Computer Assignment 2: France (Group 12)

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Q1: Data preperation

We will be using the GDP data in euro, as this was the best data we found and transforming it using the exchange rate would lead to high fluctuation.

```
library(readxl)
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
```

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.0 --

## v ggplot2 3.3.3     v purrr   0.3.4
## v tibble  3.0.5     v stringr 1.4.0
## v tidyr   1.1.2     v forcats 0.5.1
## v readr   1.4.0

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(lubridate) # This package is used for working with dates
```

```
##
## Attaching package: 'lubridate'
```

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

```
options(scipen = 99999)

# Importing the Current Account Balance as a % of GDP of France

CABalance_FR <- read_csv("sourcecode/FRED_bop_france_quarterly.csv",
    col_types = cols(DATE = col_date(format = "%d/%m/%Y"),
        FRAB6BLTT02STSAQ = col_number())) %>%
  rename(date = DATE, CAasPercGDP_quart_FR = FRAB6BLTT02STSAQ)


# Importing the General Government Debt as a % of GDP. THIS IS NOT IN PERCENT! GOVERNMENT DEBT OF 100%

GovDebt_FR <- read_csv("sourcecode/OECD_gov_debt_annual.csv",
    col_types = cols(LOCATION = col_character(),
        INDICATOR = col_skip(), SUBJECT = col_skip(),
        MEASURE = col_skip(), FREQUENCY = col_skip(),
        TIME = col_date(format = "%Y"), Value = col_number(),
        `Flag Codes` = col_skip())) %>%
  rename(date = TIME) %>%
  filter(LOCATION == "FRA") %>%
  mutate(LOCATION = NULL, GovDebt_ann_FR = Value / 100, Value = NULL)


# Importing Interest Rate on Government Bonds (10 year), also called "Long term interest rate", in %/an

# This function transform dates in a quarterly format of "2000-Q1" to 2000-01-01
QuarterToDate <- function(QuarterlyDate){

  NumberofQuarter <- substr(QuarterlyDate, 7, 7)

  Month <- 3 * as.numeric(NumberofQuarter) - 2
  Month <- ifelse(Month == 10, Month, paste(0, Month))

  Year <- substr(QuarterlyDate ,1, 4)

  Date_String <- paste(Year, "-", Month, "-01") %>%
    str_replace_all(" ", "")

  Date <- as.Date(Date_String)

  Date
}

IntRate_FR <- read_csv("sourcecode/OECD_interest_rates_france_quarterly.csv",
    col_types = cols(INDICATOR = col_skip(),
        SUBJECT = col_skip(), MEASURE = col_skip(),
        FREQUENCY = col_skip(), Value = col_number(),
        `Flag Codes` = col_skip())) %>%
  mutate(date = QuarterToDate(TIME), IntRate_quart_FR = Value / 100, Value = NULL, TIME = NULL, LOCATIO
```

```r
# Exchange rate against the US dollar

XR_EurUSD <- read_csv("sourcecode/FRED_exchage_rate_quarterly.csv",
    col_types = cols(DATE = col_date(format = "%d/%m/%Y"),
        DEXUSEU = col_number())) %>%
  rename(date = DATE, XR_quart_EurUSD = DEXUSEU) %>%
  mutate(XR_quart_EurUSD = 1/XR_quart_EurUSD)


# Total GDP, in millions of US dollars

GDP_FR <- read_csv("sourcecode/FRED_euros_france_gdp_quarterly.csv",
    col_types = cols(DATE = col_date(format = "%d/%m/%Y"),
        CPMNACSCAB1GQFR = col_number())) %>%
  mutate(date = DATE, DATE = NULL, GDP_quart_eur_FR = CPMNACSCAB1GQFR * 1000000, CPMNACSCAB1GQFR = NULL)


