ANGLO-CHINESE JUNIOR COLLEGE
JC2 Economics

H2	DOMESTIC MACROECONOMIC ISSUES (1) STANDARD OF LIVING

©ACJC Econs Dept/2024/H2 Domestic Macroeconomic Problems

WHAT IS THIS TOPIC ABOUT?

The overall aim of governments is to attain the highest possible standard of living for all residents in their countries with the available resources and technology. The key to achieving high and rising standard of living is a strong and stable macroeconomic performance. It is through sustainable economic growth, rising income and high employment level in the labour market that a population can enjoy high material standard of living. In the earlier set of notes on Introduction to Macroeconomics, you have learnt that standard of living has both the material and non-material aspects, as such we should be aware that by improving on the material aspect of standard of living is insufficient on its own because the non-material aspect is just as important.

This new topic of **Domestic Macroeconomic Aims & Problems** will take you to understand these two big areas of focus:

1. How standard of living is measured and the limitations in using national income figures to measure living standards.
2. The causes of domestic macroeconomic problems, and the consequences of these problems on current and future standard of living.

Keep connected to the key ideas you have learnt in the previous topic of Introduction to Macroeconomics because these are needed for you to understand the causes of macroeconomic problems. Macroeconomic problems come about from the imbalances between AD and AS and these imbalances will pose challenges to the government in achieving its aim of raising standard of living.

LEARNING OUTCOMES

Enduring Understanding:

- A comprehensive measure of standard of living should take into consideration both material and non-material conditions affecting individuals in a country.
- Macroeconomic problems are caused by a confluence of internal and external conditions, often interrelated in nature, affecting a country's aggregate demand and aggregate supply, hence national income and general price level.
- Both the country's national income and general price level will thus affect the overall standard of living, directly and indirectly.

Overarching Essential Questions:

- Does a better economic performance of a country always lead to an improvement in its living standards?
- Can a country achieve all four macroeconomic goals at any one point in time?

Article: How the Covid-19 pandemic affective liveability worldwide

The Global Liveability Index 2021

Rank	City	Location
1	Auckland	New Zealand
2	Osaka	Japan
3	Adelaide	Australia
4	Wellington	New Zealand
5	Tokyo	Japan
6	Perth	Australia
7	Zurich	Switzerland
8	Geneva	Switzerland
9	Melbourne	Australia
10	Brisbane	Australia

The pandemic has caused huge volatility in The Economist bi-annual Liveability index, which ranks 140 cities across five areas: stability, healthcare, education, culture and environment, and infrastructure. (For a full methodology, see page 6.) Data for this survey were gathered between February 22nd and March 21st 2021, when cities were at different stages of their battle with the pandemic

