Assignment No. 4

For this assignment, you first employ some macroeconomic data for the US through the WDI package in R. You will, then, estimate the parameters of a population regression function to examine the determinants of US inflation.

1. You are required to use R for this exercise. In particular, you must use the following libraries: *tidyverse* and *WDI*, both of which are introduced and discussed as part of the pre-recorded lectures.

   a. Put together a data frame using the *WDI* function, which is part of the *WDI* library. Call your data frame: *df*. For this data frame, the country should be set as the US. And the indicators should include:
      - FP.CPI.TOTL.ZG (*Inflation, consumer prices (annual %)*)
      - NY.GDP.MKTP.KD.ZG (*GDP growth (annual %)*)
      - FM.LBL.BMNY.ZG (*Broad money growth (annual %)*)
      - NE.GDI.FTOT.KD.ZG (*Gross fixed capital formation (annual % growth)*)

      The starting year must be set at 1973, and the end year must be set at 2019.
      Copy and paste below the line of code by which you put together the above data frame (10 points).

      ```
      # Step 1: Install a new package, called: tidyverse, WDI
      install.packages("tidyverse")
      install.packages("WDI")

      # Step 2: Call the libraries on interest, incluing:
      library(tidyverse)
      library(WDI)
      # Step 3: Call WDI dataset from WDI library.

      df<-WDI(country="US",indicator=c("FP.CPI.TOTL.ZG","NY.GDP.MKTP.KD.ZG","FM.LBL.BMNY.ZG","NE.GDI.FTOT.KD.ZG"),start=1973,end=2019)
      df
      ```

   b. Rename variable FP.CPI.TOTL.ZG as: *inflation*. Copy and paste the code below. (2.5 points)

      ```
      df<-mutate(df, inflation=FP.CPI.TOTL.ZG)
      ```

   c. Rename variable NY.GDP.MKTP.KD.ZG as: *gdp_growth*. Copy and paste the code below. (2.5 points)

      ```
      df<-mutate(df, gdp_growth=NY.GDP.MKTP.KD.ZG)
      ```

   d. Rename variable FM.LBL.BMNY.ZG as: *money_growth*. Copy and paste the code below. (2.5 points)

      ```
      df<-mutate(df, money_growth=FM.LBL.BMNY.ZG)
      ```

   e. Rename variable NE.GDI.FTOT.KD.ZG as: *inv_growth*. Copy and paste the code below. (2.5 points)

      ```
      df<-mutate(df, inv_growth=NE.GDI.FTOT.KD.ZG)
      ```

f.   Estimate the parameters of the population regression function below:

$$inflation = \alpha + \beta_1 \times gdp\_growth + \beta_2 \times money\_growth + \beta_3 \times inv\_growth + \varepsilon$$

```
lm(formula = inflation ~ gdp_growth + money_growth + inv_growth,
    data = df)

Residuals:
   Min     1Q Median    3Q    Max
-5.894 -1.611 -0.541  1.504  6.913

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    1.44531    1.13702   1.271 0.210514
gdp_growth     0.01885    0.50983   0.037 0.970675
money_growth   0.42958    0.11066   3.882 0.000351 ***
inv_growth    -0.14154    0.19565  -0.723 0.473311
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.619 on 43 degrees of freedom
Multiple R-squared:  0.2765,     Adjusted R-squared:  0.2261
F-statistic: 5.479 on 3 and 43 DF,  p-value: 0.002804
```

i.   Report the lower and the upper limit of a 95% confidence interval estimation for parameter α. (5 points)

```
> confint(reg1,level=0.95)
                  2.5 %     97.5 %
(Intercept)   -0.8477144 3.7383274
```

The lower and the upper limit of a 95% confidence interval estimation for parameter α are -0.8477 and 3.7383 respectively.

ii.   Report the lower and the upper limit of a 95% confidence interval estimation for parameter β_1. (5 points)

```
> confint(reg1,level=0.95)
                2.5 %     97.5 %
gdp_growth   -1.0093281 1.0470315
```

The lower and the upper limit of a 95% confidence interval estimation for parameter β_1 are -1.0093 and 1.0470 respectively.

iii.   Report the lower and the upper limit of a 95% confidence interval estimation for parameter β_2. (5 points)

```
> confint(reg1,level=0.95)
                   2.5 %      97.5 %
 money_growth  0.2064217 0.6527442
```
The lower and the upper limit of a 95% confidence interval estimation for parameter β_2 are 0.2064 and 0.6527 respectively.

iv. Report the lower and the upper limit of a 95% confidence interval estimation for parameter β_3. (5 points)

```
> confint(reg1,level=0.95)
                 2.5 %      97.5 %
 inv_growth   -0.5361049 0.2530164
```
The lower and the upper limit of a 95% confidence interval estimation for parameter β_3 are -0.5361 and 0.2530 respectively.

v. Considering your answers to parts *ii-iv* above, list the variable(s) that has (have) a significant effect on inflation. (10 points)

Considering the answers to parts ii-iv above, it can be said that only Broad money growth (annual %) have a significant effect on inflation.