

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

Course: Macroeconomics | Program: Management

Week II: Introduction to Macroeconomics

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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.

Solving a Macroeconomic Model

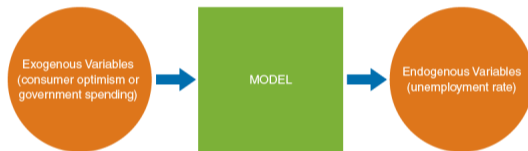
Endogenous variables, exogenous variables, parameters. Example from Mishkin (2014).

- **Endogenous variables:** the outputs of a model/variables explained inside (endo prefix) the model.
 - Example: Unemployment rate.
- **Exogenous variables:** the inputs of a model/variables used to explain the endogenous variable which are taken as given and as determined outside (exo prefix) the model.
 - Example: Consumer optimism or government spending.
- **Parameters:** the structure of a model reflecting the set of impacts.
 - Example: a 10% increase in government spending would change the unemployment rate.

Solving a Macroeconomic Model

Endogenous variables, exogenous variables, parameters. Example from Mishkin (2014).

- **Our example illustrated:**



Using Pluto

- ☒ Exercise 1 (Endogenous vs exogenous variables).
- ☒ Exercise 10 (Solving exercise 2 with linear algebra).
- ☒ Exercise 2 (Solving a macroeconomic model).

Interpreting Macroeconomic Data

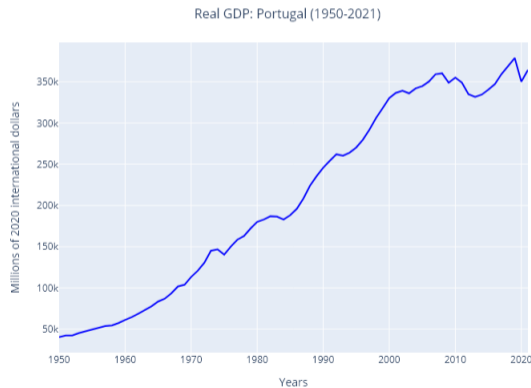
3 main variables: real GDP, unemployment, inflation.

- **Real GDP** (the focus of this class)
 - Measures the output of actual goods and services produced in an economy over a fixed period, usually a year.
- **Unemployment rate**
 - Measures the percentage of workers looking for work, but who do not have jobs, at a particular point in time.
- **Inflation**
 - Tells us how rapidly the overall level of prices is rising.

Interpreting Macroeconomic Data

Real GDP VS potential real GDP: business cycles.

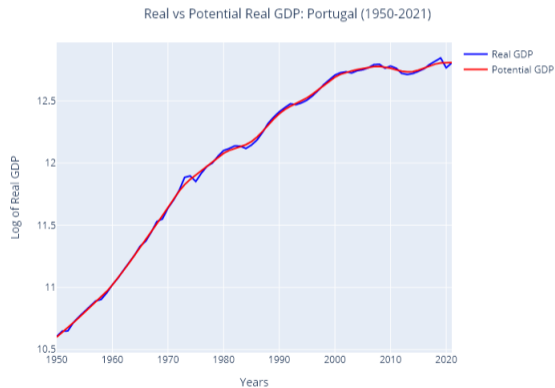
- **Real GDP and Potential Real GDP for Portugal** (source: Total Economy Database)



Interpreting Macroeconomic Data

Real GDP VS potential real GDP: business cycles.

- **Real GDP and Potential Real GDP for Portugal** (source: Total Economy Database)



Interpreting Macroeconomic Data

Real GDP VS potential real GDP: business cycles.

- **Business cycles** – short-term percentage deviations in macroeconomic activity around a trend.
 - Trend/potential real GDP is obtained using the Hodrick-Prescott filter.
 - Percentage deviations are obtained as:

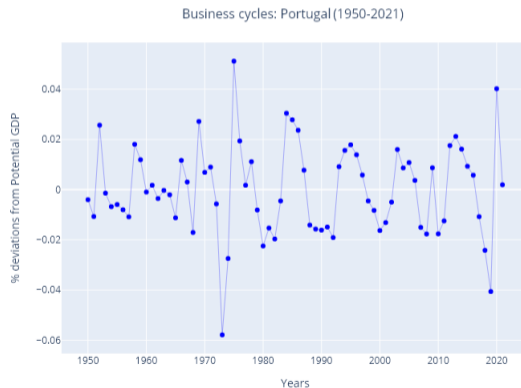
$$\Delta\% = \ln(\text{real GDP}) - \ln(\text{potential GDP})$$

- Interpret the deviations:
 - 1 Positive percentage deviation: boom.
 - 2 Negative percentage deviation: recession.

