Economics II

Lecture 08

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ECONOMICS II

Lecture 08

Summary:

- 4.2. Investment
- 4.3. Saving, investment and financial markets
- 4.4. Investment and stock of capital

Bibliography :

Frank and Bernanke (2011), Chapter 8

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After this session the student should be able to:

- Understand the concept of investment.
- Identify the main determinants of investment expenditure.
- Understand and apply the linear investment.
- Understand the relation between investment and saving.
- Understand the relation between investment and stock of capital.

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Exercises for Seminar:

Exercises 3.1. to 3.4.

(Course Program: 3. Economic Growth, Productivity and Living Standards Growth, Productivity and Living Standards)

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4.2. Investment Spending

What is INVESTMENT ?

1. Expenditures by firms on <u>new</u> capital goods (including buildings).
2. Expenditures by households on <u>new</u> houses. Residential investment (housing)
3. Expenditures by State on <u>new</u> capital goods (including infra-structures) .
4. Inventory Investment *VE* (Net value =ins – outs) of inventories of raw materials and inventories products stocked at the stock houses of firms.
5. ACOV Acquisitions less disposal of valuables by households (antiques, art objects etc.)

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The categories are grouped as:

- Gross Fixed Capital Formation (FBCF): 1, 2 e 3
- Inventory Investment (VE:): 4
- ACOV : 5

$$I = FBCF + VE + ACOV$$

- The Gross Fixed Capital Formation (FBCF)represents a higher amount when compared with inventory investment (VE).
- The public share of FBCF represents less than 20% of the total investment.
- The total investment expenditure is about 18 to 33 % of Domestic Expenditure.
- ACOV has a residual value.

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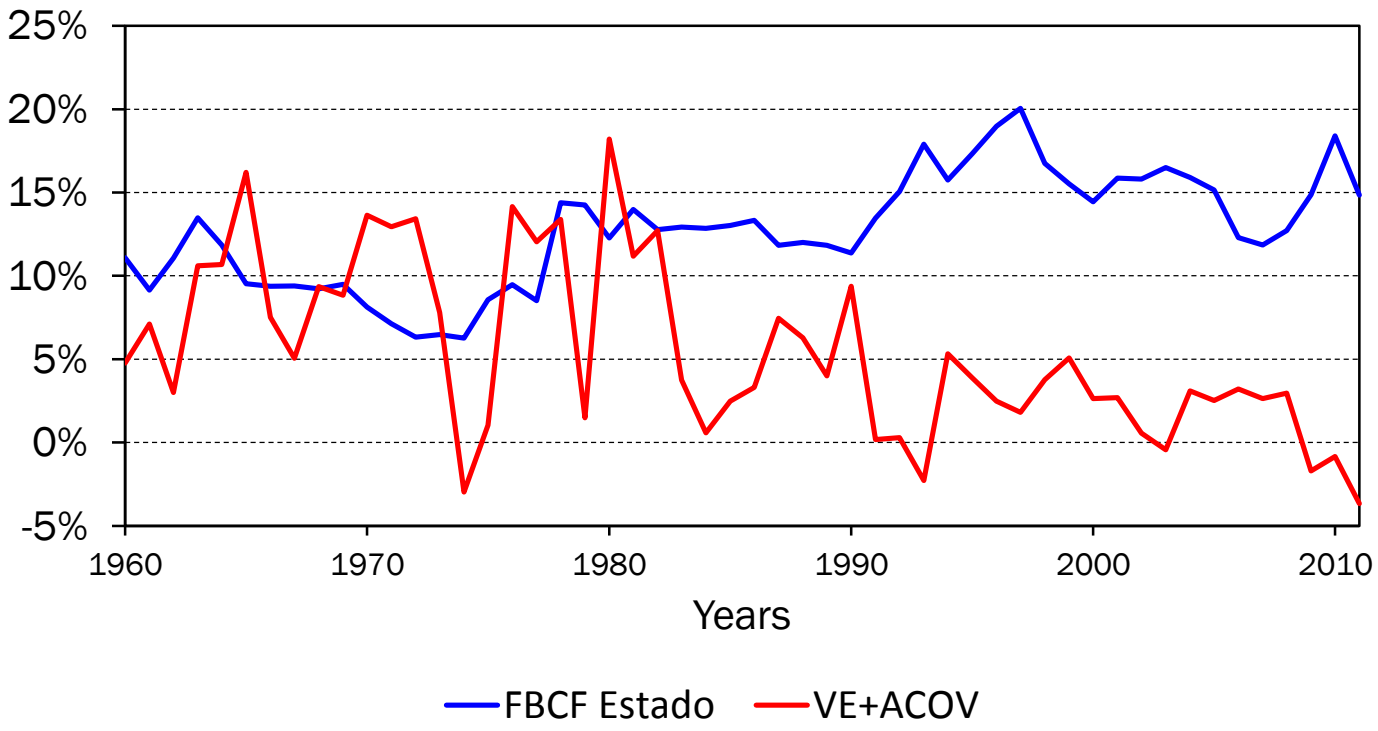
The Public FBCF and VE + ACOV as % of Total Investment (current prices) Portugal 1960-2011



