Economics in R - Data of Macroeconomics

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Measuring the Value of Economic Activity: Gross Domestic Product

Gross Domestic Product, or GDP, is considered the best measure of performances of the economy. There are two ways to view GDP: 1. view GDP as the total income of everyone in the economy 2. the total expenditure on the economy's output of goods and services.

Income, Expenditure, and the Circular Flow

- What is a flow?
- Economists distinguish two kinds of quantity variables
  - Stock: a quantity measured at a given point in time
  - Flow: a quantity measured per unit of time.
- Examples of Stock and Flow
  - A person's wealth is a tcok and his income and expenditure are flows
  - The number of unemployed people is a stock, the number of people losing their jobs is a flow
  - The amount of capital in the economy is a stock, the amount of investment is a flow

Rules for Computing GDP

Definition of GDP again: *the market value of all final goods and services produced within an economy in a given period of time.*

Used goods are not included in GDP

Inventories that are produced in one year are only considered the part of GDP of that year no matter when it is sold

Intermediate goods and value added are not included in GDP

Housing services and other imputations are complicated...

Real GDP and Nominal GDP

Nominal GDP: the value of goods and services measured at current prices. Real GDP: the value of good and services measured using a constant set of prices.

Computing Real GDP

Real GDP is measured with the price of *base year*. EX) Suppose the base year is 2014.

Real GDP$_{2014} = Price_{2014} \times Quantity_{2014}$

Real GDP$_{2015} = Price_{2014} \times Quantity_{2015}$

Real GDP$_{2016} = Price_{2014} \times Quantity_{2016}$

The GDP Deflator

GDP Deflator: also called *implicit price deflator for GDP*, is the ratio of nominal GDP to Real GDP

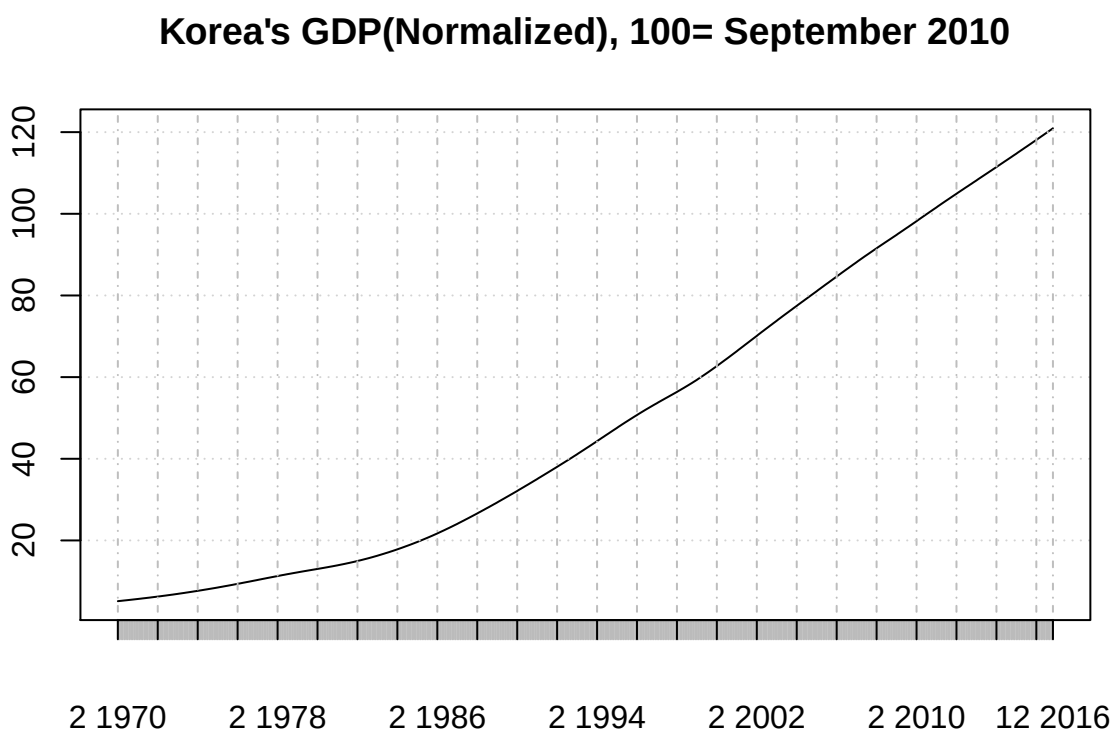
GDP Deflator $= \frac{NominalGDP}{RealGDP}$

We can rewrite as:

