

Socioeconomic burden of main diseases in eight Latin American countries

The case of Brazil

Prepared to FIFARMA

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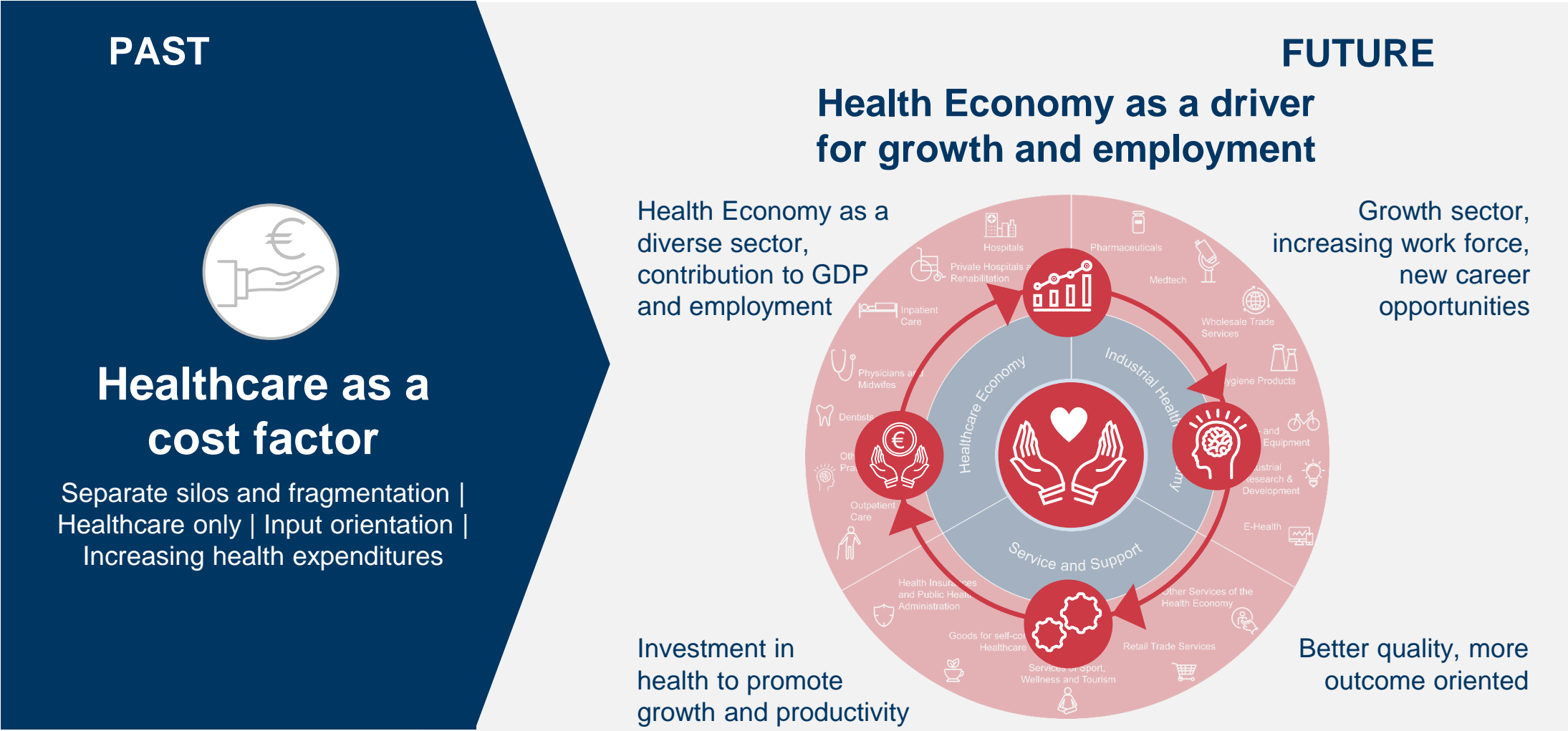
Snapshot of findings

Agenda

1

New perspectives on health investments

WifOR is fostering a paradigm shift in healthcare – From a cost factor to a driver for growth, wealth, innovation, and better health



If We Can't Measure It, We Can't Fix It

Creating common metrics to assess health investments, measure their impact on economic growth and societal well-being, and ensure health and financial system resilience



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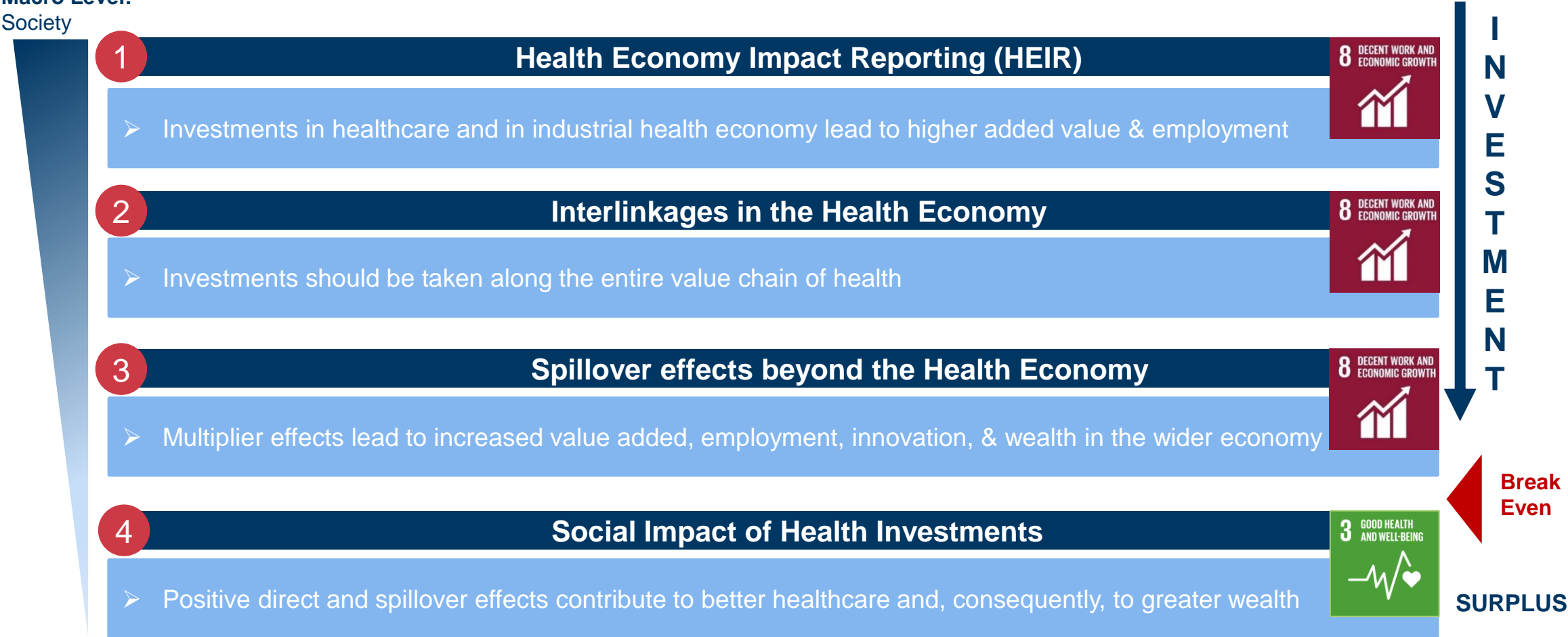


Hatice Küçük
The G20 Health and Development Partnership



4-step value framework – addressing rising global disease burden and ROI of sustainable investment for healthy societies and economies

Macro Level:
Society



Micro Level:
Individuals

Source: WifOR illustration. Ostwald, D.A., Hofmann, S., Alexandrakis, E., Atun, R.A., Lucard, A., Donnelly, A., Küçük, H. (2021): If We Can't Measure It, We Can't Fix It.

