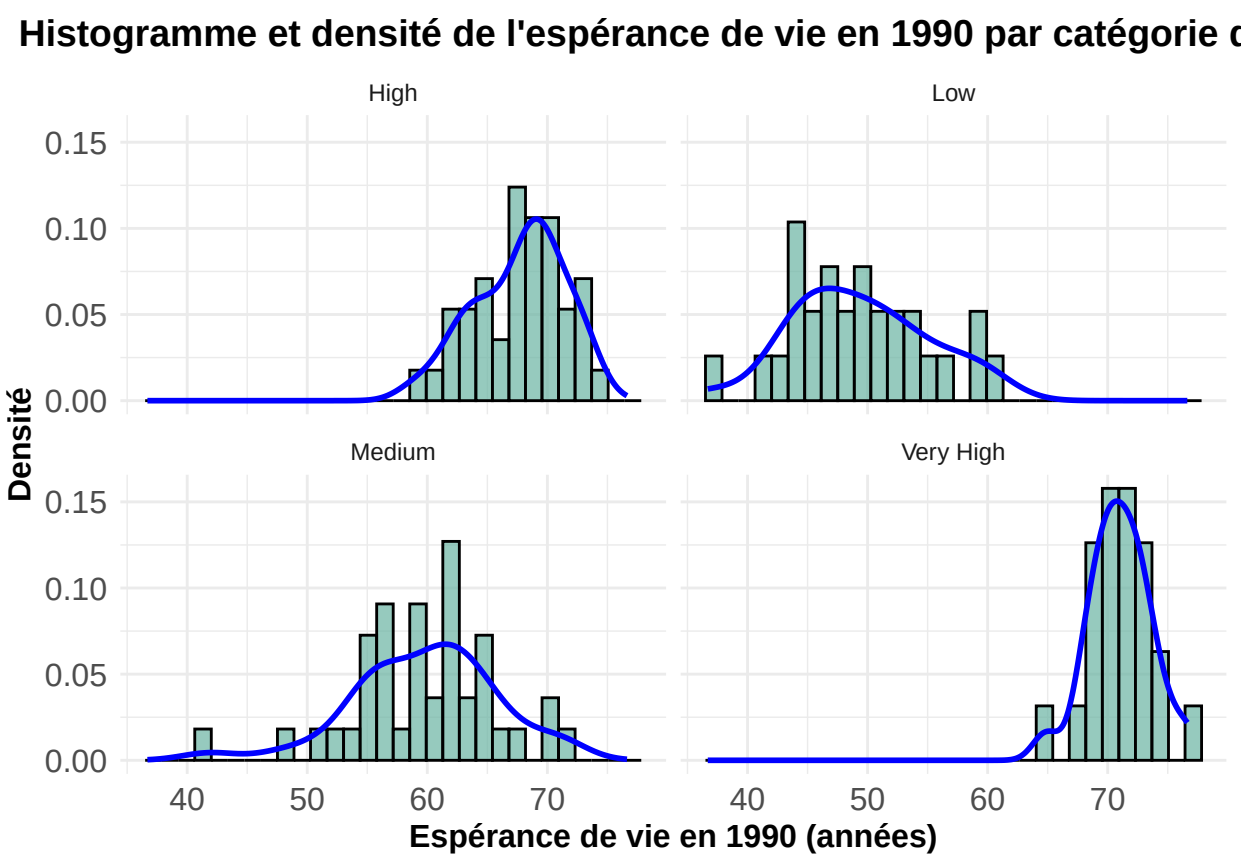
```r
# Boxplot pour l'espérance de vie en 1990 par catégorie d'IDH
ggplot(hdi_data, aes(x = hdicode, y = le_1990, fill = hdicode)) +
  geom_boxplot() +
  labs(title = "Distribution de l'espérance de vie en 1990 par catégorie d'IDH",
       x = "Catégorie de l'IDH",
       y = "Espérance de vie en 1990 (années)") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold"),
    legend.position = "none"
  ) +
  scale_fill_brewer(palette = "Set3")
```



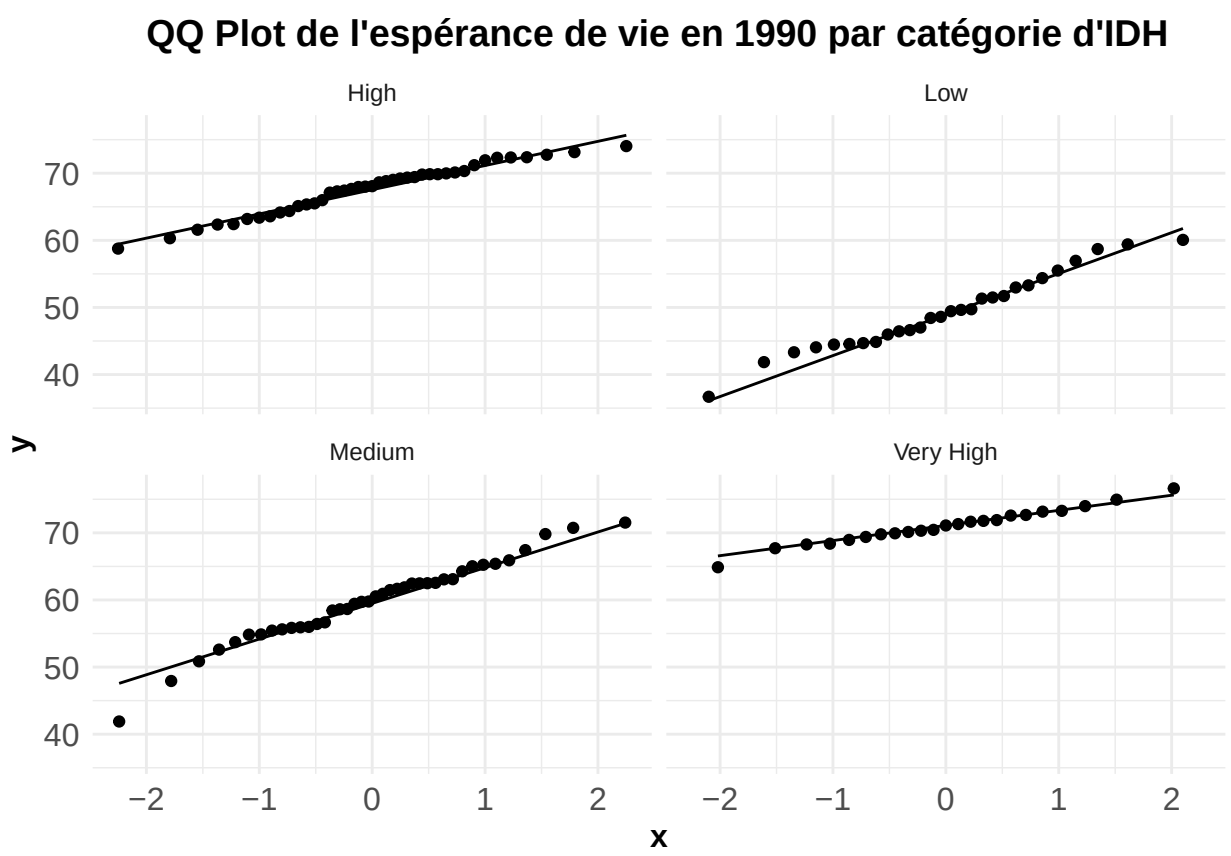

```r
# Calculer l'espérance de vie moyenne en 1990 par catégorie d'IDH
life_expectancy_summary <- hdi_data %>%
  group_by(hdicode) %>%
  summarize(mean_le_1990 = mean(le_1990, na.rm = TRUE))

# Diagramme en barres pour l'espérance de vie moyenne en 1990 par catégorie d'IDH
ggplot(life_expectancy_summary, aes(x = reorder(hdicode, mean_le_1990), y = mean_le_1990, fill = hdicod
  geom_bar(stat = "identity", color = "black", alpha = 0.7) +
  labs(title = "Espérance de vie moyenne en 1990 par catégorie d'IDH",
       x = "Catégorie de l'IDH",
       y = "Espérance de vie moyenne en 1990 (années)") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold"),
    legend.position = "none"
  ) +
  scale_fill_brewer(palette = "Set3") +
  geom_text(aes(label=round(mean_le_1990, 1)), vjust=-0.5, color="black")
```




```
# Histogramme et QQ plot pour chaque catégorie d'IDH
ggplot(hdi_data, aes(x = le_1990)) +
  geom_histogram(aes(y = ..density..), bins = 30, fill = "#69b3a2", color = "black", alpha = 0.7) +
  facet_wrap(~hdicode) +
  geom_density(color = "blue", size = 1) +
  ggtitle("Histogramme et densité de l'espérance de vie en 1990 par catégorie d'IDH") +
  xlab("Espérance de vie en 1990 (années)") +
  ylab("Densité") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  )
```




```
ggplot(hdi_data, aes(sample = le_1990)) +
  stat_qq() +
  stat_qq_line() +
  facet_wrap(~hdicode) +
  ggtitle("QQ Plot de l'espérance de vie en 1990 par catégorie d'IDH") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 14),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  )
```




```
# Test de Shapiro-Wilk pour chaque catégorie d'IDH
shapiro_tests <- hdi_data %>%
  group_by(hdicode) %>%
  summarize(p_value = shapiro.test(le_1990)$p.value)

print(shapiro_tests)
```

```
## # A tibble: 4 x 2
##   hdicode   p_value
##   <chr>       <dbl>
## 1 High        0.301
## 2 Low         0.722
## 3 Medium      0.484
## 4 Very High   0.999
```

```
# 2. Estimateurs de moyenne et de variance

# Moyenne et variance pour chaque catégorie d'IDH
summary_stats <- hdi_data %>%
  group_by(hdicode) %>%
  summarize(
    mean_le_1990 = mean(le_1990, na.rm = TRUE),
    var_le_1990 = var(le_1990, na.rm = TRUE),
    sd_le_1990 = sd(le_1990, na.rm = TRUE)
  )
```

```r
print(summary_stats)
```

```
## # A tibble: 4 x 4
##   hdicode   mean_le_1990 var_le_1990 sd_le_1990
##   <chr>            <dbl>       <dbl>      <dbl>
## 1 High              67.7       14.1        3.75
## 2 Low               49.4       32.2        5.68
## 3 Medium            59.8       36.2        6.02
## 4 Very High         71.0        6.67       2.58
```

```r
# 3. Intervalles de confiance des moyennes

# Calcul des intervalles de confiance pour la moyenne de l'espérance de vie en 1990 par catégorie d'IDH
ci_stats <- hdi_data %>%
  group_by(hdicode) %>%
  summarize(
    mean_le_1990 = mean(le_1990, na.rm = TRUE),
    sd_le_1990 = sd(le_1990, na.rm = TRUE),
    n = n()
  ) %>%
  mutate(
    error_margin = qt(1 - 0.05/2, df = n - 1) * sd_le_1990 / sqrt(n),
    ci_lower = mean_le_1990 - error_margin,
    ci_upper = mean_le_1990 + error_margin
  )

print(ci_stats)
```

```
## # A tibble: 4 x 7
##   hdicode   mean_le_1990 sd_le_1990     n error_margin ci_lower ci_upper
##   <chr>            <dbl>      <dbl> <int>        <dbl>    <dbl>    <dbl>
## 1 High              67.7       3.75    41         1.18     66.5     68.8
## 2 Low               49.4       5.68    28         2.20     47.2     51.6
## 3 Medium            59.8       6.02    40         1.92     57.9     61.7
## 4 Very High         71.0       2.58    23         1.12     69.9     72.1
```

```r
# 4. Calcul d'intervalle de confiance d'une proportion pertinente

# Proportion des pays en Sub-Saharan Africa dans chaque catégorie d'IDH
prop_ssa <- hdi_data %>%
  filter(region == "Sub-Saharan Africa") %>%
  group_by(hdicode) %>%
  summarize(proportion = n() / sum(hdi_data$hdicode == hdicode))
```

```
## Warning in hdi_data$hdicode == hdicode: longer object length is not a multiple
## of shorter object length
```

```r
# Calcul des intervalles de confiance pour la proportion
prop_ci <- hdi_data %>%
  filter(region == "Sub-Saharan Africa") %>%
  group_by(hdicode) %>%
```

```
  summarize(
    n = n(),
    N = sum(hdi_data$hdicode == hdicode)
  ) %>%
  mutate(
    proportion = n / N,
    error_margin = qt(1 - 0.05/2, df = N - 1) * sqrt((proportion * (1 - proportion)) / N),
    ci_lower = proportion - error_margin,
    ci_upper = proportion + error_margin
  )
```