The new leader is Auckland. Owing to border closures and a consequently low Covid-19 case count, New Zealand has been able to keep its theatres, restaurants and other cultural attractions open. Students have been able to continue going to school, giving Auckland a 100% score for education. This has allowed the city to move up from sixth place in our autumn 2020 survey to first position in our March 2021 rankings. In third place is Adelaide in Australia, which also imposed a ban on international travel. Three more Australian cities—Perth, Melbourne and Brisbane—appear in the top ten, with Sydney in 11th place. The Swiss cities of Zurich and Geneva also maintained their places in the top ten, despite some social restrictions still being in place.
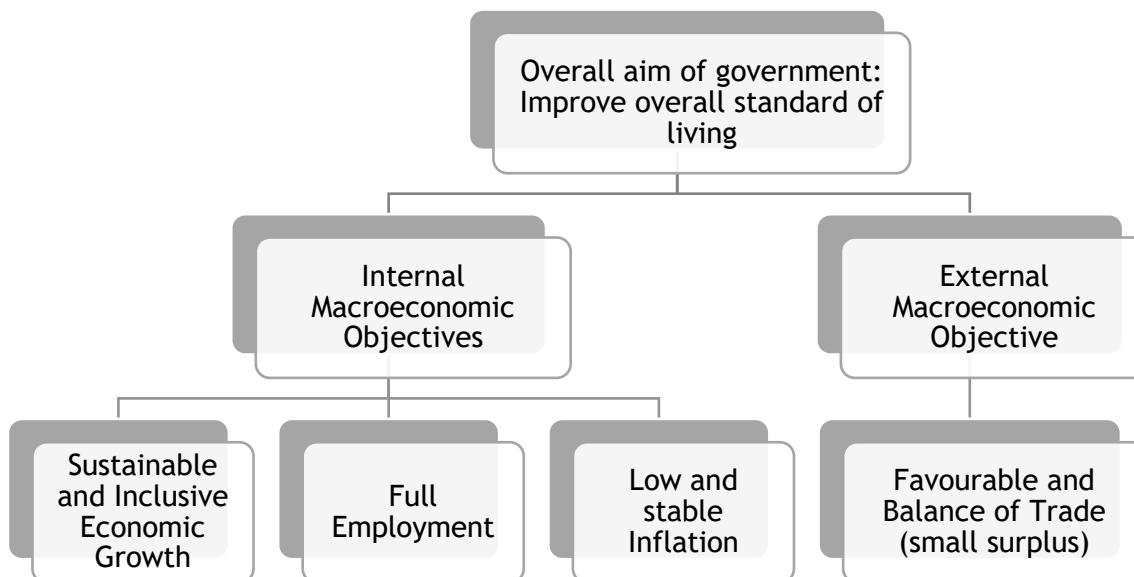
Further down the rankings, the picture is grimmer, particularly in Europe. Vienna, capital of Austria, occupied the top spot throughout 2018-20 but has slipped down to 12th place for the current survey, following the second Covid-19 wave. In Germany, Frankfurt, Hamburg and Dusseldorf have seen the biggest falls in ranking of all our 140 cities. Canadian cities such as Montreal, Vancouver, Calgary and Toronto, which have previously scored highly, have also slipped. The downward movement in rankings for the European and Canadian cities can be attributed to the heightened stress on healthcare resources during the second wave of the pandemic.

Source: The Economist Intelligence Unit

Questions:
1. State the factors that were considered in measuring a city's standard of living.

2. Explain possible reasons why New Zealand and Australia dominate the top ten list of the most liveable cities.

Overview 1: Macroeconomic aims in relation to Standard of Living

```
                    Overall aim of government:
                    Improve overall standard of
                              living
                    ┌──────────────┴──────────────┐
              Internal                        External
            Macroeconomic                   Macroeconomic
             Objectives                       Objective
      ┌───────────┼───────────┐                  │
 Sustainable      Full     Low and        Favourable and
 and Inclusive  Employment  stable        Balance of Trade
   Economic               Inflation        (small surplus)
    Growth
```

Failure to achieve the above macroeconomic objectives will result in macroeconomic issues within the country. To summarise these macroeconomic issues and its conditions, refer below:

Undesirable Economic Growth	• Negative economic growth / recession • Unsustainable but positive economic growth • Non-inclusive growth
High unemployment rate	• High unemployment due to poor / lack of demand • High unemployment due to mismatched skills
Price instability	• Rapidly rising general price level • Rapidly falling general price level (deflation) • Unstable rise and fall of general price level
Unfavourable BOT position	• Persistent and large BOT deficit • Persistent and large BOT surplus

You are to refer to the Introduction to Macroeconomics notes issued in JC1 for the explanation of each of the above macroeconomic objectives and the indicators used to assess the performance of the economy in those areas.

1. STANDARD OF LIVING (SOL)

Standard of living can be measured in material and non-material terms.

In material terms, it refers to the **amount of goods and services available for a country's citizens / residents for consumption**. This can be measured by the national output, which is the amount of goods and services produced in the economy, and the per capita earnings, which is the average income per person in the country.

In non-material terms, it refers to the qualitative aspects of life such as quality of health, education, environment, and amount of leisure time. These qualitative aspects of life can be measured by indicators such as life expectancy, education level, air quality index etc.

While not exhaustive, Figure 1 highlights some indicators that economists look at to measure a country's standard of living.