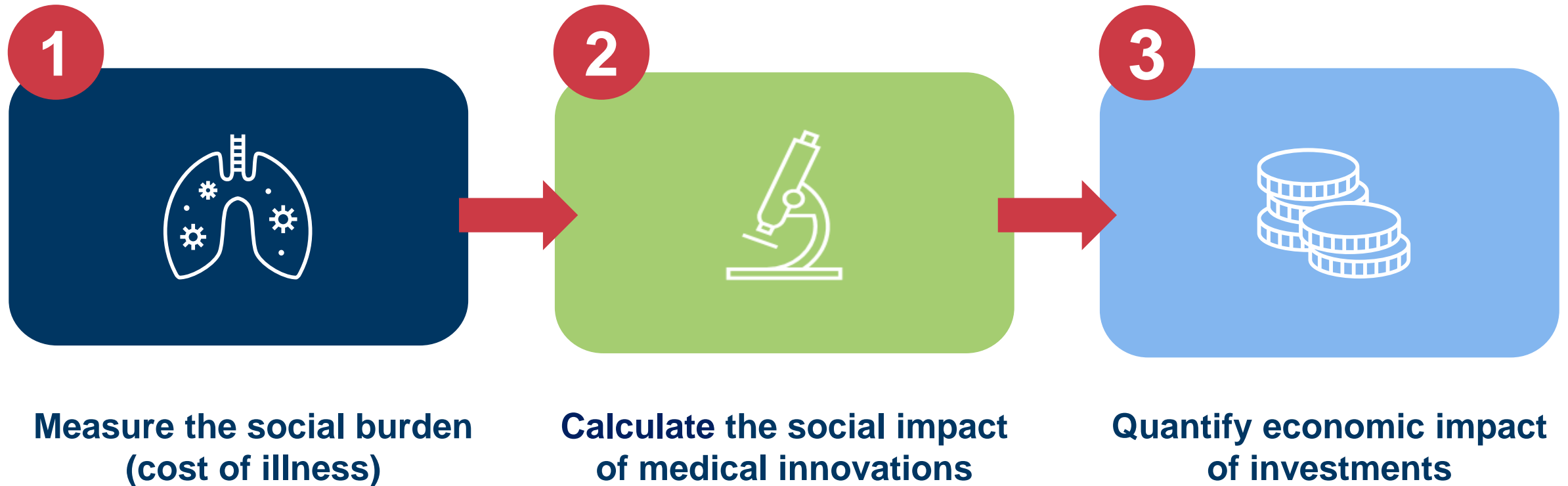


The last Fifarma studie has shown the economic impact of the Health Economy in Latin America

								
	Mexico	Colombia	Argentina	Brazil	Chile	Peru	Global ¹	Germany ²
Share of health expenditures in GDP in 2020 ³	6.2 %	7.7 %	9.5 %	9.6 %	9.4 %	5.2 %	9.8 %	12.5 %
Share of Health Economy in GDP in 2020	5.3 %	7.7 %	9.1 %	9.7 %	7.1 %	5.8 %	7.5 %	12.1 %
Labor force share in overall economy in 2020	5.5 %	9.5 %	8.8 %	7.0 %	9.4 %	5.5 %	5.6 %	16.5 %

Source: WifOR calculations. WHO (2021): Global Health Expenditure Database (accessed on 21.12.2021); Health Economy: Mexico, Colombia, Global, Brazil, Germany, Argentina: 2020; ¹Initial WifOR estimation, ²Methodological deviation due to more detailed data. ³Colombia, Argentina, Brazil and Peru 2019

Return on Investment (ROI) – Health metrics should be established and integrated into e.g., the EU Semester

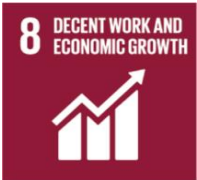


Embedding Social Impact into the SDGs – Health investments create a positive feedback loop



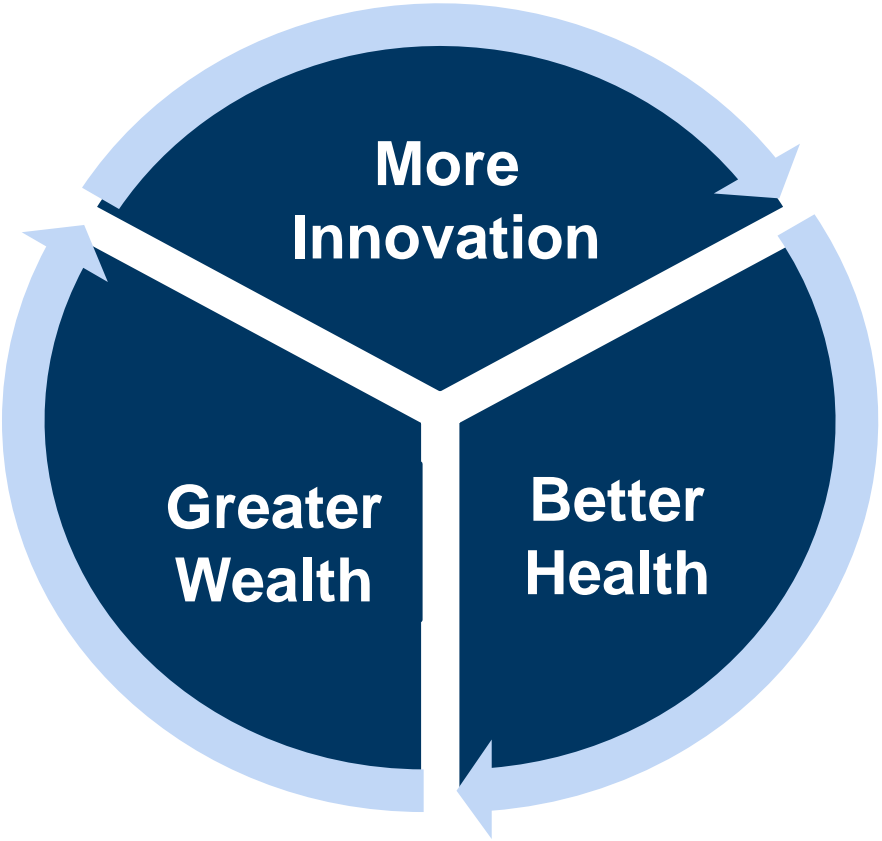
SDG GOAL 9

Build resilient infrastructure, promote sustainable industrialization and foster innovation



SDG GOAL 8

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all



SDG GOAL 3

Ensure healthy lives and promote well-being for all at all ages

2

Why addressing socioeconomic burden matters?



What we understood by socioeconomic burden?

- Socioeconomic burden (SoC) is understood as the decrease in human capital related to the losses in productivity derived from morbidity and mortality.

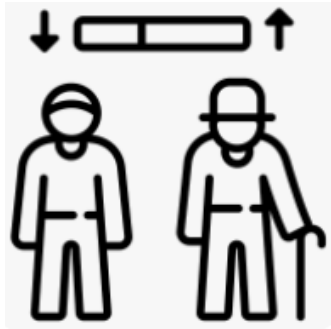
SoC burden is the extent to which a disease deteriorates individuals' capacity to use their capital, which is translated into a decrease in labor supply

- Decrease in labor supply weakens economic growth.



Why is understanding the SoC burden key for Latin American countries?

Effects of today's SoC burden on the future



- **Productivity losses slow down economic growth, even to stagnation.**
 - **Skills shortages** hinder production and innovation.
 - Decrease in labor supply reduce economic output, particularly impactful when the disease affects **the working-age population**.
 - Population aging **affects fiscal sustainability** by putting pressure on public pension and health care systems.
 - Governments should **prioritize policies to promote the future stability of the labor force**.

