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Topic 4. Measuring the economy

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Outline

1. Gross domestic product
2. Unemployment
3. Inflation

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Gross domestic product

- The Gross Domestic Product, or GDP, measures the value of all final goods and services produced in a country (or region, municipality, etc.) during a period of time.
- This definition contains four important elements:
  - Value: each good/service is valued according to its market price (monetary value).
  - Final: only includes final goods (those that are not used to produce other goods).
  - Country: measures the production of national and foreign companies in a territory.
  - Time: measures production during a specific time period (flow variable).

The three ways of measuring GDP

- How is it measured? Three alternative, but equivalent, ways:
  1. Through demand. GDP is the total value of demand final for domestic goods by domestic and foreign economic agents (households, companies, government).
  2. Through supply (or value added). GDP is the sum of the value added (sales minus intermediate costs) generated in the economy during a given period of time.
  3. Through income GDP is the sum of all the incomes (wages and profits) generated in the economy during a given period of time.
- In reality, GDP is not measured but estimated.

  Measuring GDP is unfeasible: $\sim$ *20 mill. households* $+ \sim$ *3 mill. firms.*
- This estimate is carried out by INE on a quarterly basis, and it is subject to revisions with some frequency as new statistical information allows to refine the estimates.

GDP in Spain, 2017

Demand	Mill €
Consumption	678,102
Investment	225,532
P. spending	216,332
Exports	408,390
Imports	366,489
Total	1,161,867

Supply	Mill €
Agriculture	32,399
Industry	171,001
Construction	62,070
Services	787,710
Taxes	108,687
Total	1,161,867

Incomes	Mill €
Salaries	523,665
Benefits	518,424
Taxes	119,778
Total	1,161,867

Source: Quarterly National Accounting of Spain, INE (link)

Nominal GDP *vs.* real GDP

- The GDP measures the value of production so we need some prices. Which ones?
  - Nominal GDP: values goods/services of year t using the prices of that same year t:

    A.k.a. GDP at current prices, GDP at market prices

$$\text{Nominal GDP}_t = \text{Price}_t \times \text{Quantity}_t = P_t Y_t$$

  - Real GDP: values goods/services of year t using the prices of a given (fixed) year k:

    The year from which we take prices is called "base year"

    A.k.a. GDP at constant prices, GDP in 2020 euros.

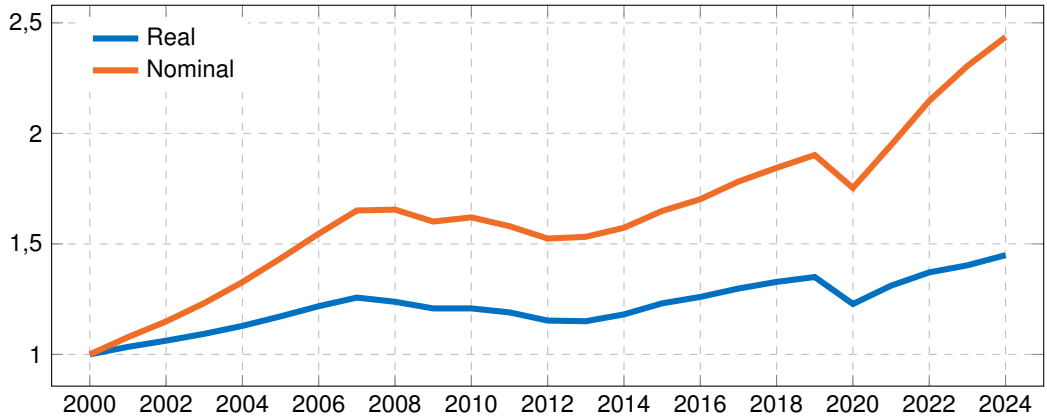
$$\text{Real GDP}_t \text{ (base } k) = \text{Price}_k \times \text{Quantity}_t = P_k Y_t$$

Nominal GDP *vs.* real GDP

- Why is this distinction relevant?
  - The changes in nominal GDP reflect changes in production and prices.
    - If nominal GDP increases we do not know if it is because production has increased, because prices have increased, because both have increased, etc...
    - Nominal GDP is not useful to analyze the evolution of GDP in the long term.
    - It is easier to estimate and available more often.
  - The changes in real GDP only reflect changes in the level of production, Y_t.
    - It allows us to measure the evolution of economic activity on the long run.
    - In the short run, prices do not change (much), so nominal GDP is still useful.

