National income and product accounts are an accounting system used to measure of aggregate economic activity.

Aggregate output (GDP):

Gross domestic product (GDP) is a measure of the total market value of all final goods and services produced within the borders of a given country during a given year.

يقصد بالناتج المحلي الإجمالي القيمة السوقية لجميع السلع والخدمات النهائية المنتجة في بلد معين وفي فترة زمنية معينة, ويتم انتاجها فقط داخل الحدود الجغرافية للدولة. السلع والخدمات المنتجة محليا هي داخل الحدود الجغرافية للدولة سواء كان من طرف احد مواطنيها أو احد المقيمين على أراضيها أو المؤسسات الوطنية أو المؤسسات الاجنبيه على أراضيها.

GDP; Production, and Income

There are three ways of defining GDP:

1. **GDP is the value of the final goods and services produced in the economy during a given period.**

- A final good is a good that is destined for final consumption.
- An intermediate good is a good used in the production of another good.

- Some goods can be both final and intermediate goods. Potatoes sold directly to consumers are final goods. Potatoes used to produce potato chips are intermediate goods.
-

Intermediate goods: - are goods and services that are purchased for resale or for further processing or manufacturing.

هي السلع التي يتم انتاجها بواسطة منشأة معينة لتستخدمها أخرى كعنصر انتاج (Input) في انتاج سلعة أو خدمة أخرى.

Final goods: - are consumption goods, capital goods, and services that are purchased by their final users, rather than for resale

To avoid multiple counting, GDP includes only the market value of final goods and ignores intermediate goods.

لنتجنب الحساب المزدوج للناتج الاجمالي المحلي فإن يجب أن نحسب القيمة السوقية للسلع النهائية . أما اذا احتسبت قيمة السلع الوسيطة في حساب الناتج المحلي الاجمالي، فإنها تحتسب مرتين، مرة كسلعة وسيطة ومرة أخرى كجزء من قيمة السلعة النهائية. ويعرف ذلك بالحساب المزدوج (Double Counting)، ويتسبب في تضخم قيمة الناتج الاجمالي المحلي بما يفوق حقيقته.

Example

Firm1 produces steel, employing workers and using machines to produce the steel. It sells the steel for $100 to firm2, which produces cars. Firm1 then pays its workers $80. Leaving $20 in profit to the firm. Firm2 buys the steel and uses it together with workers and machines, to produce cars. Revenues from car sales are $210. Of the $210 goes to pay for steel and $70 goes to workers in the firm, leaving $40 in the profit to the firm.

We can summarize this information in a table:

Steel company (firm1)	
Revenue from sales	$100
Expenses - Wages	$80 $80
Profits	$20

Car company (firm2)	
Revenue from sales	$210
Expenses - Wages - steel purchases	$170 $70 $100
Profits	$40

GDP is the value of the final goods ➔ GDP equal to the value of cars = $210

2. **GDP is the sum of value added in the economy during a given period.**
   - Value added equals the value of a firm's production minus the value of the intermediate goods it uses in production.

For the above example;

- The steel company does not use intermediate goods. Its value added is simply equal to the value of the steel it produces, $100
- The car company uses steel as an intermediate good. Thus, value added by the car company is equal to the value of the cars it produces minus the value of the steel it uses in production, $210 - $100 = $110.

GDP = total value added

Total value added = $100 + $110 = $210 = GDP.

3. **GDP is the sum of the incomes in the economy during a given period.**

   - Some of the revenues are collected by the government in the form of taxes on sales - such taxes are called indirect taxes.
- Some of the revenue go to pay workers- this component is called labor income
- The rest goes to the firm- that component is called capital income or profit income.

GDP = the sum of indirect taxes, labor income, and capital income

Return to our example.

- Indirect taxes = 0
- Of the $100 of value added by the steel company, labor income equal $80 and capital income equal $20.
- Of the $110 of value added by the car company, labor income equal $70 and capital income equal $40.

Total labor income = $80 + $70 = $150

Total capital income = $20 + $40 = $60

GDP = 0 + $150 + $60 = $210

Example (2)

During a given year, the following activities occur:

i. A silver mining company pays its workers $200,000 to mine 75 pounds of silver. The silver is then sold to a jewelry manufacturer for $300,000.
ii. The jewelry manufacturer pays its workers $250,000 to make silver necklaces, which the manufacturer sells directly to consumers for $1,000,000.