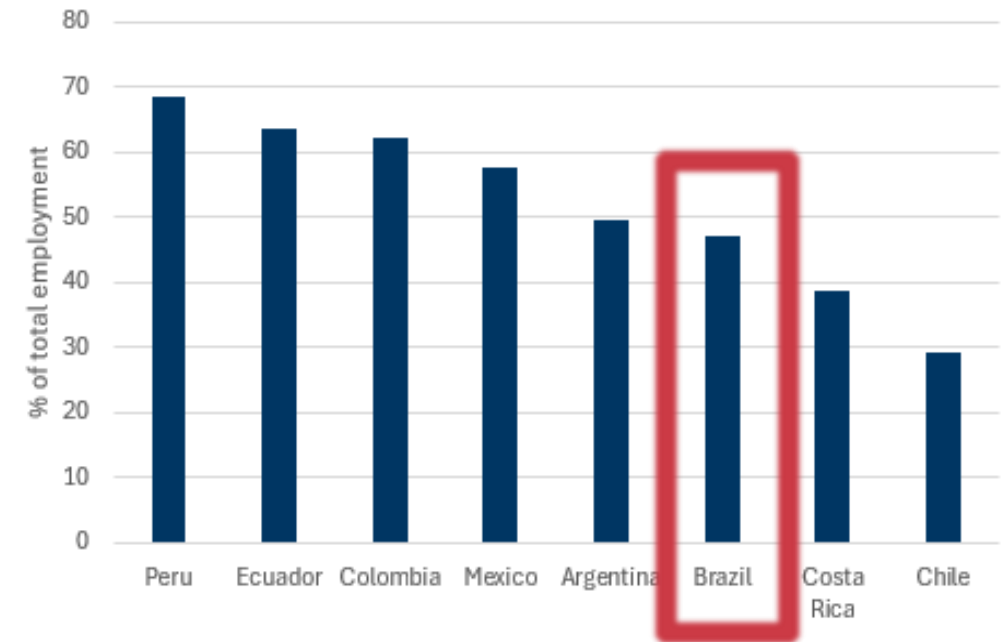


- **Exacerbation of inequalities in the economy**
 - Diseases with higher mortality and morbidity (e.g., cardiovascular) affects particularly **poorest income groups**.

Why is understanding the SoC burden key for Latin American countries?

Effects of today's SoC burden on the future

- **Exacerbation of inequalities in the economy**
 - **Informality** is prevalent in the Latin American labor market
 - Informality is linked to lower labor productivity
 - Productivity losses affects disproportionately **informal workers**
 - More likely to lose their jobs or suffer severe income losses



Informal employment, 2019
(% of total employment)

Source: World Bank, Informal Economy database, 2019.

How the estimation of the SoC burden value can help to avoid its future effects?



- Three questions emerge:
 - **What is the socioeconomic value of investing in health?**
 - **What is the level of SoC burden generated by some disease areas?**
 - **What kind of healthcare strategies (i.e., policies for preventing, promoting, and treating diseases) benefit economic development?**



- Two different levels of decision-making:
 - **National level – Making the case for allocating resources to the health economy**
 - **Distribution of health sector resources**

3

Our scope and methodology



Project aim & scope



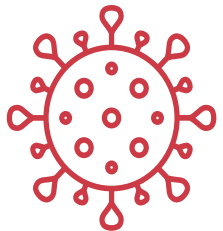
AIM

To quantify the socioeconomic burden of **selected diseases** in **eight Latin American countries**



COUNTRIES

Argentina, **Brazil**, Chile, Colombia, Costa Rica, Ecuador, Mexico, and Peru



DISEASE AREAS

Level 2: Cardiovascular disease and Neoplasms

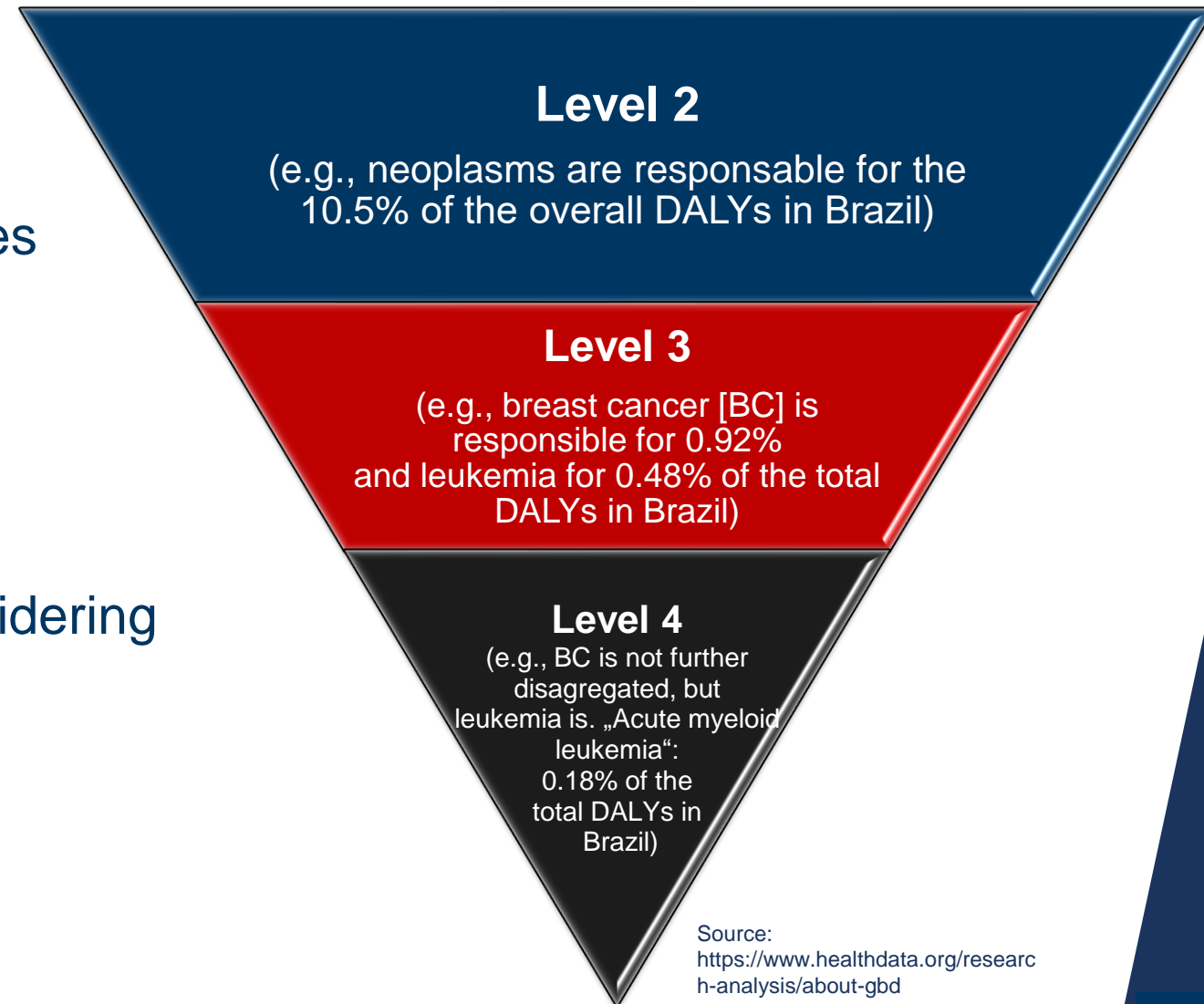
Level 3: Ischemic heart disease, Lower respiratory infections, and Breast cancer

Level 4: Diabetes mellitus type 2 and Migraine



Disease areas – Selection based on the IHME Data Base Global Burden of Disease (GBD)

- More than **350 causes of health loss** studied.
- Arranged in hierarchical nested categories
- The **more aggregated the level is, the higher is the number of patients affected.**
- The more granular the level is, the lower the health burden of the disease is, considering the whole population and probably the relation to the GDP.

