

# Measures of economic activity



# Microeconomics V.S. Macroeconomics

MACRO



MICRO



| Microeconomics                                | Macroeconomics                                 |
|---|--|
| Analyses individual components of the economy | Analyses the economy as a whole                |
| Studies individual income                     | Studies national income                        |
| Analyses demand and supply of labour          | Analyses total employment in the economy       |
| Deals with households and firms decisions     | Deals with aggregate decisions                 |
| Studies individual prices                     | Studies overall price level                    |
| Analyses demand and supply of goods           | Analyses aggregate demand and aggregate supply |

# Macroeconomic objectives

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- Macroeconomics focuses on the allocation of a **country's scarce resources**, with specific emphasis on the level of economic activity in relation to four macroeconomic objectives:
  1. A steady rate of increase in national income, that is, **economic growth**
  2. A low and sustainable **rate of unemployment** in the economy
  3. Low and stable **rate of inflation**, that is, price stability
  4. Sustainable level of government or **national debt**



# Measures of economic activity

Measurement of economic activity involves measuring an economy's national income or the value of output as well as other measures of economic performance by specialized statistical services in every country.

**National income:** the total income of an economy, consisting of factor payments or the sum of wages, interest, rent plus profit, often used interchangeably with the value of aggregate output.

**Aggregate output:** the value of all the goods and services produced in a country during a year.



→**National income = aggregate output**

# Measures of economic activity

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- We measure the '**value**' of output rather than the '**quantity**' of output in macroeconomics.
  - The value of a good = Price \* Quantity

## We measure in order to:

- Assess an economy's performance over time.
- Make comparisons of income and output performance with other economies.
- Establish a basis for making policies that will meet economic objectives.



# WHAT IS GDP

(GROSS DOMESTIC PRODUCT)?

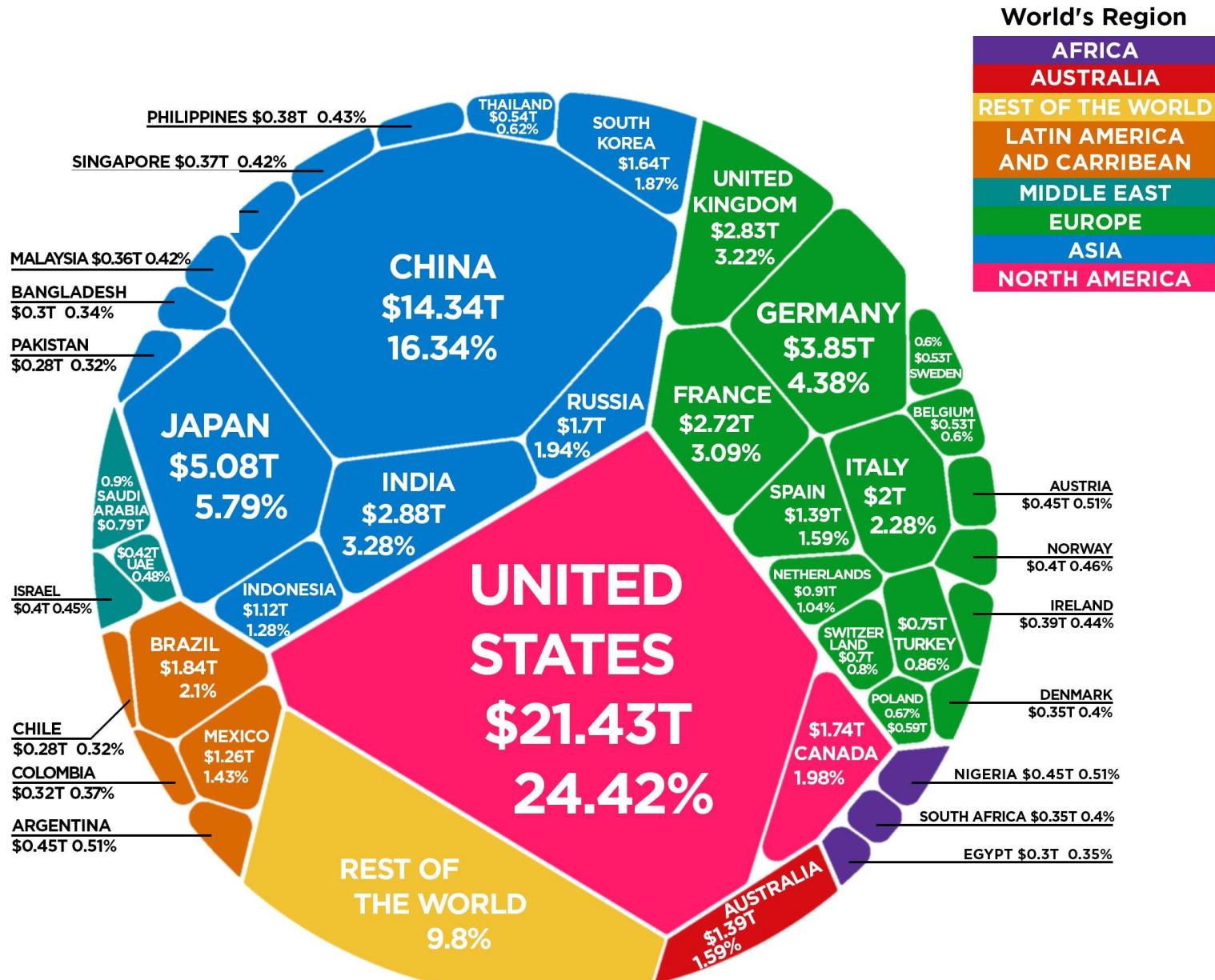
# Gross domestic product (GDP)

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- **Definition:** a measure of the value of aggregate output of an economy, it is the **market value** of all **final goods and services produced within a country** during a **given time period** (usually a year).
- It is one of the most commonly used **measures of the value of aggregate output**.
- This includes all services and production within its boundary performed by its nationals and foreigners. It calculates **all the income** that is earned **within the country**. It also takes into account income that is paid to foreign citizens.
- This index is given to assess the overall growth rate of the economy as well as the development level of a region or a country.

# The World Economy

## Gross Domestic Product (GDP) by Country 2019



# Three measurement methods

## 1. The expenditure approach:

- Adds up all **spending to buy** final goods and services produced within a country over a time period. - **E**

→ In theory, national income accounting will result in equal final values, that is **E = Y = O**. Because the value of national output equals the value of what is spent on the output (national expenditure), this expenditure becomes the (national) income to households and firms that produced the output.

## 2. The income approach:

- Adds up all **income earned** by the factors of production that produce all goods and services within a country over a time period.

→ **National income – Y**

→ In reality, the values may be slightly different due to inaccuracies and variations in the method of data collection.

## 3. The output approach:

- Calculates the **value of all final (finished) goods and services produced** in a country over a time period. → **National output - O**

# 1. The expenditure approach

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- It measures the total amount of spending to buy final goods and services in a country (usually within a year)
  - Final goods and services: a good that the final consumer consumes.
    - Ready for final use
    - Can be contrasted with intermediate goods and services, or those purchased as inputs for the production of final goods.



Tree – intermediate good  
not counted in GDP



Lumber – intermediate good  
Not counted in GDP



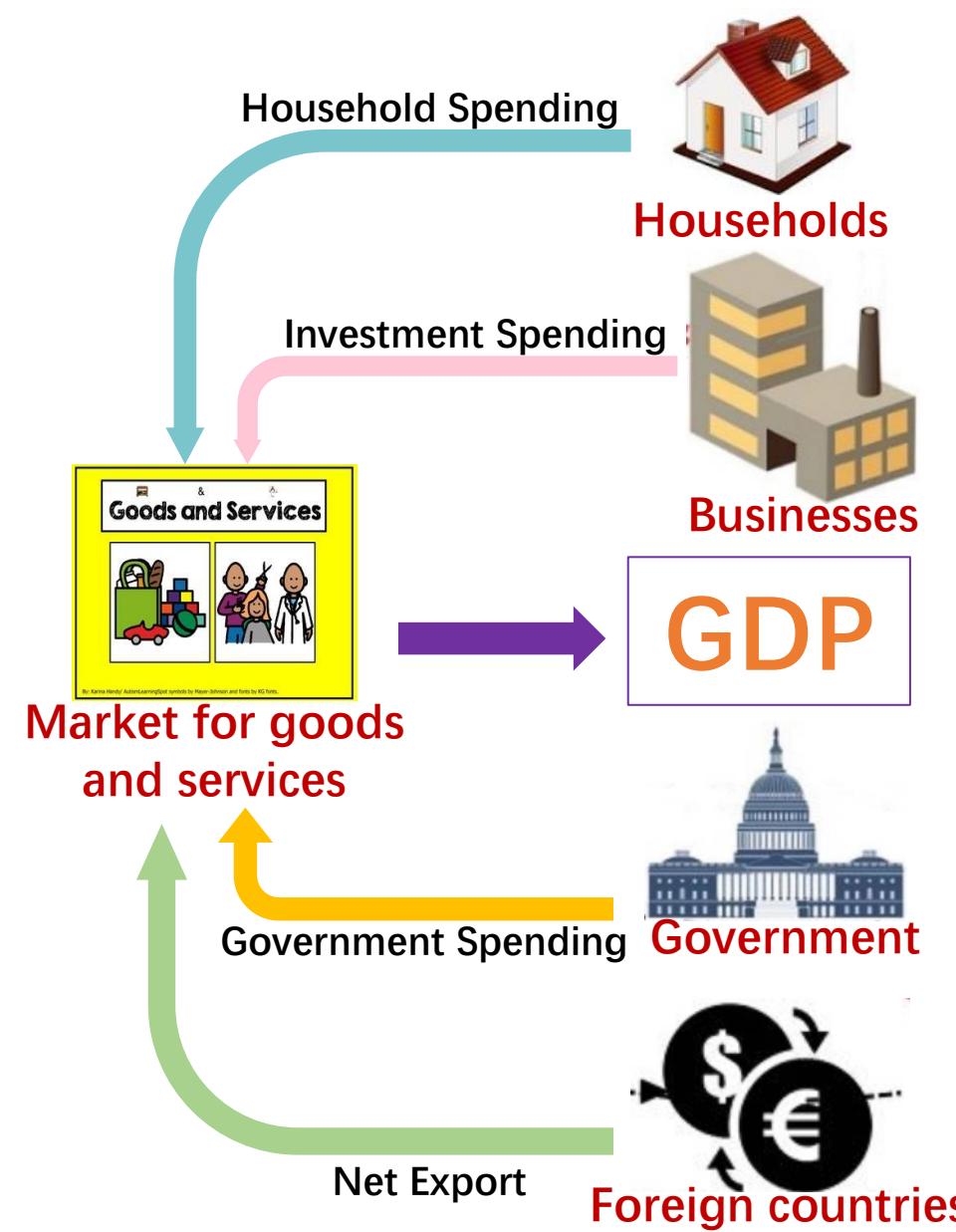
Chest – Final good  
Counted in GDP

# Discuss: final goods or intermediate goods?



# Four components of expenditure approach

$$\text{Gross Domestic Product (GDP)} = C + I + G + (X - M)$$



## ➤ C : Consumption spending.

- Including all purchases by households on final goods and services in a year (except housing, classified under investment)

## ➤ I : Investment spending.

- Spending by firms on capital goods (buildings, machinery, equipment, etc.)