A. Using the production-of-final-goods approach, what is GDP in this economy?
B. What is the value added at each stage of production? Using the value-added approach, what is GDP?
C. What are the total wages and profits earned? Using the income approach, what is GDP?

Solution:

A. The GDP for this economy, according to the final goods approach equals $1 million, the amount that the jewelry is sold for
The GDP for this economy = Value of silver necklaces = $1,000,000

B. Stage 1 Value-added = $300,000, the amount the silver is sold to the jewelry manufacturer for. Stage 2 Value- Added = the extra valued created by the jewelry firm = 1,000,000- 300,000 = $700,000. GDP by value-added is 300,000 + 700,000 = $1,000,000.

C. Total wages = 200,000 + 250,000 = $450,000.

Stage 1 profits = Revenue – Cost (wages) = 300,000 – 200,000 = $100,000.

Stage 2 profits = Revenue – intermediate inputs – wages = 1,000,000 – 300,000 – 250,000 = $450,000.

Total profits = 100,000 + 450,000 = $550,000.

GDP according to the income approach = Total labor income + Total capital income = 450,000 + 550,000 = $1,000,000.

Silver mining company	
Revenue from sales	$300,000
Expenses - Wages	$200,000
Profits	$100,000

Jewelry manufacturer	
Revenue from sales	$1,000,000
Expenses	$550,000
- Wages	$250,000
- Silver purchases	
	$300,000
Profits	$450,000

Example (3)

There are orange farms and an orange juice company in a country called Orangeland. Orangelanders live only on orange juice. In 2020, the orange farm produced 10 oranges, and sold them to the orange juice company at $1 each. The orange juice company produced 3 bottles of orange juice, and sold them all at a unit price of $10 plus 10% indirect tax collected by government (so the price paid was actually $11). The orange farm paid total wages of $6. The orange juice company paid total wages of $10. Both companies retained 50% of their net profits (after depreciation) and paid the rest of it as dividends to the households. After receiving their wage income and their dividends, the households paid a 10% direct tax on their total income to the government. The government bought one orange juice bottle (for $11). The government made no social transfers. (Notice that the firms are not paying any direct taxes on their retained profits)

Compute the GDP of Orangeland using (a) final goods approach, (b) the value added approach, and (c) the income approach.

(a) Final goods:

GDP is the value of the final goods ➔ GDP equal to the value of the orange juice
GDP =the value of 3 OJ bottles: 3*$11 = $33

(b) Value added:

Farm value added = $10*$1 = $10
OJ company value added = the value of the orange juice it produces minus the value of the oranges it uses in production = 3*$11- $10 = 33 - 10 = $23

GDP = total value added = 10 + 23 = $33

(C) Income approach

We can summarize this information in a table:

orange farms	
Revenue from sales	1 * 10 = $10
Expenses - Wages	$6 $6
Profits	$4

orange juice company	
Revenue from sales	3 * 10 = $30
Expenses	$20
- Wages	$10
- orange purchases	$10
Profits	$10

Households' income: Wages: $6 + $10 = $16
Dividends: 50% ($4 + $10) = $7 (see calculation of profits below)
Retained profits: 50% ($4 + $10) = $7 (see calculation of profits below)
Indirect tax paid = 10%*30 = $3

GDP = labor income (wage) + capital income (profit) + Indirect tax paid = (6 + 10) + (4 + 10) + 3 = $33

GDP and GNP

Gross domestic product (GDP) is a measure of the total market value of all final goods and services produced within the borders of a given country during a given year.

يقيس الناتج الاجمالي المحلي القيمة النقدية لجميع السلع والخدمات النهائية الي يتم انتاجها على حدود الدولة الجغرافية في بلد ما في فترة زمنية محددة.

GDP = Consumption (C) + Gross Investment (Ig) + Government Purchases (G) + Net Exports (NX)

GDP = C + Ig + G + NX

Personal Consumption Expenditure (C): الانفاق الاستهلاكي

Cover all expenditures by households, and consumer expenditure for services.