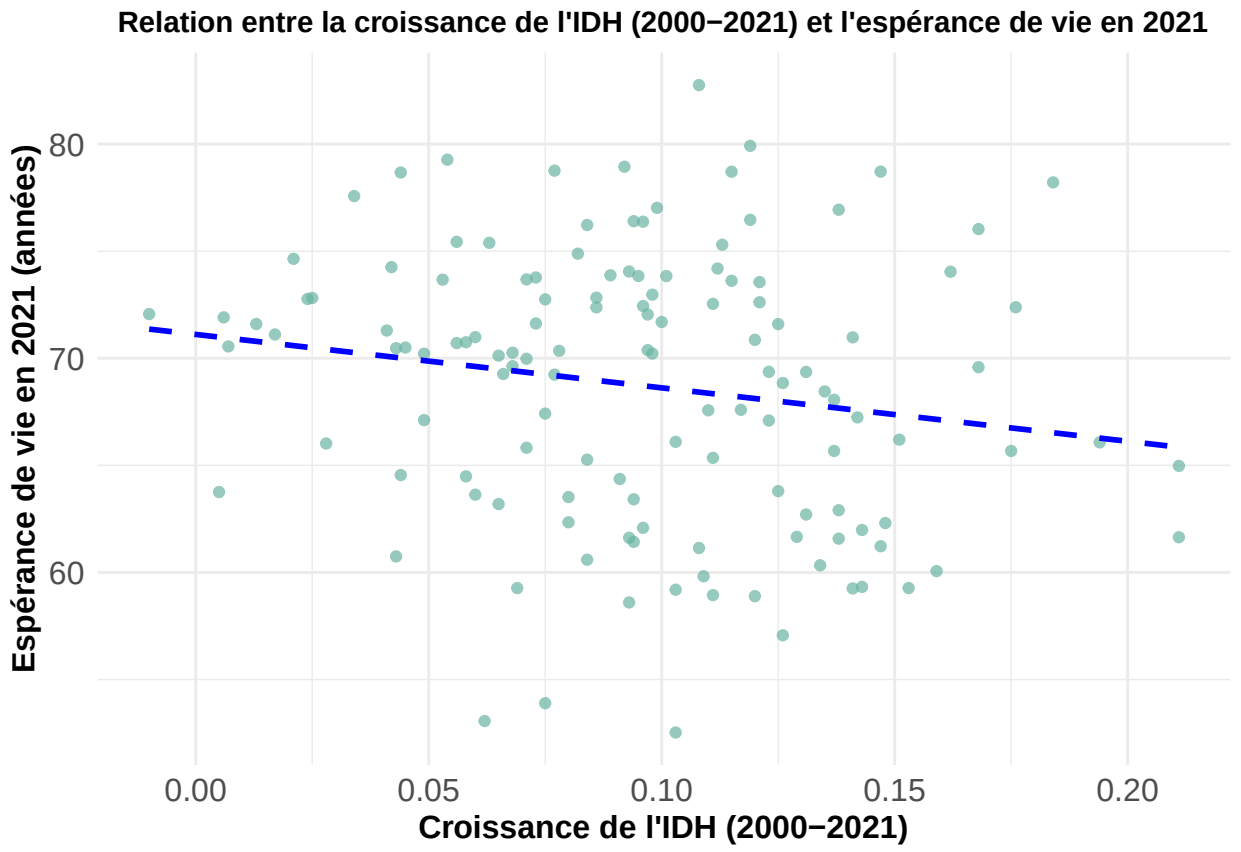
```
## Warning in hdi_data$hdicode == hdicode: longer object length is not a multiple
## of shorter object length
```

```
print(prop_ci)
```

```
## # A tibble: 4 x 7
##   hdicode       n     N proportion error_margin ci_lower ci_upper
##   <chr>     <int> <int>      <dbl>        <dbl>    <dbl>    <dbl>
## 1 High          3    41     0.0732       0.0822 -0.00903    0.155
## 2 Low          22    28     0.786        0.159   0.627      0.945
## 3 Medium       16    40     0.4          0.157   0.243      0.557
## 4 Very High     1    23     0.0435       0.0882 -0.0447     0.132
```

```
# 1. Diagramme de dispersion pour visualiser la relation entre hdi_growth_2000_2021 et le_2021
ggplot(hdi_data, aes(x = hdi_growth_2000_2021, y = le_2021)) +
  geom_point(color = "#69b3a2", alpha = 0.7) +
  geom_smooth(method = "lm", se = FALSE, color = "blue", linetype = "dashed") +
  labs(title = "Relation entre la croissance de l'IDH (2000-2021) et l'espérance de vie en 2021",
       x = "Croissance de l'IDH (2000-2021)",
       y = "Espérance de vie en 2021 (années)") +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold", size = 11),
    axis.text = element_text(size = 12),
    axis.title = element_text(size = 12, face = "bold")
  )
```

```
## `geom_smooth()` using formula = 'y ~ x'
```




```
# 2. Calculer le coefficient de corrélation de Pearson
correlation <- cor(hdi_data$hdi_growth_2000_2021, hdi_data$le_2021, use = "complete.obs")
cat("Le coefficient de corrélation de Pearson entre hdi_growth_2000_2021 et le_2021 est :", correlation
```

```
## Le coefficient de corrélation de Pearson entre hdi_growth_2000_2021 et le_2021 est : -0.1725717
```

```
# 3. Test de significativité de la corrélation
cor_test <- cor.test(hdi_data$hdi_growth_2000_2021, hdi_data$le_2021)
print(cor_test)
```

```
##
##  Pearson's product-moment correlation
##
## data:  hdi_data$hdi_growth_2000_2021 and hdi_data$le_2021
## t = -1.9976, df = 130, p-value = 0.04785
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.333606840 -0.001750902
## sample estimates:
##        cor
## -0.1725717
```

```
file_path <- "HDI.csv"
data <- read.csv(file_path)
```

```r
# Suppression des lignes avec des valeurs nulles ou vides dans la colonne 'region'
data <- data[!is.na(data$region) & data$region != "", ]

# Remplacement des abréviations des régions par leurs noms complets
data$region <- gsub("EAP", "East Asia and Pacific", data$region)
data$region <- gsub("ECA", "Europe and Central Asia", data$region)
data$region <- gsub("LAC", "Latin America and the Caribbean", data$region)
data$region <- gsub("MNA.", "Middle East and North Africa", data$region)
data$region <- gsub("SAR", "South Asia", data$region)
data$region <- gsub("SSA", "Sub-Saharan Africa", data$region)
data$region <- gsub("SA", "South Asia", data$region)
data$region <- gsub("AS", "Asia", data$region)

# Vérification des modifications
head(data)
```

```
##   iso3              country   hdicode                         region
## 1  AFG          Afghanistan       Low                     South Asia
## 2  AGO               Angola    Medium             Sub-Saharan Africa
## 3  ALB              Albania      High         Europe and Central Asia
## 5  ARE United Arab Emirates Very High                           Asia
## 6  ARG            Argentina Very High Latin America and the Caribbean
## 7  ARM              Armenia      High         Europe and Central Asia
##   hdi_rank_2021 hdi_1990 hdi_1991 hdi_1992 hdi_1993 hdi_1994 hdi_1995 hdi_1996
## 1           180    0.273    0.279    0.287    0.297    0.292    0.310    0.319
## 2           148       NA       NA       NA       NA       NA       NA       NA
## 3            67    0.647    0.629    0.614    0.617    0.624    0.634    0.645
## 5            26    0.728    0.739    0.742    0.748    0.755    0.762    0.767
## 6            47    0.723    0.730    0.735    0.739    0.744    0.745    0.751
## 7            85    0.656    0.649    0.618    0.616    0.620    0.627    0.632
##   hdi_1997 hdi_1998 hdi_1999 hdi_2000 hdi_2001 hdi_2002 hdi_2003 hdi_2004
## 1    0.323    0.324    0.332    0.335    0.337    0.362    0.376    0.392
## 2       NA       NA    0.364    0.375    0.386    0.403    0.420    0.433
## 3    0.642    0.657    0.669    0.677    0.684    0.689    0.696    0.700
## 5    0.773    0.779    0.787    0.796    0.800    0.804    0.814    0.818
## 6    0.756    0.762    0.773    0.779    0.784    0.785    0.793    0.798
## 7    0.641    0.654    0.657    0.662    0.666    0.676    0.686    0.694
##   hdi_2005 hdi_2006 hdi_2007 hdi_2008 hdi_2009 hdi_2010 hdi_2011 hdi_2012
## 1    0.400    0.409    0.424    0.430    0.440    0.448    0.456    0.466
## 2    0.447    0.459    0.475    0.486    0.500    0.510    0.526    0.541
## 3    0.711    0.718    0.730    0.736    0.741    0.754    0.766    0.778
## 5    0.822    0.827    0.831    0.834    0.833    0.835    0.840    0.846
## 6    0.802    0.814    0.817    0.825    0.827    0.834    0.841    0.843
## 7    0.707    0.721    0.738    0.742    0.741    0.746    0.750    0.755
##   hdi_2013 hdi_2014 hdi_2015 hdi_2016 hdi_2017 hdi_2018 hdi_2019 hdi_2020
## 1    0.474    0.479    0.478    0.481    0.482    0.483    0.488    0.483
## 2    0.552    0.563    0.582    0.596    0.597    0.595    0.595    0.590
## 3    0.785    0.792    0.795    0.798    0.802    0.806    0.810    0.794
## 5    0.852    0.859    0.865    0.870    0.897    0.909    0.920    0.912
## 6    0.845    0.846    0.848    0.847    0.851    0.850    0.852    0.840
## 7    0.760    0.764    0.766    0.765    0.768    0.771    0.778    0.757
##   hdi_2021 le_1990 le_1991 le_1992 le_1993 le_1994 le_1995 le_1996 le_1997
## 1    0.478 45.9672 46.6631 47.5955 51.4664 51.4945 52.5442 53.2433 53.6342
```

```
## 2    0.586 41.8933 43.8127 42.2088 42.1009 43.4217 45.8491 46.0329 46.3065
## 3    0.796 73.1439 73.3776 73.7148 73.9391 74.1313 74.3616 74.5923 73.9039
## 5    0.911 71.9004 72.2414 72.3062 72.5213 72.5982 72.6945 72.7674 72.9367
## 6    0.842 71.7837 72.3190 72.4295 72.5646 73.1725 73.1333 73.3066 73.0899
## 7    0.759 68.8209 68.6431 68.6266 68.8415 69.0725 69.3108 69.7828 69.9098
##   le_1998 le_1999 le_2000 le_2001 le_2002 le_2003 le_2004 le_2005 le_2006
## 1 52.9431 54.8464 55.2978 55.7981 56.4538 57.3445 57.9436 58.3608 58.6844
## 2 45.0570 45.3858 46.0236 46.5905 47.3865 49.6173 50.5920 51.5699 52.3688
## 3 74.9899 75.1828 75.4043 75.6388 75.8899 76.1421 76.3761 76.6208 76.8162
## 5 73.0658 73.6697 74.3800 74.6356 74.9010 76.2223 76.4532 76.6825 76.9087
## 6 73.4737 73.7219 73.9260 74.1864 74.4080 74.0801 74.8549 75.1388 75.4326
## 7 70.5142 70.2565 70.6236 70.9320 71.0179 71.4356 71.4205 71.7922 71.9868
##   le_2007 le_2008 le_2009 le_2010 le_2011 le_2012 le_2013 le_2014 le_2015
## 1 59.1113 59.8515 60.3636 60.8508 61.4191 61.9230 62.4167 62.5451 62.6587
## 2 53.6419 54.6327 55.7516 56.7258 57.5961 58.6231 59.3074 60.0397 60.6546
## 3 77.5491 77.6529 77.7810 77.9359 78.0919 78.0640 78.1226 78.4075 78.6441
## 5 77.1289 77.4877 78.0030 78.3335 78.5168 78.7155 78.8528 79.0442 79.2232
## 6 75.0057 75.6411 75.9359 75.7208 76.1240 76.4669 76.4908 76.7549 76.7602
## 7 72.3271 72.3985 72.8125 73.1597 73.3045 73.4540 73.6759 74.0577 74.4361
##   le_2016 le_2017 le_2018 le_2019 le_2020 le_2021 eys_1990 eys_1991 eys_1992
## 1 63.1361 63.0160 63.0810 63.5645 62.5751 61.9824  2.50405  2.80655  3.10905
## 2 61.0923 61.6798 62.1438 62.4484 62.2612 61.6434  3.53748  3.32483  3.30209
## 3 78.8602 79.0473 79.1838 79.2825 76.9893 76.4626 11.60293 11.76358 10.66378
## 5 79.3347 79.5036 79.6274 79.7262 78.9457 78.7104 10.47456 10.82239 10.65938
## 6 76.3077 76.8330 76.9994 77.2845 75.8921 75.3899 13.28104 13.23574 13.19059
## 7 74.6639 74.9059 75.0645 75.4386 72.1730 72.0431 10.92731 10.84546 10.76422
##   eys_1993 eys_1994 eys_1995 eys_1996 eys_1997 eys_1998  eys_1999  eys_2000
## 1  3.41155  3.71405  4.01655  4.31905  4.62155  4.92405  5.226550  5.529050
## 2  3.38587  3.46965  3.55343  3.63721  3.72099  3.80477  4.207226  4.609682
## 3 10.12650 10.09115 10.16617 10.22845 10.50508 10.66944 10.684940 10.589480
## 5 10.68766 10.80651 10.92537 11.04422 11.16308 11.28193 11.400786 11.519641
## 6 13.14545 13.10030 13.30911 13.51793 13.72675 13.93556 14.994220 15.535830
## 7 10.92055 10.61419 10.39615 10.17812 10.53719 11.18412 11.371730 11.188040
##    eys_2001  eys_2002  eys_2003  eys_2004  eys_2005  eys_2006  eys_2007
## 1  5.831550  6.134050  6.436550  7.393880  7.660418  7.926956  8.193494
## 2  5.012138  5.414593  5.817049  6.219505  6.621961  7.024417  7.426873
## 3 10.684410 10.701520 10.904710 10.884790 11.419280 11.582050 11.964230
## 5 11.638495 11.757349 11.876204 11.995058 12.113912 12.232767 12.351621
## 6 16.169960 16.279591 16.175550 16.225969 15.967810 16.152290 16.172800
## 7 10.920910 10.956490 10.992070 11.027650 11.385280 11.924650 12.616290
##    eys_2008  eys_2009 eys_2010 eys_2011  eys_2012  eys_2013 eys_2014 eys_2015
## 1  8.460032  8.726570  9.00269  9.27881  9.577323  9.875836 10.17435 10.18015
## 2  7.829328  8.231784  8.63424  9.56008 10.082500 10.604900 11.12730 11.64970
## 3 12.124880 12.263760 12.99997 13.74845 14.586650 14.925640 15.25242 15.07630
## 5 12.470476 12.589330 12.70818 12.82704 12.945893 13.064747 13.18360 13.30246
## 6 16.341551 16.673849 16.96805 17.17383 17.107370 17.091850 17.27014 17.40955
## 7 12.410850 12.956800 13.08649 13.12233 13.116395 13.110460 13.10354 12.96795
##   eys_2016 eys_2017 eys_2018 eys_2019 eys_2020 eys_2021  mys_1990 mys_1991
## 1 10.18595 10.19175 10.19755 10.26384 10.26384 10.26384 0.9711254 1.019356
## 2 12.17209 12.17210 12.17210 12.17210 12.17210 12.17210        NA       NA
## 3 14.80460 14.81613 14.69562 14.81892 14.44800 14.44800 7.3546321 7.352754
## 5 13.42131 14.34410 15.01912 15.69414 15.71769 15.71769 5.7599062 6.058644
## 6 17.66886 17.65420 17.65618 17.87487 17.87487 17.87487 8.1260894 8.192950
## 7 13.00150 13.03506 13.06861 13.10609 13.11676 13.11676 9.7817598 9.851629
```

```
##   mys_1992 mys_1993  mys_1994  mys_1995  mys_1996  mys_1997  mys_1998  mys_1999
## 1 1.067586 1.115817  1.164047  1.212277  1.251383  1.290489  1.329594  1.368700
## 2       NA       NA        NA        NA        NA        NA        NA  3.393500
## 3 7.350875 7.348996  7.347118  7.345239  7.627026  7.908813  8.190599  8.472386
## 5 6.357381 6.656119  6.954857  7.253594  7.499132  7.744670  7.990207  8.235745
## 6 8.260361 8.327772  8.395183  8.462594  8.530005  8.597416  8.664827  8.732238
## 7 9.921499 9.991369 10.061239 10.131108 10.202919 10.274729 10.346540 10.418351
##    mys_2000  mys_2001  mys_2002  mys_2003  mys_2004  mys_2005  mys_2006
## 1  1.407806  1.465161  1.522516  1.579871  1.637226  1.694581  1.776703
## 2  3.424720  3.463880  3.504403  3.544927  3.585451  3.625975  3.666499
## 3  8.754173  8.823680  8.888406  8.953131  9.017857  9.082583  9.147309
## 5  8.481283  8.583590  8.685898  8.788205  8.890512  8.992820  9.160983
## 6  8.799649  8.867060  9.391140  9.915220 10.007093 10.098967 10.190840
## 7 10.490161 10.488220 10.558853 10.629486 10.700119 10.770752 10.841385
##    mys_2007  mys_2008  mys_2009  mys_2010  mys_2011  mys_2012  mys_2013
## 1  1.858825  1.940947  2.023069  2.105191  2.157332  2.209473  2.261614
## 2  3.707023  3.747547  3.788071  3.828594  3.869118  3.909642  3.950166
## 3  9.212034  9.276760  9.451740  9.626720  9.801700 10.025110 10.196281
## 5  9.329147  9.497311  9.665474  9.833638 10.001802 10.169965 10.338129
## 6 10.298600 10.406360 10.543210 10.599640 10.699790 10.785070 10.894600
## 7 10.912018 10.982651 11.053284 11.123917 11.194550 11.288965 11.383380
##    mys_2014  mys_2015  mys_2016  mys_2017  mys_2018  mys_2019  mys_2020
## 1  2.313755  2.365896  2.463660  2.561425  2.659189  2.756953  2.854718
## 2  3.990690  4.704040  5.417391  5.417391  5.417391  5.417391  5.417391
## 3 10.370374 10.547439 10.727528 10.910692 11.096983 11.286455 11.286455
## 5 10.506293 10.674456 10.842620 12.055400 12.484000 12.694030 12.694030
## 6 10.908510 10.917550 10.928190 11.016445 11.104700 11.147269 11.147269
## 7 11.477795 11.572210 11.379900 11.187590 11.235160 11.282730 11.330300
##    mys_2021 gnipc_1990 gnipc_1991 gnipc_1992 gnipc_1993 gnipc_1994 gnipc_1995
## 1  2.985070   2684.550   2276.289   2059.868   1525.533   1087.962   1339.087
## 2  5.417391   4845.707   5405.349   2073.902   2034.215   1557.198   3411.907
## 3 11.286455   4742.216   3358.088   3080.747   3538.885   3940.312   4583.051
## 5 12.694030 102433.136  96250.290  93043.477  92505.331  96784.427 101303.276
## 6 11.147269  13597.686  14803.999  15940.726  17132.684  17874.844  17091.771
## 7 11.330300   5210.202   4633.938   2741.696   2560.861   2752.651   3097.537
##   gnipc_1996 gnipc_1997 gnipc_1998 gnipc_1999  gnipc_2000  gnipc_2001
## 1   1332.307   1230.261   1149.902   1071.801    984.9974    894.0246
## 2   3372.994   3980.795   3902.584   3524.190   3690.6049   3900.7104
## 3   5044.975   4496.164   4952.597   5595.613   6065.1953   6645.3483
## 5 101490.244 103567.035  99915.769  98569.193 104640.2807 103519.0537
## 6  17782.845  18984.604  19427.083  18535.781  18180.4498  17153.2977
## 7   3334.672   3596.499   3778.688   3923.756   4178.3886   4602.4417
##   gnipc_2002 gnipc_2003 gnipc_2004 gnipc_2005 gnipc_2006 gnipc_2007 gnipc_2008
## 1   1267.629   1401.324   1384.696   1435.192   1518.768   1811.167   1753.067
## 2   4659.954   4684.385   4929.945   5390.700   5672.126   6359.181   6490.788
## 3   6920.555   7341.564   7756.648   8197.994   8814.502   9399.469   9962.442
## 5  96736.926  97761.537  98236.078  92443.556  88502.512  79459.263  69814.631
## 6  14727.851  16057.211  16058.544  17271.064  20131.403  21872.986  22558.471
## 7   5264.792   6031.859   6753.741   7747.422   8881.593  10262.080  11125.754
##   gnipc_2009 gnipc_2010 gnipc_2011 gnipc_2012 gnipc_2013 gnipc_2014 gnipc_2015
## 1   1884.201   1938.316   1999.653   2125.863   2193.554   2178.507   2101.589
## 2   6999.175   6911.740   6885.536   7280.846   7478.105   7704.232   7652.656
## 3  10153.096  10643.058  11056.645  11146.263  11552.982  11691.648  12016.298
## 5  59017.261  54911.244  56152.065  57445.955  60005.695  62573.505  65577.512
```

```
## 6  20884.450  22734.967  23944.355  23557.513  23915.420  23087.870  23508.767
## 7   9428.798   9745.427  10072.896  10830.554  11351.539  11518.605  11774.349
##   gnipc_2016 gnipc_2017 gnipc_2018 gnipc_2019 gnipc_2020 gnipc_2021
## 1   2077.567   2085.488   2054.940   2097.889   1997.852   1824.191
## 2   7189.427   6861.576   6381.522   6082.747   5593.142   5465.618
## 3  12484.624  12802.148  13302.706  13485.311  12996.763  14131.110
## 5  66881.330  67667.508  67195.095  68590.901  63016.401  62573.592
## 6  22694.285  22996.671  21924.731  21197.741  19178.332  20925.268
## 7  11570.468  12541.163  12933.834  13847.908  12454.145  13157.994
##   gdi_group_2021 gdi_1990 gdi_1991 gdi_1992 gdi_1993 gdi_1994 gdi_1995 gdi_1996
## 1              5    0.595    0.588    0.586    0.548    0.524    0.543    0.544
## 2              4       NA       NA       NA       NA       NA       NA       NA
## 3              1    0.922    0.921    0.932    0.938    0.935    0.933    0.933
## 5              2    0.961    0.958    0.957    0.956    0.959    0.962    0.960
## 6              1    0.982    0.980    0.975    0.972    0.961    0.963    0.965
## 7              1       NA       NA       NA       NA       NA    0.975    0.978
##   gdi_1997 gdi_1998 gdi_1999 gdi_2000 gdi_2001 gdi_2002 gdi_2003 gdi_2004
## 1    0.536    0.534    0.523    0.515    0.504    0.549    0.563    0.522
## 2       NA       NA    0.838    0.831    0.845    0.840    0.836    0.840
## 3    0.933    0.926    0.929    0.929    0.933    0.934    0.936    0.938
## 5    0.962    0.960    0.959    0.961    0.963    0.962    0.964    0.965
## 6    0.970    0.970    0.990    0.989    0.990    0.989    0.987    0.988
## 7    0.974    0.976    0.976    0.944    0.935    0.927    0.935    0.953
##   gdi_2005 gdi_2006 gdi_2007 gdi_2008 gdi_2009 gdi_2010 gdi_2011 gdi_2012
## 1    0.541    0.560    0.587    0.594    0.609    0.627    0.642    0.649
## 2    0.844    0.849    0.853    0.855    0.859    0.867    0.826    0.848
## 3    0.940    0.943    0.947    0.949    0.951    0.960    0.964    0.974
## 5    0.962    0.954    0.944    0.933    0.917    0.921    0.919    0.919
## 6    0.990    0.994    0.997    0.995    0.994    0.995    0.991    0.998
## 7    0.964    0.968    0.970    0.970    0.972    0.974    0.980    0.977
##   gdi_2013 gdi_2014 gdi_2015 gdi_2016 gdi_2017 gdi_2018 gdi_2019 gdi_2020
## 1    0.659    0.630    0.673    0.682    0.703    0.710    0.712    0.689
## 2    0.866    0.884    0.893    0.900    0.900    0.903    0.902    0.904
## 3    0.968    0.968    0.984    0.988    0.991    0.997    1.002    1.006
## 5    0.920    0.921    0.922    0.921    0.945    0.948    0.955    0.952
## 6    0.997    0.995    1.000    0.996    0.993    1.000    1.000    0.999
## 7    0.982    0.985    0.986    0.986    0.990    0.987    0.993    0.995
##   gdi_2021 hdi_f_1990 hdi_f_1991 hdi_f_1992 hdi_f_1993 hdi_f_1994 hdi_f_1995
## 1    0.681  0.1962799  0.1963781  0.1993623  0.1953114  0.1820919  0.1994831
## 2    0.903         NA         NA         NA         NA         NA         NA
## 3    1.007  0.6168638  0.6001266  0.5895949  0.5950040  0.6002976  0.6095146
## 5    0.953  0.6978884  0.7070154  0.7093498  0.7145918  0.7232951  0.7317911
## 6    0.997  0.7127944  0.7192385  0.7222341  0.7256521  0.7267372  0.7282964
## 7    1.001         NA         NA         NA         NA         NA  0.6153939
##   hdi_f_1996 hdi_f_1997 hdi_f_1998 hdi_f_1999 hdi_f_2000 hdi_f_2001 hdi_f_2002
## 1  0.2044079  0.2041635  0.2030516  0.2052368  0.2039369  0.2015474  0.2341243
## 2         NA         NA         NA  0.3312964  0.3399087  0.3530624  0.3670664
## 3  0.6200828  0.6175856  0.6296919  0.6413186  0.6492504  0.6580176  0.6629568
## 5  0.7362711  0.7436839  0.7482346  0.7553474  0.7651556  0.7706759  0.7734772
## 6  0.7347183  0.7420086  0.7478734  0.7661016  0.7718405  0.7771372  0.7769049
## 7  0.6250970  0.6313226  0.6400741  0.6438316  0.6363727  0.6359463  0.6402792
##   hdi_f_2003 hdi_f_2004 hdi_f_2005 hdi_f_2006 hdi_f_2007 hdi_f_2008 hdi_f_2009
## 1  0.2485613  0.2460171  0.2580438  0.2700403  0.2900834  0.2962788  0.3088139
## 2  0.3817384  0.3943730  0.4082733  0.4203113  0.4364248  0.4473940  0.4617109
```