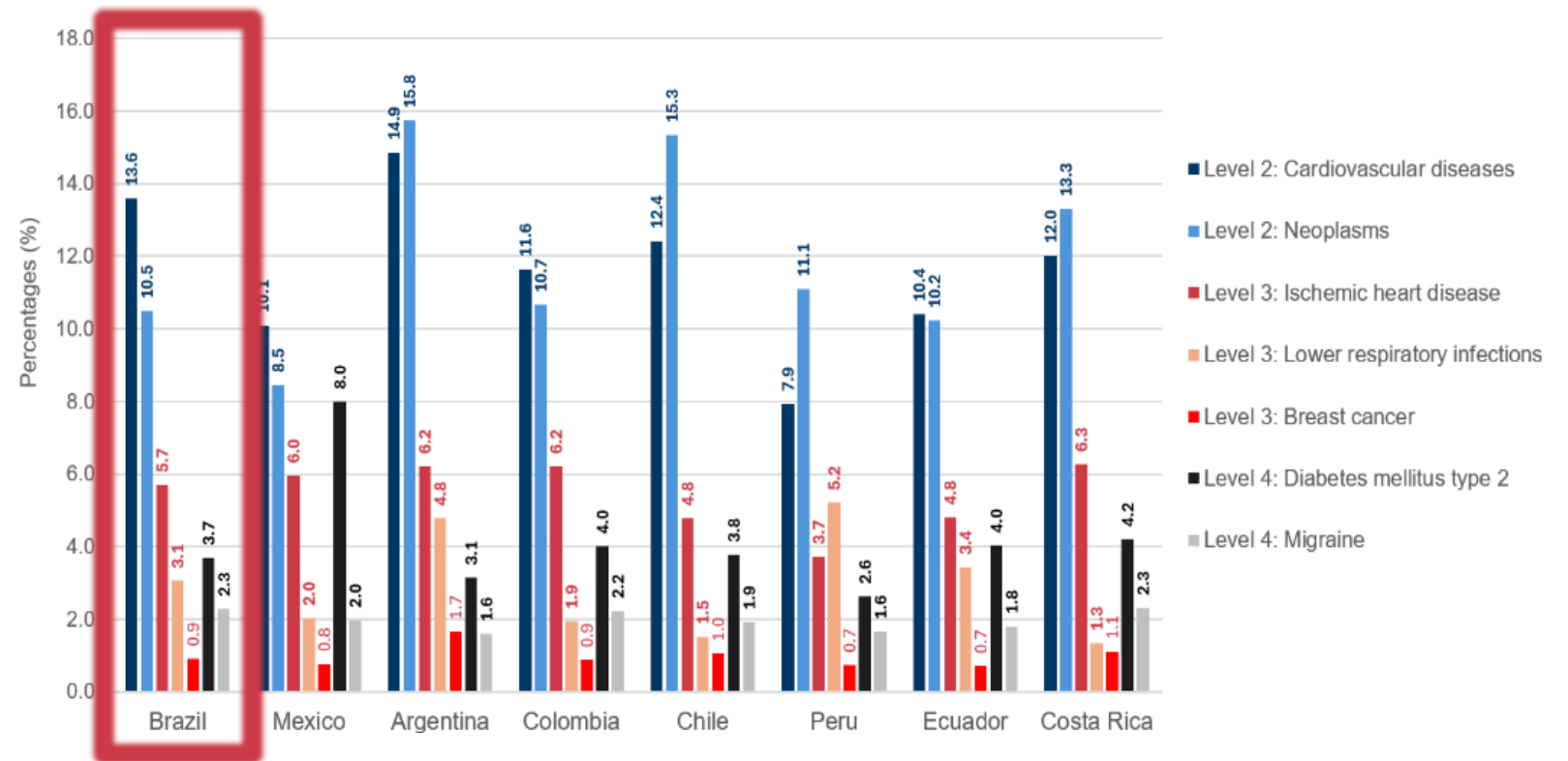


Burden of the chosen disease areas across the eight Latin American countries in the sample

- In 2019, the selected diseases were responsible for an important percentage of the total DALYs (Disability-adjusted life years) in the countries:

- 40.1% in Argentina
- 34.9% in Chile
- 33.2% in Costa Rica
- **33.1% in Brazil**
- 30.6% in Mexico
- 30.5% in Colombia
- 29.9% in Ecuador
- 28.5% in Peru

- Ischemic heart disease is a subcategory (Level 3) of Cardiovascular disease (Level 2).
- Breast cancer (Level 3) is a subcategory of Neoplasms (Level 2).
- All the other disease areas are classified into different categories.



Percentage of DALYs for a particular cause relative to DALYs for all causes, 2019

Source: WifOR elaboration. Data from the GBD 2019 study (available at the IHME website: <https://ghdx.healthdata.org/>)

WifOR's methodology goes beyond the traditional paradigm in economic evaluation to approach productivity losses



- Unique blend of **value chain effects** (Input and Output [IO] analysis) **and health economics** knowledge.
- It considers the mechanisms through which health investments drive economic development by improving population health.
 - **Direct and adjacent effects**
 - It addresses human capital losses in **paid and unpaid work** activities (i.e., labor supply effects).
- The SoC burden is measured in terms of economic losses for the country, and not based on what the individual generates for themselves.
 - Work hours are valued using **Gross Value Added (GVA)**.
- The **methodology has been validated** in numerous projects, peer review journals publications, conference presentations and books.

Productive time loss in both paid and unpaid work

1

Paid work vs. Unpaid work

Unpaid work, when given a monetary valued, is estimated to exceed 40% of the GDP in some countries (ILOSTAT, 2023)

Lost Hours of unpaid work*

Unpaid work encompasses only the activities that can be replaceable by another third person.



Gardening,
animal care



Preparation
of meals



Purchases and
procurement,
organization



Improvements
and home
repair

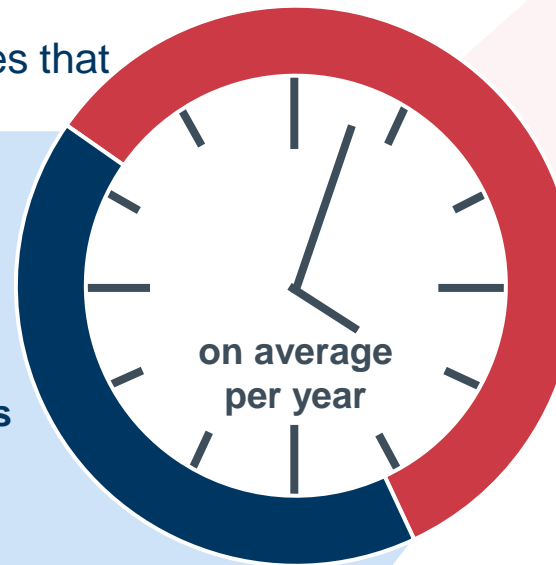


Maintenance of
dwelling, care
of textile fabrics



Informal care,
childcare and
voluntary work

Lost Hours of paid work*



- **Gender Equality:** Women's disproportionate share of unpaid work activities limited their ability to participate in the paid economy.
- **Older adults' contributions** to the country's economic growth have a significant component in unpaid work.

