The goods market

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Contents

Please Read Me

- 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.
- This presentation is based on (Blanchard and Johnson 2017, Chapter 3)

Purpose

Examine the equilibrium of the goods market and the determination of production.

The macroeconomic identity

- GDP refers to the final products that are produced within a territory. However, a key element to include are imports to examine the commercial relations with the rest of the world.
- GDP can be expressed as: $GDP_s^f(t) = C_s^f(t) + G_s^f(t) + I_s^f(t) + X_s^f(t)$
  - Where s refers to a certain territory, t a period of time and f are the monetary units in which the nominal GDP is measured. Also:
    - $GDP_s^f(t)$ is the final production of products produced **within** s.
    - $C_s^f(t)$ is the final consumption expenditure by households and the NPISHs[1] of products produced **within** s.
    - $G_s^f(t)$ is the final consumption expenditure by the government of products produced **within** s.
    - $I_s^f(t)$ is the investment[2] made with products produced **within** s.
    - $X_s^f(t)$ is the use of products by economic units **outside** s but produced **within** s, that is, exports.

[1] Non-profit institutions serving households

[2] Known as **gross capital formation** in the lingo of national accounts system

Imports

- It is important to keep in mind that imports refer to final products produced **outside** the territory s but used **within** the territory s. Imports can be used to consume or invest. In that sense:
$IM_s^f(t) = C_{rw}^f(t) + I_{rw}^f(t) + G_{rw}^f(t)$
  - Where:
    - $IM_s^f(t)$ are the imports of the territory s.
    - $C_{rw}^f(t)$ is the final consumption expenditure by households and the NPISHs of the territory s of products produced in the rest of the world, rw.
    - $I_{rw}^f(t)$ is the investment made with products produced in the rest of the world, rw.
    - $G_{rw}^f(t)$ is the final consumption expenditure by the government of products produced in the rest of the world, rw.

Imports

- To include imports, we can add and subtract them as follows:
  $GDP_s^f(t) =$
  $[C_s^f(t) + C_{rw}^f(t)] + [G_s^f(t) + G_{rw}^f(t)] + [I_s^f(t) + I_{rw}^f(t)] + X_s^f(t) - IM_s^f(t)$
- In that way we can group the following variables:
  - $C^f(t) \equiv C_s^f(t) + C_{rw}^f(t)$ is the total final consumption expenditure by households and the NPISHs in s.
  - $I^f(t) \equiv I_s^f(t) + I_{rw}^f(t)$ is the total investment in s.
  - $G^f(t) \equiv G_s^f(t) + G_{rw}^f(t)$ is the total final consumption expenditure by the government in s.
- In that way $GDP_s^f(t) \equiv C_s^f(t) + I_s^f(t) + G_s^f(t) + X_s^f(t) - IM_s^f(t)$
- If the subscripts and superscripts are removed to facilitate the notation, we have the expression that are usually found in the economics textbooks: $GDP(t) \equiv C(t) + I(t) + G(t) + X(t) - IM(t)$

Imports

- What happens if a car is imported and a household acquires it within the territory?
  - The value of the car is subtracted from $IM(t)$ but it is added to $C(t)$.
- What happens if a machine is imported and a company acquires it within the territory to produce other products?
  - The value of the machine is subtracted from IM(t) but added to the I(t).
- What happens if a product is imported and the government acquires it to provide a service to citizens within the territory?
  - The value of the product is subtracted from IM(t) but added to G(t).