يشمل الاستهلاك الشخصي جميع المشتريات التي يقوم بها المستهلكين على شراء السلع والخدمات الجديدة (شراء السلع المستعملة لا تحسب ضمن C)

Gross investment (Ig): إجمالي الاستثمار

Includes the following items:

- All final purchases of machinery, equipment, and tools by business enterprises
- All construction (الاستثمار في العقارات)
- Changes in inventories (التغيير في المخزون)

هو عبارة عن التغير في المخزون السلعي من مواد أولية ووسيطة وسلع نهائية، فالمنتج لا يقوم ببيع جميع ما ينتجه فور إنتاجه بل يخزن جزء من هذا الإنتاج توقعاً لطلبات عملائه، كما يقوم بتخزين جزء من المواد الأولية والوسيطة حتى لا يتوقف إنتاجه إذا لم يستطع الحصول على هذه المواد في الأوقات المحددة للإنتاج، وهذا النوع من الاستثمار يسمى استثماراً في المخزون Inventory Investment.

Question:
A good produced in 2020 and held in inventory until it is sold in 2021would be included in which measure of GDP? *Counted Investment in 2020*

Government Purchases (G): الانفاق الحكومي

Included all expenditures for goods and services that government consumes in providing public services

ويقصد به كل ما تنفقه الحكومة من شراء السلع وما تدفعه من رواتب وأجور باستثناء معاشات التقاعد والهبات والإعانات الأخرى.

Government purchases **include** all government expenditure on final goods and all direct purchases of resources including labor. Government purchases **do not include** government transfer payments.

Net exports (NX): صافي التجارة الخارجية

Net Export = Exports (X) – Imports (M).

If exports > imports ➔ trade surplus (فائض في الميزان التجاري)

If imports > exports ➔ trade deficient (عجز في الميزان التجاري)

Exports ≡ the purchases of domestic goods and services by foreigners. (طلب الأجنبي على السلعة المحلية)

Imports ≡ the purchases of foreign goods and services by domestic consumers. (الطلب المحلي على السلعة الأجنبية)

Example:
Indicate whether each of the following is considered as Consumption (**C**), Investment (**Ig**), Government expenditure (**G**), Net exports (**NX**).

1. A consumer buys a new computer from a domestic manufacture. Consumption
2. Ahmad buys a new house from a local builder. Investment
3. Palestinian olive oil sales to Jordan. Net exports
4. You pay a hairdresser from a haircut. Consumption
5. Construction of a new apartment complex (بناء مجمع سكني جديد). Investment
6. $10,000 spent by a government to fight crime (لمحاربة الجريمة). Government expenditure
7. A firm produce a car valued at $30,000, but doesn't sell it during the year. Investment

GNP: Gross National Product الناتج الاجمالي القومي

The total market value of all the goods and services produced by a nation (citizens of a country, whether living at home or abroad) during a specified period.

القيمة النقدية أو السوقية لجميع السلع والخدمات التي تنتجها مواطني الدولة (سواء كانوا يعيشون في الداخل أو في الخارج) خلال فترة زمنية محددة.

The difference between the GDP and GNP reflects the fact that location and ownership will be different in the case of multinational companies or expatriate workers. The product of the Honda plant in Ohio is all counted as part of US GDP, but because the Japanese owners of the plant provide the capital equipment, the part of the output due to capital services is part of Japanese Gross National Product.

GNP = GDP + Net foreign factor income (NFFI)

Net foreign factor income = Palestinian citizens income earned abroad minus foreign citizens income earned in Palestine.

دخل المواطن الفلسطيني المكتسب في الخارج مطروحًا منه دخل المواطنين الأجانب في فلسطين.

صافي عوائد عناصر الإنتاج الخارجية :عوائد عناصر الإنتاج المحمولة من الخارج من قبل المواطنين المحليين – عوائد عناصر الإنتاج المحولة إلى الخارج من قبل الأجانب .

GDP and NDP

NDP; Net domestic product

Net domestic product (NDP) is an annual measure of the economic output of a nation that is adjusted to account for depreciation.