- Spending on new construction (housing and other buildings)

## ➤ G : Government spending

- Spending by governments within a country (national, regional, local)
  - Government purchasing of factors of production
  - Government investment (public investment) – roads, airports, power generators, buildings.

## ➤ X – M : Net exports

- The value of all exports (X) – The value of all imports (M)

# Calculation exercise

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The figures below show a particular country's national income statistics for last year (all figures in \$ billion)

- Gross domestic product = \$4770
- Consumption = \$3720
- Government expenditure = \$668
- Investment expenditure = \$524

Calculate the value of the country's net exports.

$$\text{Net export} = 4770 - 3720 - 668 - 524 = - \$142 \text{ billion}$$

# Calculating nominal GDP -using the expenditure approach

The figures below show a particular country's nominal GDP for last year (all figures in \$billion)

- Private consumer expenditure = \$1205
- Government consumption expenditure = \$680
- Gross domestic fixed capital investment = \$1150
- Domestic exports of goods = \$850
- Imports of goods = \$940
- Domestic exports of services = \$1100
- Imports of services = \$1700

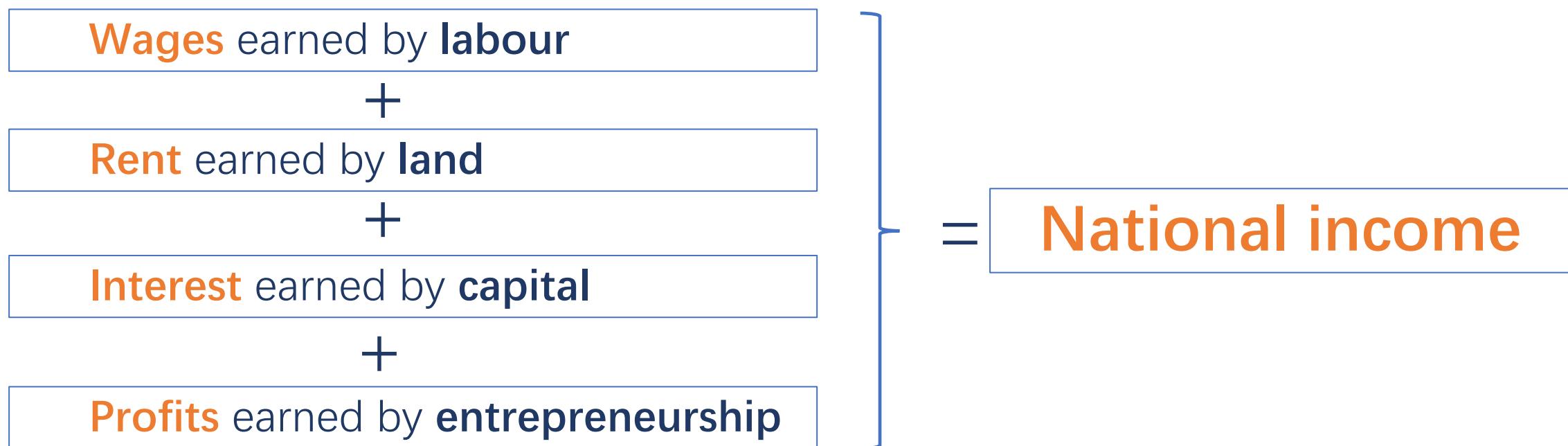
Calculate the nominal GDP?

$$\begin{aligned}\text{Nominal GDP} &= C + I + G + (X - M) \\ &= 1205 + 680 + 1150 + 850 - 940 + 1100 - 1700 = \$2345 \text{ billion}\end{aligned}$$

## 2. The Income Approach

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- Instead of looking at **who's buying the output** (the demand side), we can look at **who's being paid to produce it** (the supply side)
- The income approach adds up all **income earned by the factors of production** within a country over a time period (usually a year)



# The Income Approach

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- National income is often used as a measure of the level of economic activity, it is not the same as GDP. It is necessary to make some adjustments to national income in order to calculate GDP using the income approach.
  - It allows economists to see the relative income shares of the **different factors of production**, how these might change over time, and to make comparisons over time or across countries.

# The output approach

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- The output approach measures the value of each good and service produced in the economy over a particular time period (usually a year) and then sums them up to obtain the total value of output produced.
- It includes the value of all final goods and services.
- To calculate the value of all final goods and services produced in a country over a period of time, there are two methods:
  1. Count and sum up only market transactions entailing final sales
  2. calculate it by summing the value-added at each stage of the production and distribution process.

# Examples of output approach

|        | Production    | Cost of inputs | Price of outputs | Value added |
|--------|---------------|----------------|------------------|-------------|
| Farmer | Harvest wheat | ¥0             | ¥300             | ¥300        |

|        |                  |      |      |      |
|--------|------------------|------|------|------|
| Miller | Makes into flour | ¥300 | ¥800 | ¥500 |
|--------|------------------|------|------|------|

|       |                  |      |       |      |
|-------|------------------|------|-------|------|
| Baker | Makes into bread | ¥800 | ¥1500 | ¥700 |
|-------|------------------|------|-------|------|

Total

¥1100

¥1500

¥2600

¥1500

GDP counts only the ¥  
value of the final good

Double counting  
'value-added'  
This is the same  
as the final value

# The output approach

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- The output approach measures the value of each good and service produced in the economy over a particular time period (usually a year) and then sums them up to obtain the total value of output produced.
- It includes the value of all **final** goods and services.
- It calculates the value of output by economic sector, such as agriculture, manufacturing, transport, banking, etc.
- It provides economists with the opportunity to study the **performance of each individual sector** by looking at its relative share in total output, how this changes over time and to make comparisons of performance across sectors across countries.

# GNI: the Gross National Income

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- **Definition:** a measure of the total income received **by the residents of a country**, equal to the value of all final goods and services produced by the factors of production supplied by the country's residents regardless of where the factors are located.
- This includes all services and production performed by the citizens of that country within its borders and/or on foreign land.
- Previous name: Gross National Product (GNP)

# Distinctions between GDP and GNI

- If an economy were closed,  $\text{GDP} = \text{GNI}$
- With capital & labour flows across borders,  $\text{GDP} & \text{GNI}$  diverge from one another.
  - Profits
  - Dividends
  - Interest payments
  - Worker remittances
- Key distinction → ‘Domestic’ V.S. ‘National’
- Gross **domestic** product: output has been produced by factors of production domestically, or within the country, regardless of who owns them (residents or foreigners)
- Gross **national** Income: the income it measures is the income of the country’s residents, regardless where this income comes from.

→ **GNI = GDP + Income from abroad – income sent abroad**

# Calculating nominal GNI

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- Country: Riverland
- Nominal GDP: \$46 billion
- Income from abroad: \$2.7 billion
- Income sent abroad: \$4.7 billion

Calculate the nominal GNI?

- Nominal GNI = GDP + Income from abroad – income sent abroad  
 $= 46 + 2.7 - 4.7 = \$44 \text{ billion}$

# Expenditure approach V.S. Income approach



Government sector



Public service



Government  
Spending

Wages

Marcello Lippi: Pre-coach of  
Chinese football team  
Annual salary: 20 million Euro



国家体育总局  
General Administration of Sport of China

Government sector



Public service



Government  
Spending

Wages

Victor An: The Coach of Chinese national  
Short track speed skating team  
Annual salary: ? ? ?

# GDP V.S. GNI



Government sector



Public service



Marcello Lippi: Pre-coach of  
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GNP