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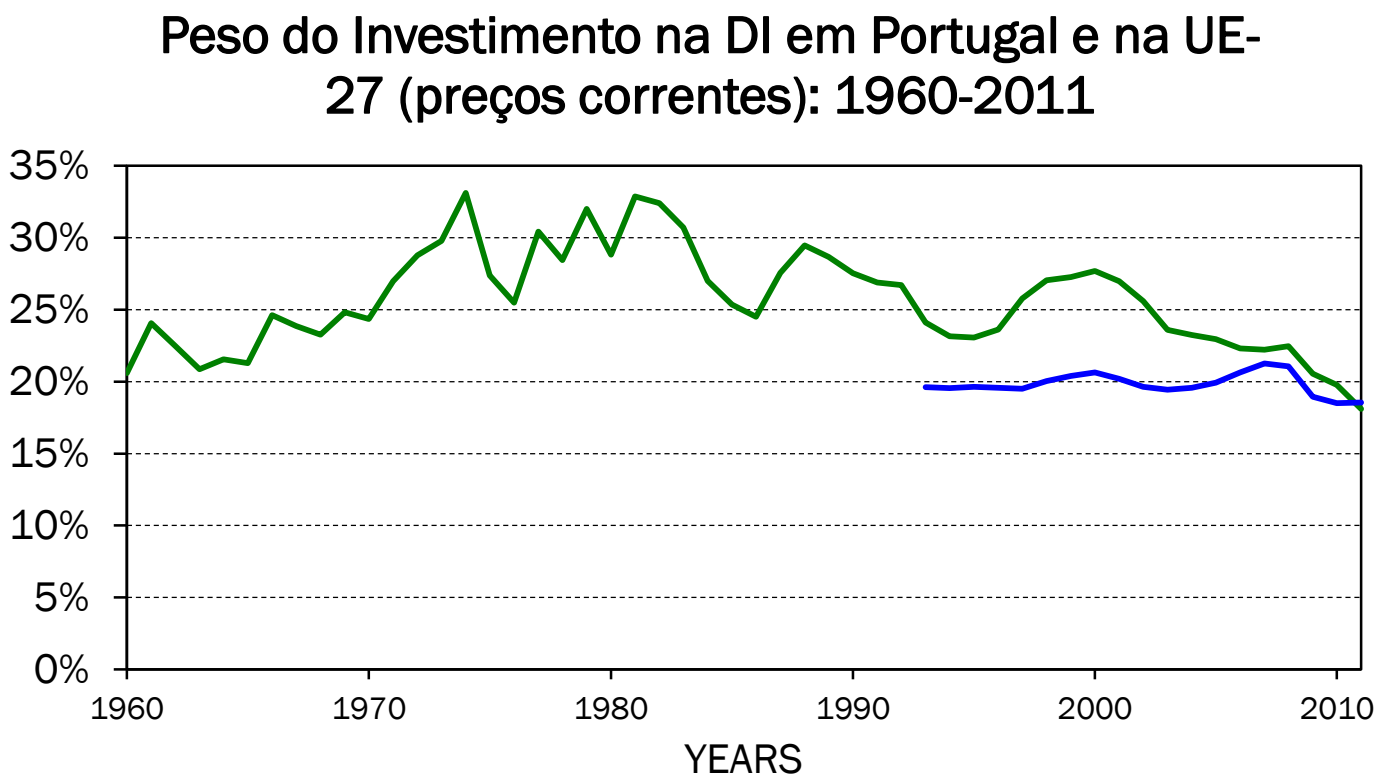
Investment as a % in Domestic Expenditure (current prices)

