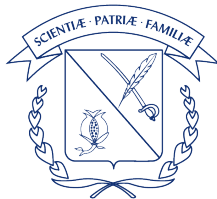


Production and Income I

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FAEDIS

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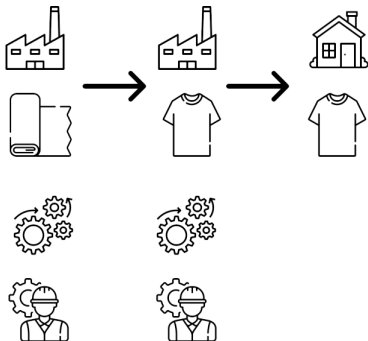
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- Check the message **Welcome greeting** published in the News Bulletin Board.
- Dear student please edit your profile uploading a photo where your face is clearly visible.
- The purpose of the virtual meetings is to answer questions and not to make a summary of the study material.
- If you want to participate, please fill out the following survey: Primer corte 30% > Learning Activities > Tu opinión sobre la economía colombiana
- This presentation is based on (Cardenas 2020, chap. 2)

Understand how production is measured using the concept of Gross Domestic Product (GDP)

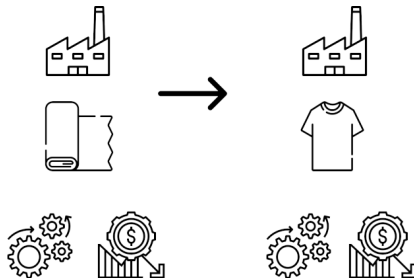
- What is? (Lequiller and Blades 2014, 19)
 - **Product:** means that we are trying to measure production without double counting



- What is? (Lequiller and Blades 2014, 19)
 - **Domestic:** means that the production to be taken into account is the one that is carried within a certain territory clearly delimited



- What is? (Lequiller and Blades 2014, 19)
 - **Gross:** means that depreciation is not deducted (in economy it is called consumption of fixed capital). In other words, the decrease in the value of the assets used in the production process due to physical deterioration, foreseeable wear or accidental damage is not deducted



- How is measure?

- 3 equivalent¹ approaches are used (Lequiller and Blades 2014, 31)
 - **Output/Production approach:** adding the aggregate value of all the production units in a territory, plus taxes minus subsidies on products
 - **Income approach:** adding all the incomes that are perceived because of the contribution to the production process
 - **Expenditure/Final demand approach:** adding all uses that firms, non-profit institutions, government bodies, households and the external sector give to production
- Gross Domestic Product is a flow so it is measured over a period of time. Usually you can find information about this variable in an monthly, quarterly or yearly periodicity
- Initially Gross Domestic Product is expressed in **current** Local Currency Units (LCU)

¹In practice, discrepancies may occur

Table 1: Output/Production approach (Colombia, 2024-Q3)

Concepto	Miles de Millones - COP ^a
Agricultura, ganadería, caza, silvicultura y pesca	40790
Explotación de minas y canteras	19286
Industrias manufactureras	43659
Suministro de electricidad, gas, vapor y aire acondicionado; Distribución de agua; evacuación y tratamiento de aguas residuales, gestión de desechos y actividades de saneamiento ambiental	18873
Construcción	17353
Comercio al por mayor y al por menor; reparación de vehículos automotores y motocicletas; Transporte y almacenamiento; Alojamiento y servicios de comida	80038
Información y comunicaciones	9662
Actividades financieras y de seguros	17786
Actividades inmobiliarias	31874
Actividades profesionales, científicas y técnicas; Actividades de servicios administrativos y de apoyo	27613
Administración pública y defensa; planes de seguridad social de afiliación obligatoria; Educación; Actividades de atención de la salud humana y de servicios sociales	63705
Actividades artísticas, de entretenimiento y recreación y otras actividades de servicios; Actividades de los hogares individuales en calidad de empleadores; actividades no diferenciadas de los hogares individuales como productores de bienes y servicios para uso propio	17103
Valor agregado bruto	387742
Impuestos menos subvenciones sobre los productos	44661
Producto interno bruto	432404

Source: DANE - Cuentas Nacionales Trimestrales - Producto Interno Bruto desde el enfoque de la producción a precios corrientes - Cuadro 1 Datos originales

Last update: 2024-11-18

^a Preliminary data at current prices

Table 2: Income approach (Colombia, 2024-Q3)

Concepto	Miles de Millones - COP ^a
Remuneración de los asalariados	140417
Impuestos menos subvenciones	52566
Excedente Bruto de Explotación	136584
Ingreso Mixto	102837
Producto Interno Bruto	432404

Source: DANE - Cuentas Nacionales Trimestrales - PIB por Ingreso - S1 Total Economía

Last update: 2024-11-18

^a Preliminary data at current prices

Table 3: Expenditure/Final demand approach (Colombia, 2024-Q3)

