ECONOMIC STATISTICS

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Module 3	National Income and GDP
Lecture 1	16 March 2026
Topic	Gross Domestic Product

GROSS DOMESTIC PRODUCT (GDP)

What is gross domestic product (GDP)?
How do we calculate it?
How can we compare GDP through time and across countries?
What is left out of the calculation?
How reliable are GDP statistics?
How do they guide policymakers?

Definition of gross domestic product (GDP)

GDP is defined in the framework of National Accounting (SNA/ESA)

→Definition

GDP = total output − intermediate consumption + net taxes on products and imports; equivalent to adding the added values and adjusting for taxes/subsidies on products.

→In Europe, the standards governing national accounts are enshrined in two international reference manuals: the System of National Accounts 2008, which is recognised globally, and its European version, called the European System of Accounts 2010.

GDP is the most frequently used indicator in the national accounts

→ two major creators of modern national accounts were both awarded Nobel prizes for economics (Simon Kuznets of the United States in 1971 and Richard Stone of the United Kingdom in 1984).

→national accounting is a fairly recent invention

→After Second World War the concept of GDP was formalised and, eventually, standardised.

→Today, a quarterly GDP estimate is one of the most keenly awaited statistics in every country, because of the information it gives about the state of the economy.

The GDP estimate is usually headline news.

On 30 January 2026, the first estimate of Quarter 4, 2025, from the beginning of October to December, came out.

See ISTAT, comunicato stampa, Statistiche flash, 30 gennaio 2026

What is gross domestic product (GDP)?

GDP combines in a single number (with no double counting),

all the output (or production) carried out

by all the firms, non-profit institutions, general government and households in one country during a given period

provided that the production takes place within the country's economic territory.

It is calculated quarterly or annually, but it can also be calculated monthly.

Measuring output

Measuring a country's total output is not a simple matter; therefore, national accountants have had to devise innovative methods of calculation.

The problem of double counting

it makes little sense to add together the output measured in euros from all firms to arrive at a macroeconomic figure. That is because the result of this calculation depends heavily on the way the firms are organised.

The innovative idea is to calculate the contribution of each firm not as its output, but as its Value Added (V.A.)

V.A. is the value of output minus the value of all inputs (called intermediate goods). The products consumed in the production process during the period are known as **intermediate goods.**

Summing the value added

If one applies this same reasoning to all firms, calculating for each its value added, it is then possible to add together the value added of each firm, without double counting.

The result will be an indicator that is independent of the way firms are organised.

This is why GDP is defined as being equal to the sum of the value added of each firm, government institution and producing household in a given country.

The composite formula for GDP (known as an aggregate) constitutes a macroeconomic indicator of output that is independent of the pattern of the organisation and avoids double counting.

The standards for GDP

A widely used definition in statistics (EU/Euro area) describes GDP as:

value of the economy's total output of goods and services minus intermediate consumption, plus net taxes on products and imports.

This sentence already contains three key ideas:
1.“Domestic”: What is produced within the country's economic borders counts, regardless of the nationality of the producers (resident/non-resident).

2.“Gross”: does not subtract depreciation (consumption of fixed capital);

3.”Measures a flow”: it refers to a period (year/quarter), not a stock (such as assets).

GDP can be estimated by three approaches, which in theory coincide (with statistical differences due to sources and rounding)

Production (or value added) approach

The idea is to add the added value created by the productive sectors and then add the net taxes on products.
Standard formula:

GDP = Σ (Value added to basic prices) +
+ Product taxes − Product subsidies

The reference to outputs minus intermediate consumption (and hence value added) is explicit in the statistical definition.

Expenditure approach (final demand)

Here we look at who purchases the final production.
The main components that make up GDP (expenditure side) include:

- final consumption of households,
- final consumption of general government,
- gross fixed capital formation (GFCF),
- change in inventories,
- exports and imports (foreign balance).

Standard formula:

$$GDP = C + G + I + \Delta Stocks + (X - M)$$

The list of components is exactly as given in the descriptions of the main National Accounting aggregates in the European context.

Income approach

Here we measures GDP at market prices by summing all primary incomes generated in the production process:

- employee salaries,
- gross operating surplus (corporations) + mixed income (household unincorporated enterprises),
- taxes on production and imports, less subsidies.

GDP = W + I + Product taxes − Product subsidies

Note: It is useful to remember that production–expenditure–income are “three sides” of the same economic process: producing goods/services = generating income = allowing final expenditures.

Calculating real GDP and real GDP growth

“gross domestic product (GDP) is estimated to have increased by 0.3% in Quarter 4 (Oct to Dec) 2025”. The comments refer not to GDP growth as such, but to the growth of real GDP.
What is the Real GDP?

Real GDP : Nominal GDP, adjusted for the effects of changes in prices. Also known as GDP in volume terms.

This aggregate is intended to identify changes in quantities having adjusted for the effects of changes in prices.

It is a problem for all the aggregates measured in the prices at the time of measurement.

Converting nominal to real GDP

national accountants have developed sophisticated methods for separating out movements in nominal GDP into two components:
- > the change in real GDP, which we can think of as GDP in volume
- > the GDP deflator, an indicator of the change in prices

GDP in nominal prices = real GDP × GDP deflator
→ real GDP = nominal GDP / GDP deflator

The GDP deflator is essentially a price index with weights that are the proportionate quantities of all of the goods and services included in GDP.

Comparing nominal and real GDP

International comparisons of GDP

Often, there is interest in comparing absolute levels of real GDP per head among different countries.
Usually, the comparison is made for a particular year or series of years.

How can this comparison among countries, or regions or zones—a so-called spatial analysis—be done?

The comparisons of GDP across countries requires purchasing power parities (PPP). It can be regarded as the hypothetical exchange rate at which countries' currencies need to be converted into a common currency, so that a given amount of the first country's currency will buy the same volume of goods and services in the second country as it does in the first.

Per capita comparison

When comparing countries, it is often useful to focus on the comparative level of GDP per capita (GDP divided by population).

The simplest version of this ratio would be GDP at nominal prices (and expressed in a common currency) divided by total population.

However, this does not take into account the difference in the level of prices across countries.

Therefore, most reports use purchasing power power parity (PPP) comparisons to make a meaningful cross-country analysis.

What is left out of the calculation?

- **Unpaid domestic work**: often not included in GDP because it does not pass through the market (except in specific cases).

- **Underground/illegal economy**: its treatment depends on the statistical rules adopted and on the possibilities for estimating it, and it receives particular attention because it affects the level of GDP.

- **Quality, innovation and digitalisation**: measurement is complex (implicit prices, new products, “free” services), so GDP estimates require advanced methodologies.