Real GDP $= \frac{NominalGDP}{GDPDeflator}$

___Let's take a look at GDP

```
library(Quandl)
library(quantmod)
#Quandl.search("GDP Korea")
KOR_GDP<-Quandl("OECD/MEI_CLI_LORSGPTD_KOR_M",type = "xts")
plot(KOR_GDP,type="l",main="Korea's GDP(Normalized), 100= September 2010")
```



The Components of Expenditure

The national income accounts divide GDP into four broad categories of spending: * Consumption (C) * Investment (I) * Government Purchases (G) * Net Exports (NX) We can write GDP as:

Y = C + I + G + NX

This equation is called the **national income accounts identity**

Consumption : goods and services bought by households

Investment : goods bought for future use. Investment is also divided into three subcategories: 1. Business fixed investment: purchase of new plant and equipment by firms 2. Residential investment: the purchase of new housing by households and landlords. 3. Inventory investment: the increase in firms' inventories of goods

Government Purchases : goods and services bought by federal, state, and local governments.

Net Exports : the value of goods and services sold to other countries (export) minus value of goods and services that foreigners sell us (Imports).

Other Measures of Income

Gross National Product(GNP) = GDP + Factor Payments from Abroad - Factor Payments to Abroad

GNP measures the total income earned by nationals(residents of a nation)

Net national Product(NNP) = GNP - Depreciation

Depreciation of capital: the amount of the economy's stock of plants, equipment, and residential structures that wears out during the year.

Personal Income = National Income - Indirect Business Taxes - Corporate Profits - Social Insurance Contributions - Net Interest + Dividends + Government Transfers to Individuals + Personal Interest Income

Disposable Personal Income = Personal Income - Personal Tax and Nontax Payments

Measuring the Cost of Living: The Consumer Price Index (CPI)

The Price of a Basket of Goods

Consumer Price Index(CPI) turns the prices of many goods and services into a single index measuring the overall level of prices

CPI = $\frac{Prices of Baskets of Current Year}{Prices of Baskets of Base Year}$

CPI is a good measure to derive inflation as well as GDP Deflator. However, genearally, CPI overstates the inflation. We need to consider that when we use CPI

Measuring Joblessness: The Unemployment Rate

- Employed: those who at the time of the survey worked as paid employees, worked in their own business, or worked as unpaid workers in a family member's business.
- Unemployed: those who were not emplyed, were available for work, and had tried to find employment during the previous four weeks.
- Not in the labor force: those who fit neither of the first two categories, such as a full-time student, homemaker, or retiree.

