Chapter 0: Introduction to macroeconomics

References: Burda & Wyplosz: Macroeconomics 4e, Oxford University Press,

Blanchard; Macroeconomics, Prentice Hall.

Macroeconomics: a branch of economics that deals with the economy as a whole.

Macroeconomics seek to understand the determinants of aggregate variables, such as national income, unemployment, inflation, investment, and international trade.

1 Some macroeconomic variables

1.1 GDP

GDP is defined for a country or a region. It is measure of its productive activity.

3 definitions (3 accounting identities)

Definition 1 *GDP = Sum of net final sales within a geographic location during a given period of time.*

(intermediate sales are excluded)

Definition 2 *GDP = Sum of value added created within a geographic location during a given period of time.*

Definition 3 *GDP = Sum of factor incomes earned from economic activities within a geographic location during a given period of time.*

GDP is a flow.

GDP and GNP :

GDP is concerned with the region in which income is generated

GNP is based on ownership: value added generated by production factors owned by residents, both at home and abroad.

1.2 Nominal and real GDP.

Nominal GDP:

$$\sum_{i=1}^{N} P_t^i Q_t^i$$

Real GDP: measured with prices taken in some predetermined base year:

$$Y_t = \sum_{i=1}^{N} P_0^i Q_t^i$$

GDP deflator is the price index:

$$P_t = \frac{\sum\limits_{i=1}^{N} P_t^i Q_t^i}{\sum\limits_{i=1}^{N} P_0^i Q_t^i}$$

By definition, $P_t Y_t$ is nominal GDP.

Other price index: consumer price index (CPI), based on a basket of goods consumed by an average citizen:

$$CPI_t = \sum_{i=1}^{n} P_t^i x^i$$

1.3 GDP per head gross rate

Y_t is a measure of the size of a country.

If N_t is the size of the population, $y_t = Y_t/N_t$ (GDP per head) is a measure of the average well being of population/ a measure of development.

The gross rate of (real) GDP per head:

$$\frac{y_{t+1} - y_t}{y_t}$$

1.4 Inflation rate

Form some price index P_t (GDP deflator or CPI), the inflation rate is:

$$\pi_t = \frac{P_{t+1} - P_t}{P_t}$$

1.5 Interest rate

Different interest rates: short run, long run ...

Nominal and real interest rates.

$i =$ nominal interest rate, $r =$ real interest rate, $\pi =$ inflation rate.

$$i = r + \pi$$

1.6 Some accounting identities

$$\mathbf{Y = C + I + G + X - Z}$$

$\mathbf{Y}$ is nominal GDP

$\mathbf{C}$ = (nominal) sales of consumption and goods services

$\mathbf{I}$ = (nominal) sales of investment

$\mathbf{G}$ = (nominal) sales of the government

$\mathbf{X}$ = (nominal) sales to the rest of the world (exports)

$\mathbf{Z}$ = (nominal) imports

$$\mathbf{Y = C + T + S}$$

$\mathbf{T}$ = net taxes and transfers

$\mathbf{S}$ = savings (flow)

By subtracting:

$$\mathbf{S} - \mathbf{I} + \mathbf{T} - \mathbf{G} = \mathbf{X} - \mathbf{Z}$$

2 Some useful concepts

2.1 Nominal and real variables

cf. the definition of nominal and real GDP.

2.2 Short run and long run

These terms have several definitions that can be understood with respect to the context.

Def 1: depends on the duration.

Short term $<$ 1 year

Long run $>$ 10 years

Def 2: related to economics.

In the short run, capital can be assumed to be constant. In the long run, the level of capital can be adjusted.

In the short run, prices and wages may have large variations, resulting from the absence of an equilibrium on the markets. In the long run, their values are adjusted such that all markets are balanced.

Def 3: from dynamical systems analysis

In continuous time:

$$\dot{X} = f(X)$$

In discrete time:

$$X_{t+1} = g(X_t)$$

The long run corresponds to the steady states such that:

$$f(X) = 0$$

or

$$X = g(X)$$

2.3 Long run and Short run macroeconomics

This course is devoted to long run macroeconomics: only real factors matter. All markets are assumed to be balanced.

In short run macroeconomics, markets are not balanced, prices adjust, monetary policy is efficient.

2.4 Endogenous and exogenous variables

Endogenous variable = unknown variable, variable calculated by the model.

Exogenous variable = variable determined outside the model.

In a model, the number of endogenous variables is always equal to the number of equations. To solve a model = to calculate the value of endogenous variables with respect to exogenous variables.

2.5 Aggregation

In macroeconomics, variables often are aggregate variables (for instance, GDP).

Keynes: it is possible to study directly aggregate variables, and to find stable relations between them.

In practice, it is not true: macroeconomic relations are rarely stables.

Modern macroeconomics: macroeconomics models based on microeconomic foundations.

Problem: in aggregating microeconomic relations, it is rare to obtain stable relations between aggregated variables.

Ex: consumption functions

$$\begin{aligned} C_1 &= a_1 + c_1 Y_1 \\ C_2 &= a_2 + c_2 Y_2 \end{aligned}$$

Aggregate consumption:

$$C = C_1 + C_2 = a_1 + a_2 + c_1 Y_1 + c_2 Y_2$$

Aggregation is possible only in the case: $c_1 = c_2 = c$.

$$C = (a_1 + a_2) + c(Y)$$

When aggregation is not possible, two solutions:

- To keep microeconomic variables

- To assume one (representative) agent