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## 3  0.6696631  0.6759564  0.6872102  0.6955581  0.7081117  0.7152641  0.7207201
## 5  0.7831982  0.7875396  0.7882416  0.7887529  0.7865928  0.7836731  0.7762137
## 6  0.7840252  0.7896270  0.7942284  0.8079921  0.8128478  0.8193191  0.8211906
## 7  0.6541420  0.6713889  0.6894012  0.7053296  0.7228123  0.7256528  0.7262141
##   hdi_f_2010 hdi_f_2011 hdi_f_2012 hdi_f_2013 hdi_f_2014 hdi_f_2015 hdi_f_2016
## 1  0.3221004  0.3335281  0.3441522  0.3547718  0.3434656  0.3648332  0.3712948
## 2  0.4733232  0.4741950  0.4945615  0.5112299  0.5281577  0.5492787  0.5655269
## 3  0.7375435  0.7517768  0.7668635  0.7711296  0.7777423  0.7885710  0.7924689
## 5  0.7826116  0.7883553  0.7949206  0.8028585  0.8104743  0.8177176  0.8226992
## 6  0.8287093  0.8330359  0.8376162  0.8389149  0.8382984  0.8428320  0.8384520
## 7  0.7322865  0.7389633  0.7431204  0.7496117  0.7545537  0.7574999  0.7553181
##   hdi_f_2017 hdi_f_2018 hdi_f_2019 hdi_f_2020 hdi_f_2021 le_f_1990 le_f_1991
## 1  0.3800544  0.3833121  0.3889597  0.3740333  0.3648402   48.3973   49.1439
## 2  0.5661392  0.5659974  0.5647451  0.5607803  0.5567451   45.4532   46.8072
## 3  0.7978155  0.8040574  0.8107466  0.7965713  0.7992216   76.4334   76.6308
## 5  0.8586809  0.8702275  0.8809787  0.8778744  0.8771323   74.9219   75.0396
## 6  0.8404036  0.8435613  0.8443416  0.8319926  0.8333250   74.9633   75.6350
## 7  0.7606546  0.7623496  0.7712950  0.7520668  0.7569495   71.9890   72.1220
##   le_f_1992 le_f_1993 le_f_1994 le_f_1995 le_f_1996 le_f_1997 le_f_1998
## 1   50.3197   52.7389   53.5442   54.0874   54.8057   55.1513   54.8179
## 2   45.4837   46.5785   47.4987   47.8294   47.9600   48.2792   47.6182
## 3   76.9718   77.1176   77.2579   77.5110   77.7464   77.3164   78.0214
## 5   74.9904   75.5239   75.5946   75.6335   75.3433   75.5336   75.6761
## 6   75.7190   75.9403   76.0488   76.2432   76.4179   76.4642   76.7581
## 7   72.4039   72.6902   72.9478   73.0235   73.5887   73.2928   74.0328
##   le_f_1999 le_f_2000 le_f_2001 le_f_2002 le_f_2003 le_f_2004 le_f_2005
## 1   56.3004   56.8579   57.3437   57.6715   58.6498   59.2159   59.6966
## 2   48.4781   48.5612   49.6056   49.8964   51.6741   52.6571   53.6339
## 3   78.2091   78.4187   78.6178   78.8228   79.0574   79.2365   79.4934
## 5   76.1929   76.6172   76.9981   77.3505   78.5208   78.7843   79.0331
## 6   76.9892   77.2233   77.5896   78.0747   77.2757   78.1030   78.5273
## 7   73.7666   74.1518   74.5869   74.7066   75.3751   75.1157   75.7812
##   le_f_2006 le_f_2007 le_f_2008 le_f_2009 le_f_2010 le_f_2011 le_f_2012
## 1   60.2431   60.9090   61.5289   61.8922   62.4078   62.9926   63.5135
## 2   54.5176   55.8149   56.7340   57.9669   59.0394   59.8693   61.0236
## 3   79.6856   80.2472   80.4292   80.5443   80.6878   80.7980   80.7025
## 5   79.2890   79.5205   79.7499   79.9821   80.2033   80.4149   80.6232
## 6   78.7156   78.5153   78.9268   79.0703   78.8378   79.3224   79.9531
## 7   76.0114   76.3218   76.5721   77.1488   77.4368   77.7133   77.4832
##   le_f_2013 le_f_2014 le_f_2015 le_f_2016 le_f_2017 le_f_2018 le_f_2019
## 1   64.0268   64.2743   64.5759   65.0957   66.0993   66.4576   66.6770
## 2   61.6844   62.4717   63.0944   63.4338   64.0185   64.7172   64.9216
## 3   80.7812   81.0125   81.1825   81.3771   81.5045   81.6079   81.6658
## 5   80.8277   81.0232   81.2116   81.3957   81.6256   81.7902   81.9075
## 6   79.9265   80.0035   80.1877   79.6700   80.0850   80.3295   80.6807
## 7   77.9127   78.4982   78.8334   79.2030   79.3806   79.6013   79.8556
##   le_f_2020 le_f_2021 eys_f_1990 eys_f_1991 eys_f_1992 eys_f_1993 eys_f_1994
## 1   65.4320   65.2791   1.970663   2.096679   2.230753   2.373401   2.525171
## 2   64.9821   64.3066   3.280223   3.070807   3.037664   3.102295   3.166317
## 3   79.6756   79.1726  11.302020  11.479070  10.758500  10.352310  10.153800
## 5   81.1121   80.9371  10.965130  11.375870  11.236050  11.204950  11.320285
## 6   79.2846   78.6471  14.242580  13.946096  13.646481  13.343368  13.036698
## 7   76.9955   77.3500         NA         NA         NA         NA         NA
##   eys_f_1995 eys_f_1996 eys_f_1997 eys_f_1998 eys_f_1999 eys_f_2000 eys_f_2001
```

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## 1   2.686646   2.858447   3.041233   3.235709   3.442620   3.662762   3.896981
## 2   3.229733   3.292542   3.354747   3.418440   3.759085   4.099730   4.440375
## 3  10.098950  10.196570  10.429930  10.547030  10.664130  10.618970  10.790990
## 5  11.435620  11.550955  11.666289  11.781624  11.896959  12.012294  12.127628
## 6  13.234335  13.428296  13.618519  13.804942  15.686240  16.174431  16.820459
## 7  10.855928  11.019515  11.185568  11.354122  11.525217  11.698890  11.394348
##   eys_f_2002 eys_f_2003 eys_f_2004 eys_f_2005 eys_f_2006 eys_f_2007 eys_f_2008
## 1   4.146178   4.411310    4.13772   4.592572   5.047424   5.502276   5.957128
## 2   4.781020   5.121665    5.46231   5.802955   6.143600   6.484245   6.824890
## 3  10.864367  10.937743   11.01112  11.526240  11.705140  12.192260  12.348200
## 5  12.242963  12.358298   12.47363  12.588967  12.704302  12.819637  12.934972
## 6  16.969151  16.934660   16.92638  16.731859  17.058540  17.112631  17.330669
## 7  11.401128  11.408768   11.41722  11.759080  12.287387  12.970670  12.693650
##   eys_f_2009 eys_f_2010 eys_f_2011 eys_f_2012 eys_f_2013 eys_f_2014 eys_f_2015
## 1   6.411980   6.819135    7.22629   7.423227   7.620163    7.81710   7.791942
## 2   7.165535   7.506180    7.28679   8.137600   8.988400    9.83930  10.690100
## 3  12.620820  13.386770   14.11511  15.027850  15.429990   15.78335  15.601780
## 5  13.050306  13.165641   13.28098  13.396311  13.511646   13.62698  13.742315
## 6  17.661840  17.920719   18.26399  18.184910  18.202570   18.43401  18.606020
## 7  13.216060  13.354970   13.39542  13.405690  13.415960   13.47136  13.372720
##   eys_f_2016 eys_f_2017 eys_f_2018 eys_f_2019 eys_f_2020 eys_f_2021 mys_f_1990
## 1   7.766785   7.741627    7.71647   7.736391   7.736391   7.736391   0.342503
## 2  11.540933  11.540900   11.54090  11.540900  11.540900  11.540900         NA
## 3  15.405060  15.511230   15.50103  15.671730  15.314140  15.314140   6.692814
## 5  13.857650  14.473940   15.16117  15.848393  16.535620  16.535620   5.898316
## 6  18.889740  18.908730   18.93041  19.233801  19.233801  19.233801   8.005131
## 7  13.449457  13.526193   13.60293  13.731650  13.816580  13.816580   9.617912
##   mys_f_1991 mys_f_1992 mys_f_1993 mys_f_1994 mys_f_1995 mys_f_1996 mys_f_1997
## 1  0.3718604  0.4012178  0.4305752  0.4599326   0.489290  0.5186474  0.5480048
## 2         NA         NA         NA         NA         NA         NA         NA
## 3  6.6964859  6.7001582  6.7038306  6.7075029   6.711175  6.9976166  7.2840580
## 5  6.2374182  6.5765200  6.7484554  7.0596597   7.370864  7.6226988  7.8745336
## 6  8.0926704  8.1811674  8.2696644  8.3581614   8.446658  8.5351553  8.6236523
## 7  9.6936898  9.7694673  9.8452448  9.9210223   9.996800 10.0745203 10.1522408
##   mys_f_1998 mys_f_1999 mys_f_2000 mys_f_2001 mys_f_2002 mys_f_2003 mys_f_2004
## 1  0.5773623  0.6067197  0.6360771  0.6719583  0.7078396  0.7437209  0.7796021
## 2         NA  2.2316100  2.2768400  2.3338220  2.3952288  2.4566356  2.5180423
## 3  7.5704994  7.8569408  8.1433822  8.2351904  8.3118674  8.3885445  8.4652215
## 5  8.1263685  8.3782033  8.6300381  8.7712643  8.9124905  9.0537168  9.1949430
## 6  8.7121492  8.8006462  8.8891432  8.9776402  9.4926252 10.0076103 10.0970968
## 7 10.2299613 10.3076818 10.3854023 10.3970604 10.4763063 10.5555523 10.6347982
##   mys_f_2005 mys_f_2006 mys_f_2007 mys_f_2008 mys_f_2009 mys_f_2010 mys_f_2011
## 1  0.8154834  0.8415789  0.8676743  0.8937698  0.9198653  0.9459608   1.011199
## 2  2.5794491  2.6408559  2.7022627  2.7636695  2.8250762  2.8864830   2.947890
## 3  8.5418986  8.6185756  8.6952527  8.7719297  8.9801099  9.1882900   9.396470
## 5  9.3361692  9.3622308  9.3882923  9.4143538  9.4404153  9.4664768   9.492538
## 6 10.1865832 10.2760696 10.3847346 10.4933996 10.6630497 10.6813602  10.775400
## 7 10.7140442 10.7932901 10.8725361 10.9517820 11.0310280 11.1102739  11.189520
##   mys_f_2012 mys_f_2013 mys_f_2014 mys_f_2015 mys_f_2016 mys_f_2017 mys_f_2018
## 1   1.076438   1.141677   1.206915   1.272154   1.430358   1.588562   1.746765
## 2   3.009297   3.070703   3.132110   3.657993   4.183876   4.183876   4.183876
## 3   9.832490  10.077895  10.329424  10.587232  10.851474  11.122311  11.399908
## 5   9.518600   9.544661   9.570723   9.596784   9.622846  11.738140  12.287930
## 6  10.946510  11.009650  11.075140  11.084610  11.063790  11.179625  11.295460
```