GDP



GDP



GNP



国家体育总局  
General Administration of Sport of China

Government sector

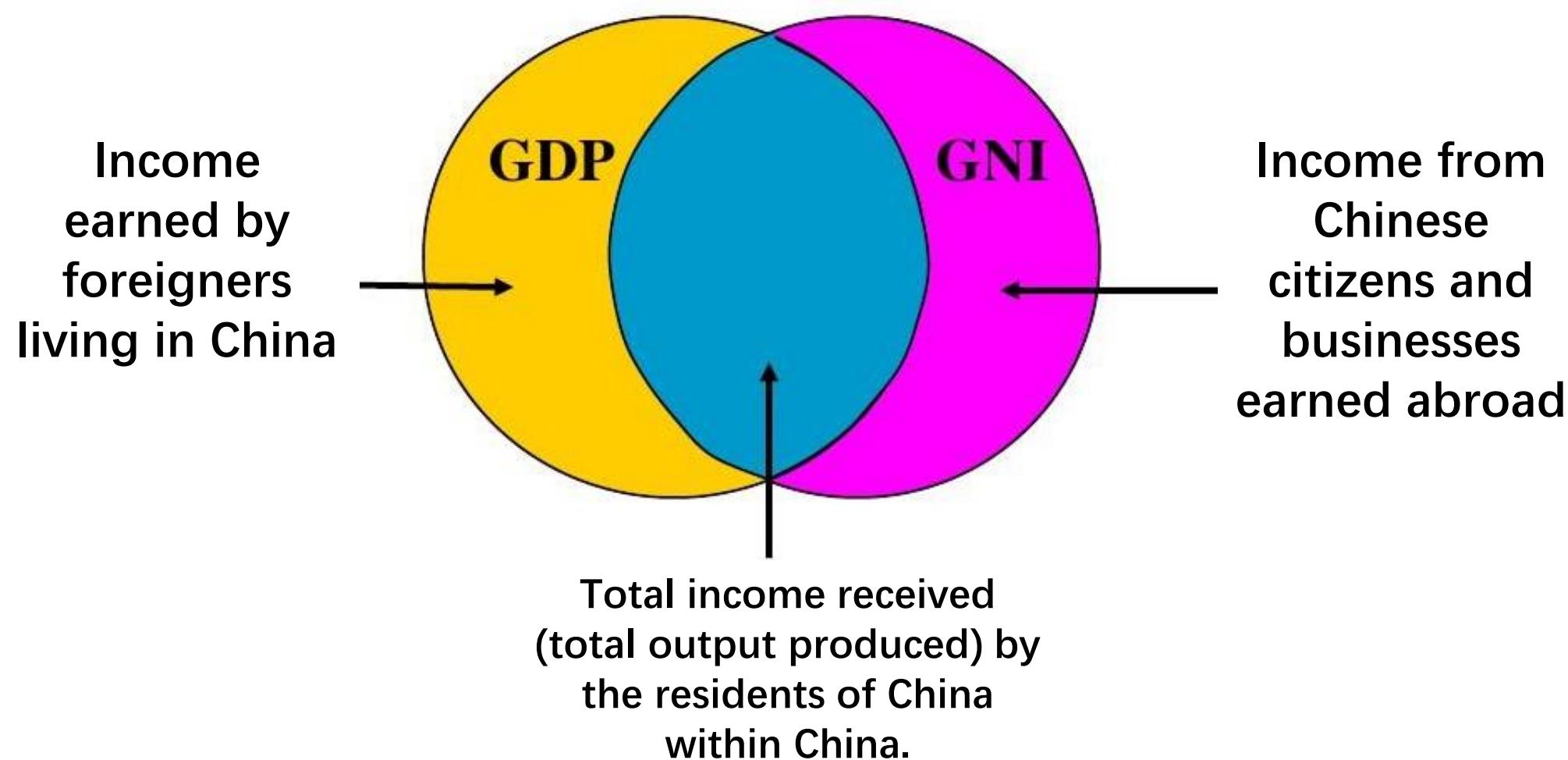


Public service



Victor An: The Coach of Chinese national  
Short track speed skating team  
Annual salary: ? ? ?

# Distinctions between GDP and GNI



# Distinctions between GDP and GNI

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- GDP is used by countries to see the strength of their local economy.
  - GNI is used to see how the nationals within a country are doing economically.
- 
- If inflows > outflows, then GNI > GDP
  - If inflows < outflows, then GNI < GDP

# Nominal values and Real values

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- **Nominal value:** value that is in money terms, measured in terms of prices that prevail at the time of measurement, and that does not account for changes in the price level.

Measurement problem → The prices do change over time. The increased nominal GDP may be due to changes in the **quantities of output** produced, or changes in the **price of goods and services**, or a combination of both.

- **Real value** is a measure of value that takes into account changes in prices over time.
  - It eliminates the influence of price changes, and give us an indication of how actual output produced has changed.

# Nominal GDP V.S. real GDP

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- Nominal GDP and nominal GNI are measured in terms of **current prices**, which does not account for changes in prices.
- Real GDP and real GNI are measures of economic activity that have **eliminated the influence of changes in price**.
- When a variable is being compared over time, it is important to use real values.

# Calculating the real GDP for each year

| 1<br>Goods<br>and<br>services | 2<br>2001<br>Q | 3<br>2001<br>P | 4<br>2001<br>value<br>(Q × P) | 5<br>2002<br>Q | 6<br>2002<br>P | 7<br>2002<br>value<br>(Q × P) | 8<br>2003<br>Q | 9<br>2003<br>P | 10<br>2003<br>value<br>(Q × P) |
|-------------------------------|----------------|----------------|-------------------------------|----------------|----------------|-------------------------------|----------------|----------------|--------------------------------|
| Burgers                       | 37             | £3             | £111                          | 40             | £4             | £160                          | 39             | £5             | £195                           |
| Haircuts                      | 15             | £18            | £270                          | 17             | £20            | £340                          | 18             | £21            | £378                           |
| Tractors                      | 10             | £50            | £500                          | 11             | £60            | £660                          | 10             | £65            | £650                           |
| Nominal<br>GDP                |                |                | £881                          |                | £1160          |                               |                |                | £1223                          |

- **Nominal GDP** measures the value of current output valued at current prices.

- **Real GDP** measures the value of current output valued at constant (base year) prices.
- \* Any year can be used as the base year

| 1<br>Goods<br>and<br>services | 2<br>2001<br>Q | 3<br>2001<br>P | 4<br>2001<br>output<br>in 2001<br>P<br>(Q × P) | 5<br>2002<br>Q | 6<br>2001<br>P | 7<br>2002<br>output<br>in 2001<br>P<br>(Q × P) | 8<br>2003<br>Q | 9<br>2001<br>P | 10<br>2003<br>output<br>in 2001<br>P<br>(Q × P) |
|-------------------------------|----------------|----------------|--|----------------|----------------|--|----------------|----------------|---|
| Burgers                       | 37             | £3             | £111   | 40             | £3             | £120   | 39             | £3             | £117  |
| Haircuts                      | 15             | £18            | £270   | 17             | £18            | £306   | 18             | £18            | £324  |
| Tractors                      | 10             | £50            | £500   | 11             | £50            | £550   | 10             | £50            | £500  |
| Real<br>GDP                   |                |                | £881   |                |                | £976   |                |                | £941  |

# The GDP deflator



- In real world, economists use short-cut methods that take the form of **price indices (index)**.
- A price index is a measure of average prices in one period relative to average prices in a base year. → GDP (price) deflator

$$\text{• GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} *100$$

# Calculating the GDP deflator

| 1<br>Goods<br>and<br>services | 2<br>2001<br>Q | 3<br>2001<br>P | 4<br>2001<br>value<br>(Q × P) | 5<br>2002<br>Q | 6<br>2002<br>P | 7<br>2002<br>value<br>(Q × P) | 8<br>2003<br>Q | 9<br>2003<br>P | 10<br>2003<br>value<br>(Q × P) |
|-------------------------------|----------------|----------------|-------------------------------|----------------|----------------|-------------------------------|----------------|----------------|--------------------------------|
| Burgers                       | 37             | £3             | £111                          | 40             | £4             | £160                          | 39             | £5             | £195                           |
| Haircuts                      | 15             | £18            | £270                          | 17             | £20            | £340                          | 18             | £21            | £378                           |
| Tractors                      | 10             | £50            | £500                          | 11             | £60            | £660                          | 10             | £65            | £650                           |
| Nominal<br>GDP                |                |                | £881                          |                |                | £1160                         |                |                | £1223                          |

- GDP deflator in 2001 =  $881/881 * 100 = 100$
- GDP deflator in 2002 =  $1160/976 * 100 = 118.8$
- GDP deflator in 2003 =  $1223/941 * 100 = 130$



| Year | Nominal GDP | Real GDP | GDP deflator |
|------|-------------|----------|--------------|
| 2001 | £881        | £881     | 100.0        |
| 2002 | £1160       | £976     | 118.8        |
| 2003 | £1223       | £941     | 130.0        |

# Using the GDP deflator to calculate real GDP

- 
- Real GDP =  $\frac{\text{Nominal GDP}}{\text{GDP deflator}} * 100$

- Country X: GDP deflator

| 2004 | 2005 | 2006  | 2007  | 2008  |
|------|------|-------|-------|-------|
| 95.7 | 97.7 | 100.0 | 105.9 | 102.4 |

- Base year: 2006
- The prices on average increased in the period 2004-2007, decrease in 2008.

# Calculation exercise

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Use the data below to calculate the real GDP in 2019 and 2020.

| Year | Nominal GDP (\$bn) | GDP deflator | Real GDP (\$bn) |
|------|--------------------|--------------|-----------------|
| 2019 | 260.00             | 106.7        |                 |
| 2020 | 262.40             | 108.5        |                 |

$$\text{Real GDP in 2019} = 260/106.7 = \$243.65 \text{ billion}$$

$$\text{Real GDP in 2020} = 262.4/108.5 = \$241.84 \text{ billion}$$

# GDP Per capita

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A per capita measure takes the **total value** (of output, income, expenditure, etc.) and divided this by the **total population** of a country.



$$\text{GDP Per Capita Formula} = \frac{\text{Real GDP}}{\text{Population}}$$



**Country A**

Population 1000

GDP \$10,000,000

$$10 \text{ million} \div 1000 = 10,000$$

GDP Per Capita = \$10,000

**Country B**

Population 200

GDP \$4,000,000

$$4 \text{ million} \div 200 = 20,000$$

GDP Per Capita = \$20,000

# Per capita values

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## Importance of ‘per capita’ measures:

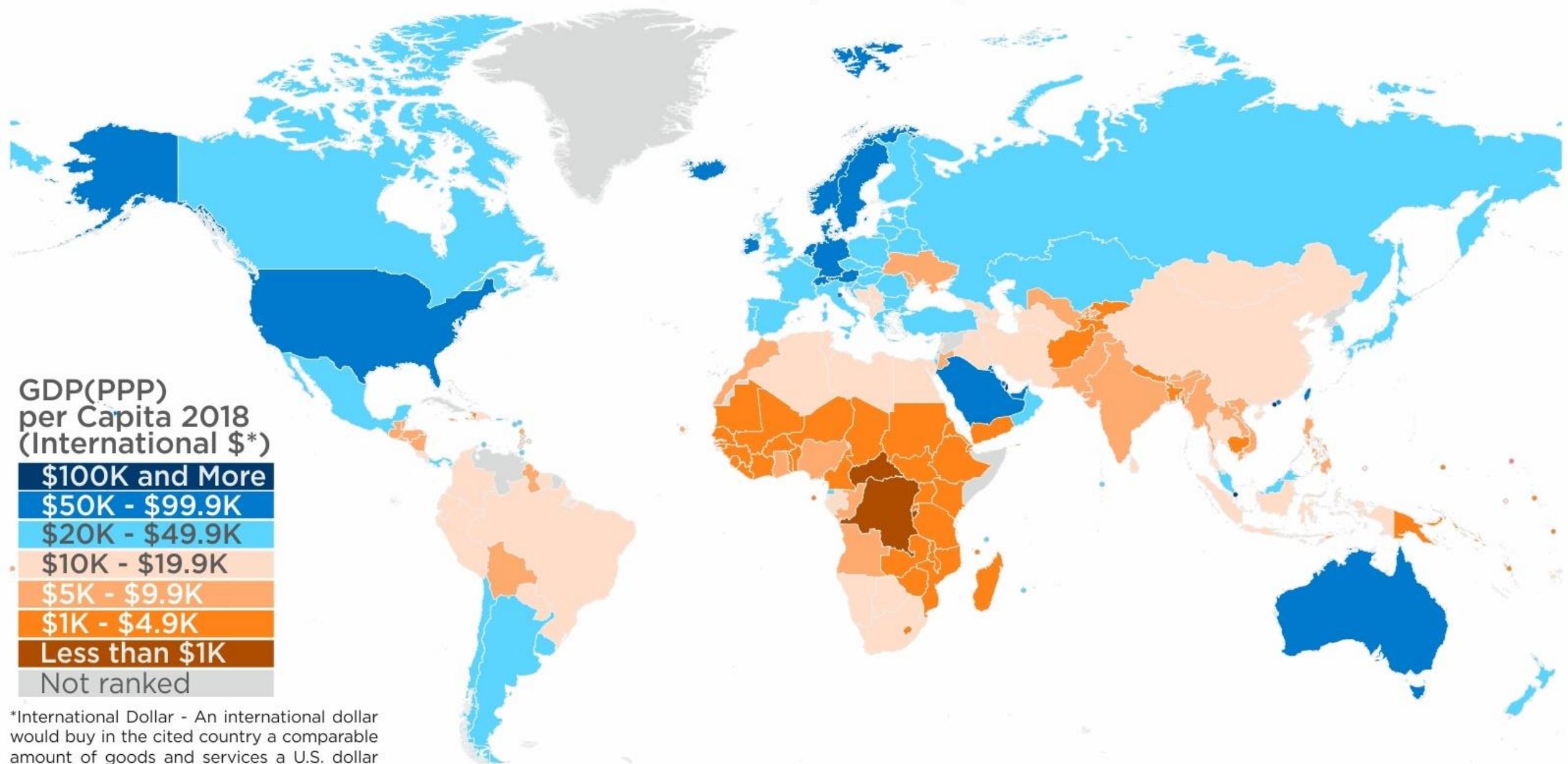
1. Differing population sizes across countries;
2. Population growth: changes in the size of GDP (or GNI) per capita over time depend very much on the relationship between growth in total GDP (or GNI) and growth in population.
  - If total GDP increases faster than the population, GDP per capita increases
  - If the country’s population increases faster than total GDP, then GDP per capita falls.