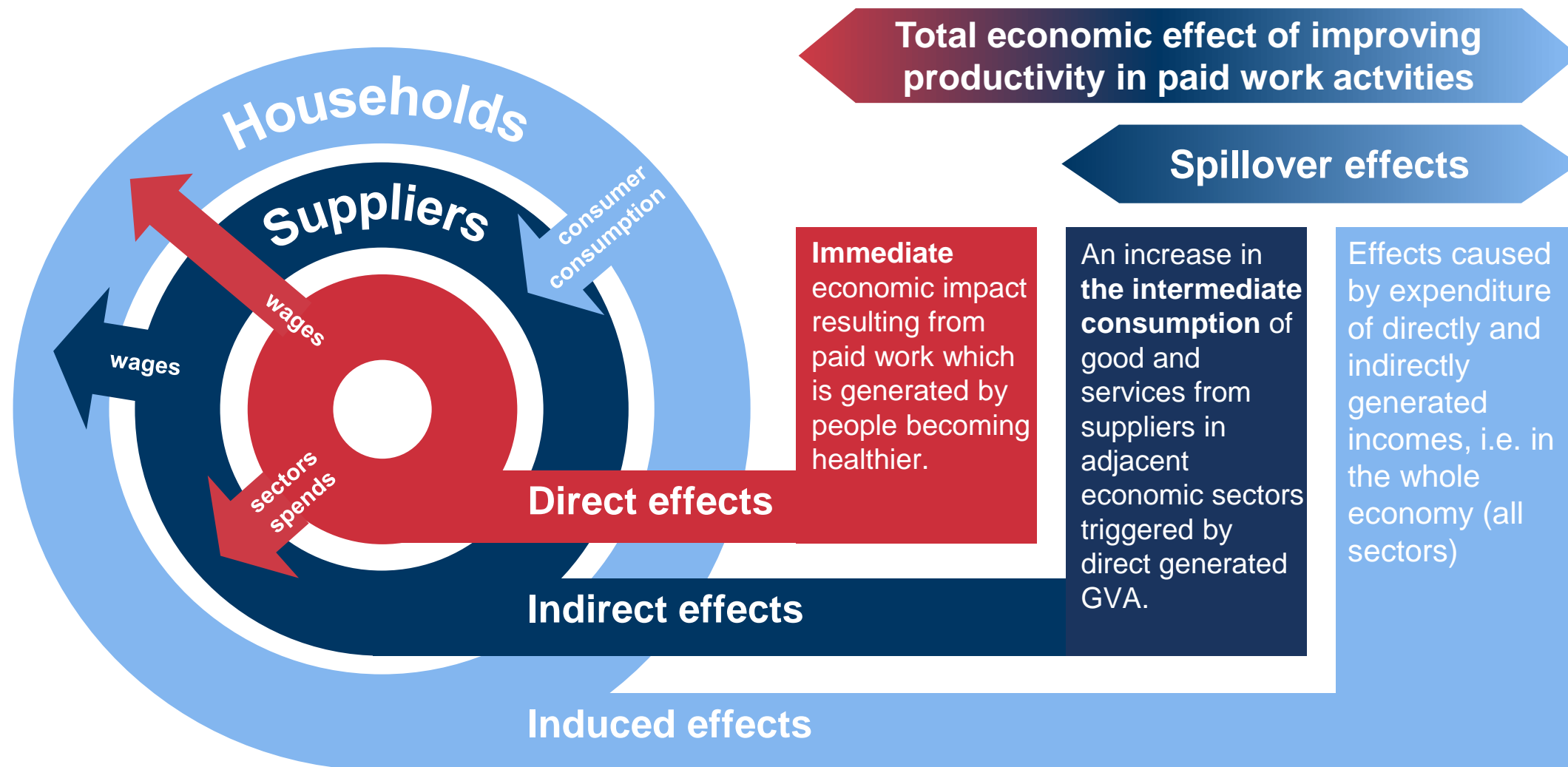
Source: WifOR's illustration.

* For both, unpaid and paid work, the present study focuses only on the patients suffering from the disease, without considering the losses of the caregivers.

Gross Value-Added effects are derived from improving productivity (healthier people) in paid work activities

2

Direct vs Spillover effects



The effects of having a healthier population on the overall economy have been explored under the input-output (IO) model perspective (Leontief, 1986; Conway, 2022).
Source: WifOR 2023.

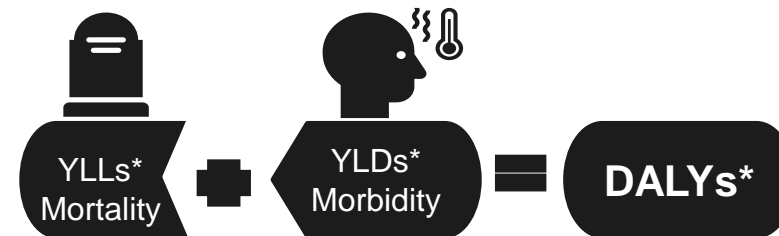
Socioeconomic burden of main diseases in eight Latin American countries

Our methodology involves two distinct estimations of YLLs: No substitution and 2. Substitution after one year

3

Non-substitution vs
Substitution

- Individuals contribute economically through their engagement in paid and unpaid work throughout the year.
 - Any years lost due to disability or mortality are considered nonproductive → **DALYs**.
- Mortality (YLLs) Assumptions
 - Human Capital Approach (HCA) - Assuming Non-substitution**
 - It assumes the irreplaceable loss of an individual's productivity upon premature death.
 - Friction Cost Approach (FCA) – Assuming Substitution**
 - Presuming that within a year, the tasks of the deceased are either assumed by another individual, absorbed through technological advancements, or adapted within the production process.
- Maximum age considered**
 - Unpaid work we assume a maximum productive life of less than 85 years.
 - Paid work we assume a maximum age of work of less than 70.



*Years of Life Lost (YLLs), Years Lived with Disability (YLDs), Disability-adjusted life year (DALYs)

4

Study results for Brazil



Socioeconomic (SoC) burden for Brazil in 2022 amounts to 3,9 up to 5,8% of the GDP

- Compared with the following indicators (% of the GDP):
- Total health expenditures: **10.3%**
 - Government expenditure on education: **5.8%**
 - Tax revenue: **18.9%**
- Note: Information from the World Bank data last year available

Socioeconomic burden related to the seven selected diseases

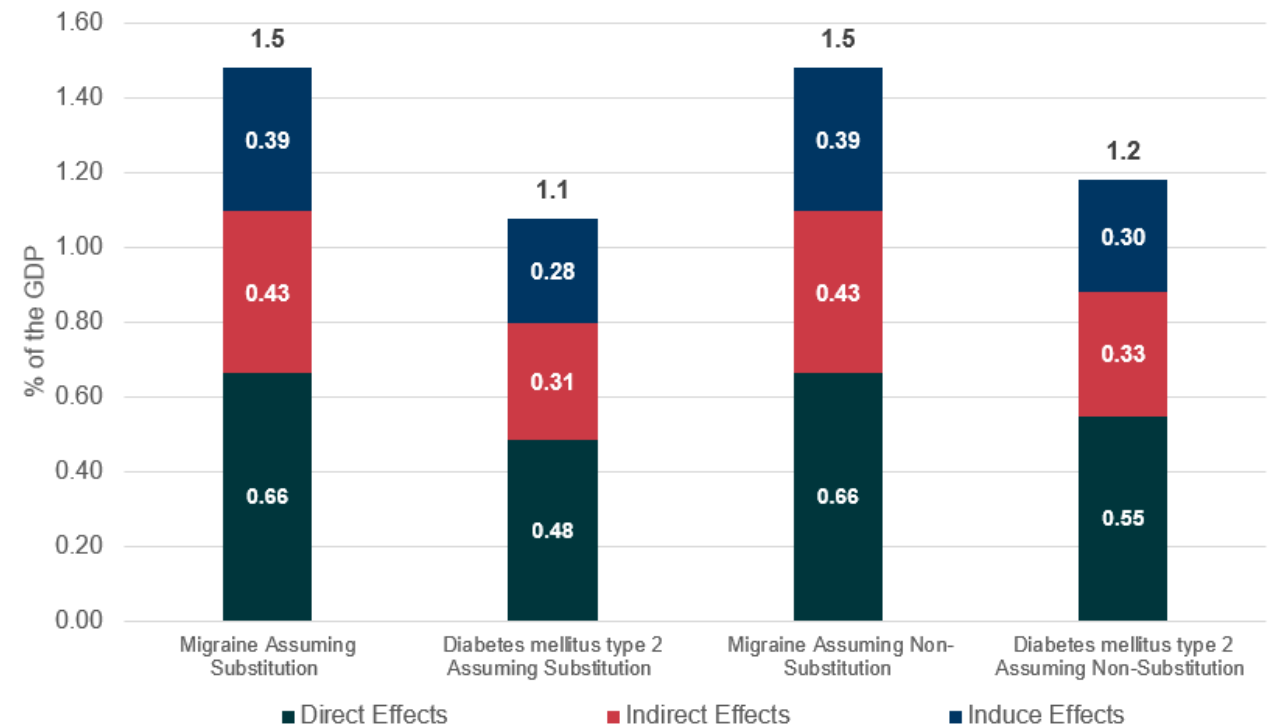
Cause		Human Capital Approach (HCA)		Friction Cost Approach (FCA)	
		Billion US dollars*	% of the GDP	Billion US dollars*	% of the GDP
Level 2	Cardiovascular diseases	30.9	1.6	15.4	0.8
	Neoplasms	21.9	1.2	6.2	0.3
Level 3	Ischemic heart disease	10.4	0.5	3.4	0.2
	Lower respiratory infections	3.8	0.2	0.7	0.0
	Breast cancer	2.9	0.2	1.0	0.1
Level 4	Diabetes mellitus type 2	24.2	1.3	21.8	1.1
	Migraine	29.6	1.6	29.6	1.6
Monetary value of the productivity lost because of the <u>SEVEN DISEASES</u>		110.5 Billion US dollars	5.8%	73.8 Billion US dollars	3.9%

