Computer Assignment 2: France (Group 12)

‘Javier Torralba Flores (ANR: u146430, SNR: 2042878), Maximilian Grotz (ANR: u271366, SNR: 2056313), Abdirahman Nuur (ANR: u824009 , SNR: 2057152) and Mathieu Van de Vel (ANR: u130770, SNR: 2050053)’

14/04/2021

# 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% = 1  
  
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 %/annum  
  
# 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, LOCATION = NULL)  
  
  
# 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