Portugal 1960-2011 and EU 27



Source: European Commission (2012)

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We will treat only the intentions of investment in Gross Fixed Capital Formation (GFCF) [FBCF]of the firms:

- because the VE (and ACOV) are less important and are rarely planned;
- because the logically distinct household investment
- because the distinct logic of state GFCF: it is an instrument of economic policy.

Determinants of investment intentions (of firms):

- Expected profits
  - Expected future sales;
  - Market risks;
  - Economic conjuncture.

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What are the alternatives faced by the investor?

- **alternative 1: apply the money (own or from others) as a financial asset without risk and receive interests at a real interest rate of *r*.**
- **alternative 2: apply the money (own or from others) in a real asset (e.g. a new machine) and receive future additional profits, with risk.**
- **The investor chooses the alternative with the higher expected gain.**

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Present Value of the profits on year t :

$$\Pi_t^{At} = \frac{\Pi_t}{(\ 1 + r\ ^t}$$

- Π_t^{At} Present value of the profits on year t
- r real interest rate.
- Π_t profits of year t, at prices of year 0)

Π_t^{At} is the equivalent at year 0 of the amount (at constant prices) Π_t which will be received after t periods.

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Example:

- Investment: 450,000 euros.
- Duration of the project: 5 years.
- Real Interest rate (r): 4.5%/year.
- Expected profits Π_t at prices of reference (base) year: 100,000 euros each year.

It seems that the project is worthwhile, because

500,000 > 450,000. <u>However...</u>

- We are not considering (wrongly) the opportunity cost of the project (alternative 1). And we <u>must</u> consider it.

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Financial Table of the Project, (thousand of Euros)

Discounted cash flow analysis often used by businesses to make investment decisions

t	Π_t	$\Pi_t^{At} = \Pi_t/(1+r)^t$
0	0	0.0
1	100	95.7
2	100	91.6
3	100	87.6
4	100	83.9
5	100	80.2
Total	**500**	**439**

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The present value of the expected total profits is :

$$VP = \sum_{t=1}^{5} \Pi_t^{At} = 95,7 + 91,6 + 87,6 + 83,9 + 80,2 =$$

$$= 439 \text{ milhares de euros} \qquad \text{Thousand euros}$$

- With a Present Value (*PV*) =439,000, it means less than the amount of the investment (450,000) , the project should not be undertaken. *PV= 439<450*
  - **Buy a financial asset is a better alternative**
- If the real interest rate (*r*) will decreased a certain amount the project will became profitable.

- The present value (*PV*) of a project depends (negatively) on the real interest rate (*r*) .
- Consequently, the firm investment depends negatively on the real interest rate.
  - (*real* and not nominal ...Why?)
- As the real interest rate increases, the number of profitable projects in an economy decreases.
  - Consequently, the real investment expenditure will be lower.

The Investment Function (linear)

Assumes that the real rate of interest is the main determinant of the investment behavior :

$$I = \bar{I} - b.r \qquad b \geq 0$$

- I – investment expenditures intentions;
- r –real interest rate;
- b –sensibility of investment to real interest rate;
- $\bar{I}$ - autonomous investment
  - It is necessarily positive (why?)