Domestic production plus imports and aggregate demand

$$GDP(t) \equiv C(t) + I(t) + G(t) + X(t) - IM(t)$$

$$\underbrace{GDP(t)}_{\text{Domestic production}} + \underbrace{IM(t)}_{\text{Imports}} \equiv \underbrace{C(t) + I(t) + G(t)}_{\text{Domestic aggregate demand}} + \underbrace{X(t)}_{\text{Exports}}$$

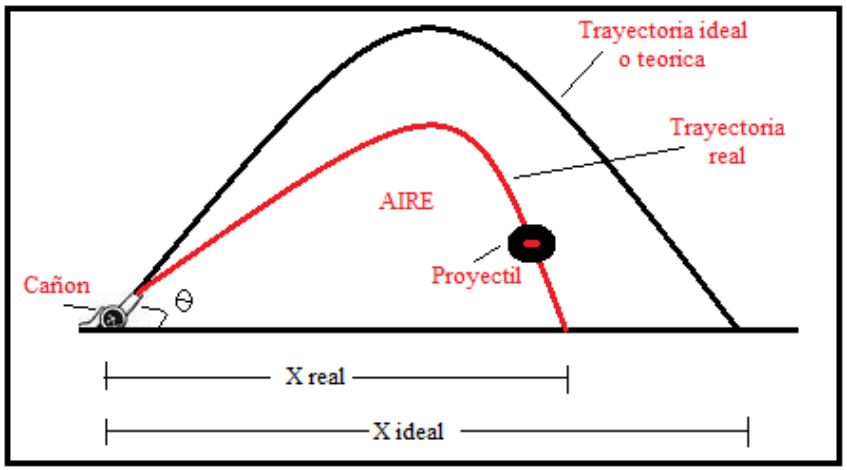
$$\underbrace{GDP(t) + IM(t)}_{\text{Aggregate supply}} \equiv \underbrace{C(t) + I(t) + G(t) + X(t)}_{\text{Aggregate demand}}$$

Types of equations in the models

- **Identities**: it's a relationship that is true by definition.
  - Accounting equation: $Assets \equiv Liabilities + Equity$
  - Accounting of GDP as the value of final products: $GDP(t) \equiv C(t) + I(t) + G(t) + X(t) - IM(t)$
  - Definition of tangent function in trigonometry: $tan\ \theta \equiv \frac{sin\ \theta}{cos\ \theta}$

Types of equations in the models

- **Behavioral equations**: represents a hypothesis about how a variable is determined.
  - How does consumption behave? In economics, an **ideal** consumption function is assumed that explains how this variable is determined: $C(t) = c_0 + c_1 Y_D(t)\ c_0 > 0\ 0 < c_1 < 1$
  - What is the maximum distance a projectile travels from the ground? In physics, an **ideal** projectile motion function is assumed that explains how this variable is determined: $X_{ideal}^{max} = \frac{v_0^2 sin(2\theta)}{g}$ (Mattos 2014)



Types of equations in the models

- **Equilibrium conditions**: establishes a requirement that should be met.
  - What condition must be met in a market so that resources are optimally allocated? The quantity demanded should tend to be equal to the quantity supplied **or there will be a surplus or shortage**.
  - What condition must be met in a supermarket when people line up with their cart to pay? The length of the rows should tend to be the same **or people will change lines**.
    - **Disequilibrium** (left) and **equilibrium** (right) situations:

Goods market model

- The models that will be seen can be expressed in three ways: algebraically, graphically and explained with words.
- **Algebraically**
  - Aggregate demand (identity) assuming no commercial relations with the rest of the world and that investment doesn't vary: $Z(t) \equiv C(t) + \bar{I} + G(t)$.
  - Aggregate supply as the added value of production: $Y(t)$.
  - Consumption (behavioral equation): $C(t) = c_0 + c_1 Y_D(t)$.
  - Disposabel income (identity): $Y_D(t) \equiv Y_R(t) - T(t)$.
    - Where $T(t)$ includes taxes paid minus transfers from the state that consumers receive.
    - By definition aggregate value is equivalent to the sum of the different incomes in a territory (identity) $Y(t) \equiv Y_R(t)$. Therefore $Y_D(t) = Y(t) - T(t)$.

