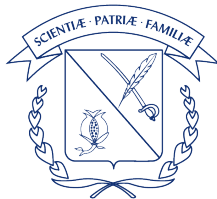


Production and Income II

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Table of contents I

- 1 Please Read Me
- 2 Purpose
- 3 Inflation adjustments in GDP
- 4 Economics sectors and GDP
- 5 Macroeconomic identity
- 6 Resource of interest
- 7 Acknowledgments

- 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)

- Initially the Gross Domestic Product is expressed in current Local Currency Units (LCU) which is the sum of monetary values
- A particular monetary value is the product of a quantity and a unit price
- A change in the level of Gross Domestic Product, measure in current LCU, is a combination of changes in quantities and prices
 - Inflation adjustments, applied to GDP, **try** to eliminate the changes of prices
 - There are 2 approaches to make inflation adjustments (**ABS 2003**):
 - **Constant price estimates**
 - **Chain volume measures**

- **Chain volume measures** is the alternative used by the Departamento Administrativo Nacional de Estadística (DANE) to make inflation adjustments
 - A gentle introduction to this approach is explained in ([ABS 2003](#))
 - The monetary values adjusted using **chain volume measures** are not additive. This means that the sum of the components of an aggregate is not necessarily equal to the aggregate
 - In addition to the values adjusted using **chain volume measures**, DANE reports a value known as statistical discrepancy because of non additivity

Table 1: Expenditure/Final demand approach using chain volume measures and expressed in thousands of millions (Colombia)

Concepto	2015	2022 ^a	2023 ^b
Gasto de consumo final individual de los hogares y las ISFLH ^c	551013	740299	746541
Gasto de consumo final individual de los hogares	547843	736931	NA
Gasto de consumo final de las ISFLH ^c	3170	3404	NA
Gasto de consumo final del gobierno general	119188	156237	158758
Formación bruta de capital	191305	198273	147015
Exportaciones	125936	133496	138021
Importaciones	182750	253174	215163
Producto interno bruto	804692	972298	978233
Discrepancia estadística	0	-3207	2786

Source: DANE - Cuentas Nacionales Anuales - Producto Interno Bruto (PIB) - Series encadenadas de volumen con año de referencia 2015

Last update: 2024-06-28

^a Provisional data

^b Preliminary data

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

Table 2: Expenditure/Final demand approach using current prices and expressed in thousands of millions (Colombia)

Concepto	2015	2022 ^a	2023 ^b
Gasto de consumo final individual de los hogares y las ISFLSH ^c	551013	1085690	1202350
Gasto de consumo final individual de los hogares	547843	1080441	1196277
Gasto de consumo final de las ISFLH ^c	3170	5249	6073
Gasto de consumo final del gobierno general	119188	205744	231997
Formación bruta de capital	191305	290196	213891
Exportaciones	125936	297374	280484
Importaciones	182750	409213	356264
Producto interno bruto	804692	1469791	1572458

Source: DANE - Cuentas Nacionales Anuales - Producto Interno Bruto (PIB) - Precios corrientes

Last update: 2024-06-28

^a Provisional data

^b Preliminary data

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

Table 3: ISIC adapted for Colombia (DANE 2022, 134–677)

Section Division Description		
A	01-03	Agricultura, ganadería, caza, silvicultura y pesca
B	05-09	Explotación de minas y canteras
C	10-33	Industrias manufactureras
D	35	Suministro de electricidad, gas, vapor, y aire acondicionado
E	36-39	Distribución de agua; evacuación y tratamiento de aguas residuales, gestión de desechos y actividades de saneamiento ambiental
F	41-43	Construcción
G	45-47	Comercio al por mayor y al por menor; reparación de vehículos automotores y motocicletas
H	49-53	Transporte y almacenamiento
I	55-56	Alojamiento y servicios de comida
J	58-63	Información y comunicaciones
K	64-66	Actividades financieras y de seguros