# Investment (usually Gross Fixed Capital Formation), in millions of US dollars

Invest_FR <- read_csv("sourcecode/FRED_euros_investments_quarterly.csv",
    col_types = cols(DATE = col_date(format = "%d/%m/%Y"),
        FRAGFCFQDSMEI = col_number())) %>%
  mutate(Invest_quart_eur_FR = FRAGFCFQDSMEI, FRAGFCFQDSMEI = NULL) %>%
  rename(date = DATE)


# Gross national savings as a % of GDP (savings rate). Again, this is in decimals, and not percent

SavingsR_FR <- read_csv("sourcecode/OECD_savings_rate_annual.csv",
    col_types = cols(INDICATOR = col_skip(),
        SUBJECT = col_skip(), MEASURE = col_skip(),
        FREQUENCY = col_skip(), TIME = col_date(format = "%Y"),
        Value = col_number(), `Flag Codes` = col_skip())) %>%
  filter(LOCATION == "FRA") %>%
  mutate(SavR_ann_FR = Value / 100, LOCATION = NULL, Value = NULL) %>%
  rename(date = TIME)


# Merging them all together

DF_FR <- CABalance_FR %>%
  full_join(IntRate_FR, by = "date") %>%
  full_join(XR_EurUSD, by = "date") %>%
  full_join(GDP_FR, by = "date") %>%
  full_join(Invest_FR, by = "date") %>%
  full_join(GovDebt_FR, by = "date") %>%
  full_join(SavingsR_FR, by = "date") %>%
  filter(date != "1998-10-01")

DF_quart_FR <- DF_FR %>%
  select(!c(GovDebt_ann_FR, SavR_ann_FR))

DF_ann_FR <- DF_FR %>%
```

```
  select(c(date, GovDebt_ann_FR, SavR_ann_FR)) %>%
  na.omit()

print(DF_quart_FR)
```

```
## # A tibble: 88 x 6
##    date       CAasPercGDP_qua~ IntRate_quart_FR XR_quart_EurUSD GDP_quart_eur_FR
##    <date>                <dbl>            <dbl>           <dbl>            <dbl>
##  1 1999-01-01            4.38            0.0394           0.893     344117000000
##  2 1999-04-01            4.85            0.0420           0.946     347464000000
##  3 1999-07-01            2.23            0.0500           0.953     351727000000
##  4 1999-10-01            2.22            0.0528           0.964     356592000000
##  5 2000-01-01            1.58            0.0557           1.01      362660000000
##  6 2000-04-01            1.93            0.0539           1.07      367789000000
##  7 2000-07-01            0.316           0.0539           1.11      372166000000
##  8 2000-10-01            0.590           0.0523           1.15      376980000000
##  9 2001-01-01            1.78            0.0490           1.08      380845000000
## 10 2001-04-01            1.21            0.0512           1.14      383539000000
## # ... with 78 more rows, and 1 more variable: Invest_quart_eur_FR <dbl>
```

```
print(DF_ann_FR)
```

```
## # A tibble: 21 x 3
##    date       GovDebt_ann_FR SavR_ann_FR
##    <date>              <dbl>       <dbl>
##  1 1999-01-01          0.740      0.0912
##  2 2000-01-01          0.724      0.0856
##  3 2001-01-01          0.715      0.0850
##  4 2002-01-01          0.752      0.0718
##  5 2003-01-01          0.791      0.0658
##  6 2004-01-01          0.805      0.0685
##  7 2005-01-01          0.821      0.0642
##  8 2006-01-01          0.773      0.0681
##  9 2007-01-01          0.759      0.0710
## 10 2008-01-01          0.825      0.0629
## # ... with 11 more rows
```

Q2: Government debt, interest rate, current account and the exchange rate

1. Government debt and interest rate

2. Current account and the exchange rate

3. Relevant events and policy responses

4. Currency union and its effects

Q3: Investment rate and the Feldstein-Horioka puzzle

1. Investment rate

2. Investment rate: Graph

3. Feldstein-Horioka puzzle

References