1.1 Material SOL Indicator: Gross Domestic Product (GDP)

Figure 1: Measures of SOL
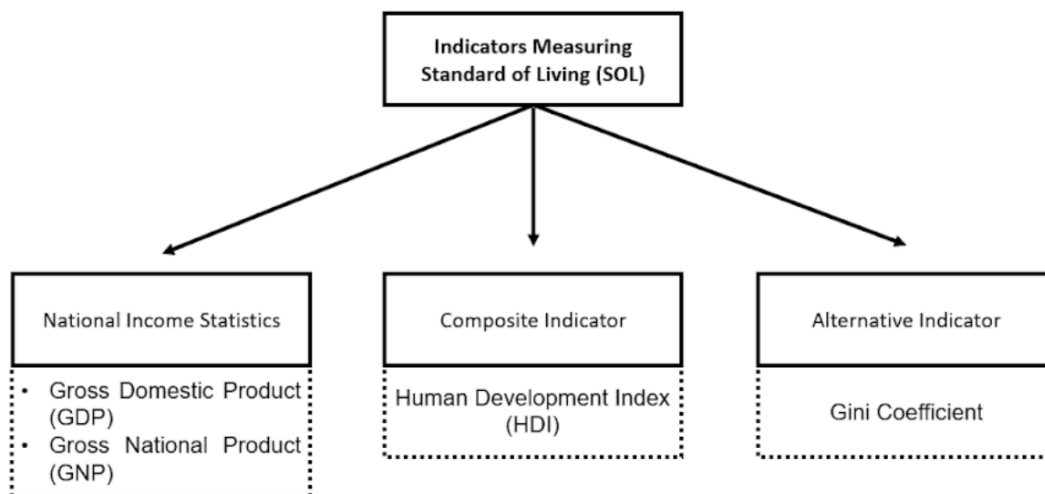
Material SOL can be measured by Gross Domestic Product (GDP).

▪ Definition of GDP: the monetary value of all final goods and services produced by residents within the geographical boundaries of a country, in a given period of time, regardless of ownership of the factors of production.

Here is how a country's GDP is indicative of material SOL. As GDP measures the value of goods and services produced, this production of goods and services in turn generates income in terms of firms' profits and workers' wages. Therefore, a higher GDP implies higher levels of production of economic activities and thus income. Higher income allows residents in a country to increase their consumption of goods and services. Consequently, material SOL improves.

Having said that, GDP generated may not fully belong to the domestic economy where there is a large concentration of foreigners working and

foreign-owned firms. As such, some parts of profits and personal earnings in the GDP will flow out due to overseas remittance. Consequently, GDP may overestimate citizens' SOL. This is why if a country hopes to measure its citizens' standard of living, Gross National Product (GNP) could be a more accurate indicator.

1.2 Material SOL Indicator: Gross National Product (GNP)

GNP is defined as <u>the **monetary** value of all **final** goods and services **produced by nationals** of a country, **irrespective of location of production** (domestic or abroad), in a given period of time.</u>

It captures only the economic activities generated by its citizens / nationals only, hence the term 'NATIONAL' product.

1.3. Differences between GDP and GNP

The difference between "GNP" and "GDP" is a term called "**net factor income from abroad**" (see Equation 1 below).

To calculate the "Net factor income from abroad", it is taking the "income **earned by nationals** from the production of output **located overseas**" MINUS the "income **paid to foreign firms/individuals** from production of output **located domestically**" (see Equation 2 below). *Note that the net factor income from abroad can be a positive or negative value.*

Equation 1:	Gross National Product (GNP)	=	Gross Domestic Product (GDP)	+	Net Factor Income from Abroad
Equation 2:	Net Factor Income from Abroad	=	Income earned by nationals from the production of output located overseas	—	Income paid to foreign firms/individuals from production of output located domestically

The significance of the above difference is as follows:

Due to globalisation and international trade, residents residing within the country may be made up of both the citizens and foreigners. As such, there will inevitably be some production that takes place within the geographical boundaries of a country using **factors owned by foreigners -** i.e "income paid abroad".
Similarly, some productive resources owned by the citizens of the country which are located outside of their country - i.e "income earned from abroad".

Therefore, to accurately measure **material SOL of <u>citizens</u>** from a given country, "income paid abroad" must be subtracted and "income earned from abroad" must be added into GDP to get GNP.

(Note to students: GNP (Gross National Product) and GNI (Gross National Income) can be used interchangeably. For consistency, the notes will be using GNP.)

Think about this:

What do you think are some possible limitations of measuring and calculating the net factor income from abroad? How would that affect the accuracy of GNP?