Concepto	Miles de Millones - COP ^a
Gasto de consumo final individual de los hogares y las ISFLH ^b	321997
Gasto de consumo final del gobierno general	58389
Formación bruta de capital	73987
Exportaciones	69116
Importaciones	91084
Producto Interno Bruto	432404

Source: DANE - Cuentas Nacionales Trimestrales - Producto Interno Bruto desde el enfoque del gasto a precios corrientes - Cuadro 1 Datos originales

Last update: 2024-11-18

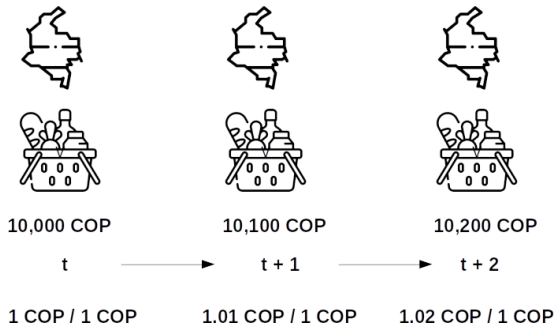
^a Preliminary data at current prices

^b Instituciones sin fines de lucro que sirven a los hogares

- What adjustments are applied?²
 - **Inflation adjustments**
 - GDP is expressed in **constant** Local Currency Units (LCU)
 - **Season and calendar adjustments**
 - In Colombia this is applied to quarterly GDP (**DANE 2018**)
 - **Population adjustments**
 - GDP is expressed in per capita terms
 - **Purchase Power Parity (PPP) adjustment**
 - It is used only to make international comparisons and it is led by the International Comparison Program (ICP)

²For an introduction of the first 3 adjustments check out (**Hyndman and Athanasopoulos 2021, chap. 3**, Section 3.1 Transformations and adjustments)

- An inflation adjustment is necessary because an arbitrary quantity of local currency units don't have the same purchase power in different periods



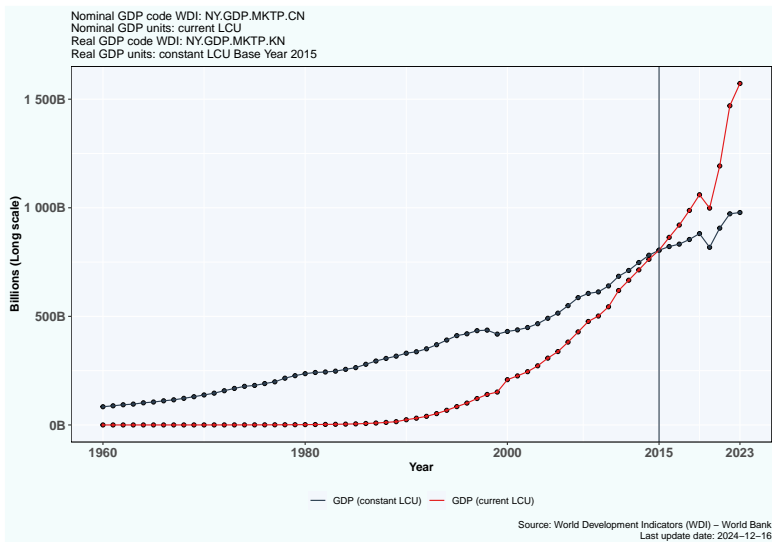
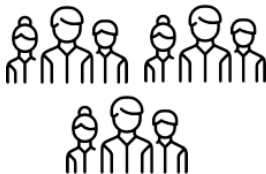
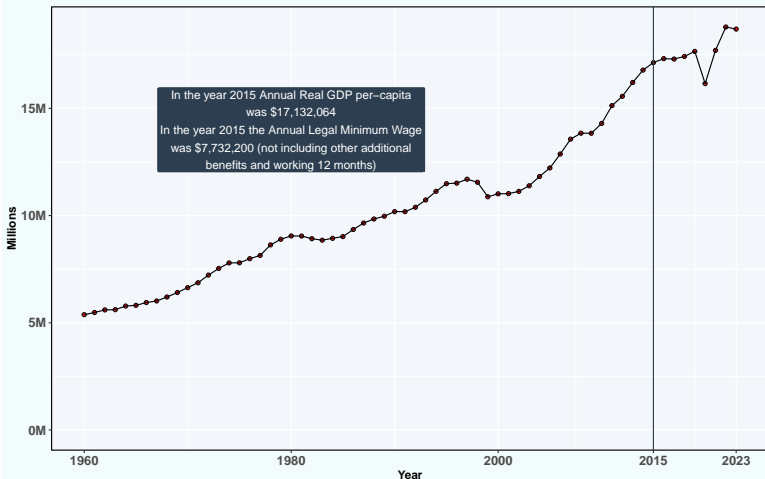


Figure 1: Nominal and real GDP Colombia

- Some countries have more population than others so they can produce more. Therefore it is necessary to express the GDP per inhabitant