# Total value V.S. per capita value

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- **Total** measures of the value of output and income, provide a **summary statement** of the **overall size of an economy**.
- **Per capita** figures are useful as a summary measure of the **standard of living** in a country, because they provide an indication of how much of total output or total income in the economy corresponds to each person in the population on average.

# Gross Domestic Product (GDP, PPP) per Capita Around the World 2018



# The meaning of real GDP/GNI per capita at purchasing power parity (PPP)

- Different countries have different price levels. Same amount of money in a low-price country has greater **purchasing power** than in a high-price country.
- Purchasing power refers to the quantity of goods and services that can be bought with money.

# The meaning of real GDP/GNI per capita at purchasing power parity (PPP)

- Purchasing power parities (PPPs) – ‘**buying power equivalence**’.
  - **Special exchange rates between currencies** PPP provides that the exchange rate between two countries should be equal to the ratio of the respective purchasing power of those currencies. If this is not the case, then one of the currencies may be either over- or undervalued against the other currency.
  - Purchasing power parity (PPP) compares international economies by **standardizing the prices within a "basket of goods"**. In economics, a ‘basket of goods’ often represents items that most families in a nation need to live a standard lifestyle. The goods change from country to country as the goods are different for each group of citizens.
  - The use of PPP exchange rates to convert GDP (or GNI or any other output or income variable) **eliminates the influence of price level differences across countries** and is very important for making cross country comparisons.





Imagine country A has a GDP per capita of \$40,000, while that of country B is just \$10,000.

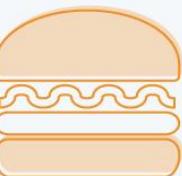
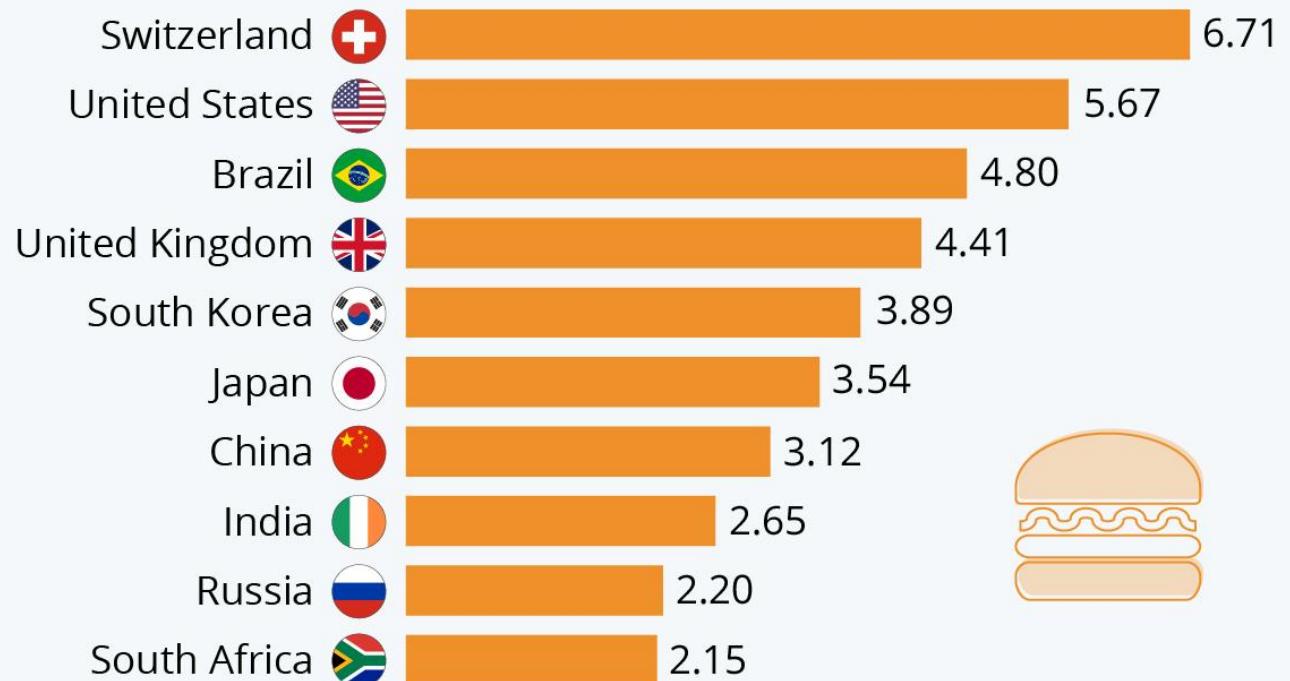


Does that mean country A's people are 4 times as rich?

→ It depends. What if a basket of goods, plus housing, utilities, transport and health costs are four times as expensive in country A compared to B? The two countries' standards of living would be pretty similar.

# Burgernomics: The Price of a Big Mac in Comparison

Price of a Big Mac in selected countries (in U.S. dollars)



As of January 2020

Source: The Economist

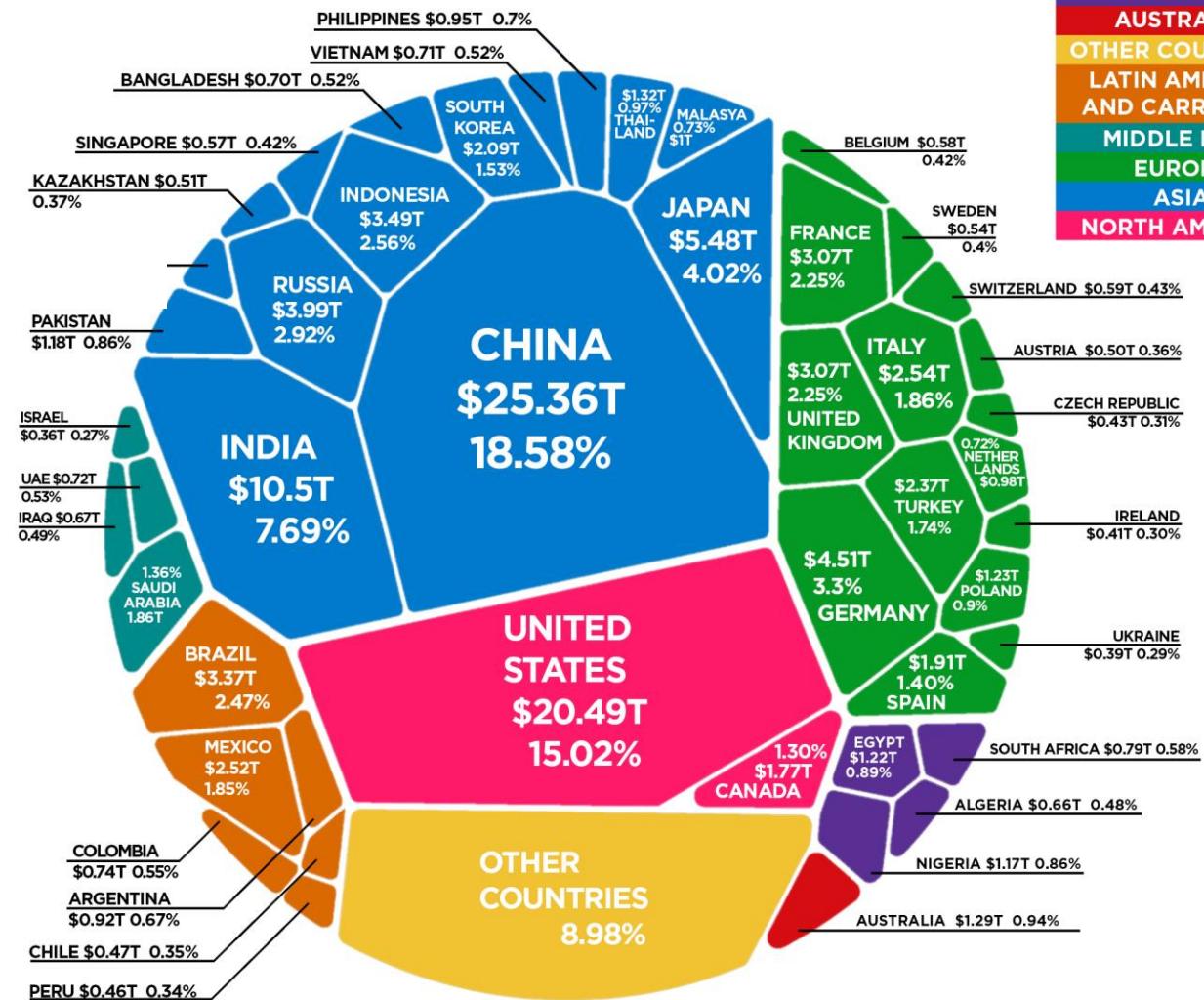


In 1986, The Economist published for the first time in its **Big Mac Index (IMC)** pages as an illustration of the purchasing power parity of money the average price of a **McDonald's Big Mac** in different countries. Customarily, a “basket of goods” is used to determine purchasing power, but the burger-loving folks over at the Economist simplified things by placing just a single Big Mac burger in their hypothetical basket, making the concept a bit easier to digest.