*Monetary data is comprehensively accounted for and presented at the **2015 price levels** to be consistent with the constant values supplied by the World Bank.
Source: WifOR elaboration.



Paid work – 2022: The significant value stemming from spillover effects within the Brazilian economy is noteworthy

- Spillover effects correspond to between 71% and 123% of estimated direct effects
- The health status of workers across sectors determine the growth potential of each sector within the value chain. → **industry policies**
- The figure shows examples of two major diseases: migraine and type 2 diabetes

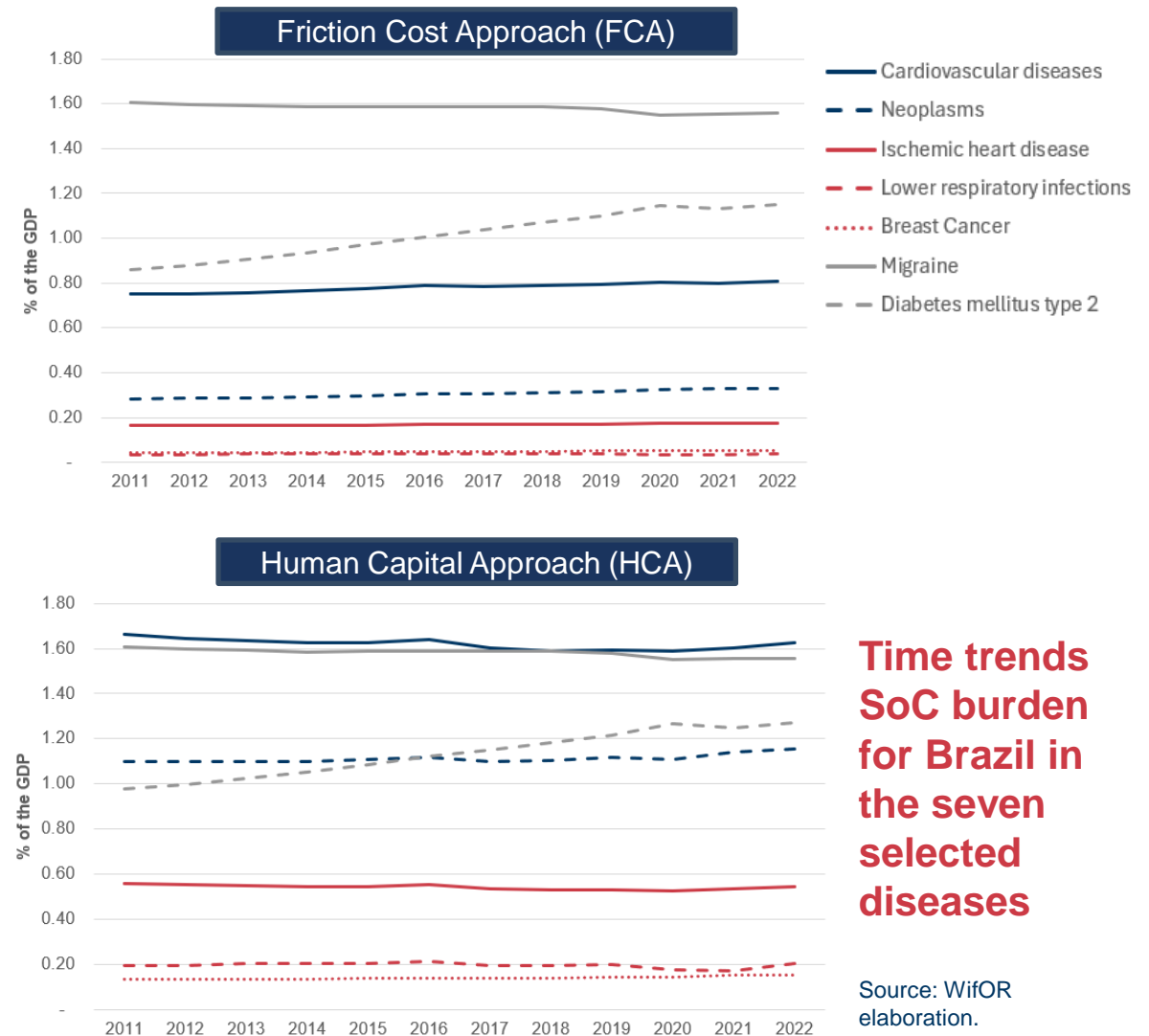


Total SoC burden related to paid work activities for the two major disease: Spillover effects