Labor Force = Number of Employed + Number of Unemployed

Unemployment Rate = $\frac{Number of Unemployed}{Labor Force} \times 100$

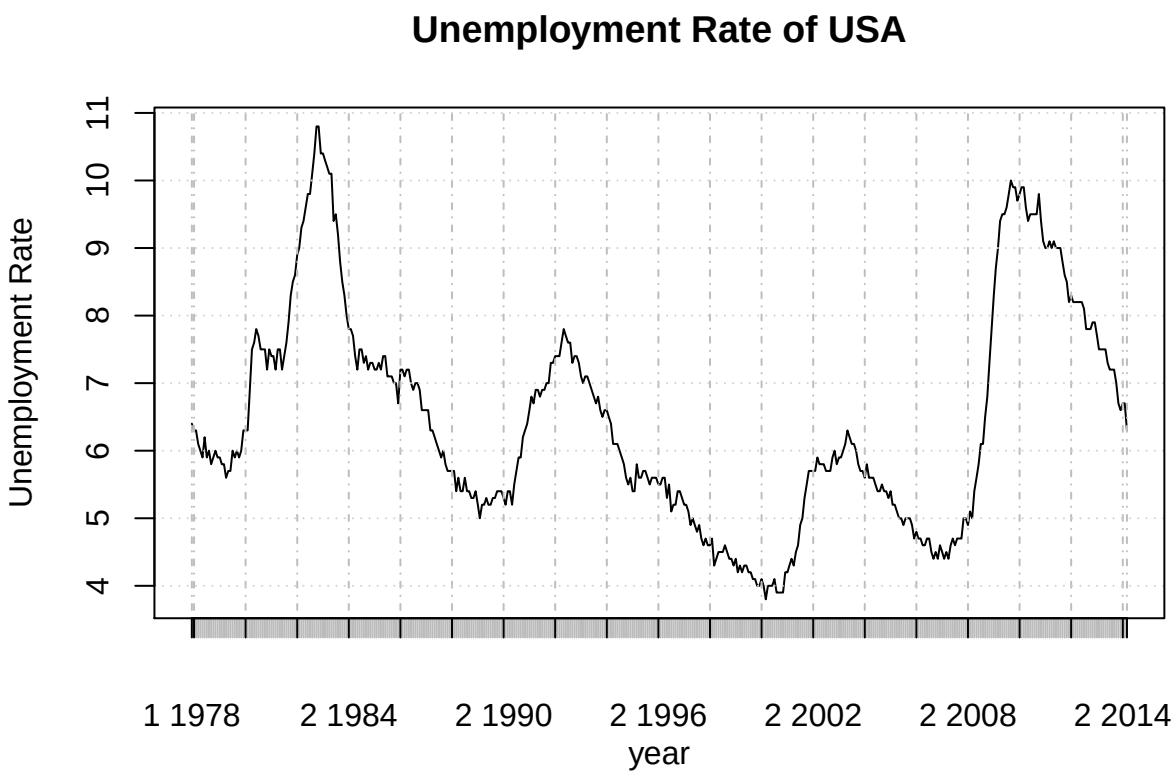
Labor-Force Participation Rate = $\frac{Labor Force}{Adult Population} \times 100$

```
Quandl.search("unemployment United States")
```

```
## Unemployment - United States
## Code: FRBC/UNEMP_ST_US
## Desc: Unemployment - United States. Percent unemployed.
## Freq: monthly
## Cols: Date | Value
##
## Unemployment for United States
## Code: FRED/M08I4AUSM175NNBR
## Desc: Thousands Of Persons Not Seasonally Adjusted, Series Is Presented Here As Three Variables--(1)
## Freq: monthly
## Cols: DATE | VALUE
##
## Unemployment for United States
## Code: FRED/M08K4BUSM148NNBR
## Desc: Millions Of Persons Not Seasonally Adjusted, Series Is Presented Here As Three Variables--(1)-
## Freq: monthly
## Cols: DATE | VALUE
##
## Labour Force and Unemployment - USA
## Code: UIFS/LABR_USA
## Desc: International Financial Statistics (IFS) is a major source of statistics on all aspects of dom
## Freq: annual
## Cols: Date | UNEMPLOYMENT RATE (PERCENT PER ANNU) | UNEMPLOYMENT (THOUSANDS) | NON-AGR EMPLOYMENT SA
##
## Unemployment - Quarterly - United States
## Code: ILOSTAT/UNE_TUNE_NB_SEX_T_SOC_AGGREGATE_TOTAL_Q_USA
## Desc: Numbers of person are in thousands and rates are in percentage. This data is generated monthy
## Freq: monthly
## Cols: Date | Value
##
## Unemployment - Quarterly - United States
## Code: ILOSTAT/UNE_TUNE_NB_SEX_T_AGE_AGGREGATE_TOTAL_Q_USA
## Desc: Numbers of person are in thousands and rates are in percentage. This data is generated monthy
## Freq: monthly
## Cols: Date | Value
##
## Unemployment - Annual - United States
## Code: ILOSTAT/UNE_TUNE_NB_SEX_T_AGE_AGGREGATE_TOTAL_USA
## Desc: Numbers of person are in thousands and rates are in percentage. This data is generated monthy
## Freq: annual
## Cols: Date | Value
##
## Unemployment - Monthly - United States
## Code: ILOSTAT/UNE_TUNE_NB_SEX_T_AGE_AGGREGATE_TOTAL_M_USA
## Desc: Numbers of person are in thousands and rates are in percentage. This data is generated monthy
## Freq: monthly
## Cols: Date | Value
##
```

```
## Unemployment - Monthly - United States
## Code: ILOSTAT/UNE_TUNE_NB_SEX_T_AGE_10YRBANDS_TOTAL_M_USA
## Desc: Numbers of person are in thousands and rates are in percentage. This data is generated monthy a
## Freq: monthly
## Cols: Date | Value
##
## Unemployment - Annual - United States
## Code: ILOSTAT/UNE_TUNE_NB_SEX_T_DUR_DETAILS_TOTAL_USA
## Desc: Numbers of person are in thousands and rates are in percentage. This data is generated monthy a
## Freq: annual
## Cols: Date | Value
```

```
UE<-Quandl("FRBC/UNEMP_ST_US",type="xts")
plot(UE,type="l",main="Unemployment Rate of USA",xlab="year",ylab="Unemployment Rate")
```




```
plot(UE["2007::"],main="Unemployment Rate of USA",xlab="year",ylab="Unemployment Rate")
```


Unemployment Rate of USA
Unemployment Rate
5
6
7
8
9
10
2 2007
2 2008
2 2009
2 2010
2 2011
2 2012
2 2013
year