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## 7  11.286042  11.382565  11.479088  11.575610  11.379530  11.183450  11.229473
##   mys_f_2019 mys_f_2020 mys_f_2021 gni_pc_f_1990 gni_pc_f_1991 gni_pc_f_1992
## 1   1.904969   2.063173   2.311080      668.0558      564.9264      508.7507
## 2   4.183876   4.183876   4.183876     3944.3793     4401.0806     1689.7392
## 3  11.684433  11.684433  11.684433     3269.5222     2379.6756     2221.0458
## 5  12.525340  12.525340  12.525340    26161.8784    25084.3954    24640.5603
## 6  11.353645  11.353645  11.353645     8857.4433     9801.5814    10707.6190
## 7  11.275496  11.321520  11.321520     3752.3899     3357.6009     1994.2362
##   gni_pc_f_1993 gni_pc_f_1994 gni_pc_f_1995 gni_pc_f_1996 gni_pc_f_1997
## 1      374.5811      266.2076      328.4241      324.3166      297.8915
## 2     1658.1897     1270.1592     2788.0027     2761.1226     3265.6470
## 3     2572.8210     2884.5843     3354.0665     3643.3424     3221.1300
## 5    25031.8125    26457.3577    27968.0271    28511.0648    29579.4020
## 6    11680.7953    12318.7179    11726.9252    12321.6858    13337.1877
## 7     1867.0964     2015.3934     2280.3997     2465.3313     2668.2514
##   gni_pc_f_1998 gni_pc_f_1999 gni_pc_f_2000 gni_pc_f_2001 gni_pc_f_2002
## 1      277.7259      258.5663      237.2676       216.819       310.019
## 2     3208.5702     2903.4985     3047.3618      3225.212      3859.264
## 3     3476.1536     3849.0198     4118.5415      4489.685      4679.395
## 5    28921.2293    28840.5923    30880.0775     31218.577     29812.785
## 6    13739.2940    13034.7782    12765.7966     11945.286     10037.041
## 7     2810.5291     2922.2124     2450.6561      2464.026      2576.357
##   gni_pc_f_2003 gni_pc_f_2004 gni_pc_f_2005 gni_pc_f_2006 gni_pc_f_2007
## 1      345.8247      344.9831      361.2609      379.7256      450.2103
## 2     3887.5799     4100.7077     4493.9673     4735.7385     5317.9095
## 3     5020.5473     5370.4207     5743.9994     6246.5081     6732.5423
## 5    30504.4013    30452.3682    28159.8460    26814.9280    24215.9052
## 6    11093.7231    11249.1173    11956.7324    14059.8741    15172.8974
## 7     3015.0280     3984.8615     4793.9641     5596.2075     6520.9810
##   gni_pc_f_2008 gni_pc_f_2009 gni_pc_f_2010 gni_pc_f_2011 gni_pc_f_2012
## 1      434.2512      466.8929      510.7816      537.5166       585.093
## 2     5436.6486     5871.4975     6022.7417     5935.4971      6281.502
## 3     7208.7412     7154.4036     7945.2164     8532.4027      8773.019
## 5    21577.2856    17588.7746    18997.1158    20273.4308     22011.369
## 6    15540.6405    14530.5259    16255.5747    16324.0958     16224.238
## 7     6920.7891     6058.5017     6337.6802     6809.0517      7298.612
##   gni_pc_f_2013 gni_pc_f_2014 gni_pc_f_2015 gni_pc_f_2016 gni_pc_f_2017
## 1      637.7672      506.1399      681.1317      712.0451      755.0683
## 2     6458.5342     6662.0561     6626.8120     6235.8235     5961.7593
## 3     8378.2193     8309.1703     9683.9988    10011.1289    10148.6129
## 5    24600.5038    27359.2276    30235.5280    31893.3341    33303.3258
## 6    16447.3575    15948.0214    17009.0244    16509.7040    16119.6990
## 7     7741.6403     7840.0008     8016.5297     7695.7010     8546.6873
##   gni_pc_f_2018 gni_pc_f_2019 gni_pc_f_2020 gni_pc_f_2021 hdi_m_1990 hdi_m_1991
## 1       755.825      783.7023       635.271      532.9554  0.3299102  0.3340456
## 2      5554.956     5306.0860      4856.214     4751.3733         NA         NA
## 3     10655.838    10984.0909     10650.533    11637.2157  0.6687091  0.6513670
## 5     31652.234    32180.7137     28847.026    28921.1448  0.7265204  0.7381642
## 6     16334.358    15884.8379     14374.395    15580.7157  0.7258445  0.7341318
## 7      8468.047     9422.8263      8248.700     8736.2638         NA         NA
##   hdi_m_1992 hdi_m_1993 hdi_m_1994 hdi_m_1995 hdi_m_1996 hdi_m_1997 hdi_m_1998
## 1  0.3402283  0.3563744  0.3475604  0.3675551  0.3760921  0.3807608  0.3804858
## 2         NA         NA         NA         NA         NA         NA         NA
## 3  0.6323606  0.6341389  0.6421949  0.6535890  0.6643284  0.6619656  0.6798097
```

```
## 5  0.7411955  0.7471954  0.7539125  0.7607058  0.7670852  0.7732990  0.7792514
## 6  0.7407023  0.7468478  0.7563393  0.7561986  0.7615758  0.7652007  0.7712636
## 7         NA         NA         NA  0.6309121  0.6392076  0.6482147  0.6556365
##   hdi_m_1999 hdi_m_2000 hdi_m_2001 hdi_m_2002 hdi_m_2003 hdi_m_2004 hdi_m_2005
## 1  0.3922791  0.3962528  0.4000020  0.4267367  0.4414863  0.4717338  0.4766556
## 2  0.3954915  0.4090368  0.4178883  0.4368454  0.4566314  0.4694015  0.4836679
## 3  0.6906266  0.6985495  0.7052964  0.7100476  0.7153730  0.7204798  0.7307252
## 5  0.7875164  0.7965631  0.8000974  0.8037223  0.8125965  0.8160792  0.8195353
## 6  0.7734895  0.7801808  0.7851771  0.7854273  0.7943604  0.7995620  0.8021806
## 7  0.6593950  0.6742930  0.6803445  0.6908543  0.6997755  0.7044097  0.7152237
##   hdi_m_2006 hdi_m_2007 hdi_m_2008 hdi_m_2009 hdi_m_2010 hdi_m_2011 hdi_m_2012
## 1  0.4824561  0.4943620  0.4987141  0.5073555  0.5133894  0.5197466  0.5301781
## 2  0.4951299  0.5117121  0.5235698  0.5373640  0.5456886  0.5739851  0.5834500
## 3  0.7374023  0.7478830  0.7534323  0.7576625  0.7682576  0.7795660  0.7874077
## 5  0.8266226  0.8334655  0.8403092  0.8468174  0.8498963  0.8574690  0.8651865
## 6  0.8127845  0.8152484  0.8233569  0.8258903  0.8328093  0.8402031  0.8390319
## 7  0.7285925  0.7448993  0.7483789  0.7468734  0.7519164  0.7536744  0.7604630
##   hdi_m_2013 hdi_m_2014 hdi_m_2015 hdi_m_2016 hdi_m_2017 hdi_m_2018 hdi_m_2019
## 1  0.5387573  0.5455743  0.5421892  0.5441588  0.5405142  0.5401197  0.5460807
## 2  0.5906061  0.5977559  0.6149680  0.6285572  0.6292291  0.6268916  0.6264083
## 3  0.7962314  0.8030641  0.8011907  0.8021945  0.8053855  0.8067729  0.8094634
## 5  0.8731434  0.8804344  0.8869844  0.8929315  0.9084666  0.9175373  0.9226824
## 6  0.8415651  0.8425507  0.8426828  0.8416952  0.8466716  0.8435663  0.8444224
## 7  0.7635355  0.7657218  0.7680721  0.7661271  0.7685099  0.7721800  0.7770417
##   hdi_m_2020 hdi_m_2021 le_m_1990 le_m_1991 le_m_1992 le_m_1993 le_m_1994
## 1  0.5429636  0.5356109   43.7088   44.3528   45.0697   50.2164   49.5307
## 2  0.6204935  0.6165577   38.6736   41.0091   39.1890   38.1613   39.7335
## 3  0.7919412  0.7936046   70.0500   70.3212   70.6602   70.9567   71.2024
## 5  0.9219010  0.9206314   70.2619   70.6984   70.8309   70.9381   71.0269
## 6  0.8327837  0.8355211   68.5519   68.9574   69.0948   69.1604   70.1803
## 7  0.7560015  0.7561106   65.4466   65.0085   64.7473   64.8849   65.0799
##   le_m_1995 le_m_1996 le_m_1997 le_m_1998 le_m_1999 le_m_2000 le_m_2001
## 1   51.0387   51.7216   52.1525   51.1337   53.4104   53.7617   54.2716
## 2   43.8847   44.1179   44.3496   42.5824   42.4549   43.5620   43.7139
## 3   71.4282   71.6686   70.7734   72.1896   72.4013   72.6461   72.9212
## 5   71.1524   71.3646   71.5553   71.7043   72.3478   73.1658   73.3879
## 6   69.9500   70.1231   69.7050   70.1493   70.4067   70.5826   70.7492
## 7   65.4446   65.8200   66.3224   66.7846   66.5541   66.8899   67.0729
##   le_m_2002 le_m_2003 le_m_2004 le_m_2005 le_m_2006 le_m_2007 le_m_2008
## 1   55.2265   56.0316   56.6578   57.0128   57.1332   57.3416   58.1715
## 2   44.9404   47.5679   48.5320   49.5080   50.2270   51.4727   52.5274
## 3   73.2203   73.4985   73.7863   74.0329   74.2435   75.0995   75.1627
## 5   73.6314   74.9841   75.2020   75.4166   75.6388   75.8253   76.0273
## 6   70.7521   70.8303   71.5304   71.6917   72.0661   71.4871   72.2762
## 7   67.1244   67.3059   67.4940   67.5957   67.7430   68.0803   67.9948
##   le_m_2009 le_m_2010 le_m_2011 le_m_2012 le_m_2013 le_m_2014 le_m_2015
## 1   58.8200   59.2776   59.8254   60.3173   60.7915   60.8119   60.7597
## 2   53.5371   54.4154   55.3139   56.2197   56.9254   57.6063   58.2133
## 3   75.3158   75.4925   75.6932   75.7302   75.7863   76.1142   76.4036
## 5   76.2334   76.4587   76.6655   76.9312   77.0842   77.3314   77.5634
## 6   72.6937   72.5165   72.8411   72.9385   73.0113   73.4240   73.2943
## 7   68.2418   68.5973   68.6129   69.0372   69.0619   69.2361   69.5951
##   le_m_2016 le_m_2017 le_m_2018 le_m_2019 le_m_2020 le_m_2021 eys_m_1990
## 1   61.1934   60.1049   59.9231   60.6191   59.8662   58.9147   3.939093
```

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## 2   58.7410   59.3305   59.5817   59.9774   59.5840   59.0291   3.794737
## 3   76.6392   76.8729   77.0366   77.1679   74.6325   74.0869  11.884360
## 5   77.6844   77.8706   78.0280   78.1751   77.4638   77.2164  10.161470
## 6   72.9326   73.5263   73.6309   73.8568   72.5465   72.1818  12.319502
## 7   69.6726   69.9198   69.9920   70.4029   67.0510   66.5544         NA
##   eys_m_1991 eys_m_1992 eys_m_1993 eys_m_1994 eys_m_1995 eys_m_1996 eys_m_1997
## 1   4.171640   4.417915   4.678730   4.954942   5.247461   5.557248   5.885324
## 2   3.578853   3.566516   3.669445   3.772983   3.877127   3.981878   4.087233
## 3  12.030530  10.574120   9.912680  10.029070  10.228640  10.256000  10.572460
## 5  10.502480  10.333310  10.390470  10.512902  10.635335  10.757767  10.880200
## 6  12.525383  12.734705  12.947525  13.163902  13.383895  13.607564  13.834971
## 7         NA         NA         NA         NA   9.634753   9.832547  10.034401
##   eys_m_1998 eys_m_1999 eys_m_2000 eys_m_2001 eys_m_2002 eys_m_2003 eys_m_2004
## 1   6.232769   6.600724   6.990403   7.403086   7.840133   8.302980  10.468870
## 2   4.195760   4.661126   5.126492   5.591857   6.057223   6.522589   6.987955
## 3  10.791851  10.697250  10.553890  10.572100  10.630103  10.688107  10.746110
## 5  11.002633  11.125065  11.247498  11.369931  11.492363  11.614796  11.737228
## 6  14.066179  14.301250  14.896540  15.507800  15.580110  15.408100  15.520240
## 7  10.240399  10.450627  10.665170  10.447472  10.511852  10.575372  10.638075
##   eys_m_2005 eys_m_2006 eys_m_2007 eys_m_2008 eys_m_2009 eys_m_2010 eys_m_2011
## 1  10.559860  10.650850  10.741840  10.832830  10.923820   11.07618   11.22855
## 2   7.453321   7.918687   8.384053   8.849419   9.314785    9.78015   11.86942
## 3  11.298410  11.448810  11.733590  11.906640  11.927430   12.64353   13.41751
## 5  11.859661  11.982094  12.104526  12.226959  12.349392   12.47182   12.59426
## 6  15.200720  15.246750  15.236130  15.357910  15.692640   16.02111   16.09179
## 7  11.011480  11.561914  12.262020  12.117330  12.694860   12.81761   12.85233
##   eys_m_2012 eys_m_2013 eys_m_2014 eys_m_2015 eys_m_2016 eys_m_2017 eys_m_2018
## 1   11.62275   12.01695   12.41115   12.44832   12.48549   12.52266   12.55983
## 2   12.07820   12.28690   12.49570   12.70450   12.91322   12.91320   12.91320
## 3   14.18841   14.48115   14.78336   14.60936   14.25933   14.17994   13.95683
## 5   12.71669   12.83912   12.96155   13.08399   13.20642   14.21426   14.64673
## 6   16.04890   16.00249   16.12708   16.23976   16.46864   16.43111   16.41450
## 7   12.83323   12.81412   12.75356   12.58435   12.58443   12.58452   12.58460
##   eys_m_2019 eys_m_2020 eys_m_2021 mys_m_1990 mys_m_1991 mys_m_1992 mys_m_1993
## 1   12.67219   12.67219   12.67219   1.311020   1.385486   1.459952   1.534418
## 2   12.91320   12.91320   12.91320         NA         NA         NA         NA
## 3   14.03350   13.65187   13.65187   7.920670   7.922593   7.924515   7.926438
## 5   14.92828   15.20983   15.20983   5.704970   5.991241   6.277512   6.563782
## 6   16.55146   16.55146   16.55146   8.259141   8.302910   8.346911   8.390912
## 7   12.57721   12.52400   12.52400   9.992224  10.054736  10.117249  10.179761
##   mys_m_1994 mys_m_1995 mys_m_1996 mys_m_1997 mys_m_1998 mys_m_1999 mys_m_2000
## 1   1.608884   1.683350   1.736839   1.790329   1.843818   1.897308   1.950798
## 2         NA         NA         NA         NA         NA   4.695640   4.709320
## 3   7.928360   7.930283   8.222502   8.514721   8.806940   9.099159   9.391377
## 5   6.850053   7.136324   7.375565   7.614806   7.854046   8.093287   8.332528
## 6   8.434913   8.478914   8.522915   8.566916   8.610917   8.654918   8.698919
## 7  10.242274  10.304786  10.363391  10.421997  10.480602  10.539208  10.597813
##   mys_m_2001 mys_m_2002 mys_m_2003 mys_m_2004 mys_m_2005 mys_m_2006 mys_m_2007
## 1   2.001141   2.051484   2.101827   2.152170   2.202513   2.300053   2.397593
## 2   4.726427   4.743725   4.761023   4.778320   4.795618   4.812916   4.830214
## 3   9.424060   9.483050   9.542040   9.601030   9.660020   9.719010   9.778000
## 5   8.395916   8.459305   8.522693   8.586082   8.649470   8.959736   9.270002
## 6   8.742920   9.281220   9.819520   9.906957   9.994393  10.081830  10.189765
## 7  10.595860  10.656324  10.716788  10.777252  10.837716  10.898180  10.958644
```

```
##   mys_m_2008 mys_m_2009 mys_m_2010 mys_m_2011 mys_m_2012 mys_m_2013 mys_m_2014
## 1   2.495133   2.592673   2.690213   2.755239   2.820266   2.885293   2.950319
## 2   4.847512   4.864810   4.882108   4.899406   4.916704   4.934002   4.951300
## 3   9.836990   9.965207  10.093423  10.221640  10.238510  10.333292  10.428951
## 5   9.580268   9.890533  10.200799  10.511065  10.821331  11.131597  11.441862
## 6  10.297700  10.396720  10.499770  10.609850  10.593950  10.752560  10.713240
## 7  11.019108  11.079572  11.140036  11.200500  11.292402  11.384305  11.476208
##   mys_m_2015 mys_m_2016 mys_m_2017 mys_m_2018 mys_m_2019 mys_m_2020 mys_m_2021
## 1   3.015346   3.082470   3.149594   3.216718   3.283843   3.350967   3.401310
## 2   5.922784   6.894269   6.894269   6.894269   6.894269   6.894269   6.894269
## 3  10.525496  10.622934  10.721275  10.820526  10.920695  10.920695  10.920695
## 5  11.752128  12.062394  12.372660  12.680070  12.805080  12.805080  12.805080
## 6  10.719990  10.766970  10.823605  10.880240  10.906023  10.906023  10.906023
## 7  11.568110  11.380390  11.192670  11.242177  11.291684  11.341190  11.341190
##   gni_pc_m_1990 gni_pc_m_1991 gni_pc_m_1992 gni_pc_m_1993 gni_pc_m_1994
## 1      4700.299      3987.413      3611.100      2675.907      1908.509
## 2      5770.778      6437.837      2469.428      2422.270      1854.181
## 3      6163.322      4308.316      3921.221      4489.665      4986.091
## 5    140146.366    131254.173    126522.763    125375.389    130889.448
## 6     18488.612     19962.775     21335.256     22751.062     23597.613
## 7      6768.247      5995.555      3543.750      3313.844      3559.835
##   gni_pc_m_1995 gni_pc_m_1996 gni_pc_m_1997 gni_pc_m_1998 gni_pc_m_1999
## 1      2347.288      2336.563      2157.936      2016.630      1878.914
## 2      4057.948      4006.252      4720.572      4620.429      4166.534
## 3      5807.971      6449.878      5780.739      6446.446      7368.328
## 5    136699.089    136432.710    138639.856    133285.712    131108.977
## 6     22613.911     23401.501     24793.306     25276.283     24191.419
## 7      3997.238      4294.709      4624.500      4853.864      5039.406
##   gni_pc_m_2000 gni_pc_m_2001 gni_pc_m_2002 gni_pc_m_2003 gni_pc_m_2004
## 1      1726.031      1564.229      2213.983      2442.948      2409.342
## 2      4356.573      4600.281      5489.331      5509.370      5787.847
## 3      8044.965      8839.236      9200.195      9698.667     10174.372
## 5    138848.694    136869.899    127462.665    128510.773    129106.148
## 6     23745.950     22505.637     19548.628     21157.081     20997.753
## 7      6109.273      7000.028      8290.632      9442.262      9896.447
##   gni_pc_m_2005 gni_pc_m_2006 gni_pc_m_2007 gni_pc_m_2008 gni_pc_m_2009
## 1      2492.273      2638.814      3147.897      3047.085      3273.769
## 2      6317.676      6639.333      7433.916      7577.945      8161.266
## 3     10677.660     11401.942     12078.588     12720.560     13148.588
## 5    121276.398    114970.399    101808.979     88402.744     74500.279
## 6     22726.588     26361.432     28745.075     29753.341     27394.453
## 7     11113.526     12643.529     14566.645     15987.785     13345.297
##   gni_pc_m_2010 gni_pc_m_2011 gni_pc_m_2012 gni_pc_m_2013 gni_pc_m_2014
## 1       3336.67      3430.984      3633.441      3715.005      3813.314
## 2       7827.22      7863.212      8308.613      8526.052      8774.787
## 3      13332.02     13568.500     13505.520     14707.565     15052.240
## 5      68327.62     69812.383     71181.955     73967.146     76687.505
## 6      29368.51     31740.233     31055.951     31548.815     30382.128
## 7      13725.25     13903.085     14992.533     15621.392     15886.716
##   gni_pc_m_2015 gni_pc_m_2016 gni_pc_m_2017 gni_pc_m_2018 gni_pc_m_2019
## 1      3489.647      3411.484      3385.358      3325.135      3383.761
## 2      8705.840      8167.841      7784.199      7228.560      6878.238
## 3     14333.943     14943.969     15442.824     15939.648     15980.468
## 5     79962.260     81329.078     82051.909     82267.850     84230.355
```