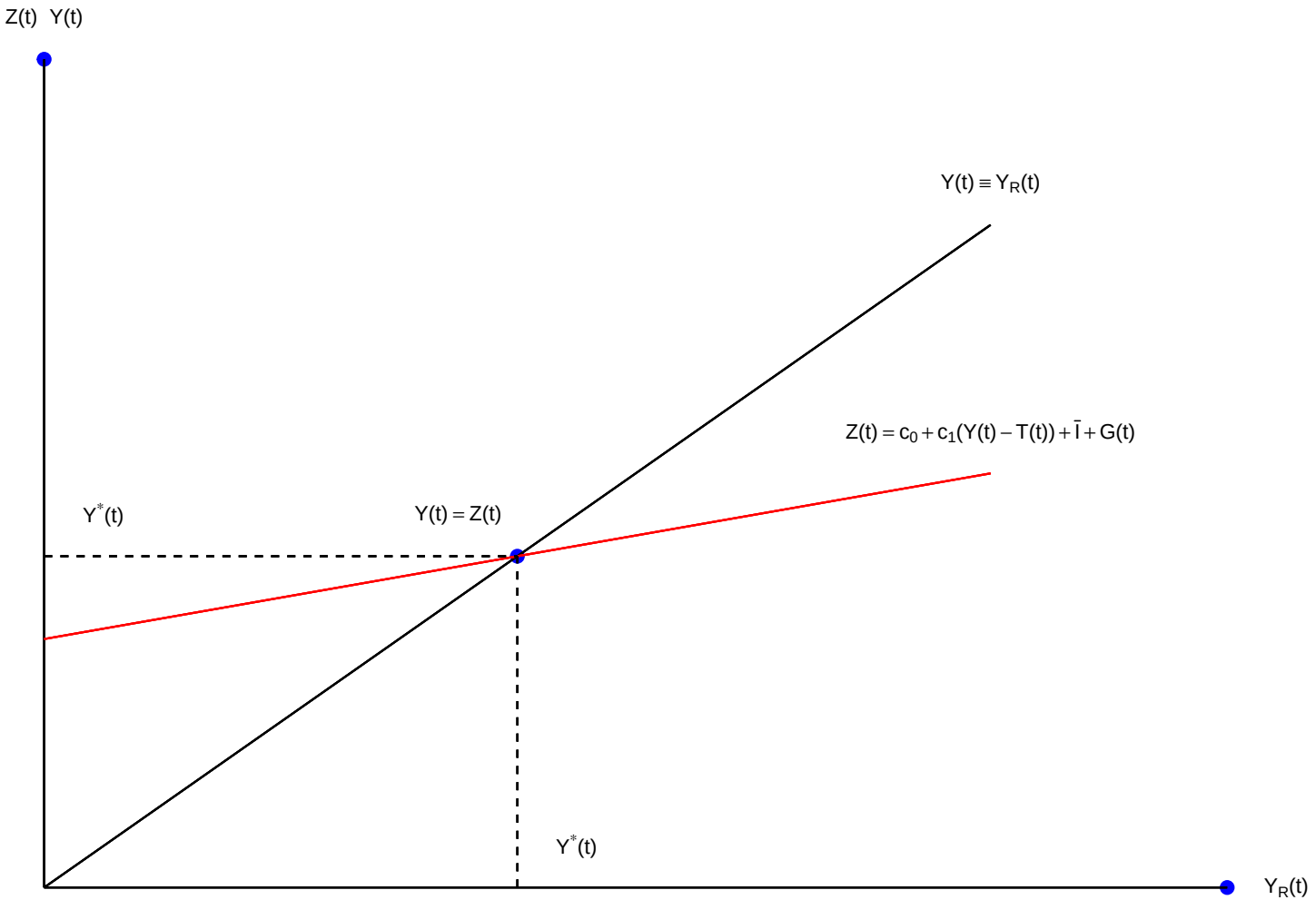
Goods market model

- **Algebraically**
  - Equilibrium condition:

$$
\begin{aligned}
Y(t) &= Z(t) \\
Y(t) &= C(t) + \bar{I} + G(t) \\
Y(t) &= c_0 + c_1 Y_D(t) + \bar{I} + G(t) \\
Y(t) &= c_0 + c_1 (Y(t) - T(t)) + \bar{I} + G(t) \\
Y^*(t) &= \frac{1}{1 - c_1} (c_0 + \bar{I} + G(t) - c_1 T(t)
\end{aligned}
$$

