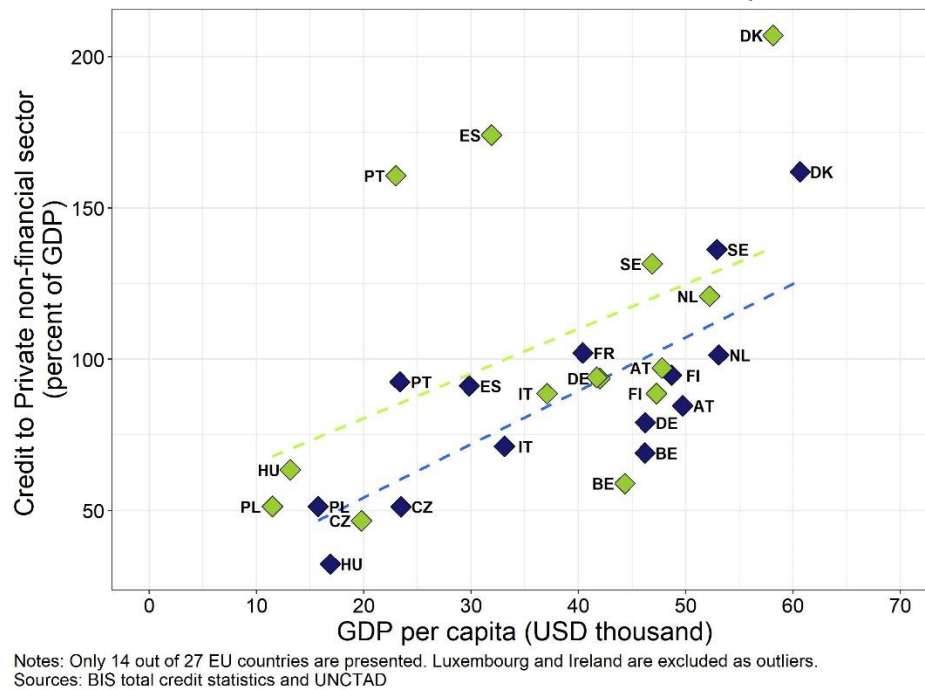


Credit default of the EU's countries on the horizon? (2009 vs 2019)



Commentary:

When an individual or company is granted a loan, it must eventually repay more than it initially borrowed. A sound use of the credit would therefore be to generate additional income from which the loan could be paid off. Otherwise, it must reduce its spending or find other means of funding, which may lead to financial instability issues. As loans can take decades to repay, income growth may only be seen in the long run.

Figure presented above shows that in the 10-year period (from 2009 to 2019), European economies in general have indeed managed to increase average income with respect to the level of indebtedness in 2009.

In overall, thirteen countries increased their average income, seven of which simultaneously reduced their credit exposure (Denmark, Germany, Ireland, Hungary, Netherlands, Austria, and Portugal). The remaining six countries acquired additional credit (Belgium, Czechia, Luxembourg, Poland, Finland, Sweden).

Spain, Italy, and France, on the other hand, saw their average income to fall. However, Spain and Italy managed to reduce their debt levels. France was the only economy to experience a decline in income while taking on more debt.

This raises question that needs further consideration. Is the observed increase in income sufficient? In particular, how resilient will economies be when the long period of low interest rates ends, which will prompt debt service to rise?