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## 6     30145.909     29007.241     30013.520     27626.895     26615.874
## 7     16254.281     16208.978     17343.390     18326.034     19213.939
##   gni_pc_m_2020 gni_pc_m_2021 ihdi_2010 ihdi_2011 ihdi_2012 ihdi_2013 ihdi_2014
## 1      3331.900       3089.27     0.312     0.315     0.323        NA        NA
## 2      6347.626       6196.65        NA        NA        NA        NA        NA
## 3     15341.871      16629.90     0.657     0.669     0.696     0.704     0.711
## 5     77854.409      77317.68        NA        NA        NA        NA        NA
## 6     24077.505      26376.43     0.702     0.714     0.721     0.724     0.725
## 7     17572.067      18557.95     0.673     0.678     0.684     0.689     0.694
##   ihdi_2015 ihdi_2016 ihdi_2017 ihdi_2018 ihdi_2019 ihdi_2020 ihdi_2021
## 1        NA        NA        NA        NA        NA        NA        NA
## 2     0.395     0.407     0.409     0.410     0.410     0.409     0.407
## 3     0.714     0.717     0.720     0.720     0.724     0.709     0.710
## 5        NA        NA        NA        NA        NA        NA        NA
## 6     0.731     0.725     0.733     0.732     0.729     0.718     0.720
## 7     0.697     0.689     0.694     0.697     0.704     0.686     0.688
##   coef_ineq_2010 coef_ineq_2011 coef_ineq_2012 coef_ineq_2013 coef_ineq_2014
## 1      29.139247      29.495694      29.208713             NA             NA
## 2             NA             NA             NA             NA             NA
## 3      12.813144      12.624666      10.429779      10.298332      10.198068
## 5             NA             NA             NA             NA             NA
## 6      15.163433      14.645295      14.011593      13.774797      13.745554
## 7       9.638624       9.486343       9.336438       9.194577       9.060822
##   coef_ineq_2015 coef_ineq_2016 coef_ineq_2017 coef_ineq_2018 coef_ineq_2019
## 1             NA             NA             NA             NA             NA
## 2      32.040235      31.708308      31.423800      31.167534      30.927971
## 3      10.133330      10.100487      10.233289      10.554499      10.589337
## 5             NA             NA             NA             NA             NA
## 6      13.432602      13.788157      13.398058      13.390462      13.838606
## 7       8.935868       9.622445       9.502875       9.396357       9.289583
##   coef_ineq_2020 coef_ineq_2021 loss_2010 loss_2011 loss_2012 loss_2013
## 1             NA             NA 30.357143  30.92105 30.686695        NA
## 2       30.65358      30.412168        NA        NA        NA        NA
## 3       10.72704      10.767685 12.864721  12.66319 10.539846 10.318471
## 5             NA             NA        NA        NA        NA        NA
## 6       13.86211      13.837301 15.827338  15.10107 14.472123 14.319527
## 7        9.21321       9.136398  9.785523   9.60000  9.403974  9.342105
##   loss_2014 loss_2015 loss_2016 loss_2017 loss_2018 loss_2019 loss_2020
## 1        NA        NA        NA        NA        NA        NA        NA
## 2        NA 32.130584 31.711409 31.490787 31.092437 31.092437 30.677966
## 3 10.227273 10.188679 10.150376 10.224439 10.669975 10.617284 10.705290
## 5        NA        NA        NA        NA        NA        NA        NA
## 6 14.302600 13.797170 14.403778 13.866040 13.882353 14.436620 14.523810
## 7  9.162304  9.007833  9.934641  9.635417  9.597925  9.511568  9.379128
##   loss_2021 ineq_le_2010 ineq_le_2011 ineq_le_2012 ineq_le_2013 ineq_le_2014
## 1        NA    33.841740    32.896702    32.035759    31.204229    30.735620
## 2 30.546075    39.497757    38.038704    36.532726    35.230549    34.032326
## 3 10.804020     8.208471     7.643039     7.151946     6.757605     6.456813
## 5        NA     5.837978     5.720531     5.594656     5.483333     5.372208
## 6 14.489311     9.677747     9.399137     9.146879     8.912259     8.654256
## 7  9.354414    10.976511    10.519669    10.069955     9.644372     9.243107
##   ineq_le_2015 ineq_le_2016 ineq_le_2017 ineq_le_2018 ineq_le_2019 ineq_le_2020
## 1    30.177126    29.334085    28.069740    27.506069    27.021290    26.433699
## 2    33.003925    32.076153    31.222630    30.453831    29.735142    28.911974
```

```
## 3     6.262599     6.164068     6.129035     6.151076     6.255591     6.668705
## 5     5.262248     5.154099     5.036153     4.916706     4.800525     4.645751
## 6     8.435143     8.235308     8.007047     7.813666     7.628760     7.699285
## 7     8.868245     8.494014     8.135306     7.815752     7.495430     7.266310
##   ineq_le_2021 ineq_edu_2010 ineq_edu_2011 ineq_edu_2012 ineq_edu_2013
## 1    26.165367      42.80900      44.82338      44.82338      44.82338
## 2    28.187733            NA            NA            NA            NA
## 3     6.790635      11.90000      11.90000      11.90000      11.90000
## 5     4.524926            NA            NA            NA            NA
## 6     7.624846       6.91431       6.83090       6.43056       6.51336
## 7     7.035874       3.68500       3.68500       3.68500       3.68500
##   ineq_edu_2014 ineq_edu_2015 ineq_edu_2016 ineq_edu_2017 ineq_edu_2018
## 1      44.82338      45.36517      45.36517      45.36517      45.36517
## 2            NA      34.17144      34.17144      34.17144      34.17144
## 3      11.90000      11.90000      11.90000      12.33344      12.33344
## 5            NA            NA      18.24144      14.47534      12.63436
## 6       6.19228       6.33131       6.15194       6.20843       5.95181
## 7       3.68500       3.68500       2.93495       2.93495       2.93495
##   ineq_edu_2019 ineq_edu_2020 ineq_edu_2021 ineq_inc_2010 ineq_inc_2011
## 1      45.36517      45.36517      45.36517      10.76700      10.76700
## 2      34.17144      34.17144      34.17144      24.45400      28.94534
## 3      12.33344      12.33344      12.33344      18.33096      18.33096
## 5      12.63436      12.63436      12.63436            NA            NA
## 6       5.78729       5.78729       5.78729      28.89824      27.70585
## 7       2.93495       2.93495       2.93495      14.25436      14.25436
##   ineq_inc_2012 ineq_inc_2013 ineq_inc_2014 ineq_inc_2015 ineq_inc_2016
## 1      10.76700            NA            NA            NA            NA
## 2      28.94534      28.94534      28.94534      28.94534      28.87733
## 3      12.23739      12.23739      12.23739      12.23739      12.23739
## 5            NA            NA            NA            NA            NA
## 6      26.45734      25.89877      26.39013      25.53135      26.97722
## 7      14.25436      14.25436      14.25436      14.25436      17.43837
##   ineq_inc_2017 ineq_inc_2018 ineq_inc_2019 ineq_inc_2020 ineq_inc_2021
## 1            NA            NA            NA            NA            NA
## 2      28.87733      28.87733      28.87733      28.87733      28.87733
## 3      12.23739      13.17898      13.17898      13.17898      13.17898
## 5            NA            NA            NA            NA            NA
## 6      25.97870      26.40591      28.09977      28.09977      28.09977
## 7      17.43837      17.43837      17.43837      17.43837      17.43837
##   gii_rank_2021 gii_1990 gii_1991 gii_1992 gii_1993 gii_1994 gii_1995 gii_1996
## 1           167       NA       NA       NA       NA       NA       NA       NA
## 2           136    0.725    0.723    0.721    0.719    0.717    0.714    0.712
## 3            39       NA       NA       NA       NA       NA       NA       NA
## 5            11    0.659    0.647    0.640    0.632    0.635    0.627    0.624
## 6            69    0.442    0.439    0.436    0.430    0.429    0.426    0.422
## 7            53    0.470    0.468    0.487    0.491    0.481    0.469    0.463
##   gii_1997 gii_1998 gii_1999 gii_2000 gii_2001 gii_2002 gii_2003 gii_2004
## 1       NA       NA       NA       NA       NA       NA       NA       NA
## 2    0.708    0.683    0.678    0.671    0.665    0.657    0.649    0.643
## 3       NA       NA    0.330    0.319    0.282    0.297    0.305    0.301
## 5    0.616    0.609    0.605    0.605    0.602    0.599    0.597    0.592
## 6    0.419    0.415    0.415    0.413    0.412    0.390    0.385    0.377
## 7    0.446    0.438    0.462    0.453    0.444    0.439    0.408    0.394
##   gii_2005 gii_2006 gii_2007 gii_2008 gii_2009 gii_2010 gii_2011 gii_2012
```

```
## 1    0.748    0.749    0.752    0.755    0.755    0.753    0.746    0.738
## 2    0.636    0.628    0.621    0.568    0.560    0.551    0.544    0.545
## 3    0.306    0.285    0.286    0.293    0.242    0.246    0.252    0.235
## 5    0.584    0.311    0.202    0.193    0.185    0.175    0.181    0.171
## 6    0.373    0.369    0.367    0.363    0.369    0.364    0.362    0.360
## 7    0.386    0.376    0.331    0.348    0.341    0.346    0.342    0.327
##   gii_2013 gii_2014 gii_2015 gii_2016 gii_2017 gii_2018 gii_2019 gii_2020
## 1    0.728    0.718    0.706    0.692    0.678    0.671    0.665    0.674
## 2    0.540    0.531    0.530    0.529    0.538    0.537    0.537    0.537
## 3    0.225    0.219    0.204    0.191    0.170    0.164    0.156    0.156
## 5    0.161    0.151    0.126    0.118    0.112    0.103    0.056    0.050
## 6    0.356    0.351    0.345    0.338    0.328    0.315    0.306    0.293
## 7    0.305    0.313    0.309    0.306    0.261    0.260    0.239    0.239
##   gii_2021 mmr_1990 mmr_1991 mmr_1992 mmr_1993 mmr_1994 mmr_1995 mmr_1996
## 1    0.678     1500     1530     1520     1480     1540     1490     1440
## 2    0.537     1150     1100     1130     1110     1130     1060     1020
## 3    0.144       40       47       49       47       39       38       32
## 5    0.049       13       12       11       10       10        9        8
## 6    0.287       84       82       80       76       75       72       71
## 7    0.216       52       47       56       60       54       54       55
##   mmr_1997 mmr_1998 mmr_1999 mmr_2000 mmr_2001 mmr_2002 mmr_2003 mmr_2004
## 1     1470     1410     1470     1450     1390     1300     1240     1180
## 2      985      953      909      827      766      690      628      574
## 3       30       27       25       23       23       21       21       18
## 5        8        7        7        6        6        5        5        5
## 6       71       69       70       66       67       65       65       61
## 7       50       50       43       43       42       39       38       36
##   mmr_2005 mmr_2006 mmr_2007 mmr_2008 mmr_2009 mmr_2010 mmr_2011 mmr_2012
## 1     1140     1120     1090     1030      993      954      905      858
## 2      519      473      431      395      359      326      300      281
## 3       22       18       19       20       20       21       22       17
## 5        5        4        4        4        4        4        4        4
## 6       59       57       56       53       56       51       48       47
## 7       35       36       32       36       32       32       30       30
##   mmr_2013 mmr_2014 mmr_2015 mmr_2016 mmr_2017 mmr_2018 mmr_2019 mmr_2020
## 1      810      786      701      673      638      638      638      638
## 2      269      258      251      246      241      241      241      241
## 3       16       16       15       16       15       15       15       15
## 5        3        3        3        3        3        3        3        3
## 6       44       42       41       40       39       39       39       39
## 7       26       27       28       26       26       26       26       26
##   mmr_2021 abr_1990 abr_1991 abr_1992 abr_1993 abr_1994 abr_1995 abr_1996
## 1      638  142.960  147.525  147.521  147.896  155.669  156.770  154.932
## 2      241  198.803  197.301  196.400  195.398  195.291  193.237  192.841
## 3       15   14.815   14.784   16.155   17.855   20.157   21.869   21.756
## 5        3   48.493   41.065   39.971   38.536   41.638   35.147   34.231
## 6       39   70.928   71.979   72.151   72.502   73.516   72.810   71.390
## 7       26   73.201   78.736   86.553   85.981   82.148   69.251   62.587
##   abr_1997 abr_1998 abr_1999 abr_2000 abr_2001 abr_2002 abr_2003 abr_2004
## 1  156.444  154.262  154.416  152.572  150.863  148.141  143.370  138.827
## 2  187.510  182.742  178.605  177.316  176.253  175.341  171.817  170.795
## 3   20.149   18.001   16.098   14.792    9.697   13.217   15.231   19.046
## 5   29.477   26.185   24.881   25.818   25.759   25.389   25.997   25.047
## 6   70.424   69.307   68.268   66.540   64.000   63.078   60.281   62.620
```