Variable code WDI: NY.GDP.PCAP.KN
 Variable units: constant LCU Base Year 2015



Source: World Development Indicators (WDI) – World Bank
 Last update date: 2024-12-16

Figure 2: Real GDP per-capita Colombia

- Purchasing power parity

- The amount of products that 1 local currency unit of an economy can buy in another economy



10 USD



10,000 COP

$$10,000 \text{ COP} / 10 \text{ USD} = 1,000 \text{ COP} / 1 \text{ USD}$$

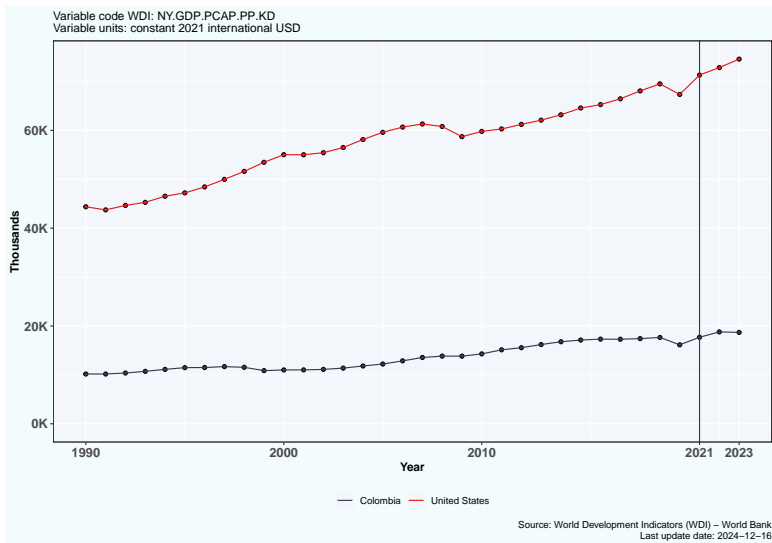


Figure 3: GDP per-capita purchasing power parity for Colombia and USA

- The most common metric used to measure economic growth is the annual percent growth of real GDP per capita.
 - If the periodicity of real GDP per capita is **yearly** and we don't want to make international comparisons the formula is:

$$\frac{\text{GDP per capita constant LCU}_t - \text{GDP per capita constant LCU}_{t-1}}{\text{GDP per capita constant LCU}_{t-1}} \times 100$$

- The most common metric used to measure economic growth is the annual percent growth of real GDP per capita.
 - If the periodicity of real GDP per capita is **quarterly** and we don't want to make international comparisons the formula is:

$$\frac{\text{GDP per capita constant LCU}_t - \text{GDP per capita constant LCU}_{t-4}}{\text{GDP per capita constant LCU}_{t-4}} \times 100$$

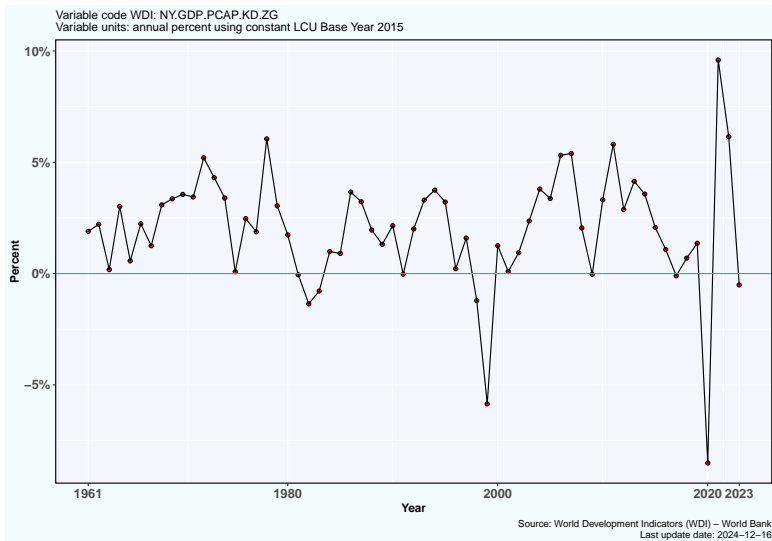


Figure 4: Growth real GDP per-capita Colombia

- To my family that supports me
- To the taxpayers of Colombia and the **UMNG students** who pay my salary
- To the **Business Science** and **R4DS Online Learning** communities where I learn **R** and π -thon
- To the **R Core Team**, the creators of **RStudio IDE**, **Quarto** and the authors and maintainers of the packages **tidyverse**, **readxl**, **knitr**, **kableExtra**, **tidyquant**, **wbstats** and **tinytex** for allowing me to access these tools without paying for a license
- To the **Linux kernel community** for allowing me the possibility to use some **Linux distributions** as my main **OS** without paying for a license

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