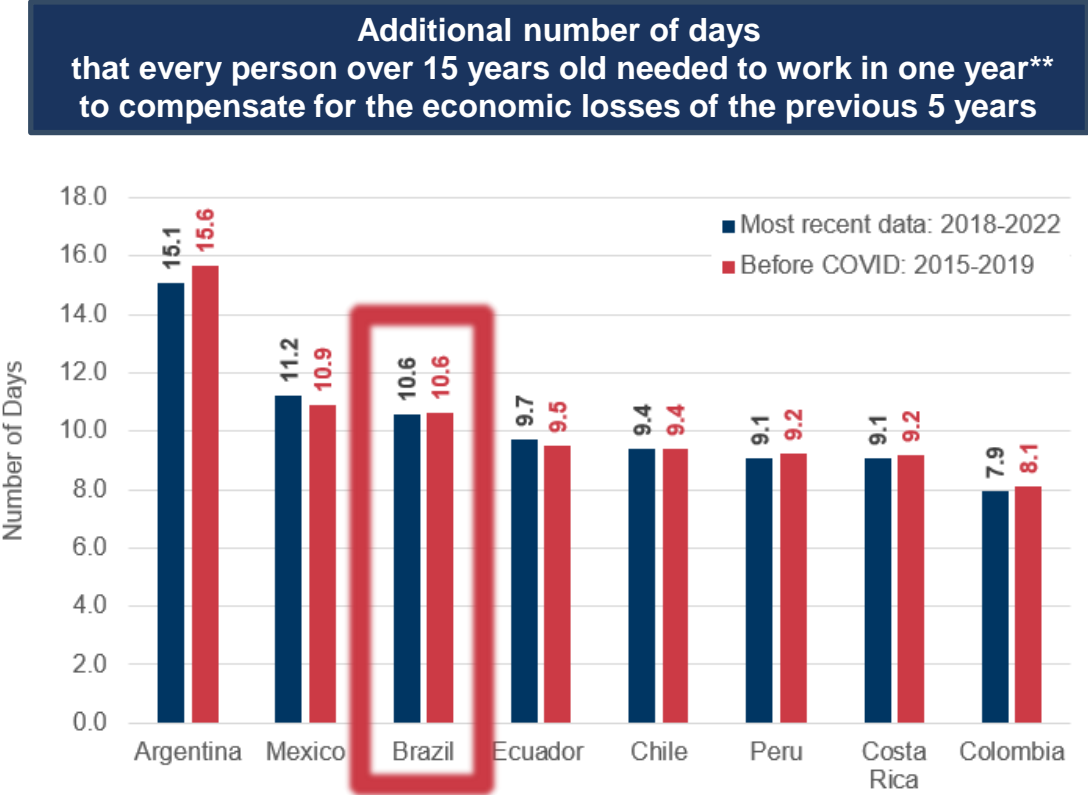
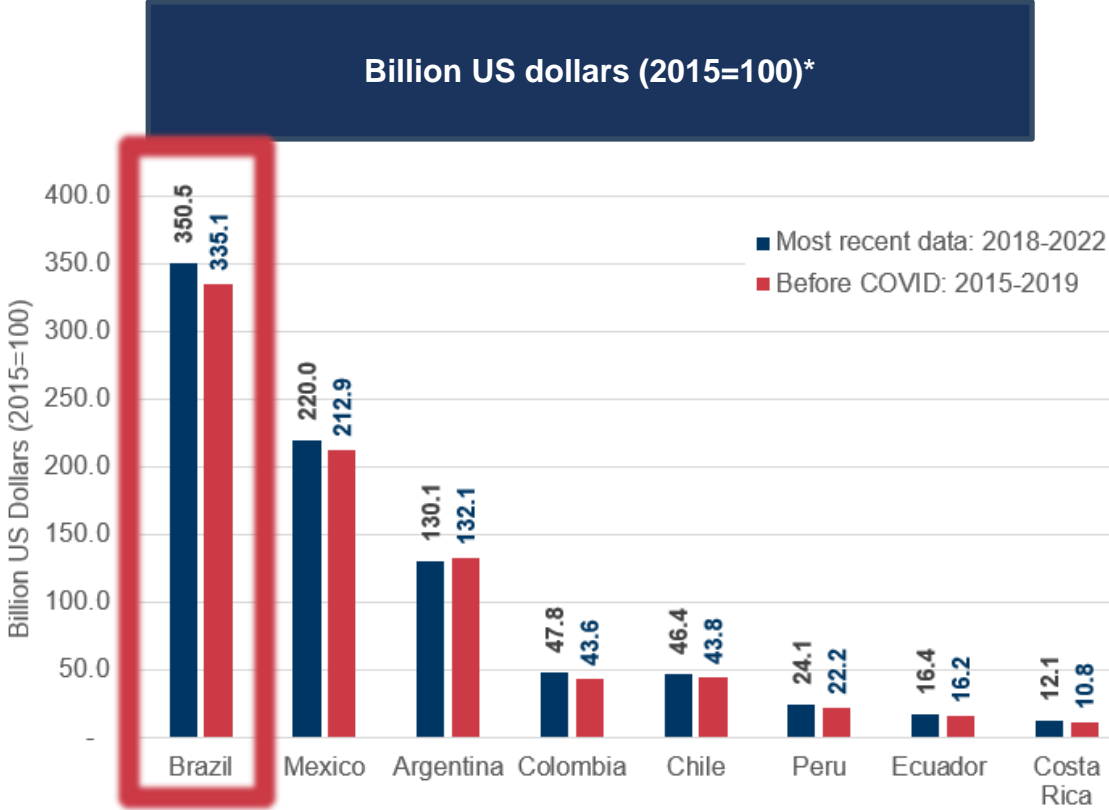
Source: WifOR Elaboration

Socioeconomic (SoC) burden for Brazil between 2011 and 2022 (including paid and unpaid work)

- **Migraine** emerges as the leading cause of economic losses across types, followed by cardiovascular and diabetes type 2.
- The burden **of type 2 diabetes mellitus** consistently rises over time.
- **Cardiovascular and neoplasms** SoC burden is higher under the non-substitution assumption (HCA).
- **Breast cancer and lower respiratory infections** have a comparatively lower impact on the economy than other diseases in the sample.



Every individual (+15y/o) in Brazil would need to work in 2022 on average **10.6 days** to compensate the economic losses of the previous 5 years



Time trends socioeconomic burden for the seven selected disease: FCA Approach – Assuming Substitution

*Monetary data is comprehensively accounted for and presented at the 2015 price levels to be consistent with the constant values supplied by the World Bank.

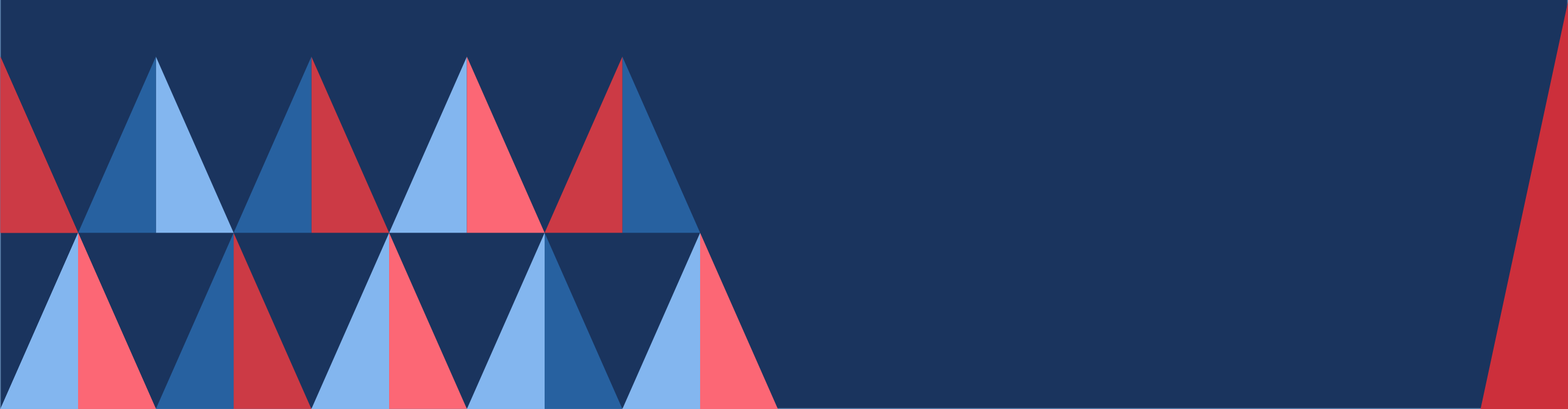
**To determine the extra workdays needed, we analyze economic data from the last year of the specified period. For example, using economic indicators from 2022, we estimate the GVA per person. This helps us calculate the additional workdays required for individuals over 15 in 2022 to make up for the losses incurred between 2018 and 2022.

Source: WifOR elaboration



5

Snapshot of findings



Snapshot of findings

- The SoC burden of the seven diseases is highly relevant to the Brazilian economy.
 - During the period 2018-2022, the economy lost **350.5 Billion US Dollars**.
- The rise in the SoC burden of **type 2 diabetes** is concerning. Diabetes poses a threat to economic sustainability and healthcare sector resilience.
 - Latin America witnesses a surge in diabetes cases due to factors like aging populations, lifestyle choices, and obesity rates.
 - Brazil falls under the average SoC burden for type 2 diabetes among the evaluated countries (as % of GDP).
 - Additionally, it exacerbates the burden of other diseases, for instance, cardiovascular conditions.
- Brazil faces a significant SoC burden related to the debilitating effects of **migraine**.
 - The highest among all the countries evaluated.