```
## 7   54.180   48.124   41.327   36.644   32.841   32.756   31.669   31.569
##   abr_2005 abr_2006 abr_2007 abr_2008 abr_2009 abr_2010 abr_2011 abr_2012
## 1  133.071  126.106  125.858  128.171  120.635  120.820  116.454  111.286
## 2  170.951  169.366  168.678  168.701  169.586  164.955  159.295  156.557
## 3   18.869   17.503   17.309   18.545   18.987   19.650   20.692   20.909
## 5   22.179   19.436   17.771   16.389   15.087   13.720   12.330   11.149
## 6   64.877   64.070   66.424   66.149   66.695   67.064   68.264   68.719
## 7   29.062   24.607   24.544   25.220   28.266   29.070   28.694   29.083
##   abr_2013 abr_2014 abr_2015 abr_2016 abr_2017 abr_2018 abr_2019 abr_2020
## 1  106.537  101.454   97.415   94.018   90.342   88.431   86.803   84.296
## 2  153.345  151.093  148.074  146.135  145.235  142.575  141.278  139.825
## 3   20.865   20.942   20.276   18.171   16.585   15.580   15.013   14.672
## 5    9.876    8.819    7.785    7.035    5.593    4.275    3.825    3.077
## 6   69.167   67.791   65.395   61.852   57.783   51.029   46.153   39.866
## 7   25.412   27.222   24.660   24.621   21.379   19.533   19.041   18.571
##   abr_2021  se_f_1990  se_f_1991  se_f_1992  se_f_1993 se_f_1994 se_f_1995
## 1   82.565  0.7004847  0.7723605  0.8442364  0.9161122  0.987988  1.059864
## 2  138.402  4.4957169  4.8432953  5.2177461  5.6211468  6.055736  6.523924
## 3   14.517 58.1648835 58.3858494 58.6068154 58.8277813 59.048747 59.269713
## 5    3.085 43.9072962 46.2760713 48.6448464 51.0136216 53.382397 55.751172
## 6   39.065 35.3124098 36.2694092 37.2523441 38.2352791 39.218214 40.201149
## 7   18.511 84.5996742 85.0555172 85.5113601 85.9672031 86.423046 86.878889
##   se_f_1996 se_f_1997 se_f_1998 se_f_1999 se_f_2000 se_f_2001 se_f_2002
## 1  1.121385  1.182905  1.244426  1.305947  1.367468   1.47650  1.585532
## 2  7.028310  7.571691  8.157083  8.787733  9.467141  10.19908 11.118868
## 3 61.297516 63.325318 65.353121 67.380923 69.408725  70.99655 72.105877
## 5 57.474281 59.197390 60.920499 62.643608 64.366717  65.66604 66.965373
## 6 41.184084 42.167019 43.149954 44.132889 45.115824  46.09876 51.146694
## 7 87.412365 87.945840 88.479316 89.012791 89.546267  89.97026 90.585679
##   se_f_2003 se_f_2004 se_f_2005 se_f_2006 se_f_2007 se_f_2008 se_f_2009
## 1  1.694564  1.803596  1.912628  1.887654   1.86268  1.837706  1.812733
## 2 12.038659 12.958450 13.878241 14.798032  15.71782 16.637614 17.557405
## 3 73.215203 74.324529 75.433855 76.543181  77.65251 78.761833 79.892064
## 5 68.264701 69.564029 70.863358 71.686381  72.50940 73.332427 74.155450
## 6 56.194630 58.451978 60.709327 60.832103  60.95488 61.077654 61.200430
## 7 91.201097 91.816515 92.431934 93.047352  93.66277 94.278188 94.893607
##   se_f_2010 se_f_2011 se_f_2012 se_f_2013 se_f_2014 se_f_2015 se_f_2016
## 1  1.787759  2.008868  2.229978  2.451087  2.672197  2.893306  3.459785
## 2 18.477196 19.396987 20.316778 21.236570 22.156361 25.160130 28.163900
## 3 81.022296 82.152527 85.216042 87.706596 90.197151 93.740037 94.151904
## 5 74.978473 75.801496 76.624519 77.447542 78.270565 79.093588 79.916611
## 6 61.323205 62.800821 64.278437 65.756053 67.233668 68.711284 69.271313
## 7 95.509025 96.124443 96.311131 96.497818 96.684505 96.871193 96.504036
##   se_f_2017 se_f_2018 se_f_2019 se_f_2020 se_f_2021 se_m_1990 se_m_1991
## 1  4.026264  4.592743  5.159222  5.725701   6.39573  5.419459  5.583395
## 2 28.163900 28.163900 28.163900 28.163900  28.16390 23.282538 23.739825
## 3 94.563771 94.975638 95.387505 95.387505  95.38751 67.010643 67.062596
## 5 76.095253 78.247238 81.997002 81.997002  81.99700 42.276174 44.446598
## 6 69.831342 70.391372 70.951401 70.951401  70.95140 37.850177 38.548382
## 7 96.136879 96.091713 96.046547 96.001381  96.00138 88.613440 88.935999
##   se_m_1992 se_m_1993 se_m_1994 se_m_1995 se_m_1996 se_m_1997 se_m_1998
## 1  5.747332  5.911269  6.075205  6.239142  6.344189  6.449235  6.554282
## 2 24.206094 24.681521 25.166286 25.660571 26.164565 26.678458 27.202444
## 3 67.114550 67.166504 67.218458 67.270411 69.800749 72.331086 74.861423
```

```
## 5 46.617022 48.787446 50.957870 53.128294 54.751603 56.374912 57.998221
## 6 39.259467 39.970551 40.681636 41.392721 42.103806 42.814890 43.525975
## 7 89.258557 89.581116 89.903674 90.226233 90.590864 90.955496 91.320127
##   se_m_1999 se_m_2000 se_m_2001 se_m_2002 se_m_2003 se_m_2004 se_m_2005
## 1  6.659329  6.764376  7.183767  7.603158   8.02255  8.441941  8.861332
## 2 27.736722 28.281493 28.836964 29.426029  30.01510 30.604161 31.193227
## 3 77.391760 79.922098 80.570557 81.208216  81.84588 82.483535 83.121194
## 5 59.621530 61.244838 61.010361 60.775883  60.54140 60.306927 60.072449
## 6 44.237060 44.948145 45.659229 51.111229  56.56323 58.835384 61.107540
## 7 91.684758 92.049390 92.391983 92.868896  93.34581 93.822723 94.299637
##   se_m_2006 se_m_2007 se_m_2008 se_m_2009 se_m_2010 se_m_2011 se_m_2012
## 1  9.458985  10.05664  10.65429  11.25194  11.84959  12.40825  12.96691
## 2 31.782293  32.37136  32.96042  33.54949  34.13856  34.72762  35.31669
## 3 83.758853  84.39651  85.03417  86.16005  87.28594  88.41182  89.42938
## 5 60.770144  61.46784  62.16553  62.86323  63.56092  64.25862  64.95631
## 6 61.231120  61.35470  61.47828  61.60186  61.72544  63.21275  64.70006
## 7 94.776550  95.25346  95.73038  96.20729  96.68420  97.16112  97.28203
##   se_m_2013 se_m_2014 se_m_2015 se_m_2016 se_m_2017 se_m_2018 se_m_2019
## 1  13.52557  14.08423  14.64288  14.66676  14.69063  14.71451  14.73838
## 2  35.90575  36.49482  44.02049  51.54617  51.54617  51.54617  51.54617
## 3  90.45197  91.47457  92.49716  92.63247  92.76779  92.90310  93.03841
## 5  65.65401  66.35170  67.04940  67.74709  81.09943  84.51494  85.59674
## 6  66.18737  67.67468  69.16198  69.72569  70.28939  70.85309  71.41679
## 7  97.40294  97.52385  97.64476  97.39824  97.15172  97.11813  97.08454
##   se_m_2020 se_m_2021 pr_f_1990 pr_f_1991 pr_f_1992 pr_f_1993 pr_f_1994
## 1  14.76226  14.86571        NA        NA        NA        NA        NA
## 2  51.54617  51.54617  9.545455  9.545455  9.545455  9.545455  9.545455
## 3  93.03841  93.03841        NA        NA        NA        NA        NA
## 5  85.59674  85.59674  0.000000  0.000000  0.000000  0.000000  0.000000
## 6  71.41679  71.41679 22.796353 22.796353 22.796353 22.796353 22.796353
## 7  97.05096  97.05096  6.315789  6.315789  6.315789  6.315789  6.315789
##   pr_f_1995 pr_f_1996 pr_f_1997 pr_f_1998 pr_f_1999 pr_f_2000 pr_f_2001
## 1        NA        NA        NA        NA        NA        NA        NA
## 2  9.545455  9.545455  9.545455 15.454545 15.454545 15.454545 15.454545
## 3        NA        NA        NA        NA  5.161290  5.161290  5.714286
## 5  0.000000  0.000000  0.000000  0.000000  0.000000  0.000000  0.000000
## 6 22.796353 22.796353 22.796353 22.796353 22.796353 21.276596 21.276596
## 7  6.315789  6.315789  6.315789  6.315789  3.053435  3.053435  3.053435
##   pr_f_2002 pr_f_2003 pr_f_2004 pr_f_2005 pr_f_2006 pr_f_2007 pr_f_2008
## 1        NA        NA        NA 25.925926 25.925926 25.872093 25.872093
## 2 15.454545 15.454545 15.000000 15.000000 15.000000 15.000000 37.272727
## 3  5.714286  5.714286  6.428571  7.142857  7.142857  7.142857  7.142857
## 5  0.000000  0.000000  0.000000  0.000000  5.000000 22.500000 22.500000
## 6 31.306991 31.306991 33.639144 37.386018 36.778115 39.755352 39.755352
## 7  3.053435  4.580153  5.343511  5.343511  5.343511  9.160305  8.396947
##   pr_f_2009 pr_f_2010 pr_f_2011 pr_f_2012 pr_f_2013 pr_f_2014 pr_f_2015
## 1 25.925926 27.635328 27.635328  27.63533  27.63533  27.63533  27.44479
## 2 38.636364 38.636364 38.181818  34.09091  34.09091  36.81818  36.81818
## 3 16.428571 16.428571 15.714286  15.71429  17.85714  20.00000  20.71429
## 5 22.500000 22.500000 17.500000  17.50000  17.50000  17.50000  22.50000
## 6 37.804878 37.804878 37.689970  37.68997  37.08207  37.08207  37.08207
## 7  9.160305  9.160305  8.396947  10.68702  10.68702  10.68702  10.68702
##   pr_f_2016 pr_f_2017 pr_f_2018 pr_f_2019 pr_f_2020 pr_f_2021 pr_m_1990
## 1  27.44479  27.44479  27.44479  27.24359  27.21519  27.21519        NA
```

```
## 2  36.81818  30.45455  30.45455  30.00000  30.00000  29.54545  90.45455
## 3  22.85714  27.85714  27.85714  29.50820  29.50820  35.71429        NA
## 5  22.50000  22.50000  22.50000  50.00000  50.00000  50.00000 100.00000
## 6  37.08207  38.90578  39.51368  39.87730  40.72948  44.37690  77.20365
## 7  10.68702  18.09524  18.09524  23.48485  23.48485  33.64486  93.68421
##   pr_m_1991 pr_m_1992 pr_m_1993 pr_m_1994 pr_m_1995 pr_m_1996 pr_m_1997
## 1        NA        NA        NA        NA        NA        NA        NA
## 2  90.45455  90.45455  90.45455  90.45455  90.45455  90.45455  90.45455
## 3        NA        NA        NA        NA        NA        NA        NA
## 5 100.00000 100.00000 100.00000 100.00000 100.00000 100.00000 100.00000
## 6  77.20365  77.20365  77.20365  77.20365  77.20365  77.20365  77.20365
## 7  93.68421  93.68421  93.68421  93.68421  93.68421  93.68421  93.68421
##   pr_m_1998 pr_m_1999 pr_m_2000 pr_m_2001 pr_m_2002 pr_m_2003 pr_m_2004
## 1        NA        NA        NA        NA        NA        NA        NA
## 2  84.54545  84.54545  84.54545  84.54545  84.54545  84.54545  85.00000
## 3        NA  94.83871  94.83871  94.28571  94.28571  94.28571  93.57143
## 5 100.00000 100.00000 100.00000 100.00000 100.00000 100.00000 100.00000
## 6  77.20365  77.20365  78.72340  78.72340  68.69301  68.69301  66.36086
## 7  93.68421  96.94656  96.94656  96.94656  96.94656  95.41985  94.65649
##   pr_m_2005 pr_m_2006 pr_m_2007 pr_m_2008 pr_m_2009 pr_m_2010 pr_m_2011
## 1  74.07407  74.07407  74.12791  74.12791  74.07407  72.36467  72.36467
## 2  85.00000  85.00000  85.00000  62.72727  61.36364  61.36364  61.81818
## 3  92.85714  92.85714  92.85714  92.85714  83.57143  83.57143  84.28571
## 5 100.00000  95.00000  77.50000  77.50000  77.50000  77.50000  82.50000
## 6  62.61398  63.22188  60.24465  60.24465  62.19512  62.19512  62.31003
## 7  94.65649  94.65649  90.83969  91.60305  90.83969  90.83969  91.60305
##   pr_m_2012 pr_m_2013 pr_m_2014 pr_m_2015 pr_m_2016 pr_m_2017 pr_m_2018
## 1  72.36467  72.36467  72.36467  72.55521  72.55521  72.55521  72.55521
## 2  65.90909  65.90909  63.18182  63.18182  63.18182  69.54545  69.54545
## 3  84.28571  82.14286  80.00000  79.28571  77.14286  72.14286  72.14286
## 5  82.50000  82.50000  82.50000  77.50000  77.50000  77.50000  77.50000
## 6  62.31003  62.91793  62.91793  62.91793  62.91793  61.09422  60.48632
## 7  89.31298  89.31298  89.31298  89.31298  89.31298  81.90476  81.90476
##   pr_m_2019 pr_m_2020 pr_m_2021 lfpr_f_1990 lfpr_f_1991 lfpr_f_1992 lfpr_f_1993
## 1  72.75641  72.78481  72.78481      15.180      15.214      15.223      15.197
## 2  70.00000  70.00000  70.45455      75.408      75.381      75.369      75.371
## 3  70.49180  70.49180  64.28571      51.364      54.727      55.608      54.638
## 5  50.00000  50.00000  50.00000      29.083      29.779      30.272      30.944
## 6  60.12270  59.27052  55.62310      45.041      46.331      47.486      48.717
## 7  76.51515  76.51515  66.35514      44.833      44.864      44.904      44.952
##   lfpr_f_1994 lfpr_f_1995 lfpr_f_1996 lfpr_f_1997 lfpr_f_1998 lfpr_f_1999
## 1      15.178      15.221      15.078      14.954      14.873      14.827
## 2      75.387      75.416      75.414      75.428      75.456      75.494
## 3      53.825      52.576      51.660      52.615      51.658      50.445
## 5      31.121      31.279      31.883      32.480      33.072      33.659
## 6      49.576      48.966      49.762      50.973      51.494      50.775
## 7      45.003      45.053      45.087      45.117      45.141      45.158
##   lfpr_f_2000 lfpr_f_2001 lfpr_f_2002 lfpr_f_2003 lfpr_f_2004 lfpr_f_2005
## 1      14.795      14.936      15.113      15.298      15.475      15.644
## 2      75.539      75.546      75.564      75.590      75.617      75.641
## 3      49.782      49.087      48.757      48.186      47.625      47.067
## 5      34.244      34.911      35.586      36.216      36.744      37.176
## 6      50.509      49.613      47.508      48.801      50.136      49.280
## 7      45.169      45.162      45.151      45.139      45.132      45.130
```

```
##   lfpr_f_2006 lfpr_f_2007 lfpr_f_2008 lfpr_f_2009 lfpr_f_2010 lfpr_f_2011
## 1      15.455      15.275      15.137      15.076      15.111      15.454
## 2      75.625      75.614      75.607      75.603      75.605      74.847
## 3      46.511      45.958      45.410      45.839      46.727      52.446
## 5      37.979      38.812      39.739      40.795      41.976      43.301
## 6      49.916      49.080      48.243      48.964      47.875      48.134
## 7      45.134      45.145      44.839      45.550      46.934      49.462
##   lfpr_f_2012 lfpr_f_2013 lfpr_f_2014 lfpr_f_2015 lfpr_f_2016 lfpr_f_2017
## 1      15.879      16.794      17.749      18.746      19.798      20.887
## 2      74.834      74.833      74.843      74.864      74.882      74.912
## 3      48.778      43.598      43.733      46.898      49.676      49.510
## 5      44.718      46.190      47.659      49.072      50.373      51.947
## 6      48.234      47.826      47.600      47.679      47.760      47.844
## 7      49.837      50.207      49.539      48.778      47.034      46.891
##   lfpr_f_2018 lfpr_f_2019 lfpr_f_2020 lfpr_f_2021 lfpr_m_1990 lfpr_m_1991
## 1      21.228      21.566      16.189      14.848      77.430      77.176
## 2      74.955      75.011      73.618      73.968      79.292      79.367
## 3      51.189      52.723      49.786      50.733      72.510      75.143
## 5      48.951      48.923      45.703      46.542      91.714      91.894
## 6      49.316      50.168      46.642      50.010      74.389      74.812
## 7      43.112      44.757      41.961      42.663      62.743      62.786
##   lfpr_m_1992 lfpr_m_1993 lfpr_m_1994 lfpr_m_1995 lfpr_m_1996 lfpr_m_1997
## 1      76.871      76.580      76.330      76.102      76.140      76.262
## 2      79.405      79.409      79.381      79.321      79.335      79.310
## 3      75.858      75.222      74.680      73.768      73.023      73.726
## 5      91.989      92.196      92.168      92.137      92.143      92.114
## 6      75.107      75.380      75.522      75.197      75.358      75.660
## 7      62.842      62.909      62.980      63.051      63.099      63.141
##   lfpr_m_1998 lfpr_m_1999 lfpr_m_2000 lfpr_m_2001 lfpr_m_2002 lfpr_m_2003
## 1      76.415      76.549      76.646      76.589      76.491      76.393
## 2      79.252      79.167      79.064      79.055      79.017      78.961
## 3      72.917      71.884      71.298      70.702      70.424      68.960
## 5      92.053      91.969      91.865      91.968      92.077      92.054
## 6      75.746      75.441      75.280      74.897      74.102      74.491
## 7      63.175      63.198      63.213      63.204      63.188      63.172
##   lfpr_m_2004 lfpr_m_2005 lfpr_m_2006 lfpr_m_2007 lfpr_m_2008 lfpr_m_2009
## 1      76.332      76.318      76.422      76.567      76.712      76.813
## 2      78.901      78.850      78.897      78.930      78.955      78.970
## 3      67.465      65.930      64.357      62.750      61.114      64.292
## 5      91.767      91.243      90.443      89.732      89.251      89.056
## 6      74.871      74.895      74.794      74.266      73.729      73.660
## 7      63.161      63.159      63.164      63.180      62.899      63.560
##   lfpr_m_2010 lfpr_m_2011 lfpr_m_2012 lfpr_m_2013 lfpr_m_2014 lfpr_m_2015
## 1      76.842      76.659      76.420      75.588      74.737      73.875
## 2      78.972      79.883      79.922      79.930      79.912      79.865
## 3      63.788      67.483      65.197      61.180      62.984      63.957
## 5      89.125      89.472      89.976      90.557      91.098      91.509
## 6      73.601      74.266      73.538      73.135      72.283      71.749
## 7      67.615      67.583      67.734      67.879      67.158      66.578
##   lfpr_m_2016 lfpr_m_2017 lfpr_m_2018 lfpr_m_2019 lfpr_m_2020 lfpr_m_2021
## 1      73.045      72.183      72.023      71.863      65.580      66.515
## 2      79.827      79.756      79.653      79.519      78.798      79.071
## 3      64.800      66.440      67.247      67.742      65.631      66.154
## 5      91.697      91.559      90.621      90.686      87.191      88.003
```