NDP = GDP – Depreciation

NDP = C + In + G + NX

National income (NI): الدخل القومي

National income (NI): includes all income earned through the use of national resources.

شمل الدخل القومي جميع الدخل المكتسب من استخدام الموارد الدولة الاقتصادية .

National income (NI) = Compensation of employees (wage) + Rent + Interest + Profit + Taxes on production and imports.

Or: NI = NDP + NFFI

Disposable Income (DI) الدخل المتاح

DI = Personal Income (PI) – Personal Taxes (PT)

Or: DI = Consumption (C) + Personal saving (S)

Nominal and Real GDP

Nominal GDP: is the sum of the quantities of final goods produced times their current price.

Nominal GDP increases over time because:

- The production of most goods increases over time.
- The prices of most goods also increase over time.

$$\text{Nominal GDP} = \Sigma\,(P_t \times Q_t)$$

Nominal GDP is also called dollar GDP or GDP in current dollars.

Real GDP: is constructed as the sum of the quantities of final goods times *constant* (rather than *current*) prices.

$$\text{Real GDP} = \Sigma\,(P_0 \text{ x } Q_t)$$

Where; P_0 is the price in the base year

Real GDP is also called GDP in terms of goods, GDP in constant dollars, GDP adjusted for inflation.

Example

good	2018		2019		2020	
	price	quantity	price	quantity	price	quantity
Pizza	$11.25	12	$12	10	$13	10
Soda	$1.5	24	$1.45	20	$1.5	30
Ice cream	$3	15	$3	18	$3.5	12

Suppose 2018 is the base year.

1. **Calculate Nominal GDP (2018)**

NGDP = (P_p * $Q_{p\ (2018)}$) + (P_s * $Q_{s\ (2018)}$) + (P_i* $Q_{i\ (2018)}$)

= (11.25 * 12) + (1.5 * 24) + (3 * 15) = $216

2. **Calculate Nominal GDP (2008)**

NGDP = (P_p * Q_p (2019) + (P_s * Q_s(2019)+ P_i * Q_i (2019)

= (12 * 10) + (1.45 * 20) + (3 * 18) = $203

3. **Calculate Nominal GDP (2020)**

NGDP = (P_p * Q_p (2020) + (Ps * Qs (2020) + Pi * Qi (2020)

= (13 * 10) + (1.5 * 30) + (3.5 * 12) = $217

4. **Calculate Real GDP (2018)**

RGDP = {P_p(2018) * Q_p(2018)} + {Ps(2018) * Qs(2018)} + {Pi(2018) * Qi(2018)}

= (11.25*12) + (1.5*24) + (3*15) = $216 = Nominal GDP (2018)

For the base year, NGDP = RGDP

5. **Calculate Real GDP (2019)**

RGDP = {P_p(20018) * Q_p(2019)} + {Ps(2018) * Qs(2019)} + {Pi(2018) * Qi(2019)}

= (11.25*10) + (1.5*20) + (3*18) = $196.5

GDP Price Index (GDP Deflator) الرقم القياسي للاسعار

A price index is a measure of the price of a specified collection of goods and service, called a "market basket" in a given year as compared to the price of an identical collection of goods and services in a reference year (base year).

Price index = $\frac{Nominal\ GDP}{Real\ GDP}$ x 100

Example:
An economy produces two goods, Potatoes and Cars. Quantities and prices per unit for years 2009 and 2010 are as follows:

	2019		2020	
	Quantity	Price	Quantity	Price
Potatoes	100,000	$1	100,000	1.2
Cars	20	$15,000	24	$16,000

Using the prices of 2019 as a base year prices

Calculate Nominal GDP and Real GDP and Price index in 2020.

NGDP = $\sum$ (P_{2020} * Q_{2020}) = $P_{Potato\ 2020}$ * $Q_{Potato\ 2020}$ + $P_{Car\ 2020}$ * $Q_{Car\ 2020}$

NGDP = (1.2 * 100,000) + (16,000 * 24) = 120,000 + 384,000 = $504,000.