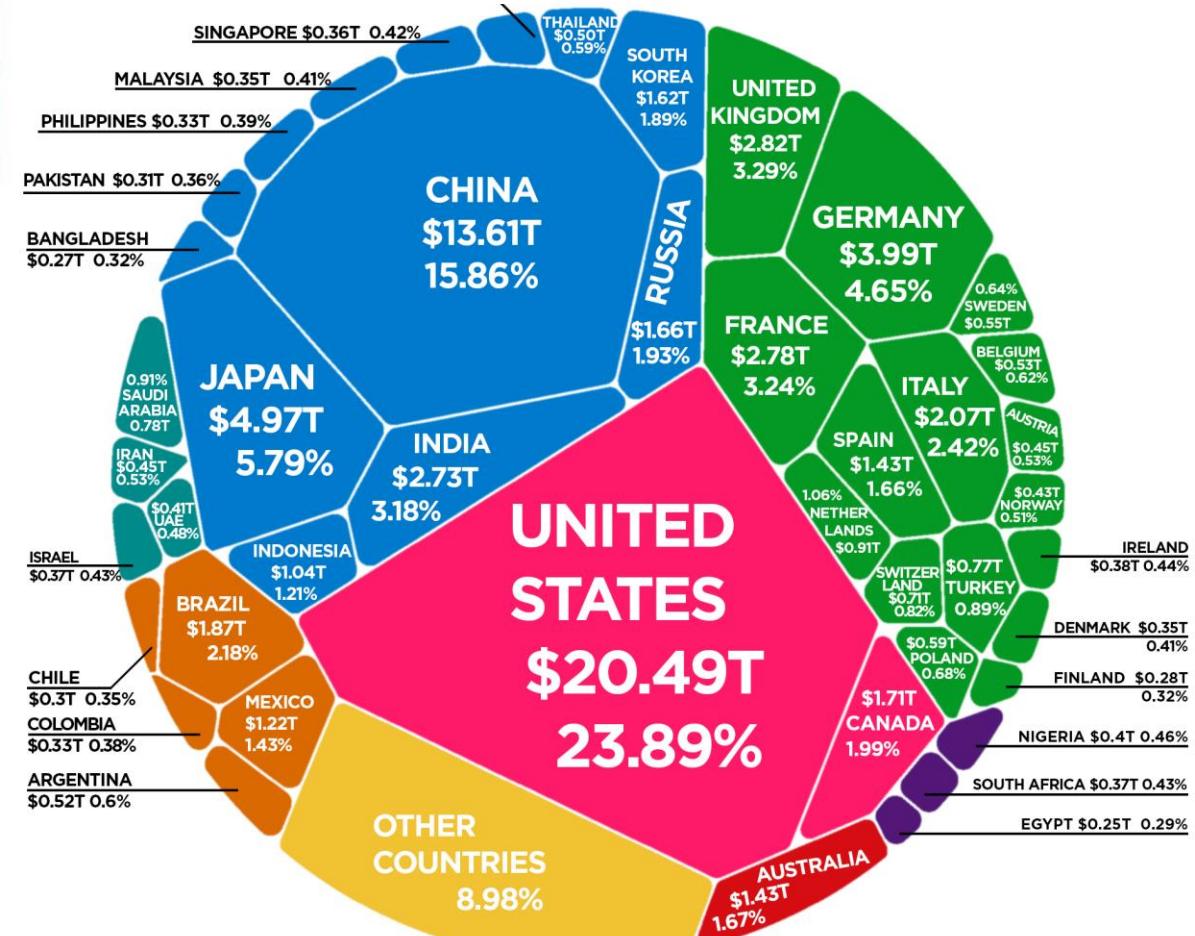
For example, the January 2020 Big Mac Index showed that a Big Mac cost, on average, £3.44(\$4.41) in the UK and \$5.67 in the US. Since the ingredients are virtually identical, this implies that the exchange rate at the time should have been £0.61 to the dollar (PPP adjusted exchange rate). The actual (market) exchange rate, however, was £0.78 pounds to the dollar.

# Changes in the World GDP when Adjusted by Cost of Living

GDP at PPP (2018)

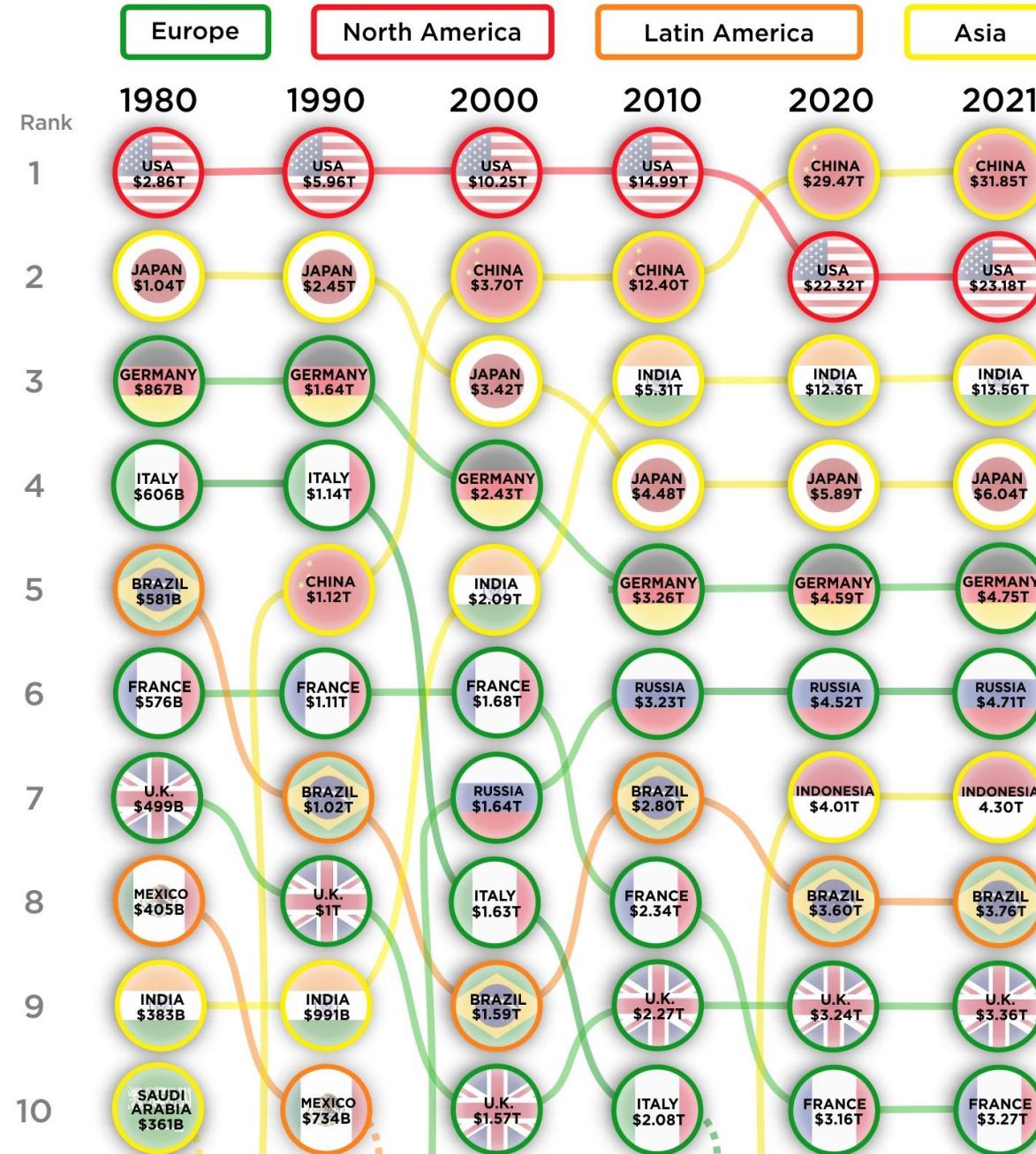


GDP (2018)



# The World's Biggest Economies Over Time

GDP (PPP) by Country (1980-2021\*)



# The importance of PPP

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- GDP and PPP are economic computations that can determine the **strength of a nation's economy**.
- It is a good tool to compare the economic performance and position of different countries. This is because the PPP rate is not subject to extreme fluctuations (on a day to day basis) and typically only changes (marginally) over years.
- It can help economists determine exchange rate trends in the long run, as exchange rates tend to move in the direction of the PPP exchange rate.

- Country: Lakeland

| Year                                     | 2015 | 2016  | 2017  | 2018  | 2019  |
|--|------|-------|-------|-------|-------|
| <b>Nominal GDP<br/>(billion Lkl)</b>     | 19.9 | 20.7  | 21.9  | 22.6  | 22.3  |
| <b>Price deflator<br/>(GDP deflator)</b> | 98.5 | 100.0 | 102.3 | 107.6 | 103.7 |
| <b>Population<br/>million</b>            | 1.20 | 1.21  | 1.22  | 1.23  | 1.27  |

- Identify the base year.
- Calculate real GDP for each of the five years.

- Country: Lakeland

| Year                                     | 2015 | 2016  | 2017  | 2018  | 2019  |
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- Identify the base year: 2016
- Calculate real GDP for each of the five years.
  - Real GDP in 2015 =  $19.9/98.5 \times 100 = 20.20$  billion Lkl
  - Real GDP in 2016 =  $20.7/100 \times 100 = 20.70$  billion Lkl
  - Real GDP in 2017 =  $21.9/102.3 \times 100 = 21.41$  billion Lkl
  - Real GDP in 2018 =  $22.6/107.6 \times 100 = 21$  billion Lkl
  - Real GDP in 2019 =  $22.3/103.7 \times 100 = 21.50$  billion Lkl

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  - Real GDP in 2018 =  $22.6/107.6*100 = 21$  billion Lkl
  - Real GDP in 2019 =  $22.3/103.7*100 = 21.50$  billion Lkl
- **State which year real GDP is the same as nominal GDP, outline why.**

- Country: Lakeland

| Year                                     | 2015 | 2016  | 2017  | 2018  | 2019  |
|--|------|-------|-------|-------|-------|
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  - Real GDP in 2017 =  $21.9/102.3*100 = 21.41$  billion Lkl
  - Real GDP in 2018 =  $22.6/107.6*100 = 21$  billion Lkl
  - Real GDP in 2019 =  $22.3/103.7*100 = 21.50$  billion Lkl
- In 2017-2018, nominal GDP increased, but real GDP fell, why?

