Economic Growth II

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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. 3)

Analyze the determinants of economic growth

Gross domestic product is obtained by using the following inputs:

- Labor
  - Quantity of labor:
    - Employment[1]
    - Hours worked
  - Quality of Labor:
    - Employment by educational attainment
    - Compensation by educational attainment

[1] Includes individuals employed aged 15 years or over where this age range is necessary for international comparisons.

Gross domestic product is obtained by using the following inputs[2]:

- Produced non-financial fixed assets[3]
  - Dwellings
  - Other buildings and structures
    - Buildings other than dwellings
    - Other structures
    - Land improvements
  - Machinery and equipment
    - Transport equipment
    - Information and Computer Technology (ICT) equipment
    - Other machinery and equipment
  - Weapons systems
  - Cultivated biological resources

[2]These categories are taken from (United Nations et al. 2009, 555)

[3]Other non-financial assets can be included but these are the ones that are usually measured. For more information check out (OECD 2009) and (OECD 2001)

Other factors that affect the Gross Domestic Product different from labor and produced non-financial fixed assets

- These factors are not directly observable but are used in growth accounting to calculate **Total Factor Productivity/Multifactor productivity** as an approximation to technological change
    - Technological change is defined as changes in the Gross Domestic Product that are not due to changes in inputs

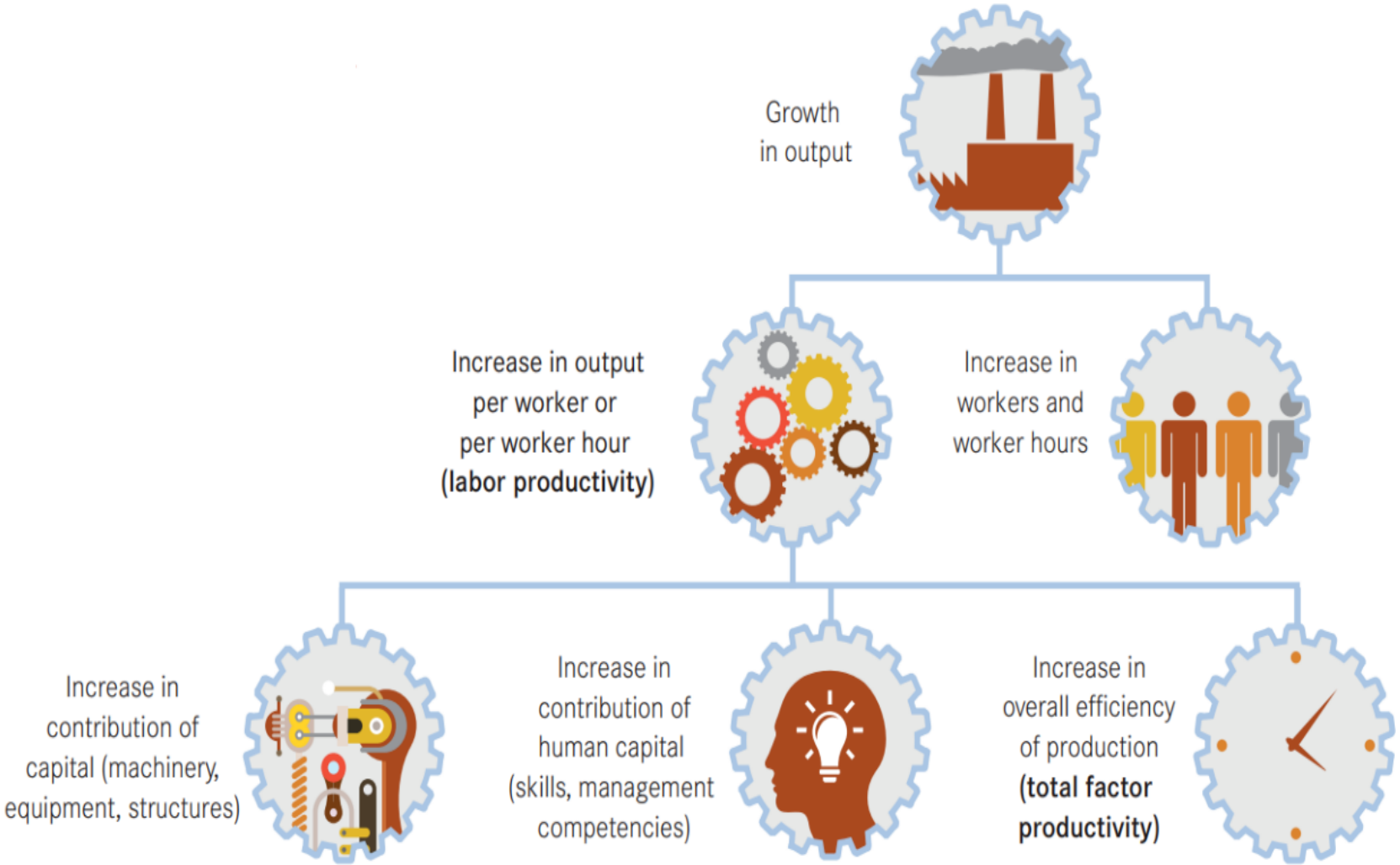

Figure 1: Labor productivity and total factor productivity (Vries and Azeez Erumban 2022, 21, fig 6)