Goods market model

- **Graphically**



Goods market model

- Using **words**
  - **Equilibrium condition**:
    - If $Y(t) > Z(t)$ then companies accumulate inventories by not selling everything they produce. Therefore they restrict production until they sell their inventories.
    - If $Y(t) < Z(t)$ households or NPISHs seek to consume more, companies want to invest more and government want to spend more. However, production is not enough, so a shortage is generated and the prices of final products rise. As prices rise there are incentives to produce more.
  - **Consumption function**: $C(t) = c_0 + c_1(Y(t) - T(t))$
    - If $c_0 > 0$ it means that if the disposable income is equal to zero, consumers can: dissave selling for example assets or using money accumulated in previous periods or borrowing.
    - If $0 < c_1 < 1$ it means that if the disposable income increases, consumers do not consume or save the entire increase.

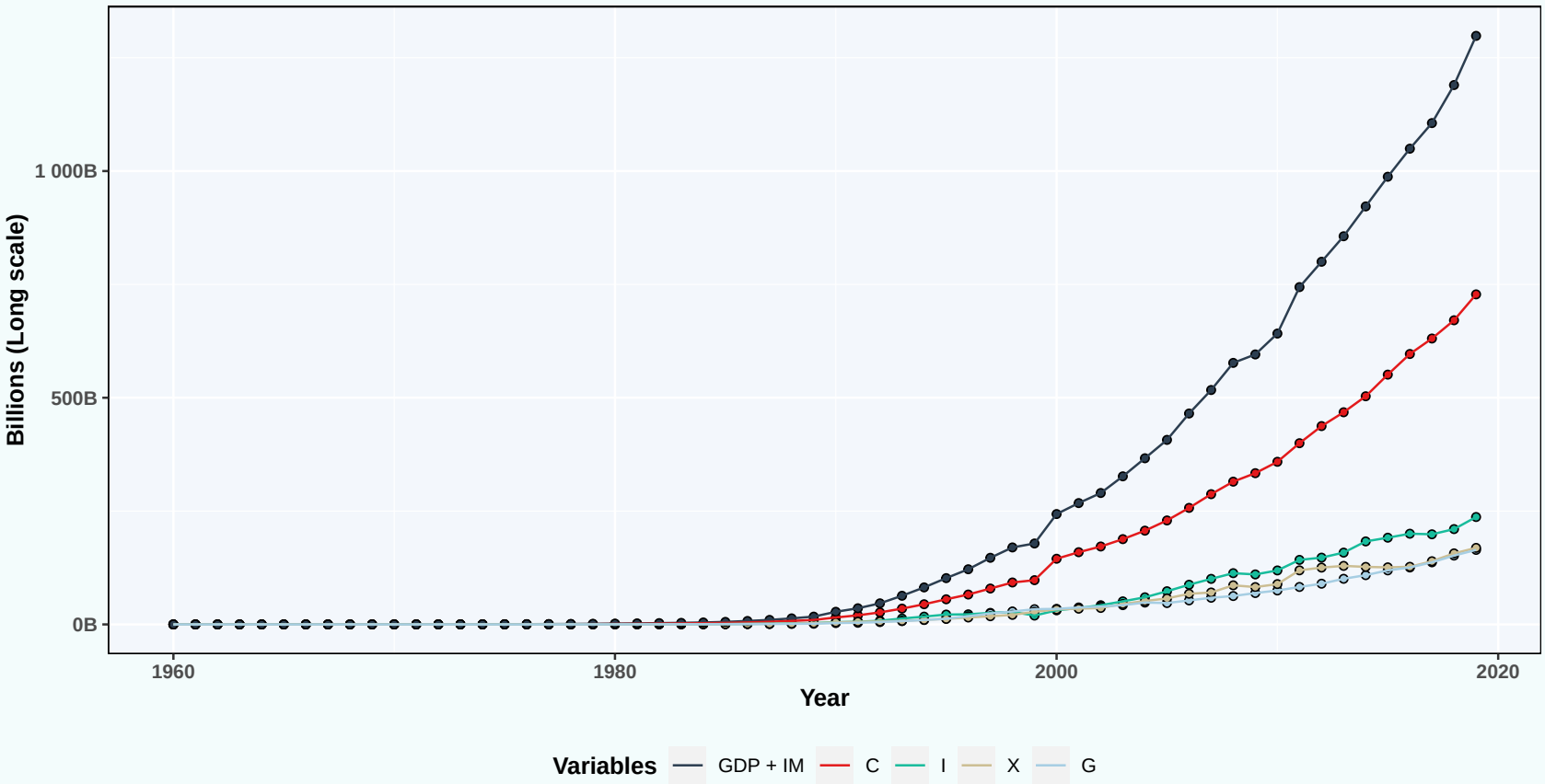
Goods market model

- Using **words**
  - **Equilibrium production**: $Y^*(t) = \frac{1}{1-c_1}(c_0 + \bar{I} + G(t) - c_1 T(t))$
    - If public spending increases, $G(t)$, the equilibrium production, $Y^*(t)$, increases more than the increase in spending but only in t.
    - Public spending cannot increase indefinitely and if it does then in later periods taxes will raise. That is to say, $T(t)$ will have to increase.
    - This effect occurs because $\frac{1}{1-c_1} > 1$. Therefore, the government can boost the economy but only in t and not indefinitely. How much? It will depend on c_1.
    - Let's assume that $c_1 = 0.6$, that is, for every 100 monetary units that disposable income increases, consumption increases by 60 monetary units. Therefore $\frac{1}{1-c_1} = 1.5$, so for every 100 monetary units that public spending increases equilibrium production increases 150 monetary units. It is an excellent situation but only in t since this cannot be done indefinitely.

Components of aggregate demand in Colombia

Colombia nominal aggregate demand and its components

GDP code WDI: NY.GDP.MKTP.CN
IM code WDI: NE.IMP.GNFS.CN
C code WDI: NE.CON.PRVT.CN
I code WDI: NE.GDI.TOTL.CN
G code WDI: NE.CON.GOVT.CN
X code WDI: NE.EXP.GNFS.CN
Variables units: current LCU



Source: World Development Indicators (WDI) − World Bank
Last update date: 2020−08−18