- Country: Lakeland

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|--|------|-------|-------|-------|-------|
| <b>Nominal GDP<br/>(billion Lkl)</b>     | 19.9 | 20.7  | 21.9  | 22.6  | 22.3  |
| <b>Price deflator<br/>(GDP deflator)</b> | 98.5 | 100.0 | 102.3 | 107.6 | 103.7 |
| <b>Population<br/>million</b>            | 1.20 | 1.21  | 1.22  | 1.23  | 1.27  |

- Identify the base year: 2016
- Calculate real GDP for each of the five years.
  - Real GDP in 2015 =  $19.9/98.5*100 = 20.20$  billion Lkl
  - Real GDP in 2016 =  $20.7/100*100 = 20.70$  billion Lkl
  - Real GDP in 2017 =  $21.9/102.3*100 = 21.41$  billion Lkl
  - Real GDP in 2018 =  $22.6/107.6*100 = 21$  billion Lkl
  - Real GDP in 2019 =  $22.3/103.7*100 = 21.50$  billion Lkl
- In 2018-2019, nominal GDP fell, but real GDP increased, why?

- Country: Lakeland

| Year                                     | 2015 | 2016  | 2017  | 2018  | 2019  |
|--|------|-------|-------|-------|-------|
| <b>Nominal GDP<br/>(billion Lkl)</b>     | 19.9 | 20.7  | 21.9  | 22.6  | 22.3  |
| <b>Price deflator<br/>(GDP deflator)</b> | 98.5 | 100.0 | 102.3 | 107.6 | 103.7 |
| <b>Population<br/>million</b>            | 1.20 | 1.21  | 1.22  | 1.23  | 1.27  |

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  - Real GDP in 2019 =  $22.3/103.7*100 = 21.50$  billion Lkl
- **Calculate real GDP per capita for each of the year.**

- Country: Lakeland

| Year                          | 2015 | 2016  | 2017  | 2018  | 2019  |
|-------------------------------|------|-------|-------|-------|-------|
| Nominal GDP (billion Lkl)     | 19.9 | 20.7  | 21.9  | 22.6  | 22.3  |
| Price deflator (GDP deflator) | 98.5 | 100.0 | 102.3 | 107.6 | 103.7 |
| Population million            | 1.20 | 1.21  | 1.22  | 1.23  | 1.27  |

Real GDP for each of the five years.

- Real GDP in 2015 = 20.20 billion Lkl
- Real GDP in 2016 = 20.70 billion Lkl
- Real GDP in 2017 = 21.41 billion Lkl
- Real GDP in 2018 = 21 billion Lkl
- Real GDP in 2019 = 21.50 billion Lkl

- **Real GDP per capital**

- 2015 =  $20,200,000,000/1,200,000 = 16,833.33$  Lkl
- 2016 =  $20,700,000,000/1,210,000 = 17,107.44$  Lkl
- 2017 =  $21,410,000,000/1,220,000 = 17,549.18$  Lkl
- 2018 =  $21,000,000,000/1,230,000 = 17,073.17$  Lkl
- 2019 =  $21,500,000,000/1,270,000 = 16,929.13$  Lkl

- In 2018-2019, real GDP increased but real GDP per capita fell, why?

# National income statistics

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- National income statistics is the statistical data used to measure national income and output and other measures of economic performance. We usually use Real per capital GDP and real per capital GNI as the indicator of the economic well-being of the country.
- But it may not lead to valid conclusions, since:
  1. The national income statistics do not accurately measure the 'true' value of output produced in an economy.
  2. The economic well-being is closely related to a variety of factors that GDP and GNI are unable to account for.

# 1. Why national income statistics do not accurately measure the ‘true’ value of output?

- ① GDP and GNI do not include **non-marketed output**. It is usually far greater in developing countries compared to more developed ones.
- ‘non-marketed output’: output of goods and services is not sold in the market and does not generate any income.



The work of housewife



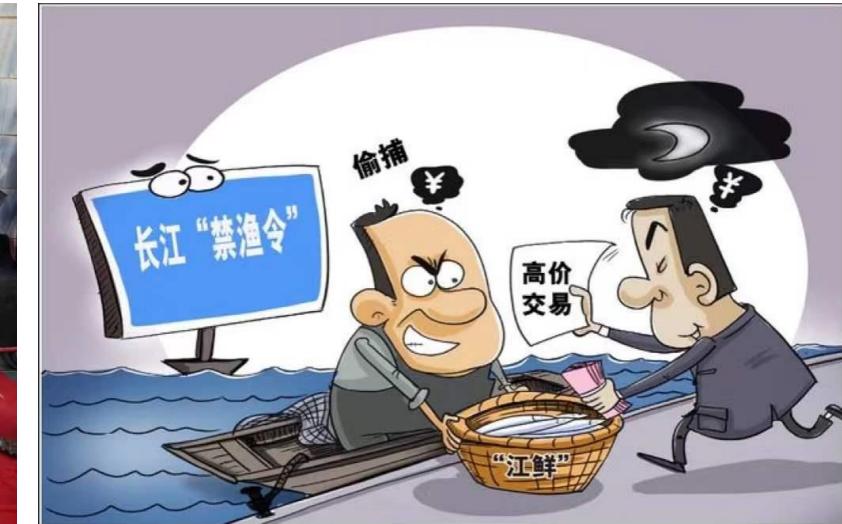
Self-consumption of farmers' agricultural goods



Households building their own house

# 1. Why national income statistics do not accurately measure the ‘true’ value of output?

- ② GDP and GNI do not include **output sold in underground markets**. Goods and services are traded in markets and do generate incomes, but they go unrecorded and not included in GDP/GNI.



# 1. Why national income statistics do not accurately measure the ‘true’ value of output?

- ③ GDP and GNI do not take into account **quality improvements** in goods and services. – The quality of many products improves over time, yet they are not taken into account.



1990: 大哥大  
RMB: 15,000



2024: iPhone 15  
RMB: 6,999

# 1. Why national income statistics do not accurately measure the ‘true’ value of output?

- ④ GDP and GNI do not account for **the value of negative externalities**, such as pollution, toxic wastes and other undesirable by-products of production. → reduce society's well-being
  - Green GDP
  - The cost of pollution treatment.
  
- ⑤ GDP and GNI do not take into account the **depletion of natural resources** (rainforests, wildlife, agricultural soils, etc.) which reduces society's well-being. → reduce society's well-being
  - Common pool resources
  - The depletion of natural resources influence the sustainability.

# 1. Why national income statistics do not accurately measure the ‘true’ value of output?

- ⑥ GDP, GNI and differing domestic price levels.
  - Goods and services sell for very different prices in different countries.
  - This problem can be effectively dealt with if we convert values of GDP and GNI of different countries into a single common currency by use of **purchasing power parities**.

# Economic Well-being

Economic well-being: It refers to **levels of prosperity, economic satisfaction** and **standards of living** among the members of a society.

- Security with respect to income and wealth
- Satisfactory quality of life
- Reduced income gap
- Low unemployment rate
- Empower of woman
- The ability to pursue one's goals
- And so on



## 2. Why measures of the value of output (GDP/GNI) cannot accurately measure economic well-being

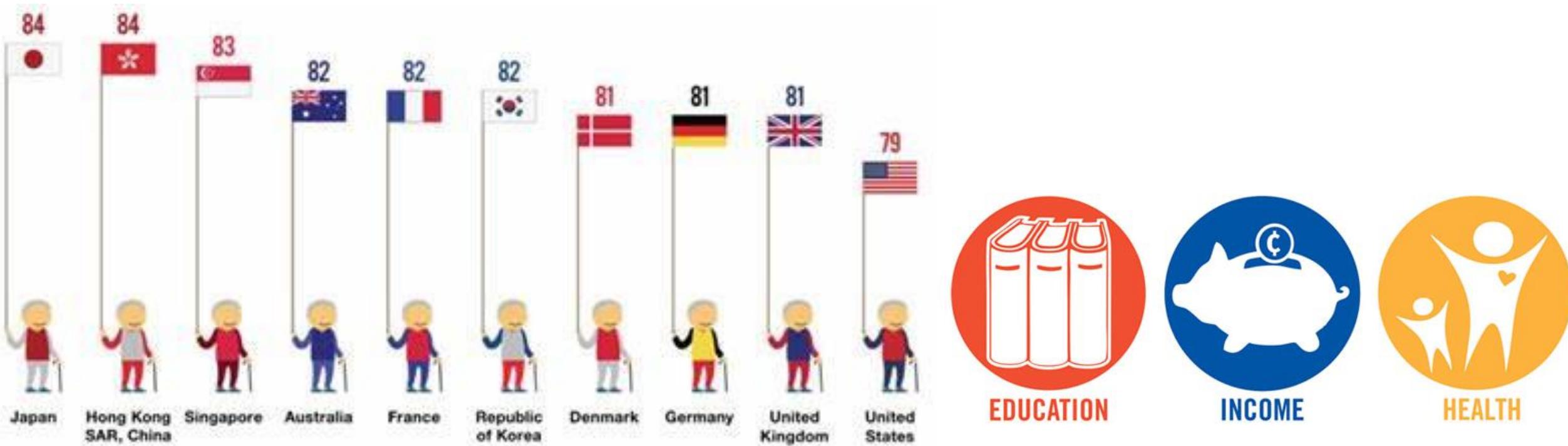
- ① GDP and GNI make no distinctions about the **composition of output**. They include the value of all without any distinctions about the degree to which they contribute to standards of living.
  - Whether a country produces capital goods(military goods) or consumption goods?