RGDP = $\sum$ (P_{2019} * Q_{2020} = ($P_{Potato\ 2019}$ * $Q_{Potato\ 2020}$ + $P_{Car\ 2019}$ * $Q_{Car\ (2020)}$)

RGDP = (1 * 100,000) + (15,000 * 24) = 100,000 + 360,000 = $460,000

Price index $_{(2020)}$ = $\frac{Nominal\ GDP}{Real\ GDP}$ x 100 = $\frac{504{,}000}{460{,}000}$ *100 = 109.56

GDP growth معدل النمو

GDP growth in year *t* will refer to the rate of change of real GDP in year *t*.

GDP growth rate = $\frac{\text{Real GDP in year } (t) - \text{Real GDP in year } (t-1)}{\text{Real GDP in year } (t-1)}$

Periods of positive GDP growth rate called expansions.

Periods of negative GDP growth rate called recessions.

Example

	2019		2020	
	Quantity	Price	Quantity	Price
Cars	10	$20,000	12	$22,000
Oranges	10,000	$1	10,000	$1

An economy produces two goods: cars, and oranges. Quantities and prices per unit for years 2019 and 2020 are as follows:

Compute GDP growth rate from 2019 to 2020.

$$\text{GDP growth rate} = \frac{\text{Real GDP in year (2011)} - \text{Real GDP in year (2010)}}{\text{Real GDP in year (2010)}}$$

Real GDP $_{(2020)}$ = {(12 x 20,000) + (10,000 x 1)} = 240,000 + 10,000 = 250,000

Real GDP $_{(2019)}$ = {(10 x 20,000) + (10,000 x 1) = 200,000 + 10,000 = 210,000

$$\text{GDP growth rate} = \frac{250{,}000 - 210{,}000}{210{,}000)} \times 100\% = 19.04\%$$

The Inflation Rate: معدل التضخم

Inflation: is a rise in the general level of prices. هو ارتفاع بشكل عام في اسعار السلع

- When inflation occurs, each dollar of income will buy fewer goods and services than before. Inflation reduces the "purchasing power" of money.

عندما يحدث التضخم ، فإن كل دولار من الدخل سيشتري سلعًا وخدمات أقل. يقلل التضخم من "القوة الشرائية" للدخل.

- Inflation does not mean that all prices are rising, some prices may be relatively constant and others may even fall.

Deflation: Is a decline in the general level of prices. (Negative inflation rate)

Measurement of Inflation

Macroeconomists typically look at two measures of the price level, at two price indexes: the GDP deflator and the consumer price index (CPI).

The GDP deflator gives the average price of output (the final goods produced in the economy). But consumers care about the average price of consumption (the goods they consume). The two prices need not be the same.

The set of goods produced in the economy is not the same as the same as the set of goods purchased by consumers, for two reasons:

Some of the goods in GDP are sold not to consumers but to firms (machine tools, for example), to the government, or to foreigners.

And some of the goods bought by consumers are not produced domestically, but rather imported from abroad.

The CPI gives the cost in dollar of a specific list of goods and services over time. The list, which is based on a detailed study of consumer spending, attempts to represent the consumption basket of typical urban consumers.

Like the GDP deflator, the CPI is typically set to 100 in the base year period. *(CPI = 100 in the base year).*

$$\text{Inflation rate} = \frac{\text{Price index in current year} - \text{Price index in base year}}{\text{Price index in base year}} \times 100$$

The CPI and the GDP deflator move together most of the time. In most years, the two inflation rates differ by less than 1%.

Example

An economy produces two goods: cars, and oranges. Quantities and prices per unit for years 2019 and 2020 are as follows: *using 2019 as the base year*

	2019		2020	
	Quantity	Price	Quantity	Price
Cars	10	$20,000	12	$22,000
Oranges	10,000	$1	10,000	$1

Calculate rate of inflation in 2020?

GDP price index (deflator) in (2019) = 100% (base year)

GDP price index (deflator) in (2020) = NGDP / RGDP = {(22,000 x 12) + (1 x 10,000)} / {(20,000 x 12) + (1 x 10,000)} = 109.6

$$\text{Inflation rate} = \frac{\text{PGDP deflator (2011)} - \text{GDP deflator (2010)}}{\text{DP deflator (2010)}} \times 100 = \frac{109.6-100}{100} \times 100\% = 9.6\%$$