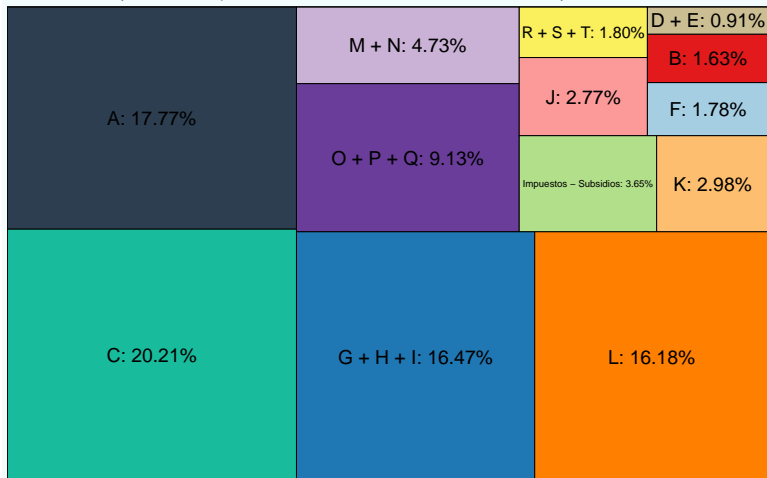
Table 4: ISIC adapted for Colombia (DANE 2022, 134–677)

Section	Division	Description
L	68	Actividades inmobiliarias
M	69-75	Actividades profesionales, científicas y técnicas
N	77-82	Actividades de servicios administrativos y de apoyo
O	84	Administración pública y defensa; planes de seguridad social de afiliación obligatoria
P	85	Educación
Q	86-88	Actividades de atención de la salud humana y de asistencia social
R	90-93	Actividades artísticas, de entretenimiento y recreación
S	94-96	Otras actividades de servicios
T	97-98	Actividades de los hogares en calidad de empleadores; actividades no diferenciadas de los hogares individuales como productores de bienes y servicios para uso propio
U	99	Actividades de organizaciones y entidades extraterritoriales ^a

^a Because of extraterritoriality, in the context of international law, the production units that belong to this category are not part of the domestic territory

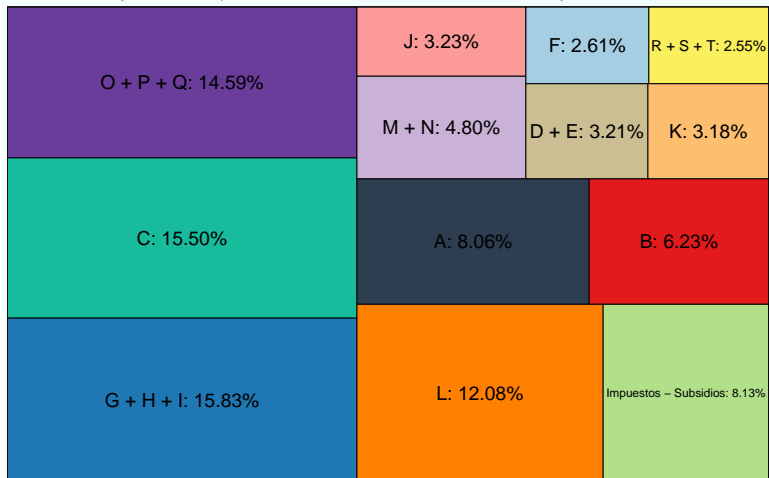
Period: 1975

Observation: Monetary values at current prices are used because of chain volume measures non-additivity

Source: DANE - Cuentas Nacionales Anuales - Retropolación Base 2015 - PIB enfoque de la producción y del gasto a precios corrientes
Update: 2021-02-15**Figure 1:** Sectors and share in GDP for Colombia

Period: 2000

Observation: Monetary values at current prices are used because of chain volume measures non-additivity