Nominal GDP *vs.* real GDP

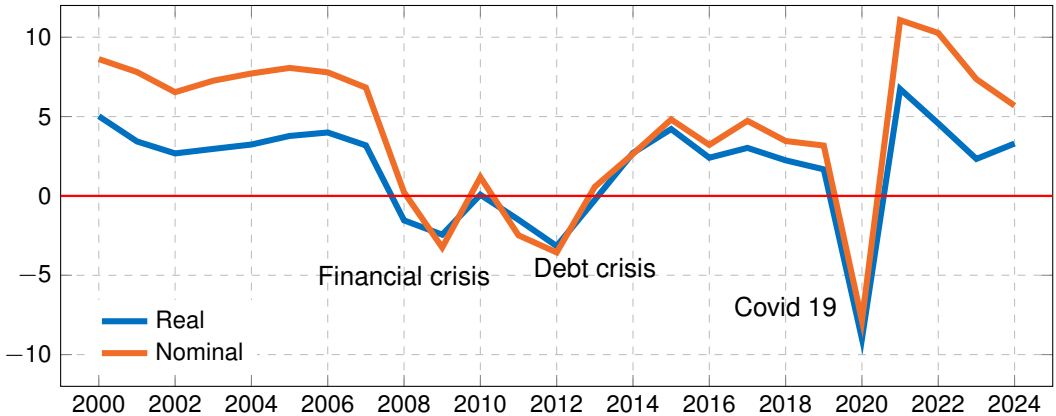
Nominal GDP and real GDP, Spain (2000 = 100)



Source: Quarterly National Accounting of Spain, INE (link)

Nominal GDP *vs.* real GDP

Nominal and real GDP growth rate, Spain



Source: Quarterly National Accounting of Spain, INE (link)

GDP limitations

- Why do we care about GDP? It is a measure of our well-being

  GDP is an indicator of our level of income, with which we can satisfy basic needs and other activities that generate well-being. In fact, GDP is correlated with measures of well-being such as life expectancy and life satisfaction rates.

- But GDP is far from a perfect measure of our well-being:
  - For example, the United Kingdom has 25% less GDP per capita than the US, but its level of well-being is the same. Why does this happen?

    Jones and Kelnow (2016), "Beyond GDP? Welfare across Countries and Time".

  - Four main limitations...

GDP limitations

1. GDP does not include many factors that contribute to well-being, like leisure, political stability, respect for individual rights, life expectancy, etc.
2. The value of GDP is independent of its distribution.

   If GDP grows by 10% but all that increase is enjoyed by 1% of the population, has well-being in the economy grown by 10%? And if GDP grows by 10% but consumption falls?
3. GDP does not includes the activity generated outside the market, like volunteering or the underground economy.

   In Spain, the INE estimates the "contribution" of smuggling, drug trafficking and prostitution since 2014, and tax and labor fraud since 2019.
4. GDP does not take into account the value of assets (eg. natural resources) and liabilities (how much debt the country has).

Summary

- GDP measures the value of all final goods and services produced in a country (or region, municipality, group of countries, etc.) during a period of time.
- There are three different but equivalent ways to measure it: through demand, through value added and through income.
- Depending on the prices we use to value goods/services, we can distinguish between nominal GDP (current prices) and real GDP (constant prices).
- Although it is a good indicator of development and (material) well-being, GDP does not include many factors that decisively affect household well-being.

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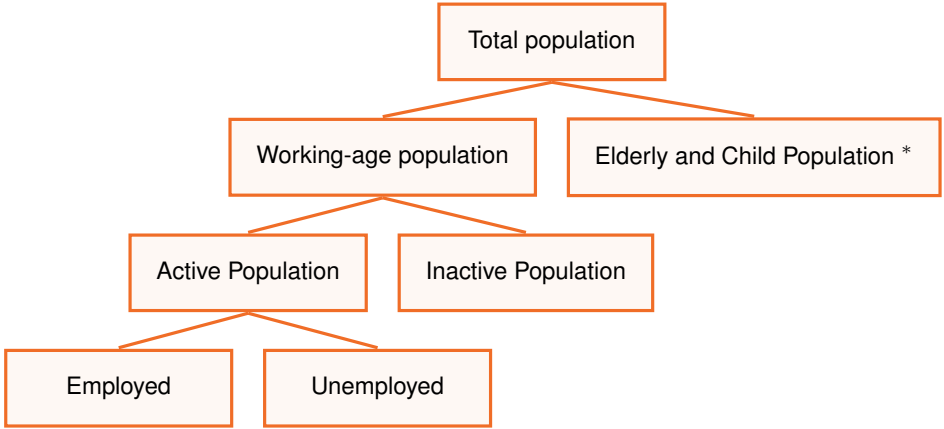
Structure of the labor market