1.4 Measuring and Comparing Material SOL

1.4.1 Comparing Material SOL Across Time

Economists would sometimes compare how material SOL of a country has changed over time. To do so, economists would compare GDP in a given year relative to another year. With reference to Table 1, the nominal GDP of a hypothetical country AC Land increased from US$280 billion to US$340 billion.

a) The difference between "Nominal" vs "Real" concept

The term **nominal means GDP is measured using prices from the same year** i.e. 2011 nominal GDP is measured using prices prevailing in 2011 while 2021 GDP is measured using prices prevailing in 2021.

Table 1: GDP of AC Land

Year	2011	2021
Nominal GDP (US$)	280 billion	340 billion

At times, real GDP is used as a basis of comparison instead. This is because **real GDP is a more accurate measurement as it removes the effect of price changes over time.**

Here is how real GDP is measured. Economists would identify a base year i.e. the starting point of the comparison. With reference to Table 2, the base year is identified as 2011. As such, the price index of the base year, which is in 2011, is given the value of 100. Next, economists would measure the change in prices in order to calculate the price index for subsequent years. In 2021, assume that prices have increased by 25% since 2011. Therefore, the price index in 2021 is 125. The following formula is then used to convert nominal GDP to real GDP.

$$Real\ GDP = \frac{Nominal\ GDP\ of\ a\ given\ year}{Price\ Index\ of\ given\ year} \times 100$$

Table 2: GDP of AC Land

Year	2011	2021
Nominal GDP (US$)	280 billion	340 billion
Price Index/GDP deflator	100	125
Real GDP (US$)	280 billion	272 billion

Using real GDP as a basis of comparison, the real GDP of AC Land has decreased from US$280 billion in 2011 to US$272 billion in 2021. Notice how material standard of living is deemed to have increased if the nominal GDP is used as the basis of comparison. However, material standard of living is found to have decreased if measured using real GDP. Therefore, comparing nominal GDP instead of real GDP over different years can be very misleading when determining changes in living standards.

b) "Per Capita" Concept

In comparing material SOL over time, economists are also mindful that the population size of a country may also change. As such, economists would also measure **material SOL in per capita terms** (see Table 3). Economists calculate real GDP per capita using the following formula:

$$Real\ GDP\ per\ capita = \frac{Real\ GDP}{Total\ Population\ Size}$$

Table 3: GDP of AC Land

Year	2011	2021
Real GDP (US$)	280 billion	272 billion
Population	5 million	6 million
Real GDP per capita (US$)	56 000	45 333

Think further: Now, imagine the population size in 2021 has dropped to 4.5million, what do you think would happen to the GDP per capita in 2021, as compared to 2011?

1.4.2 Comparing Material SOL Across Country/Space

a) **Using real GDP per capita converted into a common currency, market exchange rate**

Economists would sometimes compare material SOL of different countries. To do so, economists would **convert the real GDP value of each country into a common currency such as the US dollar** (see Table 4). Moreover, economists would measure real GDP in per capita terms to take into account countries with different population sizes.

Accounting for population sizes is important to measure material SOL across country as well. With reference to Table 4, notice how India's real GDP in (US$) is larger than Singapore's real GDP (US$); thus, implying that India has better material SOL.

However, the conclusion is reversed when real GDP per capita (US$) is compared instead. Singapore's larger real GDP per capita (US$) value is attributed to the fact that the population of Singapore pales in comparison to that of India. In 2020, Singapore's population is estimated to be at 5.69 million and India's population is in excess of 1.38 billion.

Table 4: Real GDP of Singapore and India in 2020

Country	Singapore	India
Real GDP (US$)	340 billion	2.62 trillion
Real GDP per capita (US$)	59 797	1900

b. **Using real GDP per capita converted by using Purchasing Power Parity exchange rate (PPP)**

Earlier, we see how real GDP has to be converted into a common currency using the market exchange rates, to compare material SOL across countries. There is another form of exchange rate that economists may use to convert real GDP into a common currency, and that is the Purchasing Power Parity exchange rate.

PPP measures the amount of foreign currencies needed to buy the same basket of goods and services in two countries. **PPP exchange rates** thus equalise the purchasing power of different currencies by removing the difference in price levels between different countries.

Essentially, the PPP is a form of exchange rates between currencies based on the comparison of countries' domestic price levels of a common basket of goods.