## 2. Why measures of the value of output (GDP/GNI) cannot accurately measure economic well-being

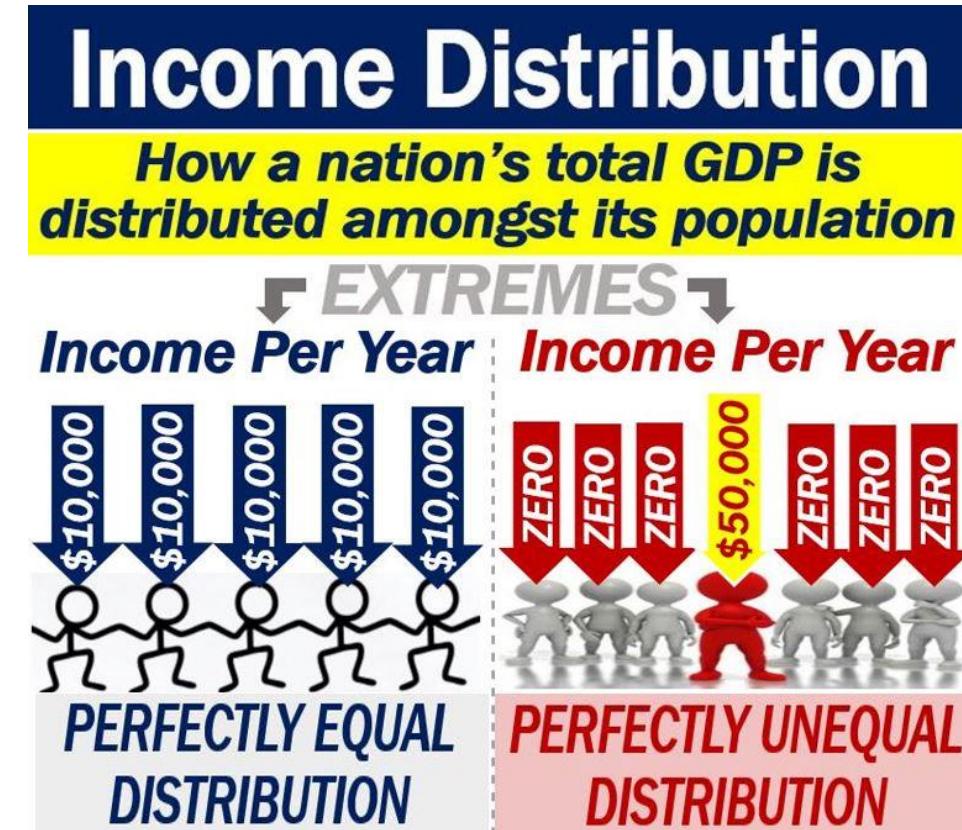
② GDP and GNI cannot reflect **achievements in levels of education, health care and life expectancy.**

- Life expectancy: the number of years one can expect to live, on average



## 2. Why measures of the value of output (GDP/GNI) cannot accurately measure economic well-being

- ③ GDP and GNI provide no information on the **distribution of income and output**.
- How equally or unequally income and output are distributed is another factor underlying society's well-being.



## 2. Why measures of the value of output (GDP/GNI) cannot accurately measure economic well-being

- ④ GDP and GNI do not take into account increased **leisure**.
- Leisure hours V.S. Working hours



**V.S**



## 2. Why measures of the value of output (GDP/GNI) cannot accurately measure economic well-being

⑤ GDP and GNI do not account for **quality of life** factors.

- Crime rate
- A sense of security and peace arising from relations with other countries
- Well-functioning institutions
- Stress levels from working conditions
- The degree of political freedom, etc.



# Alternative measures of well-being

## 1. OECD Better life Index

- By the Organization of Economic Co-operation and Development
- 36 economically more developed countries.
- Factors that make a better life.
  - 11 Well-being in the present
  - 4 Resources for well-being in the future (ensure that there will be sufficient resources in the future in order for a society to be able to maintain the well-being of its population)

| Well-being in the present              |                     |
|--|---------------------|
| Quality of life                        | Material conditions |
| State of health                        | Income and wealth   |
| Work-life balance                      | Jobs and earnings   |
| Education and skills                   | Housing             |
| Social connections                     |                     |
| Civic engagement/governance            |                     |
| Environmental quality                  |                     |
| Personal security                      |                     |
| Subjective well-being                  |                     |
| Resources for well-being in the future |                     |
| Natural capital                        | Human capital       |
| Economic capital                       | Social capital      |

# OECD Better life Index

## Mexico



## Korea



## Canada



# Alternative measures of well-being

## 2. Happiness Index



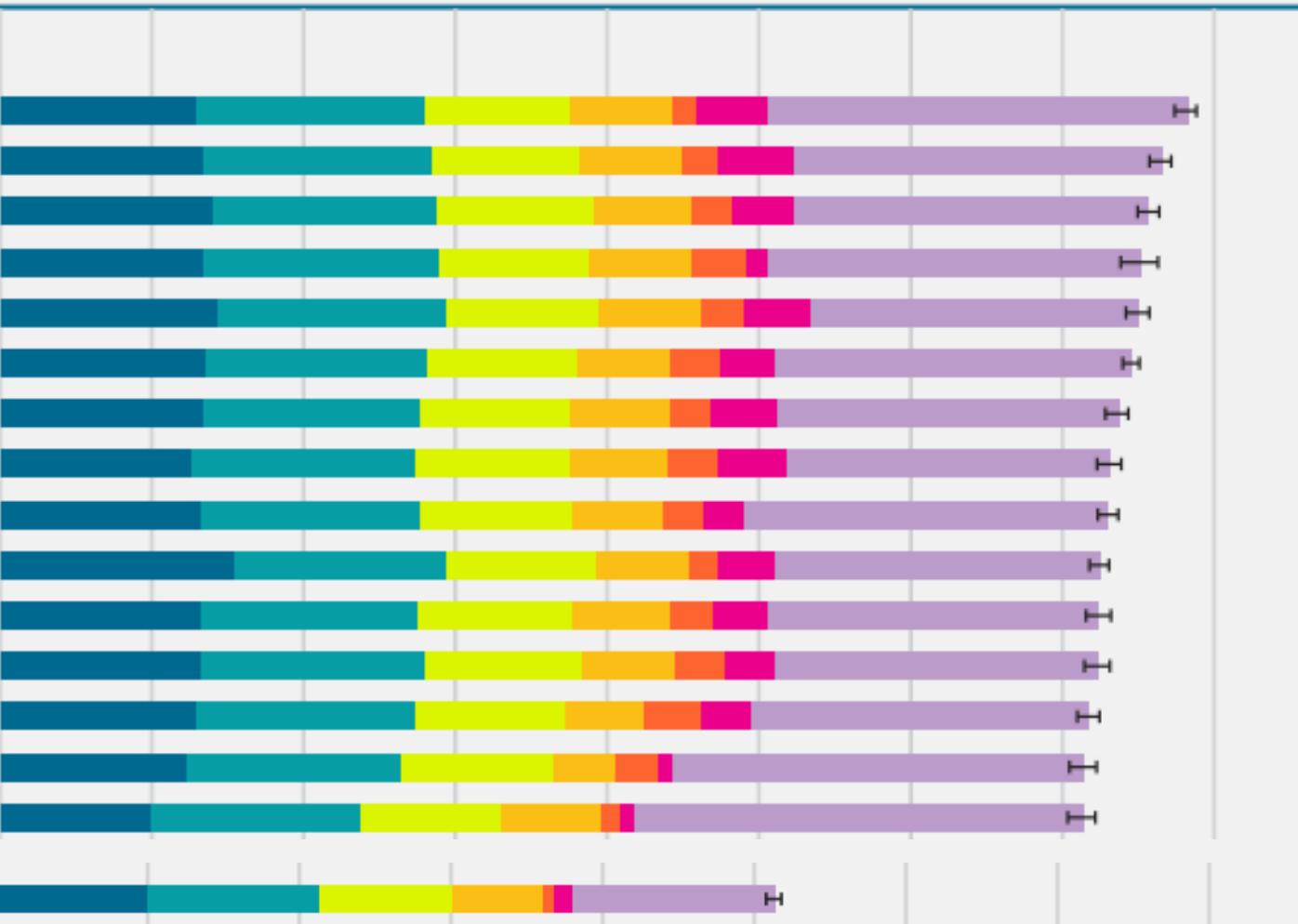
- By the United Nations Sustainable Development Network start from 2012.
- Focus on gathering scientific and technological knowledge to encourage policies for sustainable development.
- It included 156 countries.
- Ranked countries by the **happiness of their populations**.
- Based on following dimensions:
  - Real GDP per capita
  - Social support
  - Healthy life expectancy
  - Freedom to make life choices
  - Generosity
  - Perceptions of corruption
- Different theme topics for each year
- Limitation of happiness index
  - Happiness is very difficult to quantify and to measure, it means different things to different people across cultures.

# Ranking



**Figure 2.1: Ranking of Happiness 2017-2019 (Part 1)**

1. Finland (7.809)
2. Denmark (7.646)
3. Switzerland (7.560)
4. Iceland (7.504)
5. Norway (7.488)
6. Netherlands (7.449)
7. Sweden (7.353)
8. New Zealand (7.300)
9. Austria (7.294)
10. Luxembourg (7.238)
11. Canada (7.232)
12. Australia (7.223)
13. United Kingdom (7.165)
14. Israel (7.129)
15. Costa Rica (7.121)
94. China (5.124)



# Ranking

**Figure 2.1: Ranking of Happiness 2017–2019 (Part 3)**

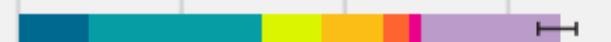
149. Central African Republic (3.476)