```
## 6      71.213      70.674      70.717      71.223      66.141      71.603
## 7      66.175      65.681      65.243      65.303      62.425      63.004
##   rankdiff_hdi_phdi_2021 phdi_1990 phdi_1991 phdi_1992 phdi_1993 phdi_1994
## 1                      5     0.270     0.276     0.284     0.294     0.289
## 2                     10        NA        NA        NA        NA        NA
## 3                     28     0.619     0.606     0.594     0.598     0.605
## 5                   -105     0.359     0.463     0.476     0.435     0.407
## 6                     26     0.668     0.670     0.670     0.675     0.678
## 7                     33        NA     0.631     0.602     0.609     0.606
##   phdi_1995 phdi_1996 phdi_1997 phdi_1998 phdi_1999 phdi_2000 phdi_2001
## 1     0.307     0.316     0.320     0.321     0.329     0.331     0.333
## 2        NA        NA        NA        NA     0.358     0.369     0.379
## 3     0.615     0.624     0.621     0.634     0.642     0.643     0.651
## 5     0.413     0.431     0.441     0.457     0.485     0.431     0.467
## 6     0.681     0.687     0.687     0.689     0.697     0.705     0.715
## 7     0.613     0.619     0.626     0.637     0.640     0.645     0.648
##   phdi_2002 phdi_2003 phdi_2004 phdi_2005 phdi_2006 phdi_2007 phdi_2008
## 1     0.358     0.371     0.388     0.396     0.406     0.421     0.427
## 2     0.395     0.413     0.424     0.437     0.449     0.462     0.471
## 3     0.654     0.655     0.656     0.664     0.671     0.683     0.682
## 5     0.498     0.471     0.472     0.510     0.485     0.470     0.479
## 6     0.729     0.730     0.730     0.728     0.737     0.735     0.741
## 7     0.653     0.661     0.667     0.680     0.688     0.698     0.696
##   phdi_2009 phdi_2010 phdi_2011 phdi_2012 phdi_2013 phdi_2014 phdi_2015
## 1     0.436     0.443     0.450     0.461     0.469     0.474     0.474
## 2     0.483     0.496     0.510     0.525     0.535     0.548     0.567
## 3     0.683     0.704     0.712     0.724     0.733     0.732     0.739
## 5     0.421     0.494     0.505     0.515     0.517     0.500     0.477
## 6     0.750     0.750     0.750     0.753     0.751     0.754     0.750
## 7     0.702     0.716     0.717     0.722     0.728     0.730     0.732
##   phdi_2016 phdi_2017 phdi_2018 phdi_2019 phdi_2020 phdi_2021
## 1     0.477     0.478     0.479     0.484     0.479     0.474
## 2     0.584     0.586     0.585     0.586     0.581     0.577
## 3     0.736     0.737     0.748     0.751     0.737     0.739
## 5     0.462     0.465     0.524     0.519     0.518     0.518
## 6     0.753     0.750     0.758     0.766     0.757     0.759
## 7     0.727     0.731     0.738     0.746     0.725     0.727
##   diff_hdi_phdi_1990 diff_hdi_phdi_1991 diff_hdi_phdi_1992 diff_hdi_phdi_1993
## 1           1.098901           1.075269           1.045296           1.010101
## 2                 NA                 NA                 NA                 NA
## 3           4.327666           3.656598           3.257329           3.079417
## 5          50.686813          37.347767          35.849057          41.844920
## 6           7.607192           8.219178           8.843537           8.660352
## 7                 NA           2.773498           2.588997           1.136364
##   diff_hdi_phdi_1994 diff_hdi_phdi_1995 diff_hdi_phdi_1996 diff_hdi_phdi_1997
## 1           1.027397          0.9677419          0.9404389          0.9287926
## 2                 NA                 NA                 NA                 NA
## 3           3.044872          2.9968454          3.2558140          3.2710280
## 5          46.092715         45.8005249         43.8070404         42.9495472
## 6           8.870968          8.5906040          8.5219707          9.1269841
## 7           2.258065          2.2328549          2.0569620          2.3400936
##   diff_hdi_phdi_1998 diff_hdi_phdi_1999 diff_hdi_phdi_2000 diff_hdi_phdi_2001
## 1          0.9259259          0.9036145           1.194030           1.186944
## 2                 NA          1.6483516           1.600000           1.813472
```

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## 3          3.5007610          4.0358744           5.022157           4.824561
## 5         41.3350449         38.3735705          45.854271          41.625000
## 6          9.5800525          9.8318241           9.499358           8.801020
## 7          2.5993884          2.5875190           2.567976           2.702703
##   diff_hdi_phdi_2002 diff_hdi_phdi_2003 diff_hdi_phdi_2004 diff_hdi_phdi_2005
## 1           1.104972           1.329787           1.020408           1.000000
## 2           1.985112           1.666667           2.078522           2.237136
## 3           5.079826           5.890805           6.285714           6.610408
## 5          38.059701          42.137592          42.298289          37.956204
## 6           7.133758           7.944515           8.521303           9.226933
## 7           3.402367           3.644315           3.890490           3.818953
##   diff_hdi_phdi_2006 diff_hdi_phdi_2007 diff_hdi_phdi_2008 diff_hdi_phdi_2009
## 1          0.7334963          0.7075472          0.6976744          0.9090909
## 2          2.1786492          2.7368421          3.0864198          3.4000000
## 3          6.5459610          6.4383562          7.3369565          7.8272605
## 5         41.3542926         43.4416366         42.5659472         49.4597839
## 6          9.4594595         10.0367197         10.1818182          9.3107618
## 7          4.5769764          5.4200542          6.1994609          5.2631579
##   diff_hdi_phdi_2010 diff_hdi_phdi_2011 diff_hdi_phdi_2012 diff_hdi_phdi_2013
## 1           1.116071           1.315789           1.072961           1.054852
## 2           2.745098           3.041825           2.957486           3.079710
## 3           6.631300           7.049608           6.940874           6.624204
## 5          40.838323          39.880952          39.125296          39.319249
## 6          10.071942          10.820452          10.676157          11.124260
## 7           4.021448           4.400000           4.370861           4.210526
##   diff_hdi_phdi_2014 diff_hdi_phdi_2015 diff_hdi_phdi_2016 diff_hdi_phdi_2017
## 1           1.043841          0.8368201          0.8316008          0.8298755
## 2           2.664298          2.5773196          2.0134228          1.8425461
## 3           7.575758          7.0440252          7.7694236          8.1047382
## 5          41.792782         44.8554913         46.8965517         48.1605351
## 6          10.874704         11.5566038         11.0979929         11.8683901
## 7           4.450262          4.4386423          4.9673203          4.8177083
##   diff_hdi_phdi_2018 diff_hdi_phdi_2019 diff_hdi_phdi_2020 diff_hdi_phdi_2021
## 1          0.8281574          0.8196721          0.8281574          0.8368201
## 2          1.6806723          1.5126050          1.5254237          1.5358362
## 3          7.1960298          7.2839506          7.1788413          7.1608040
## 5         42.3542354         43.5869565         43.2017544         43.1394072
## 6         10.8235294         10.0938967          9.8809524          9.8574822
## 7          4.2801556          4.1131105          4.2272127          4.2160738
##   co2_prod_1990 co2_prod_1991 co2_prod_1992 co2_prod_1993 co2_prod_1994
## 1     0.2097273     0.1825248    0.09523286    0.08428485    0.07505391
## 2     0.4295859     0.4134330    0.40801538    0.43964654    0.28617983
## 3     1.6569017     1.2889606    0.76872694    0.72471230    0.60784632
## 5    28.2776718    29.2560268   28.13451859   30.17091866   31.64455835
## 6     3.4360434     3.5522749    3.61565872    3.46709200    3.55289264
## 7     2.5330319     2.0792478    1.70293687    0.76566081    0.82630181
##   co2_prod_1995 co2_prod_1996 co2_prod_1997 co2_prod_1998 co2_prod_1999
## 1    0.06794342    0.06178714    0.05600521    0.05214369    0.04013268
## 2    0.78513720    0.72385275    0.49407695    0.47321542    0.57542543
## 3    0.66384275    0.64323749    0.49410404    0.56068091    0.95276615
## 5   28.98952006   28.66139766   27.36461775   28.67983026   26.14393497
## 6    3.66843564    3.82343160    3.86010724    3.86684760    4.03883565
## 7    1.06709004    0.81919790    1.04344307    1.09280864    0.98720566
##   co2_prod_2000 co2_prod_2001 co2_prod_2002 co2_prod_2003 co2_prod_2004
```

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## 1    0.03646158    0.03693064    0.04652939    0.05008262    0.03595994
## 2    0.58041021    0.57069757    0.71909356    0.49604119    0.99693227
## 3    0.96013636    1.02907495    1.19900057    1.35723822    1.32168848
## 5   35.66843923   30.45702647   24.05966235   28.45383482   27.47938465
## 6    3.86100519    3.59494450    3.30112862    3.53474760    4.07990009
## 7    1.13741538    1.15800146    1.01411414    1.14502249    1.23010478
##   co2_prod_2005 co2_prod_2006 co2_prod_2007 co2_prod_2008 co2_prod_2009
## 1    0.05080245    0.06186952    0.08371052     0.1514847     0.2373673
## 2    0.97799677    1.09686395    1.19477954     1.1747202     1.2243340
## 3    1.36027161    1.25480694    1.26199820     1.4227966     1.4308212
## 5   24.95032393   22.96858556   21.60277187    21.7180312    20.9033629
## 6    4.15073372    4.44412171    4.39079994     4.6932447     4.4203774
## 7    1.46789840    1.48787803    1.73912866     1.9173083     1.5107898
##   co2_prod_2010 co2_prod_2011 co2_prod_2012 co2_prod_2013 co2_prod_2014
## 1     0.2877387     0.4019535      0.327922     0.2615714     0.2329672
## 2     1.2358364     1.2522243      1.346212     1.2772478     1.2358612
## 3     1.5088417     1.7177879      1.601835     1.6971269     1.9406105
## 5    21.1253747    21.5710417     22.047365    22.3301163    21.9148323
## 6     4.5660757     4.6048281      4.591400     4.5059547     4.4246743
## 7     1.4780078     1.7273890      1.993008     1.9102095     1.9242146
##   co2_prod_2015 co2_prod_2016 co2_prod_2017 co2_prod_2018 co2_prod_2019
## 1     0.2296795     0.1906168     0.1889954     0.2244920     0.3192992
## 2     1.2057359     1.0888034     0.9531684     0.7911707     0.7379916
## 3     1.5553295     1.5562780     1.8382418     1.6421530     1.6881778
## 5    23.3817811    22.9320862    17.7956875    16.0112404    15.7807013
## 6     4.4667241     4.3894268     4.2743952     4.0823919     3.7419175
## 7     1.8694927     1.7720527     1.8801334     1.9736800     1.8692707
##   co2_prod_2020 co2_prod_2021 mf_1990 mf_1991 mf_1992 mf_1993 mf_1994 mf_1995
## 1     0.3123765     0.3123765    2.33    2.28    2.35    2.10    1.83    1.81
## 2     0.6754097     0.6754097    2.44    2.66    4.67    3.31    3.08    2.08
## 3     1.5757540     1.5757540    6.63    5.91    5.65    5.36    5.54    5.47
## 5    15.1933359    15.1933359   64.75   34.47   33.09   42.61   49.52   53.11
## 6     3.4732916     3.4732916   11.08   12.08   13.47   13.14   13.38   12.69
## 7     1.9877884     1.9877884      NA    2.61    2.81    1.34    3.62    3.09
##   mf_1996 mf_1997 mf_1998 mf_1999 mf_2000 mf_2001 mf_2002 mf_2003 mf_2004
## 1    1.62    1.73    2.08    2.03    2.28    2.34    2.48    2.63    2.20
## 2    2.03    2.41    2.44    2.35    2.74    3.26    3.04    3.02    3.12
## 3    6.13    6.18    6.74    7.31    9.44    8.70    8.95   10.46   11.43
## 5   49.24   49.36   44.01   41.48   42.84   41.70   44.12   46.05   47.91
## 6   12.40   13.51   14.51   14.71   14.36   13.21   10.30   11.63   11.96
## 7    3.30    3.31    3.86    3.92    3.86    4.13    5.69    6.18    6.58
##   mf_2005 mf_2006 mf_2007 mf_2008 mf_2009 mf_2010 mf_2011 mf_2012 mf_2013
## 1    2.02    1.53    1.53    1.38    1.43    1.77    2.12    1.86    1.88
## 2    3.39    3.20    3.91    4.95    5.58    4.16    4.39    4.09    4.53
## 3   12.11   12.07   11.91   13.46   14.50   11.92   12.49   12.44   11.49
## 5   42.46   52.87   59.52   57.47   73.71   54.63   52.01   49.56   49.68
## 6   13.39   13.49   14.68   14.66   13.02   14.59   16.16   15.69   16.74
## 7    6.02    7.52    9.04   10.35    8.95    6.45    6.71    6.27    6.15
##   mf_2014 mf_2015 mf_2016 mf_2017 mf_2018 mf_2019 mf_2020 mf_2021
## 1    1.66    1.62    1.66    1.41    1.32    1.38    1.38    1.38
## 2    3.97    3.59    2.79    2.64    2.28    2.18    2.18    2.18
## 3   13.14   12.61   14.39   14.46   12.85   12.96   12.96   12.96
## 5   55.49   59.76   64.95   75.61   65.97   68.95   68.95   68.95
## 6   16.57   17.85   16.95   18.75   16.88   15.81   15.81   15.81
```

```
## 7    6.44    6.50    7.79    7.35    6.01    5.95    5.95    5.95
```

```r
qual_vars <- c("region", "hdicode")
quant_vars <- c("gnipc_1990", "le_1990")

# Description des variables qualitatives
for (var in qual_vars) {
  cat("Résumé de la variable qualitative", var, ":\n")
  print(summary(as.factor(data[[var]])))
  cat("Données manquantes :", sum(is.na(data[[var]])), "\n\n")
}
```

```
## Résumé de la variable qualitative region :
##                             Asia           East Asia and Pacific
##                               20                              26
##         Europe and Central Asia Latin America and the Caribbean
##                               17                              33
##                       South Asia              Sub-Saharan Africa
##                                9                              46
## Données manquantes : 0
##
## Résumé de la variable qualitative hdicode :
##                High       Low    Medium Very High
##         3        48        32        44        24
## Données manquantes : 0
```

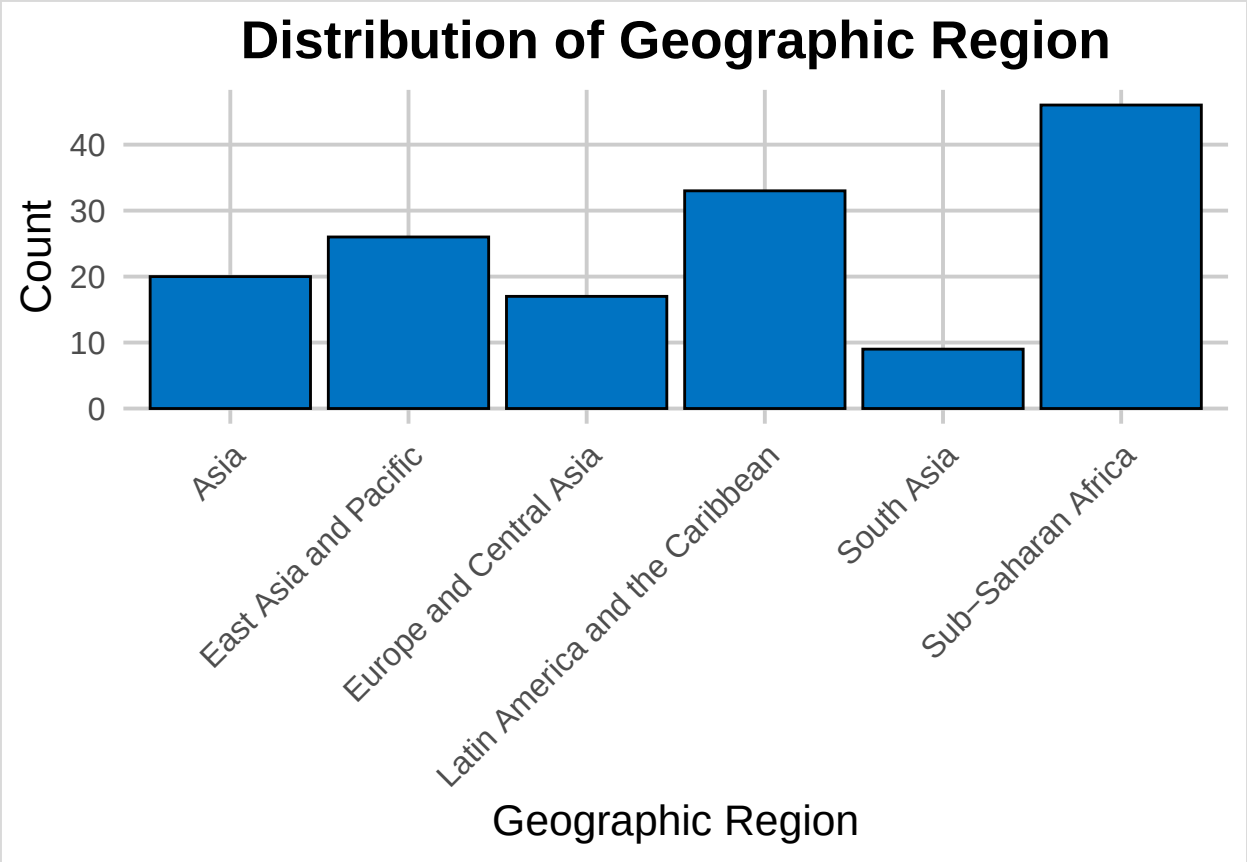
```r
# Description des variables quantitatives
for (var in quant_vars) {
  cat("Résumé de la variable quantitative", var, ":\n")
  print(summary(data[[var]]))
  cat("Données manquantes :", sum(is.na(data[[var]])), "\n\n")
}
```