Table 1: Growth accounting applied to Colombia for selected years

Measure	1990	2010	2020	2024
Growth in real GDP	4.08	4.40	-7.53	2.00
Contribution of Labor Quantity to real GDP growth	1.43	1.94	-13.53	0.66
Contribution of Labor Quality to real GDP growth	0.80	1.08	1.97	0.24
Contribution of Total Capital Services to real GDP growth	1.23	2.49	0.83	1.78
Growth of Total Factor Productivity	0.63	-1.12	3.20	-0.69

Source: Total Economy Database - Growth Accounting and Total Factor Productivity
Last update: 2024

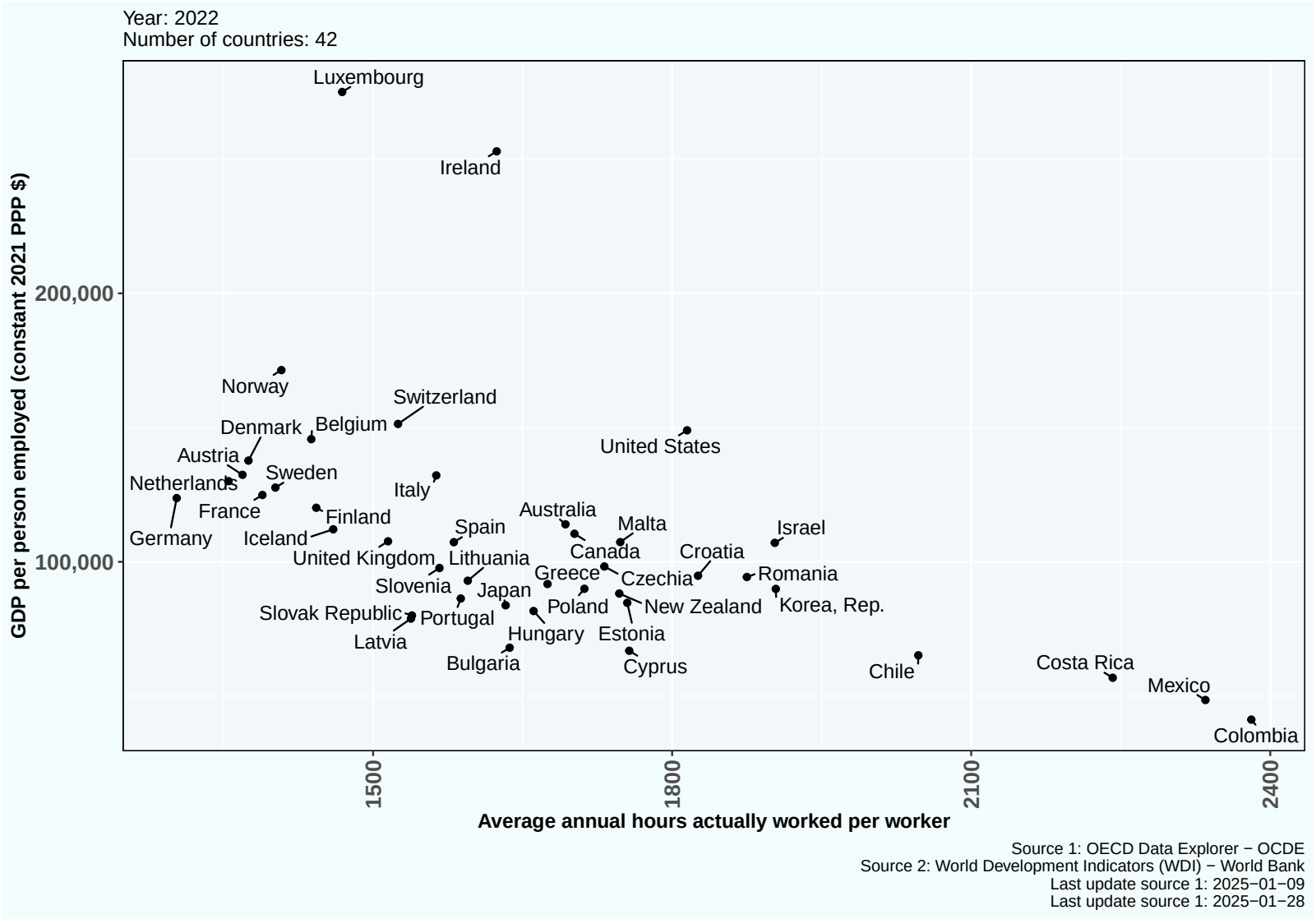

Figure 2: Mean income vs hours worked by employees

- Proximate determinants
  - Increase in workers and worked hours
  - Increase in produced non-financial fixed assets
  - Increase in educational attainment, experience and skills (lifelong learning)
  - Increase in overall efficiency of production (total factor productivity)

- Fundamental determinants
  - Better institutions (Cardenas 2020, chap. 4)
  - Integration into the global economy (Cardenas 2020, chap. 5)
  - Geographical conditions

- 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**, **knitr**, **janitor**, **kableExtra**, **wbstats**, **ggrepel** 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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