($\star$) *The INE, and many other statistical institutes, includes those over 65 in the working-age population as long as they are legally able to work.*

The unemployment rate

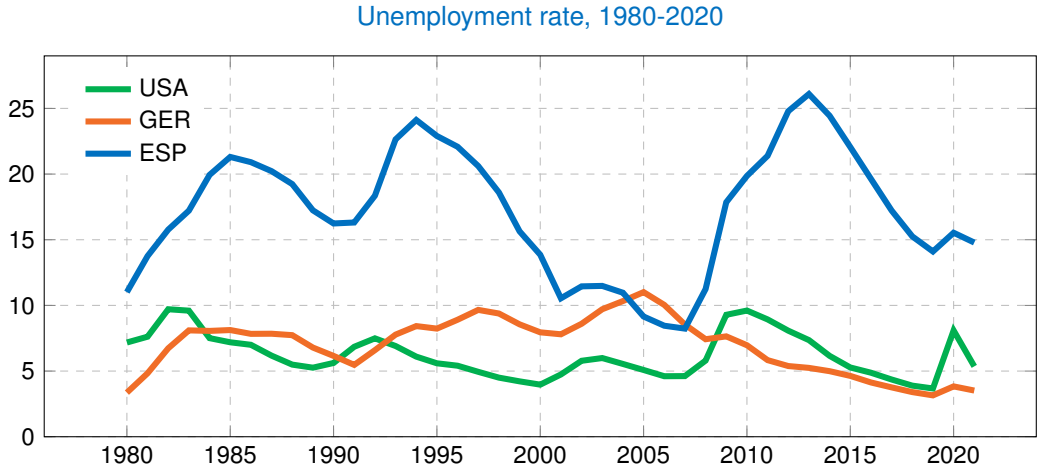
- The unemployment rate is the share of the active population that is unemployed.

$$u = \frac{\text{Unemployed}}{\text{Active Population}} \times 100$$

  - Active population: people of working age that either work or are willing to work.
  - Unemployed population: those who do not have a job, but are actively looking for a one.
- In Spain, the unemployment rate is obtained through:
  - Active Population Survey (or EPA): a quarterly survey of a sample of 65,000 families.
  - SEPE statistics: people who sign up at employment offices.

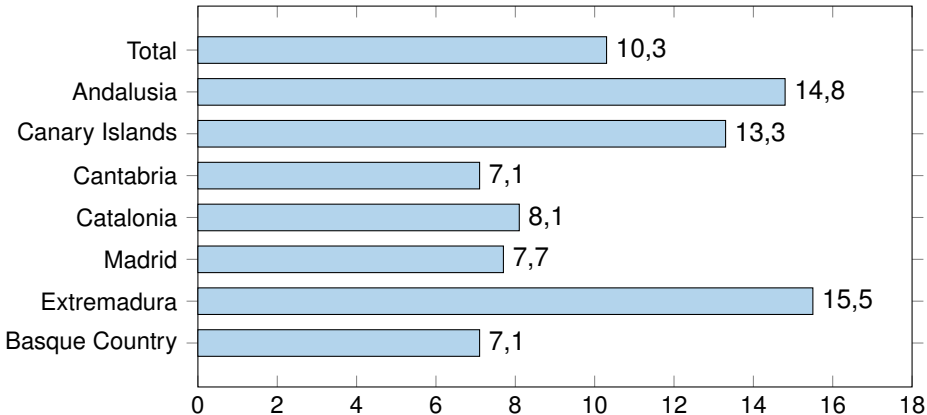
Many times, especially when unemployment is high, unemployment in the EPA and unemployment in the SEPE do not coincide.

The unemployment rate



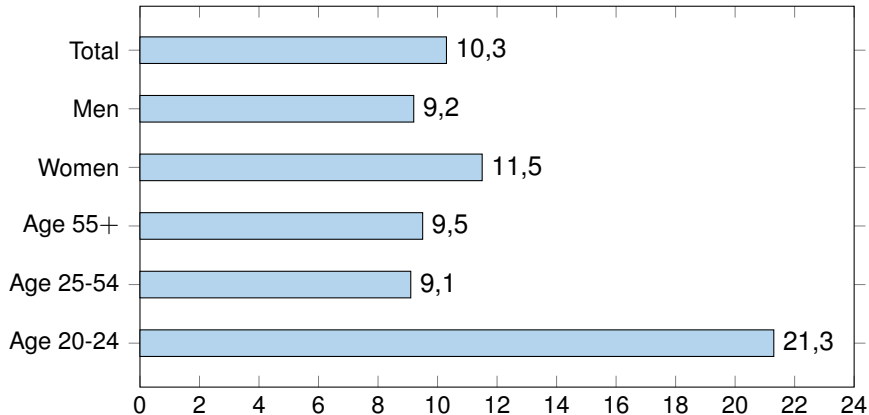
Source: World Economic Outlook database (April 2022), International Monetary Fund

Unemployment rate by Autonomous Community, Spain 2Q2025



Source: Active Population Survey, INE.

