

# Instituto Universitário de Lisboa (ISCTE-IUL) - Economics Department

Course: Macroeconomics | Program: Management

## Week III: Measuring Macroeconomic Activity

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September 27, 2023

These slides do not cover all the contents of the theoretical classes. They only provide a summary of the subjects which will be used in the practical exercises. This means you should attend theoretical classes as well.

# Gross Domestic Product

- **GDP definition** – current **market value** of **final** goods and services **newly** produced **domestically** in a country during a **given period, independently of the origin** of the inputs that are used in production.
  - Graphical example for the USA (source: Performance Magazine):



- **National income accounting identity** – GDP can be measured from the total expenditure, the production and income perspectives, all equivalent.

## GDP by the expenditure approach

- **Expenditure approach** – total spending on currently domestically produced final goods and services.

$$GDP = C + I + G + NX$$

- C: consumption expenditure;
- I: investment;
- G: government purchases of goods and services;
- NX: net exports = exports - imports.

## GDP by the income approach

- **Income approach** – sum of all the incomes received by households and firms in the economy:

$$GDP = \text{Total National Income} + \text{Net factor income} + \text{Depreciation}$$

- Total National Income:
  - 1 Compensation of employees (wages);
  - 2 Other income (rent, interest and taxes);
  - 3 Corporate profits.
- Net factor income (NFI): wages, profits, and rent (called factor income) paid by nationals to foreigners minus factor income paid to nationals by foreigners.
- Depreciation: to obtain the net income of companies, the depreciation was subtracted, therefore, to calculate the gross income, we have to add it back (if not considered, we are left with the net domestic product).

## GDP by the production approach

- **Production approach** – sum of the gross value added in the domestic production of goods and services:

$$GDP = \sum VA$$

- VA is the gross value added.
- **Value added technique** – the value of a firm's output minus the cost of the intermediate goods and services purchased by the firm, to obtain the final value of the goods and services produced:
  - Avoids double counting.

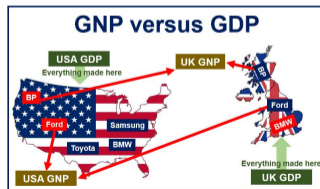
# Gross National Product (National Expenditure)

## Definition

- **GNP definition:** current **market value** of **final** goods and services **newly** produced by **national inputs** during a **given period**, **independently from where** they are produced.

$$GNP = GDP - NFI \text{ or } GNP = \text{Total National Income} + \text{Depreciation}$$

- Example for the difference between GDP and GNP (source: Market Business News):



# Gross National Product (National Expenditure)

## Using Pluto

- ☒ Exercise 1 (What counts as GDP? I).
- ☒ Exercise 2 (What counts as GDP? II).
- ☒ Exercise 3 (Approaches to estimate GDP).
- ☒ Exercise 4 (Pandora vs Utopia).
- ☒ Exercise 5 (GDP and its shares).
- ☒ Exercise 6 (Income vs Product).

# Nominal VS real variables with fixed base year indexes

## Definitions, notations and examples

- **Nominal variables:** measured at  $t$  with current prices –  $X_t, \forall t \in [t_0, t_f]$ .
  - Example: Economy with 2 goods.

$t$	<b>1910</b>		<b>1911</b>	
	Quantity	Price	Quantity	Price
<b>Bread</b>	250	1	255	1.5
<b>Rabits</b>	50	5	50	6
$GDP_t$	$250 \times 1 + 50 \times 5 = 500$		$255 \times 1.5 + 50 \times 6 = 682.5$	



# Nominal VS real variables with fixed base year indexes

## Definitions, notations and examples

- **Real variables:** measured at  $t$  with constant prices/fixed prices/prices from the base year –  $X_{t,\text{base}}, \forall t, \in [t_0, t_f]$ .
  - Example: Economy with 2 goods - base year is 1910.

$t$	1910		1911	
	Quantity	Price	Quantity	Price
<b>Bread</b>	250	1	255	1.5
<b>Rabits</b>	50	5	50	6
$GDP_{t,1910}$	$250 \times 1 + 50 \times 5 = 500$		$255 \times 1 + 50 \times 5 = 505$	

# Nominal VS real variables with fixed base year indexes

## Definitions, notations and examples

- To convert nominal variables into real variables, price indexes are used, measured between  $t$  and the base year,  $I_{t,\text{base}}^P$ :

$$X_{t,\text{base}} = \frac{X_t}{I_{t,\text{base}}^P}$$

- Example: Economy with 2 goods.

$t$	1910	1911
$GDP_t$	$250 \times 1 + 50 \times 5 = 500$	$255 \times 1.5 + 50 \times 6 = 682.5$
$GDP_{t,1910}$	$250 \times 1 + 50 \times 5 = 500$	$255 \times 1 + 50 \times 5 = 505$
$I_{t,1910}^P$	$\frac{250 \times 1 + 50 \times 5}{250 \times 1 + 50 \times 5} = \frac{500}{500} = 1$	$\frac{255 \times 1.5 + 50 \times 6}{255 \times 1 + 50 \times 5} = \frac{682.5}{505} = 1.35$

# Nominal VS real variables with fixed base year indexes

## Inflation rate

- The inflation rate corresponds to the growth rate of the Price Index between two periods:

$$\pi_{t+i} (\%) = \left( \frac{I_{t+i,base}^P - I_{t,base}^P}{I_{t,base}^P} \right) \times 100$$

- Example: Economy with 2 goods.

$t$	1910	1911
$I_{t,1910}^P$	$\frac{250 \times 1 + 50 \times 5}{250 \times 1 + 50 \times 5} = \frac{500}{500} = 1$	$\frac{255 \times 1.5 + 50 \times 6}{255 \times 1 + 50 \times 5} = \frac{682.5}{505} = 1.35$
$\pi_{1911}$	-	$\frac{1.35 - 1}{1} = 35\%$

# Nominal VS real variables with fixed base year indexes

## Nominal VS real interest rates

- **The Fisher equation** – this equation highlights a simple but very important relationship:

$$r = i - \pi$$

- $i \geq 0$ : nominal interest rate;
- $r$ : real interest rate;
- $\pi$ : inflation rate.

## Using Pluto

- ☒ Exercise 7 (Price indexes and real GDP).
- ☒ Exercise 10 (Negative real-interest rates).

# Labour force, activity rate and unemployment rate

## Definitions

- **Labour force/active population:** working-age population with the ability to work and who have expressed their willingness to do so, and who may be employed or unemployed.
- **Activity rate:** share of the labour force on total population:

$$\text{Activity rate} = \frac{\text{Labour force}}{\text{Total population}}$$

- **Unemployment rate:** share of the labour force that is unemployed:

$$\text{Unemployment rate} = \frac{\text{Unemployed population}}{\text{Labour force}}$$

# Different kinds of unemployment

## Concepts

- **Natural rate of unemployment** – rate that would prevail if the economy were in neither a boom nor a bust, being composed by two components:
  - Frictional unemployment: workers being between jobs in the dynamic economy;
  - Structural unemployment: labor market failing to match up workers and firms in the market.
- **Cyclical unemployment** – the difference between the actual rate and the natural rate, associated with short-run fluctuations in output.
- Actual unemployment is the sum of frictional, structural, and cyclical unemployment.

# Different kinds of unemployment

## Concepts

### Using Pluto

- ☒ Exercise 8 (Unemployment).
- ☒ Exercise 9 (The natural unemployment rate).