R:

```
library(readxl)
library(tidyverse)

# Credit data -----

credit_org <-
  read_xlsx("totcredit.xlsx", sheet = "Quarterly Series", range =
"A4:AQP327")

credit_org

## Countries ----

country <-
  c("BE", "BG", "CZ", "DK", "DE",
    "EE", "IE", "EL", "ES", "FR",
    "HR", "IT", "CY", "LV", "LT",
    "LU", "HU", "MT", "NL", "AT",
    "PL", "PT", "RO", "SI", "SK",
    "FI", "SE")

country_code_url <- "https://ec.europa.eu/eurostat/statistics-
explained/index.php?title=Glossary:Country_codes"

## Data preparation ----

# !!!! Quarterly/Private non-financial sector/Banks, total/Market value/
# !!!! US dollar/Billions/End of period

data_codes <- paste0("Q:", country, ":P:B:M:USD:A")

credit_f1 <- credit_org %>% select(Period, any_of(data_codes))
names(credit_f1) # some countries are missing (present 16 out of 27
countries)

# Credit at the end of 2009 and 2019
credit_f2 <-
  credit_f1[c(which(credit_f1$Period == as.Date("2019-12-31")),
              which(credit_f1$Period == as.Date("2009-12-31"))), ]

credit_f2

## Tidy data ----

# switching rows and columns
credit_data <-
  credit_f2 %>%
```

```

    pivot_longer(-Period, names_to = "Country", values_to = "Credit") %>%
    pivot_wider(names_from = "Period", values_from = "Credit") %>%
    rename(Credit.2019 = `2019-12-31`, Credit.2009 = `2009-12-31`)

credit_data

# Renaming countries
credit_data <-
  credit_data %>% mutate(Country = str_remove(Country, pattern = "Q:"),
                        Country = str_remove(Country, pattern = ":P:B:M:USD:A"))
credit_data

# GDP data -----

gdp_org <-
  read_xlsx("us_gdptotal_09135542858823.xlsx", range = "A5:U22")

gdp_pcap_org <-
  read_xlsx("us_gdptotal_09422402258867.xlsx", range = "A5:U22")

gdp_org
gdp_pcap_org

gdp_org <-
  gdp_org %>%
  slice(-1) %>% rename(Country = YEAR)

gdp_pcap_org <-
  gdp_pcap_org %>%
  slice(-1) %>% rename(Country = YEAR)

gdp_org
gdp_pcap_org

## Data transformation ----
gdp_data <-
  gdp_org %>% select(Country, "GDP.2019" = `2019`, "GDP.2009" = `2009`) %>%
  cbind(gdp_pcap_org %>% select("GDP.PCAP.2019" = `2019`, "GDP.PCAP.2009" =
`2009`))

gdp_data

# changing country labels for codes
gdp_data <-
  gdp_data %>% mutate(Country = countrycode(Country))

gdp_data

```

```

# Billions of USD (GDP) / Thousands of USD (GDP per capita)
gdp_data <-
  gdp_data %>% mutate(GDP.2019 = GDP.2019 / 1000,
                     GDP.2009 = GDP.2009 / 1000,
                     GDP.PCAP.2019 = GDP.PCAP.2019 / 1000,
                     GDP.PCAP.2009 = GDP.PCAP.2009 / 1000)

gdp_data

# Aggregated data -----

data <-
  inner_join(credit_data, gdp_data)

data

# Credit to GDP in %
data <-
  data %>%
  mutate(Credit.to.GDP.2019 = (Credit.2019 / GDP.2019) * 100,
         Credit.to.GDP.2009 = (Credit.2009 / GDP.2009) * 100) %>%
  select(Country, GDP.PCAP.2019, GDP.PCAP.2009, Credit.to.GDP.2019,
         Credit.to.GDP.2009)

data

```

```

# Plot -----

# removing outliers
outliers <- which(data$Country %in% c("LU", "IE"))

ggplot(data[-outliers, ]) +

  # 2019
  geom_point(aes(GDP.PCAP.2019, Credit.to.GDP.2019),
             size = 5, pch = 23, color = "black", fill = "midnightblue") +
  geom_smooth(aes(GDP.PCAP.2019, Credit.to.GDP.2019),
             method = "lm", se = FALSE, lty = "dashed") +
  geom_text(aes(x = GDP.PCAP.2019 + 2, y = Credit.to.GDP.2019, label =
Country),
            fontface = "bold") +

  # 2009
  geom_point(aes(GDP.PCAP.2009, Credit.to.GDP.2009),
             size = 5, pch = 23, color = "black", fill = "olivedrab3") +
  geom_smooth(aes(GDP.PCAP.2009, Credit.to.GDP.2009),
             method = "lm", se = FALSE, lty = "dashed", color =
"olivedrab1") +
  geom_text(aes(x = GDP.PCAP.2009 - 2, y = Credit.to.GDP.2009, label =
Country),
            fontface = "bold", check_overlap = TRUE) +

  # Labels
  labs(x = "GDP per capita (USD thousand)",
       y = "Credit to Private non-financial sector \n(percent of GDP)",
       caption = "Notes: Only 14 out of 27 EU countries are presented.
Luxembourg and Ireland are excluded as outliers.\nSources: BIS total credit
statistics and UNCTAD") +

  # Scales and limits
  scale_x_continuous(breaks = seq(0, 100, by = 10), limits = c(0, 70)) +
  scale_y_continuous(breaks = seq(0, 250, by = 50)) +

  # Theme
  theme_bw() +
  theme(plot.caption.position = "plot",
        plot.caption = element_text(hjust = 0, size = 12, color = "black"),
        axis.text = element_text(size = 14, color = "black"),
        axis.title = element_text(size = 18, color = "black"))

```