To observe how PPP is being employed, consider the following:

- Assume USA and China are both a single-good economy such that they both produce only bread.
- The price of bread in the USA is US$2 while the price of bread in China is RMB 3

Given the above assumptions, it then follows that the GDP of the USA and China are US$200 and RMB 300 respectively (see Table 5).

Table 5: Hypothetical GDP of USA and China in own domestic currency

Country	USA	China
Price of Bread (P)	US$ 2	RMB 3
No. of breads produced (Q)	100	100
GDP (P x Q)	US$ 200	RMB 300

"Market Exchange Rate" Concept

For fairness of comparison, the GDP of each country should be converted to a common currency. The conversion can be based on the market exchange rate. So, assume the market exchange rate to be **US$1 : RMB 6**. It then follows that the GDP of the USA remains at US$200. However, China's GDP is now valued at US$50 only i.e. RMB 300 divided by 6 (see Table 6).

Recall that GDP is a proxy for income. Income earners then use their income to purchase goods and services in order to enhance their material SOL. With reference to Table 6, a USA resident can purchase US$200 worth of goods and services in the USA. A China resident can purchase only US$50 worth of goods and services in China. Therefore, Table 6 suggests that the material standard of living is higher in the US.

Table 6: Hypothetical GDP of USA and China in US$
(market exchange rate of US$1: RMB 6)

Country	USA	China
GDP	US$200	US$50

"PPP Exchange Rate" Concept

However, the conclusion derived from Table 6 is different when the PPP exchange rate is used. Recall that the price of bread in the USA is US$2 while the price of bread in China is RMB 3 while Therefore, it follows that the PPP exchange rate is US$2 : RMB 3 which is **US$ 1 : RMB 1.5.**

It then follows that the GDP of the USA remains at US$200. However, China's GDP is now valued at US$200 i.e. RMB 300 divided by 1.5 (see Table 7). A USA resident can purchase US$200 worth of goods and services in the

USA. A China resident can also purchase US$200 worth of goods and services in China.

Table 7: Hypothetical GDP of USA and China in US$ (PPP)

Country	USA	China
GDP	US$200	US$200

You may wonder why using the PPP exchange rate would allow us to observe that China's material standard of living is equivalent to that of the US.

- This is because the price of bread is cheaper in China. Thus, a China resident would be able to purchase more bread although their income is less than their counterparts in the USA.

1.5 Limitations of Measuring and Comparing Material SOL using National Income Statistics

It must be noted that while national income statistics such as GDP and GNP does indicate material SOL, it does so to a certain extent only. The following challenges and limitations of these indicators can be found in Table 9.

Limitations in:
(1) converting nominal GDP to real GDP
(2) converting real GDP to a common currency using market exchange rate
(3) converting real GDP using PPP exchange rate

Table 8: Challenges and Limitations of using GDP values to measure material SOL

Limitations of converting nominal to real GDP	Calculation of the Consumer Price Index may include statistical errors, which then affect the accuracy of the calculation of real GDP from nominal GDP.
Limitations of converting GDP to a common currency using market exchange rate	Using the market exchange rates to convert countries' national income figures into a common currency can lead to statistical distortions due to fluctuations and inaccuracies in currency valuations. Currency Fluctuation: Market exchange rates could be influenced by factors such as: • Speculative activities by currency traders • Government intervention • Changes in other demand and supply factors in the currency market The above factors may lead to a different market exchange rate, which means the GNP value in terms of US$ will be very different.

	For example: Suppose Singapore's GNP is SGD$ 100. Using an exchange rate of US$1 = S$2, this will give a converted GNP of US$ 50 in US dollars. However, if the market exchange rate used is US$ 1= S$ 1.5, the converted GNP is then US$ 66.6. Therefore, this may under-estimate or over-estimate the true standard of living of the residents across the two countries. <u>Inaccurate Currency Valuation:</u> There may be some countries with their exchange rate being under-valued against the US$. These countries will then have their GNP under-valued, under-estimated their true standard of living. On the contrary, countries with an over-valued currency against the USD will have their national income figures over-represented. *Think further: Why will countries have their currency under-value? What macroeconomic aim can that help to achieve?*
Limitations of converting GDP using PPP exchange rate	**Qualitative differences of products in different countries have not been taken into account.** Therefore, a country with a lower GDP based on PPP could still be comparable, (or an even higher material SOL) if the quality of goods and services found in said country is higher. Differences in the basket of goods and services consumed, given that countries and individuals differ in climate, culture and social norms. For example, rice is a staple for Chinese and less so for Americans. Hence, having to satisfy different needs meant that different countries might differ in the composition of their basket of goods and services consumed. Despite the above issues, PPP-adjusted GDP figures are still preferable to market exchange rate-adjusted GDP figures because it reflects the relative domestic prices of goods and services in different countries.
Other limitations such as: a) Measurement problems	National income figures may not give an accurate measurement of a country's level of production due to statistical coverage where some data may

	be omitted. There could also be **errors in compilation**.