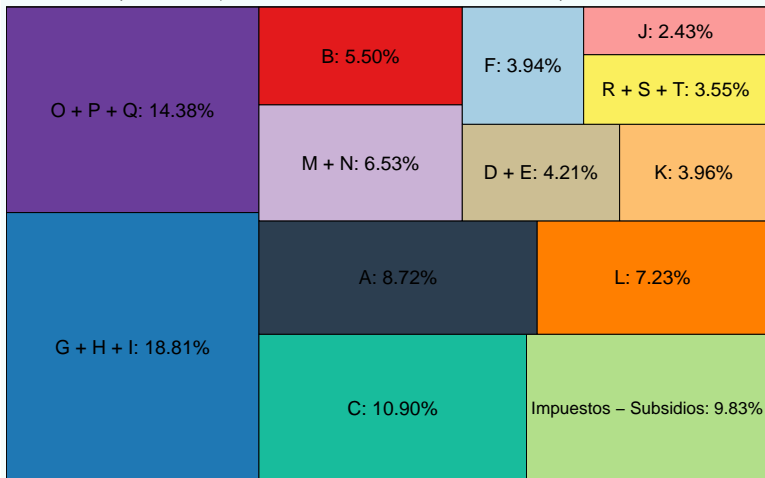
Source: DANE – Cuentas Nacionales Anuales – Retropolación Base 2015 – PIB enfoque de la producción y del gasto a precios corrientes

Update: 2021-02-15

Figure 2: Sectors and share in GDP for Colombia

Period: 2023

Observation: Monetary values at current prices are used because of chain volume measures non-additivity



Source: DANE – Cuentas Nacionales Anuales – Retropolación Base 2015 – PIB enfoque de la producción y del gasto a precios corrientes

Update: 2024-06-28

Figure 3: Sectors and share in GDP for Colombia

- Uses that firms, non-profit institutions, government bodies, households and the external sector give to production

$$\begin{aligned}
 \text{Demand}_t &= \text{Gasto de consumo final individual de los hogares y las ISFLH}_t + \\
 &\quad \text{Gasto de consumo final del gobierno general}_t + \\
 &\quad \text{Formación bruta de capital}_t + \\
 &\quad \text{Exportaciones}_t \\
 &= C_t + G_t + I_t + X_t
 \end{aligned}$$

- Aggregate value generated by the production units in a territory, plus taxes minus subsidies on products, plus products produced outside the territory offered to the territory

$$\begin{aligned}
 \text{Supply}_t &= \text{Valor agregado bruto}_t + \\
 &\quad \text{Impuestos menos subvenciones sobre los productos}_t + \\
 &\quad \text{Importaciones}_t \\
 &= \text{Producto interno bruto}_t + \\
 &\quad \text{Importaciones}_t \\
 &= GDP_t + M_t
 \end{aligned}$$

$$\mathbf{Supply}_t = \mathbf{Demand}_t$$

$$GDP_t + M_t = C_t + G_t + I_t + X_t$$

$$GDP_t = (C_t + G_t + I_t) + (X_t - M_t)$$

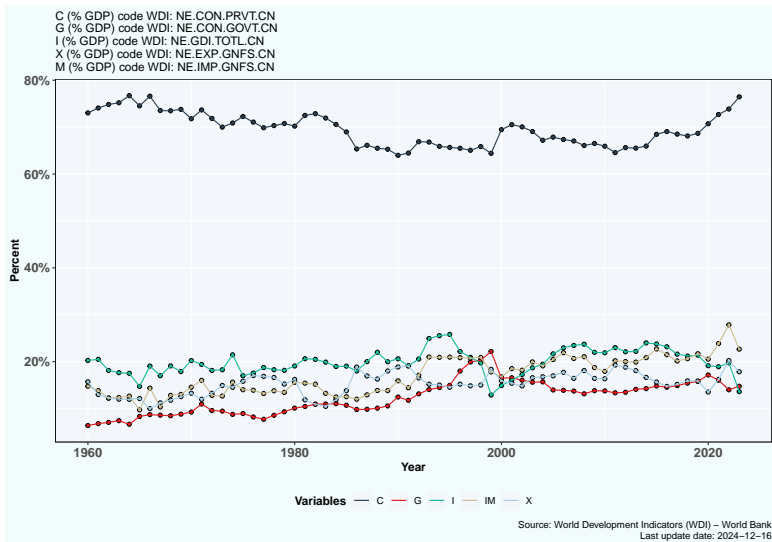


Figure 4: Share of GDP components in Colombia

If you want a summary about the topic of Gross Domestic Product check out¹:

- <https://youtu.be/YXTjJSGWnsE>

¹Banco de la República de Colombia - Cátedras de Macroeconomía y Banca Central

- 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**, **janitor**, **treemapify**, **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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