Interpreting Macroeconomic Data

Real GDP VS potential real GDP: business cycles.

- **Business cycles for Portugal** (source: Total Economy Database)



Interpreting Macroeconomic Data

The impact of business cycles across countries (specifically, recessions)

- When a crisis affects several countries, it may be interesting to analyse its impact in their economies.
- Since all the economies are different, we should make them comparable, i.e., normalize Real GDP levels for all the economies.
 - Real GDP is set to 100 when there is a crisis, as follows.

$$\text{GDP Index}_t = \frac{\text{Real GDP}_t}{\text{Real GDP}_t} \times 100$$

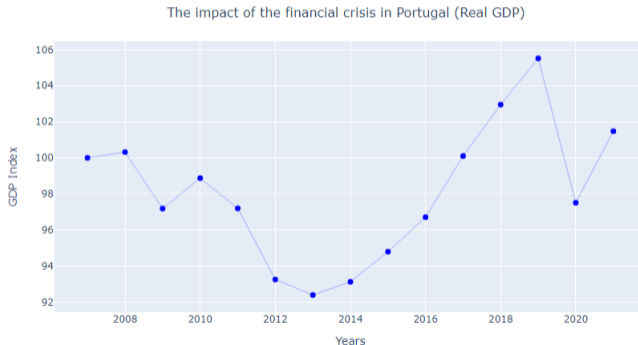
- The subsequent Real GDP values are defined in relation to the previous one.

$$\text{GDP Index}_{t+i} = \frac{\text{Real GDP}_{t+i}}{\text{Real GDP}_t} \times 100, \forall i \geq 1$$

Interpreting Macroeconomic Data

The impact of business cycles across countries (specifically, recessions)

- **GDP Index for Portugal** (source: Total Economy Database)



Interpreting Macroeconomic Data

The impact of business cycles across countries (specifically, recessions)

Using Pluto

- ⊗ Exercise 3 (Plotting real GDP).
- ⊗ Exercise 4 (Business cycles).
- ⊗ Exercise 5 (The impact of business cycles).

Size of the Government Debt

Factors that affect the debt level

- The level of public debt as a % of GDP (d_t) is affected by three factors:
 - The primary deficit (deficit before interest payments) as a share of GDP (p).
 - The growth rate of real GDP (g).
 - The real interest rate paid on public debt (r).
- The equation that drives the evolution of public debt as a proportion of GDP is:

$$d_t = p + \left(\frac{1+r}{1+g} \right) d_{t-1}$$

- If $g > r$ the level of d_t is sustainable;
- If $g < r$ the level of d_t is unsustainable (it explodes over time).

Using Pluto

- ☒ Exercise 7 (The sustainability of public debt).

Financial frictions

- Additions to the real cost of borrowing (r) caused by barriers to efficient functioning of financial markets, denoted by \bar{f} .
- Lenders need to charge a higher interest rate to protect themselves against the unexpected – it works as a risk premium.
- Financial frictions add to the real interest rate for investments, so that:

$$r_i = r + \bar{f}$$

- Investments are typically intended for long-term projects, i.e., r_i is likely to be a long-term interest rate, so f can be viewed as reflecting not only financial frictions but also the spread between long and short-term rates.

Using Pluto

- ☒ Exercise 8 (Financial frictions).

Rules and discretion

Should macroeconomic policy follow rules?

- Commitment to rules: announce rules and show commitment to such rules no matter the circumstances are.
 - Rules are good but sometimes they may put policymakers in a straightjacket.
 - Vamos estudar uma regra amplamente discutida na política monetária: a taxa de Taylor.
- Discretion: decision made given the circumstances, with no previous rules announced.

Using Pluto

- ☒ Exercise 9 (Rules vs discretion).

References

- Mishkin, F. S. (2014), *Macroeconomics: Policy and Practice*, 2nd Edition, Pearson, Addison-Wesley, New York.