Taxes in Colombia

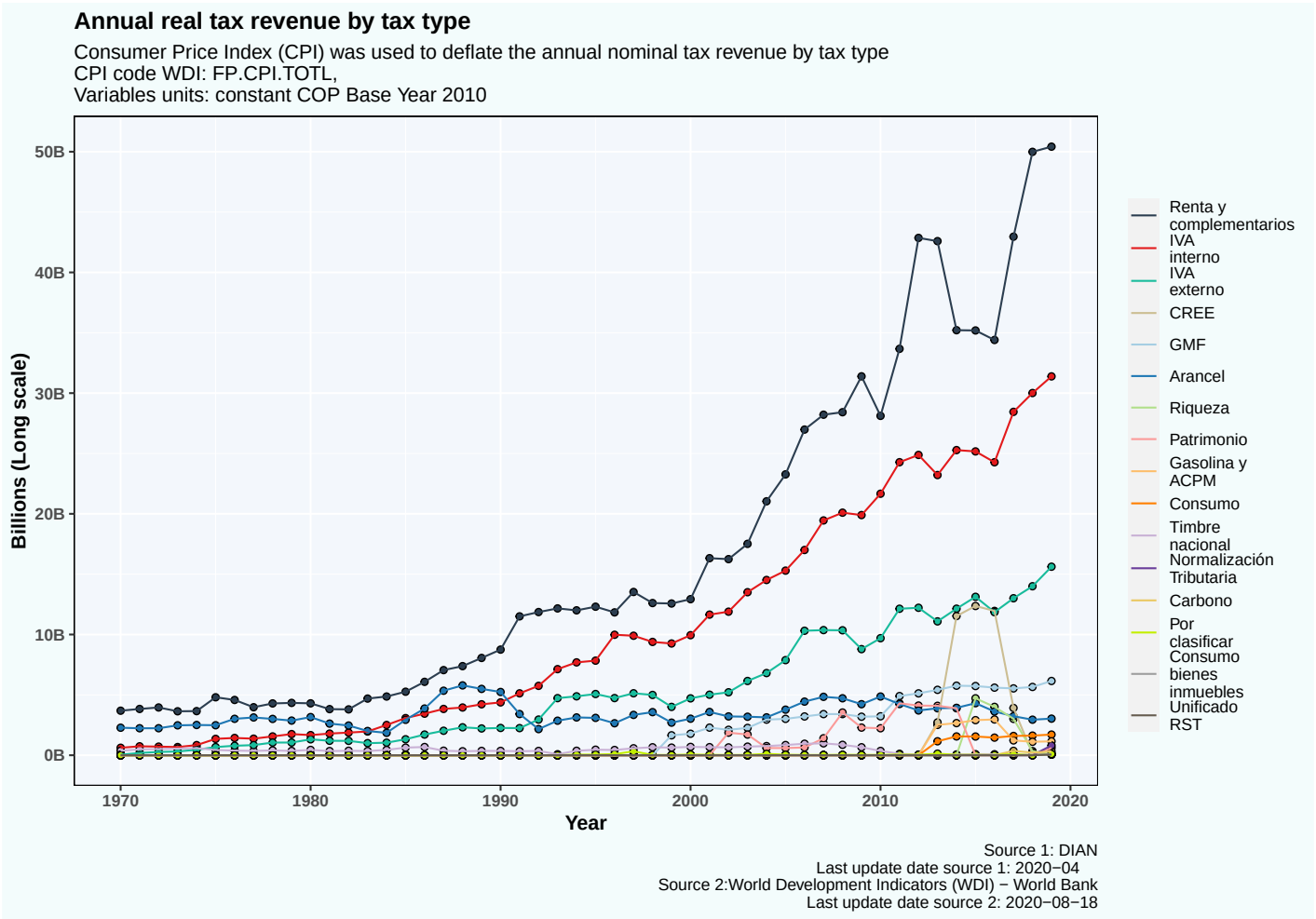
- In the model taxes are part but not equal to $T(t)$ because $T(t)$ includes taxes paid minus transfers from the state that consumers receive.
- In economics, taxes are understood as compulsory payments made by individuals to finance the activities that the government has decided to carry out, regardless of whether the compulsory payment has a specific destination or whether or not it is proportional to the goods or services received. (Observatorio Fiscal Pontificia Universidad Javeriana 2018).
- In Colombian tax law, taxes are divides in 3 categories: "impuestos", "tasas" and "contribuciones". In economics we don't make this distinction where we refer simply to the concept of tax (tributo in spanish).

Taxes in Colombia

- What are the main taxes paid in Colombia? (Observatorio Fiscal Pontificia Universidad Javeriana 2018)
  - **National taxes**: Carbono, Gasolina y ACPM, Consumo, IVA, GMF (4x1000), Renta Personas, Renta Empresas, Timbre nacional, Aranceles
  - **Local taxes**: ICA, Predial, Alcohol, cigarrillos y loterías, Sobretasa a la gasolina, Registro, Vehículos

Taxes in Colombia

- Annual tax revenue by tax type administered by DIAN (1970-2019) (DIAN 2020)



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