Unemployment rate by sex and age group, Spain 2Q2025



Source: Active Population Survey, INE.

Limitations of the unemployment rate

- The unemployment rate is a useful measure that generates a lot of attention among economists, politicians, and society in general, but is not a perfect measurement.
  - Some unemployed may not be included in the statistics:
    - Discouraged workers: those unemployed who give up looking for a job.
    - *Underemployed* workers: those employed who would like to work more.
  - Some "unemployed" may actually not be unemployed:
    - To be included in the unemployment statistics it is enough to say that you have searched for a job or to have asked for the subsidy.
    - Some unemployed people may be "employed" in the underground economy.
  - It does not offer us information about how long unemployment lasts.

Summary

- The unemployed are those individuals who do not have a job, but are actively looking for one, and their incidence is measured through the unemployment rate.
- The unemployment rate offers us useful information but has important limitations:
  - It may not reflect actual unemployment: some unemployed are excluded, and some “non-unemployed” are included.
  - Does not offer information on the duration of unemployment: analyze transitions

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Inflation rate

- We define inflation as the sustained and general increase in prices in the economy.

  If the price level experiences a sustained and general decline, we speak of deflation.

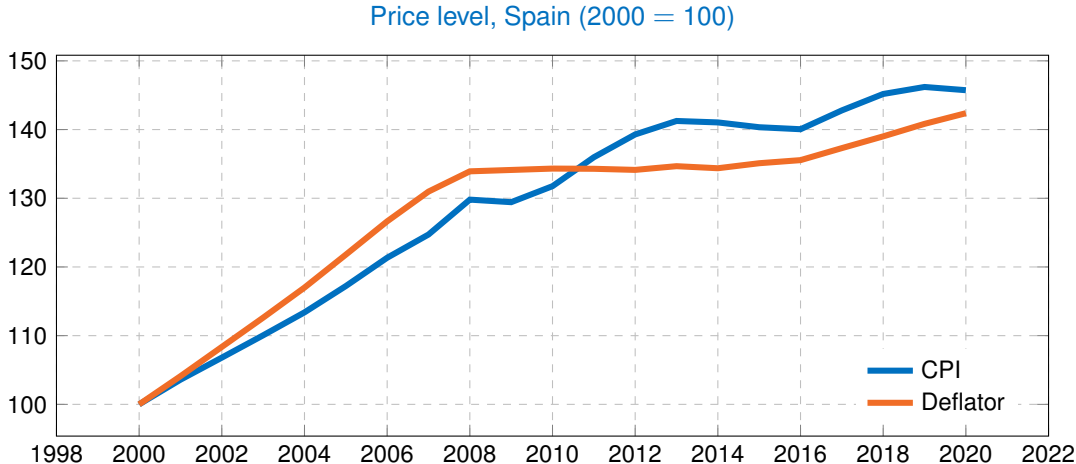
- Inflation is measured through the inflation rate: the % change in the general price level:

$$\pi_t = 100 \times \frac{P_t - P_{t-1}}{P_{t-1}}$$

- Problem: what does "price level" refer to in a real economy (with many goods and services)?

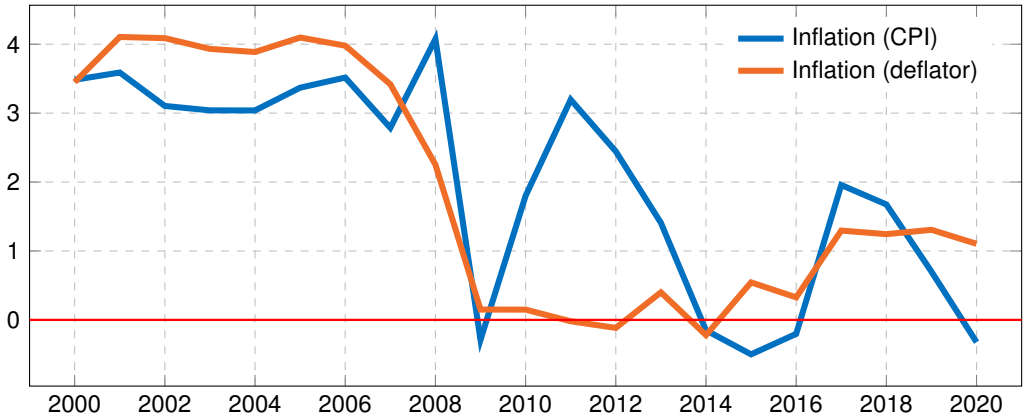
  Two non-equivalent measures:

  - The consumer price index (CPI)
  - The GDP deflator



Source: World Economic Outlook database (April 2022), IMF

Annual inflation rate (in %), Spain, 2000-2020



Source: World Economic Outlook database (April 2022), International Monetary Fund

Price index

- The Consumer Price Index (CPI) measures the cost in euros of the consumption basket of a representative household living in Spain.
  - The INE establishes a series of goods and services (more than 500 items) and estimates the relative weight of each of them in the basket.
  - Every 5 years, the INE updates the composition of the basket.
    - For example, in 2021 hygienic masks and online press subscriptions were introduced, and eliminated, among others, the DVD player or the portable CD player from the basket (it went from 977 to 955 items).
  - More regularly, the weighting of each good in the basket is updated.
- The INE publishes information on the CPI on a monthly basis.

Price index

- An alternative measure of the general price level is the GDP deflator, which is the relationship between the nominal GDP the real GDP (base k):

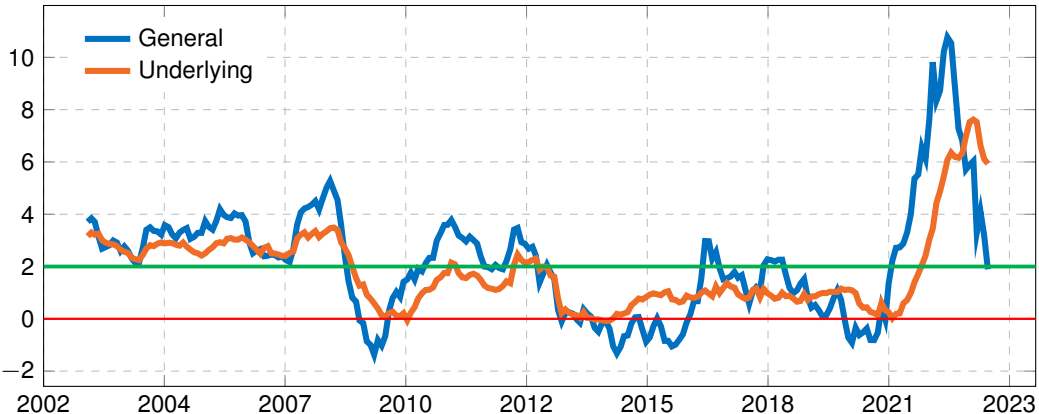
$$P_{t,k} = \frac{\text{Nominal GDP}_t}{\text{Real GDP}_t} = \frac{P_t \cdot Y_t}{P_k \cdot Y_t} = \frac{P_t}{P_k}, \qquad k \equiv \text{“base year”}$$

- Unlike the CPI, the GDP deflator takes into account all goods produced in the economy (also investment goods and exported goods), but not imported goods.
- Which measure is the best? They measure different things:
  - The GDP deflator measures the price of production $\rightarrow$ Competitiveness/Efficiency.
  - The CPI measures the price of consumption $\rightarrow$ Cost of living.
- In most (if not all) cases, when we talk about inflation we refer to the change in the CPI.

Measuring inflation

- According to its time horizon, we can distinguish four inflation measures:
  - Average rate: average CPI of a year with respect to the average CPI of the previous year.
  - Monthly rate: one month compared to the previous month.
  - Interannual rate: one month compared to the same month of the previous year.
  - Accumulated rate: one month compared to December of the previous year.
- According to the composition of the basket we can distinguish three inflation measures:
  - General inflation: CPI variation rate (all goods in the basket)
  - Core inflation: CPI change excluding energy and unprocessed foods (very volatile)
  - Underlying inflation: a measure of inflation used by central banks (CPI excluding energy and unprocessed foods and –temporarily– some others).

Inflation rate, Spain, 2002-2022



Source: World Economic Outlook database (April 2022), IMF

Summary

- Inflation is the sustained and general increase in prices in the economy and is measured through the inflation rate (% rate of variation in the price level).
- We measure the aggregate price level through the CPI and the deflator (not equivalent).
  - CPI: average price of a representative shopping basket
  - GDP deflator: relationship between nominal GDP and real GDP
- We can distinguish several inflation measures depending on the time horizon (monthly, accumulated, interannual, average) and the goods included (general and underlying).
  - The inflation rate that concerns the central bank and that guides its policy is the underlying inflation rate: more stable and more linked to local conditions.

Questions?