Snapshot of findings

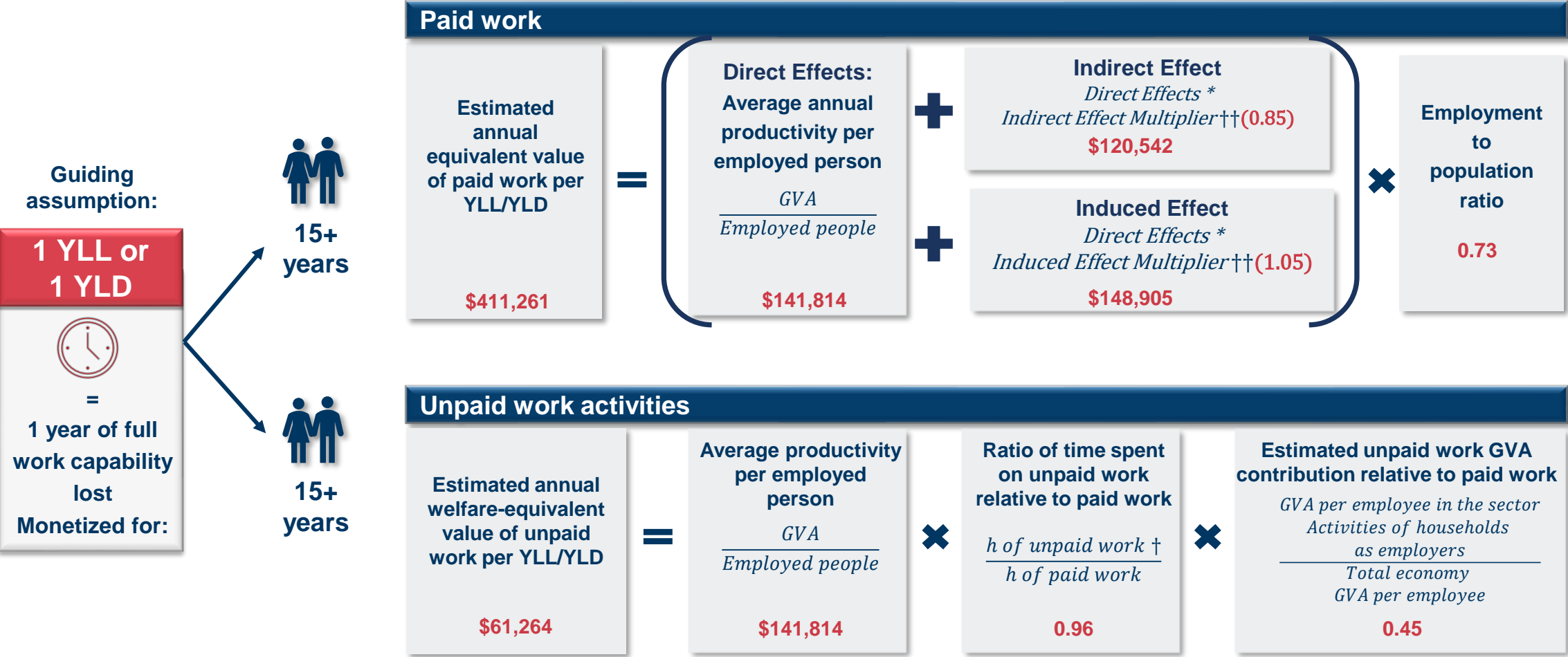
- **Cardiovascular** demonstrates a substantial SoC burden, which is relatively constant over time.
 - Brazil is the second in terms of the SoC burden among the evaluated countries.
- The magnitude of **spillover effects** is relatively higher compared to other countries.
 - Industry policies should be involved in mitigating productivity losses across the value chain.
- The impact of **Brazil's vaccination programs** is evident in the comparatively lower SoC burden.
 - Great effectiveness of the country's immunization efforts from 1990 and 2006 significant decrease in DALYs
 - Celebrating its 50th anniversary, Brazil's immunization program achieved commendable coverage rates, especially when compared to other countries.
 - Brazil now confronts a troubling decline in vaccine coverage since 2016. Prioritizing the restoration of high vaccination rates is a solution.

Some Limitations

- The current overall SoC burden estimations lack detail regarding which skill levels of workers or economic sectors are particularly affected by the reduction in labor supply.
 - There is a need for additional evaluations to consider economic distribution
- The study does not account for the additional reduction in labor supply associated with increased caregiving hours.
- Informality
 - Due to underreporting from informal employees, there's a possibility that surveys may not accurately capture the distribution between unpaid and paid work time.
 - Further exploration of additional literature is necessary to confirm and improve the estimation of unpaid hours.
 - While the World Bank data considers the values of informal labor per country, its accuracy depends on the reported information provided by each country
- We draw upon data from the Global Burden of Disease study,
 - It offers the advantage of allowing comparisons between countries and consistent metrics to approach the decrease in the capacity of the population to use their capital
 - However, it's important to note limitations in the accuracy of reported data between countries.

Annex 1 Socioeconomic burden of disease estimation

Exemplary inputs and calculations for country X in a given year



† Unpaid work hours are extracted from country specific Time Used Surveys available in the United Nation (<https://gender-data-hub-2-undesa.hub.arcgis.com/pages/indicators>)

†† The assessment of these effects is framed and proven by the application of Input-Output (IO) modelling. We calculate the country-specific Leontief inverse of the IO matrix and apply the multipliers to the direct Gross Value Added.
Source: WifOR 2024.



Annex 2

Additional Assumptions

- Discount Rate 3.5%
- In many of the selected countries, the retirement age typically stands at 65
 - In our analysis, instead of solely considering the retirement age at 65, we factored in productivity losses related to premature mortality to **the age less than 70**.
 - This approach was guided by several observations:
 - It's a prevalent practice in Latin America for individuals to remain active in the workforce past the traditional retirement age.
 - Given demographic shifts resulting in an aging population, it's reasonable to anticipate an increase in the retirement age.
 - While approximately 20% of individuals over 70 remain employed, we interpret this phenomenon as a response to deficiencies in the social protection system rather than a genuine reflection of productivity losses for the country.
- Regarding unpaid work, we assume a maximum **productive lifespan of 85 years**.
- This comprehensive approach allows for a more nuanced understanding of workforce dynamics and productivity when considering unpaid and paid work contributions.

Annex 3

Insides on the GBD study

- Burden of Disease (BoD)
 - Comparative quantification of the disease impact (e.g., health, psychosocial well-being, economic impact)
 - Use to evaluate public health, prioritize diseases, and understand the importance of particular risk factors
- Global Burden of Disease (GBD) study
 - A framework to integrate, analyse and disseminate the information on population health in a consistent way
 - Before information was fragmented and inconsistent.
 - The first GBD study was published in 1990
 - Collaboration between the WHO and Harvard School of Public Health
 - Quantified the health effects of more than 100 diseases and injuries for eight regions of the world
 - The concept of **DALYs** was introduced
 - Single measure to quantify the burden of diseases, injuries and risk factors
 - It was not conceived to evaluate interventions or marginal effect analysis
 - Since 2007 it is managed by the Institute for Health Metrics and Evaluation (IHME): University of Washington

Annex 4

Sources of Data (1)

- The economic variables were extracted from the World Bank data (period 2011 - 2022)
 - Gross value added at basic prices (GVA) (constant 2015 US\$)
 - Population ages 15-64, total
 - Population ages 65 and above, total
 - Population, female (% of total population)
 - Population, male (% of total population)
 - Employment to population ratio, 15+, total (%)
- Time Used Survey information of the most recent year available in the United Nation website
 - Average number of hours spent on unpaid domestic and care work, by sex, age and location (Hours per day)
 - Average number of hours spent on total work (paid and unpaid), by sex (Hours per day)

Annex 4

Sources of Data (2)

- Data estimated by WifOR utilize Input-Output (IO) analysis and draw upon the IO matrices from the World Input-Output Database (WIOD) and The Eora Global Supply Chain Database.
 - Multipliers are calculated per economic sector, reflecting their impact on both the national economy and the spillover effects on other countries through exports and imports. These multipliers are quantified for each country per 1 million USD revenue in each sector.
 - Indirect multipliers capture the intermediate consumption of goods and services from suppliers, triggered by the direct generated Gross Value Added (GVA).
 - Induced multipliers represent the impact of household spending, which in turn increases their income, thereby directly and indirectly generating GVA.
 - Gross Value Added (GVA) per economic sector (million USD): Considering the IO matrices from the country and using the NACE Rev.2 classification.
 - Employees per economic sector (Million of people): Considering the IO matrices from the country and using the NACE Rev.2 classification.

Annex 5

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