The inherent inaccuracies due to **under-declaration of incomes / earnings** (in tax returns by individuals and firms). Some countries may also be inaccurate due to the **"shadow economy"** where activities generating income are not reported. For example: illegal activities such as drug production and distribution, prostitution or unreported legal activities.

Statistical accuracy also differs between countries. **Developing countries** could face greater inherent problems affecting the reliability of their income figures:

- Farming activities for subsistence are not recorded
- Irregular updating of GDP reports
- Poor administrative capacity to collect data due to insufficient resources to fund official statistics office |
| Other limitations such as: Inability of national income to reflect the differences in the composition of national output | National income statistics measure a country's level of production but may be a poor indicator of the consumption level by a country's residents. This is because a country's output includes both consumption and investment goods but **current living standards depend only on consumption goods.**

Increase in national income may be caused by a rise in the **production of investment goods** (as opposed to consumer goods), such an increase will not lead to a rise in **current living standards,** although it will help to increase **future consumption and hence, future living standards.**

A rise in national income e.g. an increase in real GDP due to an increase in government expenditure on a war does not imply a rise in living standards for its residents.

Similarly, a rise in national income that stems from an increase in export revenue may not contribute to a rise in living standards, if the income generated from a higher export revenue is not spent on domestic consumption and/or imports of consumption goods. |

1.6 Sufficiency of National Income Statistics as a measurement of SOL

Even if the quality of measurement improves, it is highly disputable whether the national income figures provide good indicators of the living standards in a country. The two concepts of living standard and national income are not identical. There are material and non-material aspects of the standard of living to consider.

- National income statistics can at best reflect the material standard of living measured by the amount of goods and services that individuals within the country have available for consumption.
- Non-material aspects of living standards which involve indicators like the amount of leisure people enjoy, life expectancy, standard of education, absence of pollution and other social factors are not reflected in national income statistics.

Therefore, national income statistics can at best reflect material SOL.

1.7 Use of composite indicator like Human Development Index (HDI) in measuring and comparing standard of living

Given the limitations of only using national income statistics as a measure of living standards, these statistics should be supplemented by other indicators that indicate the composition and beneficiaries of real national output of the country, e.g. life expectancy, infant mortality, income distribution, adult literacy rate and access to clean water and sanitation. A number of composite indicators have been adopted to include some of these areas.

For a more comprehensive measure of living standards, economists usually use composite indicators such as the **Human Development Index (HDI)** to measure non-material SOL The HDI is the best-known and most widely used index of the United Nations Development Program (UNDP). It is a summary measure of human development and measures average achievement in three dimensions:
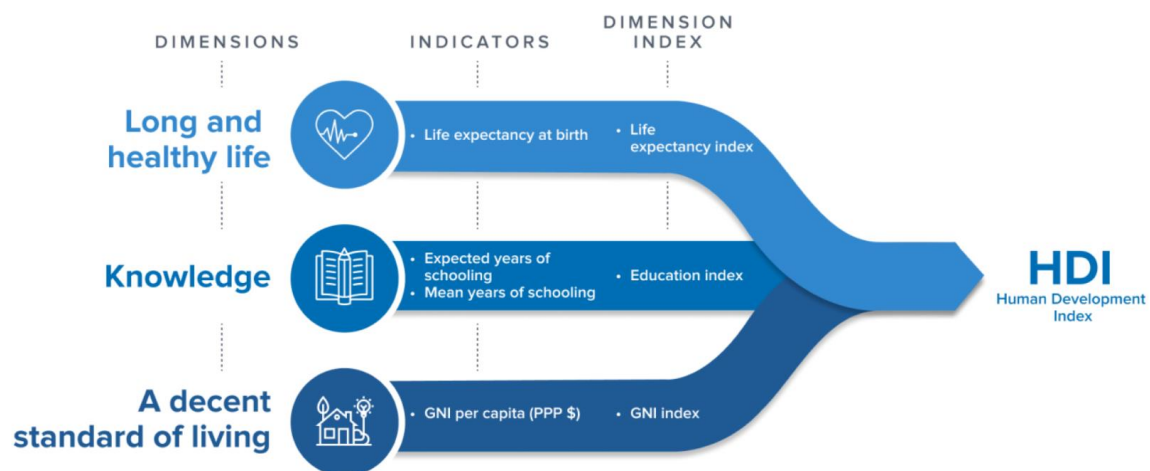
I.   Living long and healthy life → availability of healthcare services, measured by life expectancy at birth (→ life expectancy index);
II. Access to knowledge → educational opportunities, measured by adult literacy rate and the combined primary, secondary and tertiary enrolment ratio (→ education index); and
III. A decent material standard of living, measured by GNP per capita (in PPP $). → GNI index