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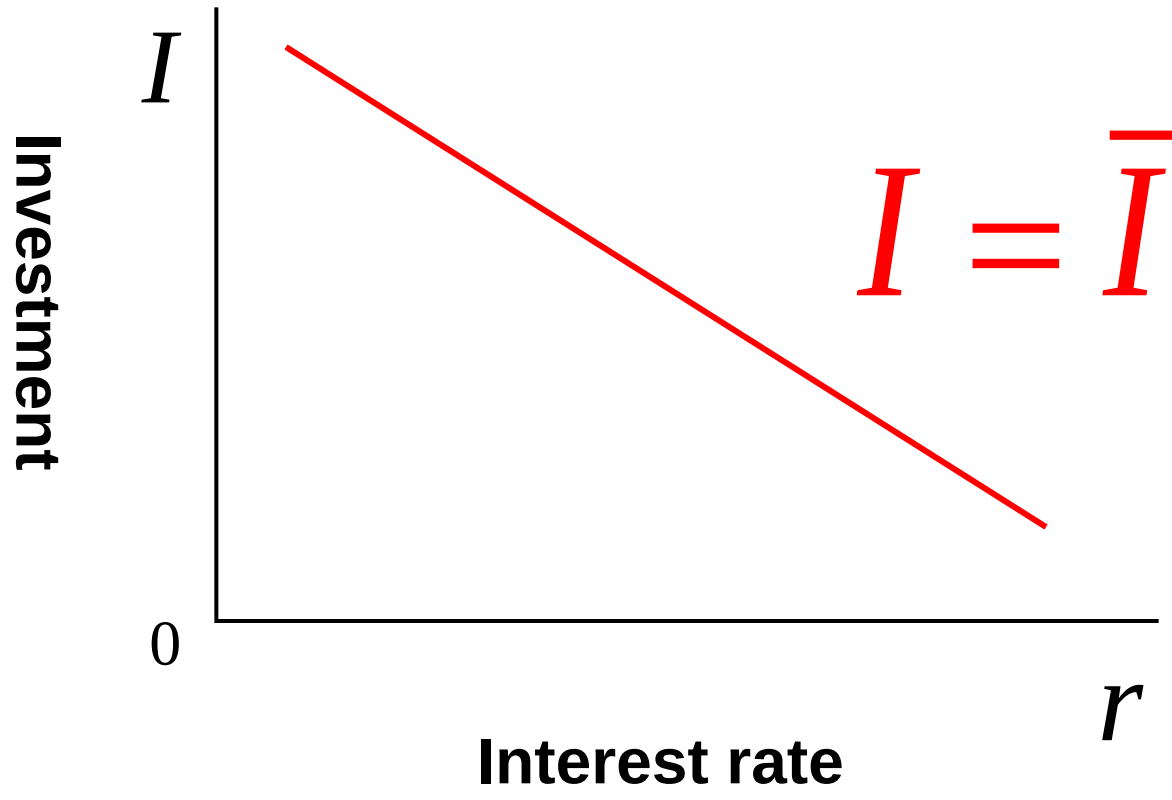
- **Real and nominal interest rate**
  - Remember:

$$r \approx i - \pi^e$$

- Nominal and real interest rate are equal when the expected inflation rate is zero.
- If inflation rate does not change, changes of the nominal interest rate are also changes of the real interest rate.
- We assume (at this stage) that the expectations about inflation rate are equal to zero (or at least exogenous)

Investment Function (linear)
Graphically



$$I = \bar{I} - b.r$$

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4.3. Saving, investment and financial markets

- Investment and saving
  - Considering a closed economy without State
  - $Y = C + I$
  - $S = Y_d - C = Y - C$
    - So, $I = S$.
  - In a closed economy without State the investment is equal to the private saving (firms and households saving)
  - In general the investment is equal to the total saving.

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- The enterprises need funds for investing :
  - Own funds (firm savings)
  - Other funds (e. g. household savings)
- Financial intermediates:
  - They move the savings from the economic agents who have finance capacity to the agents who need funds.
  - Examples of financial intermediates:
    - The banks;
    - The pension funds;
    - Assurance companies.

4.4. Investment and stock of capital

- the investment (flow variable) is related with the capital (stock variable) :

Note: only GFCF [FBCF]

$$K_t = K_{t-1} + I_t - \delta_t . K_{t-1}$$

$$K_t = K_{t-1} + FBCF_t - \delta_t . K_{t-1}$$

$$I_t - \delta_t . K_{t-1} = \Delta K_t$$

Net Investment

- The value of the **net investment** is equal to gross investment minus the depreciation of capital that occurs during the period.
- Is the **net investment** that really alters the **stock of capital**.