```
## Résumé de la variable quantitative gnipc_1990 :
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.     NA's
##    454.4   2231.2   4386.8   8441.1   9045.7 102433.1        8
## Données manquantes : 8
##
## Résumé de la variable quantitative le_1990 :
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   29.94   55.56   63.58   61.64   69.60   76.63
## Données manquantes : 0
```

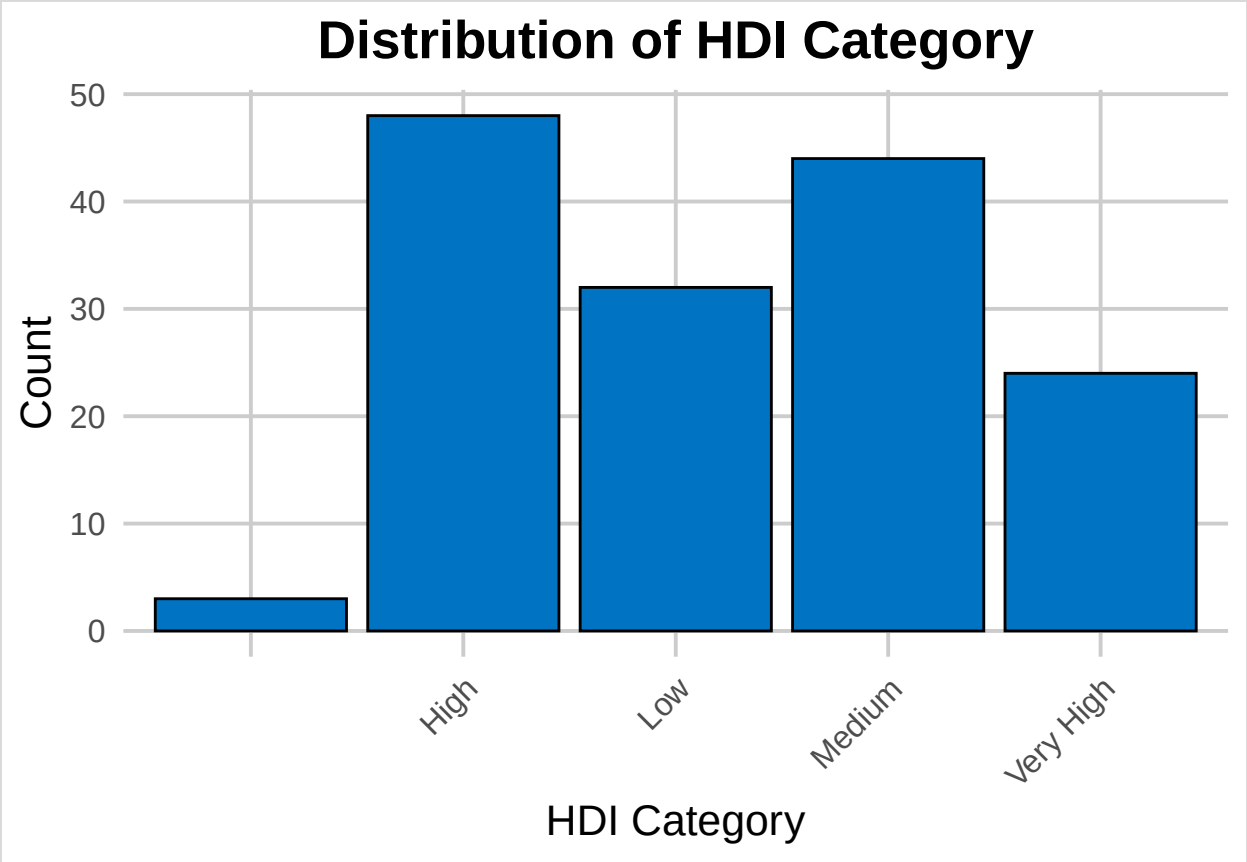
```r
# Sélection des variables d'intérêt
qual_vars <- c("region", "hdicode")
quant_vars <- c("gnipc_1990", "le_1990")

# Graphiques pour les variables qualitatives
library(ggplot2)

# Vecteurs de noms correspondants
var_labels <- list(
  region = "Geographic Region",
```

```r
  hdicode = "HDI Category",
  gnipc_1990 = "GNI per Capita (1990)",
  le_1990 = "Life Expectancy (1990)"
)

# Thème personnalisé pour les graphiques
theme_custom <- theme_minimal(base_size = 15) +
  theme(
    plot.title = element_text(hjust = 0.5, size = 20, face = "bold"),
    axis.text.x = element_text(angle = 45, hjust = 1),
    axis.title.x = element_text(size = 16),
    axis.title.y = element_text(size = 16),
    panel.grid.major = element_line(color = "grey80"),
    panel.grid.minor = element_blank(),
    plot.background = element_rect(fill = "white", color = "grey85")
  )

# Analyse univariée pour les variables qualitatives
for (var in qual_vars) {
  p <- ggplot(data, aes_string(var)) +
        geom_bar(fill = "#0073C2FF", color = "black") +
        ggtitle(paste("Distribution of", var_labels[[var]])) +
        xlab(var_labels[[var]]) +
        ylab("Count") +
        theme_custom
  print(p)

  cat("Résumé de la variable qualitative", var, ":\n")
  print(summary(as.factor(data[[var]])))
  cat("Données manquantes :", sum(is.na(data[[var]])), "\n\n")
}
```

```
## Warning: `aes_string()` was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation ideoms with `aes()`
```




```
## Résumé de la variable qualitative region :
##                             Asia           East Asia and Pacific
##                               20                              26
##         Europe and Central Asia Latin America and the Caribbean
##                               17                              33
##                       South Asia              Sub-Saharan Africa
##                                9                              46
## Données manquantes : 0
```

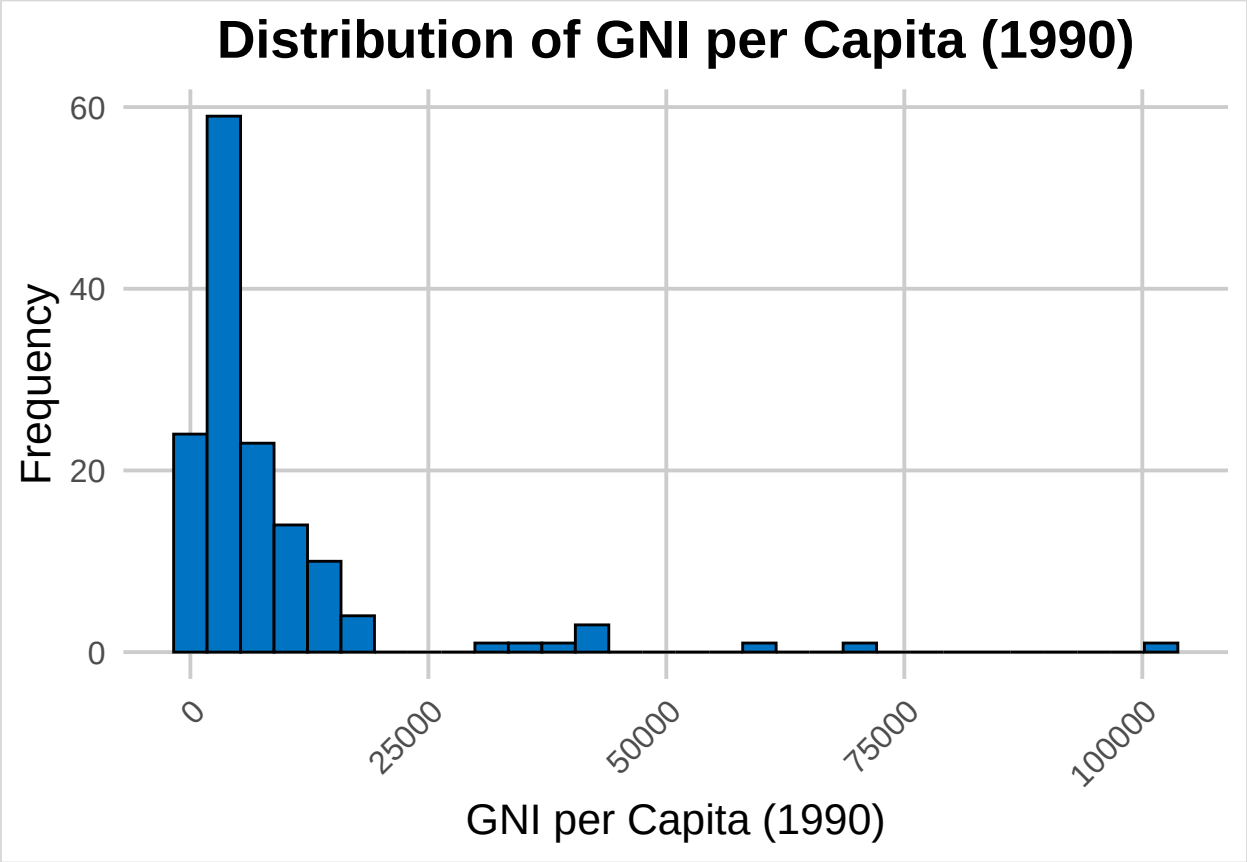



```
## Résumé de la variable qualitative hdicode :
##                High       Low    Medium Very High
##         3        48        32        44        24
## Données manquantes : 0
```

```r
# Analyse univariée pour les variables quantitatives
for (var in quant_vars) {
  p <- ggplot(data, aes_string(var)) +
        geom_histogram(bins = 30, fill = "#0073C2FF", color = "black") +
        ggtitle(paste("Distribution of", var_labels[[var]])) +
        xlab(var_labels[[var]]) +
        ylab("Frequency") +
        theme_custom
  print(p)

  cat("Résumé de la variable quantitative", var, ":\n")
  print(summary(data[[var]]))
  cat("Données manquantes :", sum(is.na(data[[var]])), "\n\n")

  # Test de normalité
  shapiro_test <- shapiro.test(data[[var]])
  cat("Test de normalité de Shapiro-Wilk pour", var, ":\n")
  print(shapiro_test)

  # Estimateurs de moyenne et variance
```

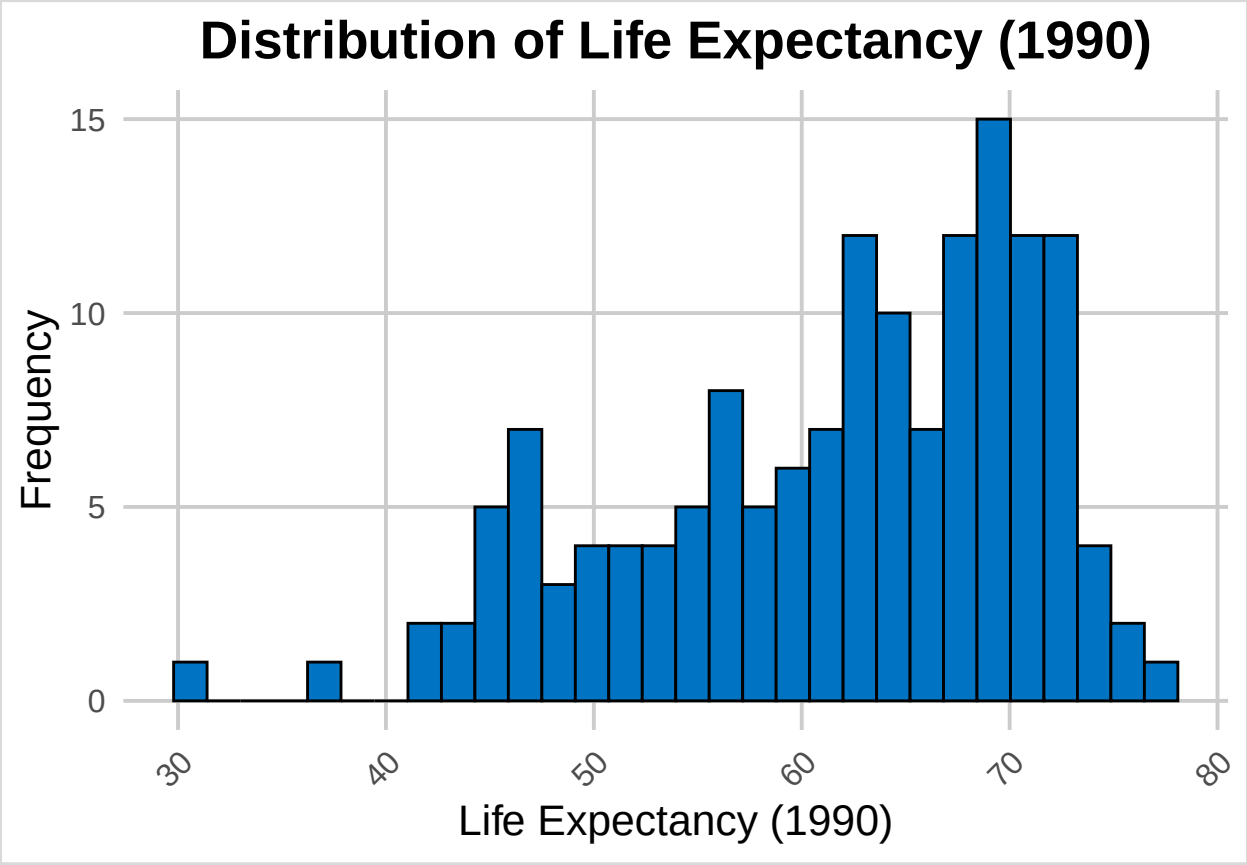
```
  mean_var <- mean(data[[var]], na.rm = TRUE)
  var_var <- var(data[[var]], na.rm = TRUE)
  cat("Moyenne de", var, ":", mean_var, "\n")
  cat("Variance de", var, ":", var_var, "\n")

  # Intervalle de confiance pour la moyenne
  n <- sum(!is.na(data[[var]]))
  error <- qnorm(0.975) * sqrt(var_var/n)
  ci <- c(mean_var - error, mean_var + error)
  cat("Intervalle de confiance de la moyenne de", var, ":", ci, "\n\n")
}
```

```
## Warning: Removed 8 rows containing non-finite values (‘stat_bin()‘).
```




```
## Résumé de la variable quantitative gnipc_1990 :
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.     NA’s
##    454.4   2231.2   4386.8   8441.1   9045.7 102433.1        8
## Données manquantes : 8
##
## Test de normalité de Shapiro-Wilk pour gnipc_1990 :
##
##  Shapiro-Wilk normality test
##
## data:  data[[var]]
```

```
## W = 0.51745, p-value < 2.2e-16
##
## Moyenne de gnipc_1990 : 8441.094
## Variance de gnipc_1990 : 173357435
## Intervalle de confiance de la moyenne de gnipc_1990 : 6283.094 10599.09
```




```
## Résumé de la variable quantitative le_1990 :
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   29.94   55.56   63.58   61.64   69.60   76.63
## Données manquantes : 0
##
## Test de normalité de Shapiro-Wilk pour le_1990 :
##
##  Shapiro-Wilk normality test
##
## data:  data[[var]]
## W = 0.93576, p-value = 2.384e-06
##
## Moyenne de le_1990 : 61.63682
## Variance de le_1990 : 90.42918
## Intervalle de confiance de la moyenne de le_1990 : 60.12007 63.15357
```

```r
# Calcul d'un intervalle de confiance d'une proportion pertinente (par exemple, proportion de pays avec
high_hdi_prop <- sum(data$hdicode == "High" | data$hdicode == "Very High", na.rm = TRUE) / nrow(data)
cat("Proportion de pays avec un HDI élevé :", high_hdi_prop, "\n")
```

```
## Proportion de pays avec un HDI élevé : 0.4768212
```

```r
# Intervalle de confiance pour la proportion
z <- qnorm(0.975)
ci_prop <- c(
  high_hdi_prop - z * sqrt((high_hdi_prop * (1 - high_hdi_prop)) / nrow(data)),
  high_hdi_prop + z * sqrt((high_hdi_prop * (1 - high_hdi_prop)) / nrow(data))
)
cat("Intervalle de confiance pour la proportion de pays avec un HDI élevé :", ci_prop, "\n")
```

```
## Intervalle de confiance pour la proportion de pays avec un HDI élevé : 0.3971571 0.5564853
```