Each dimension is expressed as a value between 0 and 1, with 0 being the lowest possible value for the dimension, and 1 being the highest. The composite index is simply the average over the three dimensions. Each country receives an HDI value from 0 to 1, and the countries are ranked according to their HDI values.

Table 9: 2019 HDI Ranking for selected countries

Rank	Country	HDI Value	Life Expectancy at Birth (years)	Expected Years of Schooling (years)	Mean years of schooling (years)	Gross National Income per capita (PPP $)
1	Norway	0.957	82.4	18.1	12.9	66 494
2	Ireland	0.955	82.3	18.7	12.7	68 371
2	Switzerland	0.955	83.8	16.3	13.4	69 394
4	Hong Kong	0.949	84.9	16.9	12.3	62 985
11	Singapore	0.938	83.6	16.4	11.6	88 155
17	United States	0.926	78.9	16.3	13.4	63 826
85	China	0.761	76.9	14.0	8.1	16 057
188	Central African Republic	0.397	53.3	7.6	4.3	993
189	Niger	0.394	62.4	6.5	2.1	1 202

Source: www.undp.org

Explain the possible relationship between Gross National Income per capita and the HDI Ranking of these countries.

1.8 A non-material SOL indicator: Gini Coefficient

An important determinant of a country's standard of living is the distribution of national income among the population. This helps to measure inclusiveness and reliability of measure in terms of it representing the SOL of a citizen.

If there is a large income inequality within the country, the standard of living of those in the highest income bracket will be significantly higher than the lower income who may experience much slower income growth or even falling income despite economic growth in the country.

### 1.8.1 Use of the Lorenz Curve to calculate Gini coefficient

The Lorenz curve is a curve showing <u>the proportion of national income earned by any given percentage of the population.</u> In the Lorenz curve below (see Figure 2),

- The horizontal axis measures percentages of the population from the poorest to the richest. For example, the 20 percent point represents the poorest 20 percent of the population.
- The vertical axis measures the percentage of national income they receive. Example, the poorest 20 percent of the population represents only 5 per cent of the total national income).

The curve starts at the origin: zero people earning zero incomes. If income were distributed totally equally, the Lorenz curve would be a straight 45° line. The 'poorest' 10 percent of the population would earn 10 percent of national income; the 'poorest' 70 percent would earn 70 percent of the cumulative share of income, and so on. The curve ends up at the top of the right-hand corner, with 100 percent of the population earning 100 percent of cumulative share of the national income.

However, most countries are unlikely to be on the line of equality. A more realistic Lorenz curve of a country with some uneven distribution of income would look like the Lorenz curve in Figure 2 below. The curve shows that the bottom 20% of the population only earns 5% of the cumulative share of national income and 90% of the population collectively only earn 55% of the national income. This means that the remaining richest 10% earn 45% of the national income share.