150. Rwanda (3.312)



151. Zimbabwe (3.299)



152. South Sudan (2.817)



153. Afghanistan (2.567)

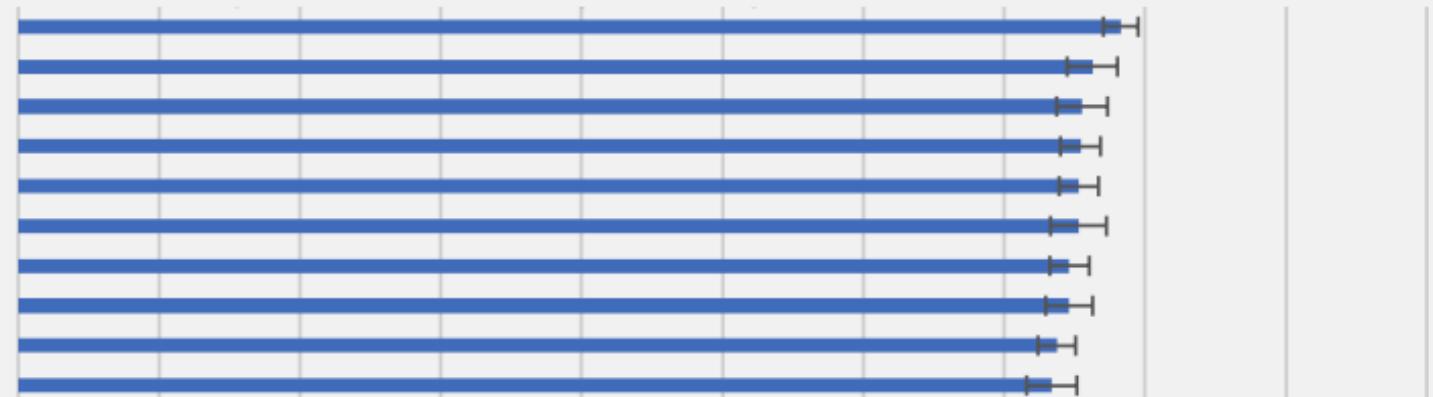


# Global ranking of cities

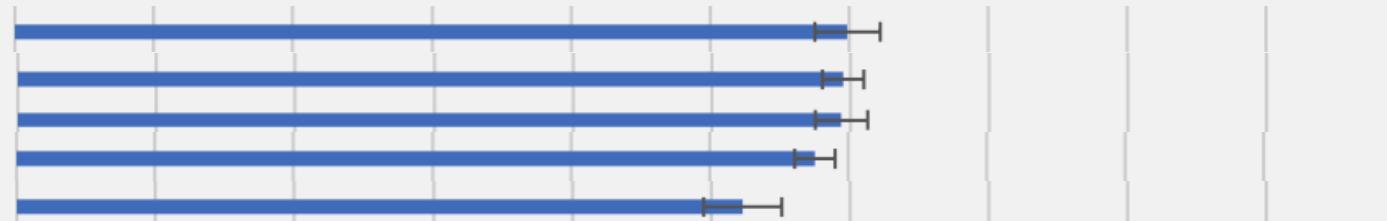
**Figure 3.1: Global Ranking of Cities – Current Life Evaluation (Part 1)**

**Subjective Well-Being Rankings**

1. Helsinki – Finland (7.828)
2. Aarhus – Denmark (7.625)
3. Wellington – New Zealand (7.553)
4. Zurich – Switzerland (7.541)
5. Copenhagen – Denmark (7.530)
6. Bergen – Norway (7.527)
7. Oslo – Norway (7.464)
8. Tel Aviv – Israel (7.461)
9. Stockholm – Sweden (7.373)
10. Brisbane – Australia (7.337)



79. Tokyo – Japan (5.989)
83. Seoul – South Korea (5.947)
84. Shanghai – China (5.936)
95. Guangzhou – China (5.761)
134. Beijing – China (5.228)



# Alternative measures of well-being

## 3. Happy Planet Index (HPI)

- Developed by the New Economics Foundation (NEF), calculated for 140-150 countries, score from 0 to 100, the highest being the best.
- Exploring new economic models ‘based on equality, diversity and economic stability’. – measure of **sustainable well-being**.

$$\text{Happy planet Index (HPI)} = \frac{\text{Life expectancy} * \text{well-being}}{\text{Ecological footprint}} * \text{inequality of outcome}$$

- ✓ **Life expectancy**: the average number of years a person expects to live;
- ✓ **Well-being**: a population’s satisfaction;
- ✓ **Inequality of outcome**: inequalities between people with regard to life expectancy and well-being (adjusted downward)
- ✓ **Ecological footprint**: the **impact on the environment** of each individual in a society on average. It is measured as the amount of land needed to provide for all their requirements and the amount of land needed to absorb their CO<sub>2</sub> emissions.

# Happy Planet Index (HPI) – TOP 5 countries

| RANK | COUNTRY            | Life expectancy ⓘ | Wellbeing ⓘ | Ecological footprint ⓘ | HPI SCORE<br>and change since<br>2018 |
|------|--------------------|-------------------|-------------|------------------------|---------------------------------------|
| 1st  | <b>COSTA RICA</b>  | 80.3 years        | 7.00/10     | 2.65 gha/p             | <b>62.1</b> (-1.2)                    |
| 2nd  | <b>VANUATU</b>     | 70.5 years        | 6.96/10     | 1.62 gha/p             | <b>60.4</b> (+0.8)                    |
| 3rd  | <b>COLOMBIA</b>    | 77.3 years        | 6.35/10     | 1.90 gha/p             | <b>60.2</b> (+2.7)                    |
| 4th  | <b>SWITZERLAND</b> | 83.8 years        | 7.69/10     | 4.14 gha/p             | <b>60.1</b> (+2)                      |
| 5th  | <b>ECUADOR</b>     | 77.0 years        | 5.81/10     | 1.51 gha/p             | <b>58.8</b> (-1.4)                    |

# Happy Planet Index (HPI) – lowest ranking countries



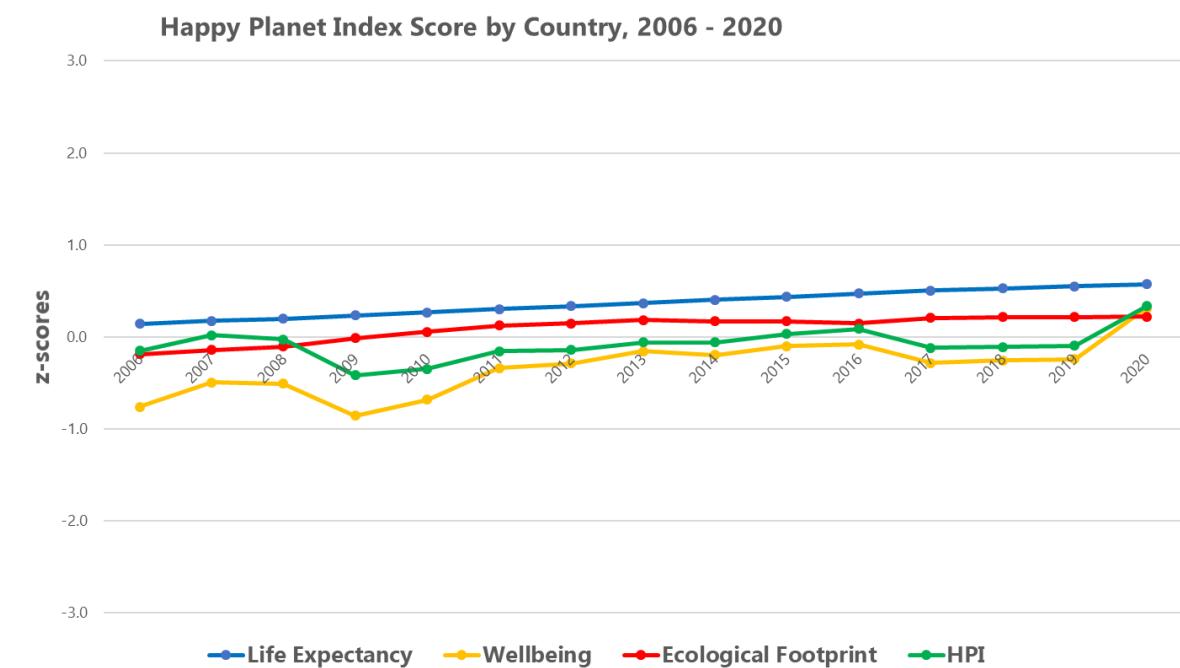
| RANK  | COUNTRY                     | Life expectancy ⓘ | Wellbeing ⓘ | Ecological footprint ⓘ | HPI SCORE<br>and change since<br>2018 |
|-------|-----------------------------|-------------------|-------------|------------------------|---------------------------------------|
| 148th | ZIMBABWE                    | 61.5 years        | 2.69/10     | 0.98 gha/p             | <b>28.6</b> (-5.6)                    |
| 149th | LESOTHO                     | 54.3 years        | 3.51/10     | 1.45 gha/p             | <b>27.3</b> (-0.4)                    |
| 150th | CENTRAL AFRICAN<br>REPUBLIC | 53.3 years        | 3.08/10     | 1.21 gha/p             | <b>25.2</b>                           |
| 151st | MONGOLIA                    | 69.9 years        | 5.56/10     | 10.08 gha/p            | <b>24.5</b> (-0.2)                    |
| 152nd | QATAR                       | 80.2 years        | 6.37/10     | 15.04 gha/p            | <b>24.3</b>                           |

# Happy Planet Index (HPI) – China

• • •

| RANK | COUNTRY | Life expectancy ⓘ | Wellbeing ⓘ | Ecological footprint ⓘ | HPI SCORE<br>and change since<br>2018 |
|------|---------|-------------------|-------------|------------------------|---------------------------------------|
| 94th | CHINA   | 76.9 years        | 5.14/10     | 3.74 gha/p             | 41.9 (+0.1)                           |

|      | Life Expectancy (years) | Ladder of life (0-10) | Ecological Footprint (g ha) | HPI  | HPI Rank |
|------|-------------------------|-----------------------|-----------------------------|------|----------|
| 2006 | 73.3                    | 4.56                  | 2.71                        | 41.4 | 94       |
| 2007 | 73.6                    | 4.86                  | 2.83                        | 42.9 | 60       |
| 2008 | 73.8                    | 4.85                  | 2.92                        | 42.5 | 64       |
| 2009 | 74.1                    | 4.45                  | 3.16                        | 39.1 | 91       |
| 2010 | 74.4                    | 4.65                  | 3.33                        | 39.7 | 88       |
| 2011 | 74.7                    | 5.04                  | 3.50                        | 41.4 | 79       |
| 2012 | 75.0                    | 5.09                  | 3.56                        | 41.5 | 83       |
| 2013 | 75.3                    | 5.24                  | 3.65                        | 42.2 | 81       |
| 2014 | 75.6                    | 5.20                  | 3.62                        | 42.2 | 83       |
| 2015 | 75.9                    | 5.30                  | 3.61                        | 43.0 | 80       |
| 2016 | 76.2                    | 5.32                  | 3.56                        | 43.5 | 75       |
| 2017 | 76.5                    | 5.10                  | 3.71                        | 41.7 | 92       |
| 2018 | 76.7                    | 5.13                  | 3.73                        | 41.8 | 92       |
| 2019 | 76.9                    | 5.14                  | 3.74                        | 41.9 | 94       |
| 2020 | 77.1                    | 5.77                  | 3.74                        | 45.6 | 94       |



# Alternative measures of well-being

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- **The happiness Index** is concerned with personal happiness
- **The happy planet index** is concerned with happiness of the planet, it is much more of a measure of sustainability and how well resources can support a population's well-being.