Lecture 03

2018/2019, 2º semester

Economics II

LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Planning of the Course

Feb 25 – lectures 3-4
Mar 11 – lectures 5-6
Mar 18 _ lectures 7-8
Mar 25 – lectures 9-10
Apr 1 -- lectures 11-12

April 9 – AI Exam

09/04/2019	10:00		ANFITEATRO 1 (FRANCESINHAS 1)

April 15 – Easter Holidays
April 22 – Easter Holidays

Apr 29 – lectures 13-14
May 6 – lectures 15-16
May 13 – lectures 17-18
May 20 – lectures 19-20

May 27 – Interruption

June 12 -

Prova escrita final: Época Normal	12/06/2019	09:00

Sumary:

Measurement of Prices and Inflation

Bibliografia:

Amaral et al. (2007), cap. 1

Frank e Bernanke (2011), cap. 5

Objectives of the Class

Make you understand:

- The differences between nominal and real indicators
- Understand the concept of price index.
- Compute inflation rates.
- Understand the cost of inflation.

Consumer price index (CPI)

- Measures, in a given time period, the cost of a basket of goods and services purchased by the "representative" household relative to the cost of the same basket in a base year;

- The cost of basket of n goods and services in the base year (t=0) is:

$$CC_0 = \sum_{j=1}^{n} p_{j,0} . c_{j,0}$$

- And that of a similar basket of *in year t is*:

$$CC_t = \sum_{j=1}^{n} p_{j,t} . c_{j,0}$$

Note the same quantities in the base year (Laspeyres index)

- Tends to overestimate inflation!

Consumer price index (CPI) [Cont.]

- It is typically collected by national institutes of statitics in all countries (INE in Portugal) monthly

- Sometimes an alternative way is used to weight the share of goods in the basket (e.g. Paasche index):

$$CC_0 = \sum_{j=1}^{n} p_{j,0} . c_{j,t}$$

- And that of a similar basket of *in year t is*:

$$CC_t = \sum_{j=1}^{n} p_{j,t} . c_{j,t}$$

Note the same quantities in the final year (

- **Tends to under-estimate inflation!**

Hermann Paasche

(1851-1925)

Etienne Laspeyres

(1834-1913)

Consumer price index (CPI) [Cont.]

- These problems of over-estimation (Laspeyres) and under-estimation (Paasche) of inflation are because consumers substitute away goods the more expensive they get, so changing the actual weights in the actual basket

- One compromise is the so-called Fischer index (a geometric weighted average of the two indexes)

- Another approach is to chain the indices – the so-called chained CPI (used in the U.S.)

- In Europe, a concern with homogeneization of methodologies led to the Harmonized CPI

Thus, the CPI index is computed as:

$$CPI_t = \frac{CC_t}{CC_0} \times 100$$

Example:

Cost of the basket in 2015 (ano base): 2300 euros

Cost of the basket in 2016: 2400 euros

$$CPI_{2015} == \frac{2300}{2300} \times 100 = 100$$

$$CPI_{2016} = \frac{2400}{2300} \times 100 = 104,35$$

We can now define the rate of increase of consumer prices:

- CPI Inflation Rate:
  - The annual percentage rate of change in the price level, as measured, for example, by the CPI (Consumer Price Index);
  - A measure of how fast the average price level is changing over time
- Can be positive (inflation) or negative (deflation)

- Recall: the price index ("P") is always measured to a base year, where it is typically set to 100, so:

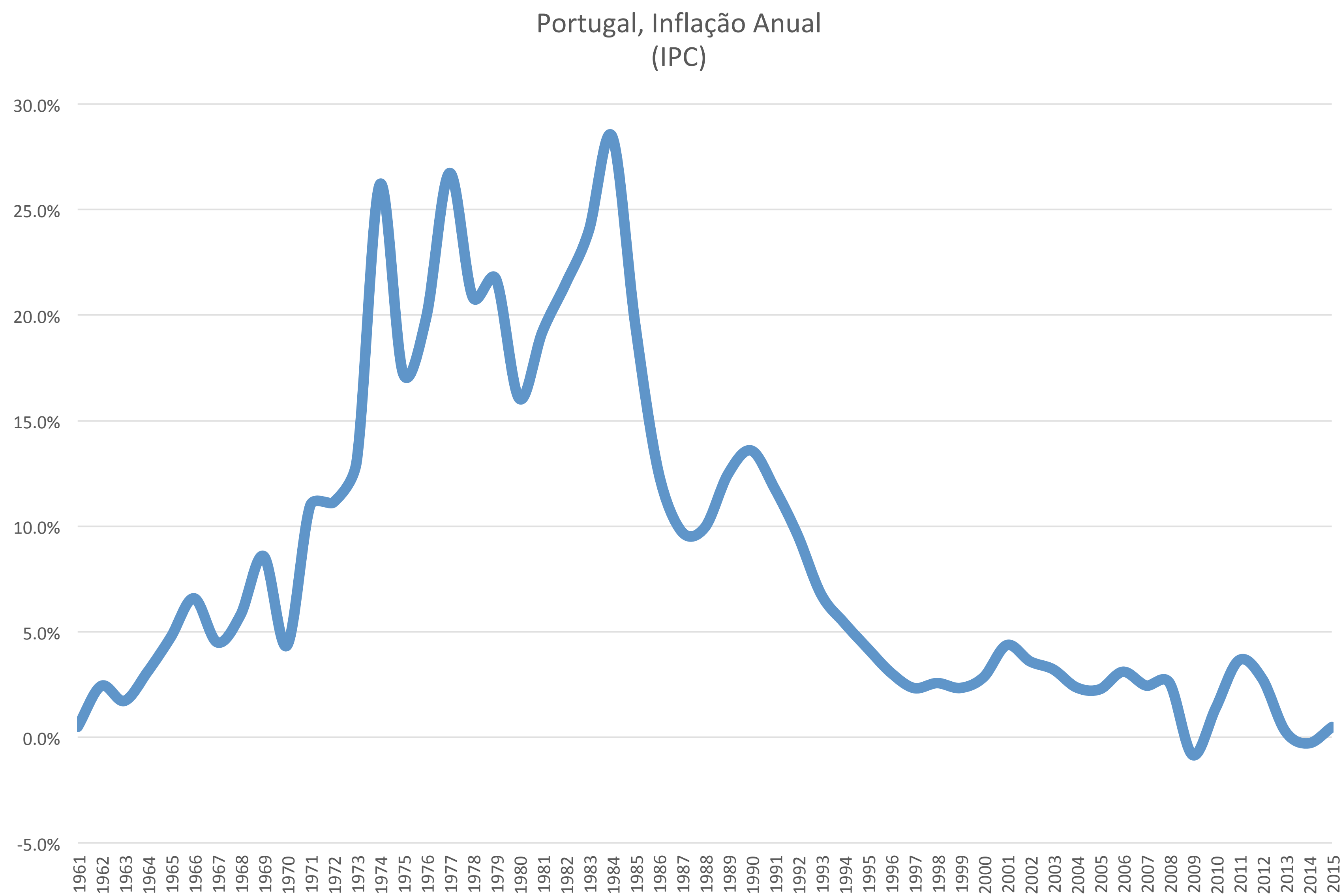
$$P_t = CPI_t / 100$$

- The inflation rate is in turn defined:

$$\pi_t = \frac{\Delta P_t}{P_{t-1}} = \frac{P_t - P_{t-1}}{P_{t-1}} = \frac{P_t}{P_{t-1}} - 1 \approx \ln(P_t) - \ln(P_{t-1})$$

where the last equality is only proximate, and this approximation is increasingly inacurate for higher inflation rates

- What was then inflation in the last slide? *4,35%*



Fonte: AMECO, Comissão Europeia, fev. 2017.

Bernard received 1000 euros/month em 2015, and was increased to 1100 euros in2016.

Did Bernard gain or loose purchasing power?

Assume inflation in 2016 was 5%, i.e.,

$$P_{2015} = 1,\ \ P_{2016} = 1,05,\ \ \ \pi_{2016} = 0,05$$

Then Bernard's salary at 2015 prices, i.e., his real wage was:

In 2015: 1000/1=1000 euros.
In 2016: 1100/1,05 = 1047,62 euros.

Nominal (current prices)
vs
Real (constant prices)

- Nominal value (current prices)
  - A quantity that is measured in terms of its current euro (or…) value

- Real value (constant prices of a reference base year). This evaluate the real change (the changes ‘in volume’, a proxy for the quantity changes)

Adjusting for Inflation
[“Deflacionar”]

- Deflating
  - The process of dividing a nominal value by a price index to express the value in real terms

$$X_t^{(R)} = \frac{X_t^{(N)}}{P_{X,t}}$$

What is the correct deflator for a variable, it will depend on what question you want to address!

In the case of wages, we are typically interested in the the **purshasing power** of wages to buy a consumer basket, so deflating wages by CPI is appropriate.

Thus: $$\textbf{Real Wage} = \frac{\textbf{Nominal Wage}}{\textbf{CPI}}$$

But we could be also interested in the value of wage relative to the producer price index (PPI), in which case we would use PPI in the denominator.

- **For other variables the suitable a deflator may be a different one:**

  - ***One example* GDPmp (*PIBpm)*.**

  - **For the GDP mp is used the deflator of the Domestic Expenditure (DE / DI Despesa Interna*)*.**

$$PIBpm_t^{(R)} = \frac{PIBpm_t^{(N)}}{P_{DI,t}}$$

CPI Inflation rate in Portugal (1955-2016)

Sources : Eurostat (2016)

Nominal and Real Interest Rate

Nominal interest rate (of market), i_t:

- Percentual gain from na asset bought at the end of t ? 1 and with interests at final t.

Real Interest rate computed at the end of t ? 1 (inflation t is not known), r_t:

- actual value present purchasing power :

$$(1+i_t)=(1+r_t).(1+\pi_t^e)\Leftrightarrow r_t=\frac{1+i_t}{1+\pi_t^e}-1\Leftrightarrow r_t=\frac{i_t-\pi_t^e}{1+\pi_t^e}$$

- If expected inflation is low, the following calculation can be used (as a proxy) :

$$r_t \approx i_t-\pi_t^e$$

Costs of Inflation

- Unexpected redistribution of wealth
  - Inflation higher than expected
    - Under contracts, wage earners are hurt to the benefit of employers
    - Hurts creditors to the benefit of debtors
- Interference with long-run planning
  - Difficult to forecast prices over long periods
- "Shoe-leather" costs
  - More frequent trips to the bank; Inflation raises the cost of holding cash
- 'Noise' in price system
- Bias in fiscal system

Interest Rate and Inflation Expectations

Suppose investors expect a higher inflation next year.

- Then by equation $(1+i_t) = (1+r_t).(1+\pi_t^e)$ in linearized form we have the so-called Fisher equation:

$$i_t \approx r_t + \pi_t^e$$

- It implies that the current nominal interest rate will go up in antecipation of a higher inflation.

- And if there is a lot of uncertainty about future inflation, then investors may also require a "risk premium"(call it η) further raising the nominal interest rate:

$$i_t \approx r_t + \pi_t^e + \eta_t$$

Interest Rate and Inflation Expectations (cont.)

- So, suppose you are a borrower (for instance, virtually all governments are debtors), the cost of high (and uncertain) inflation will be a higher nominal interest rate.

- This can be quite costly for society!