Figure 2: The Lorenz Curve
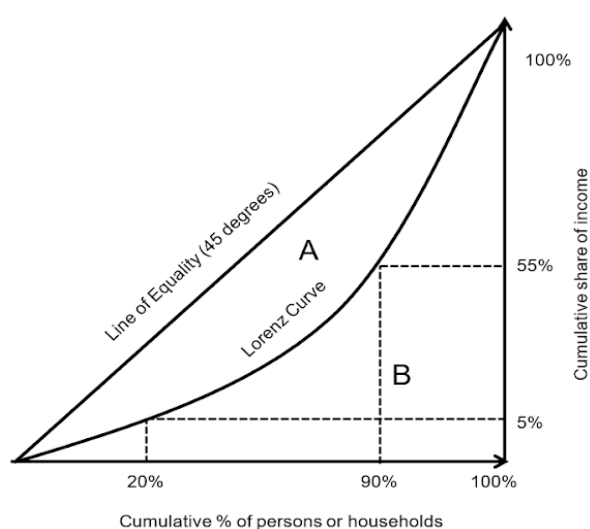
The **Gini coefficient** is a precise way of measuring the position of the Lorenz curve. Thus, it serves as a indicator of income inequality. The Gini coefficient is the ratio of the area between the Lorenz curve and the 45° line (Area A) to the whole area below the 45° line (Area A + B).

Gini Coefficient: Area A / Area (A + B)

Scenario 1: If income is **totally equally distributed** so that the Lorenz curve follows the 45° line, area A disappears and the Gini coefficient is **zero**.

Scenario 2: Area A becomes larger as inequality increases, the Gini coefficient increases. This refers to some level of income inequality.

Scenario 3: In the extreme case of **total income inequality**, where one person earns the whole of national income, area B would disappear and the Gini coefficient would be **1**. '

Essentially, **Gini coefficient can be between 0 and 1**, where zero represents the case of total income equality and one in the case of total income inequality.

Singapore's Gini coefficient data below shows that income inequality in the country improves after government intervention (graphically, area A of the Lorenze curve becomes smaller).

Figure 3: Singapore's Gini Coefficient after taxes in Singapore from 2013-2022
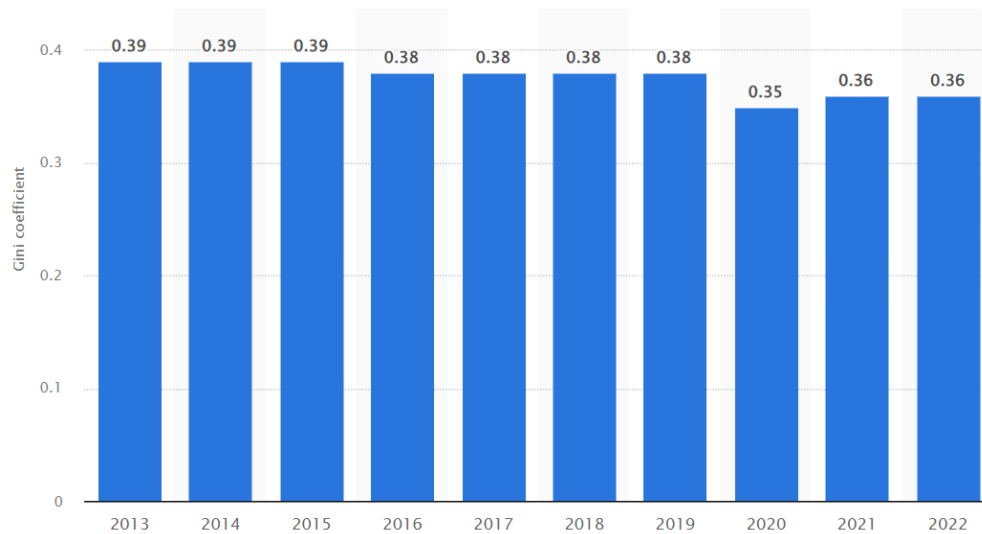
Source: Statista.com

Think about this:

"Ideally, an increase in real GDP per capita should improve income inequality."

Do you agree with the statement, why or why not?

END OF TOPIC REFLECTION

	Students should be able to	Checklist
1	Define standard of living (SOL) in terms of material and non-material aspects.	
2	Explain how material & non-material SOL is measured through the use of national income statistics and indicators.	
3	Interpret and apply the various indicators (GDP indicators, HDI, Unemployment rate, Inflation Rate, etc) to compare living standards over time and over space.	
4	Evaluate the usefulness and sufficiency of the national income statistics in measuring SOL across countries and across time.	
5	Interpret Gini coefficient and explain how it reflects 1) income distribution of a country and 2) the non-material aspect of SOL.	