Inflation

Inflation refers to the persistent increase in the general price level of goods and services. It is the percentage rate of change in the average price level over a specified period of time. Thus it is measured by the inflation rate, which is the percentage change in a price index. This does not mean that all prices increase the same, nor that all prices necessarily increase. Some prices might increase a lot, others a little, and still other prices decrease or remain unchanged. Inflation results when the average of these assorted prices follows an upward trend. Inflation leads to continual erosion of consumers' purchasing power.

Inflation can also be defined as a decline in the value or purchasing power of a currency. If the supply of money rises faster than the supply of goods and services in the country, one would expect a decline in the value of the currency. Inflation is the most common phenomenon associated with the price level. Two related phenomena are deflation, a decrease in the price level, and disinflation, a decrease in the inflation rate.

Measurement of inflation:

The most common measures of inflation are derived from the Consumer Price Index (CPI), Producer Price index (PPI) and the GDP price deflator. The CPI is the most widely known of the three.

Consumer Price Index: The Consumer Price Index (CPI) is a measure of the average prices of a fixed basket of goods and services purchased by urban consumers. This index, compiled and published monthly by the Bureau of Statistics (Uganda's case), provides a relatively accurate indication of the average price level in the economy. The CPI is based on a market basket of goods and services that are identified in an extensive survey of urban consumers. It is then assumed that urban consumers repurchase this market basket each month. The CPI compares the total expenditures on this market basket from month to month. If expenditures rise, then prices, on average, increase.

Using 2010 as the base year, calculate the inflation rate between 2010 and 2012

Year	CPI
2010	100
2011	128
2012	147

1. **Measuring Inflation**

Use the CPIs to compute the inflation rate and interpret

The **inflation rate** is the percentage change in the price level from one year to the next.

$$Inflation\ rate = \frac{CPI\ in\ current\ year - CPI\ in\ previous\ year}{CPI\ in\ previous\ year} \times 100\%$$

When the price level rises rapidly, the inflation rate is high. When the price level rises slowly, the inflation rate is low.

Bias of CPI as an estimator of Inflation

Despite being the major index for estimating inflation, CPI can overstate the magnitude of inflation due to the following;

- ✓ New Goods Bias • New goods do a better job than the old goods that they replace, but cost more. • The arrival of new goods puts an upward bias into the CPI and its measure of the inflation rate.
- ✓ Quality Change Bias • E.g better new car models cost more than the versions they replace. • A price rise that is a payment for improved quality is not inflation but might get measured as inflation.
- ✓ Commodity Substitution Bias • If the price of beef rises faster than the price of chicken, people buy more chicken and less beef. • The CPI basket doesn't change to allow for the effects of substitution between goods.

GDP Price Deflator:

The GDP price deflator is an index of prices calculated as a ratio of nominal gross domestic product to real gross domestic product. This index provides the best overall indicator of the average price level because it is based on gross domestic product. It includes the prices of all final goods and services, not just those purchased by urban consumers. It is also based on prices of business investment in capital, government purchases, and exports to the foreign sector.

Students should compute real and nominal GDP

Formula: _____

You use the GDP deflator in the formula

$$\text{The inflation rate} = \frac{(\text{GDP deflator in current year} - \text{GDP deflator in previous year})}{\text{GDP deflator in previous year}} \times 100\%.$$

The Producer Price Index (PPI)

This measures the average change in selling prices received by domestic producers of goods and services over time. PPIs measure price change from the perspective of the seller. The target set of goods and services included in the PPIs is the entire marketed output of a country's producers. The set includes both goods and services purchased by other producers as inputs to their operations or as capital investment, as well as goods and services purchased by consumers either directly from the service producer or indirectly from a retailer.

Classification of inflation according to composition of CPI

1. Headline inflation is a measure of the total inflation within an economy. However, some products have volatile prices for example food and energy, and as a result headline inflation may not present the actual state of the economy.

2. Core inflation also known as underlying is a measure of inflation that excludes certain items that face volatile price movements. It excludes products that have temporary price shocks such as food and energy costs because these shocks can diverge from the overall trend and give a false measure of inflation.

Classification of inflation on the basis of speed (magnitude)

On the basis of speed, inflation can be classified as; creeping inflation, walking inflation, running inflation, and galloping or hyperinflation.

Creeping Inflation:
It is the mildest form of inflation and the one that is generally regarded as conducive for economic growth/aggregate ouput. This is because it keeps the economy away from stagnation. On average, prices rise by less than 3% per cent annually.

Walking Inflation:
Walking inflation occurs when the price rise becomes more marked as compared to creeping inflation. Under walking inflation, prices rise by more than 3% but less than 10% annually. This kind of inflation should be taken seriously as it can result into running or galloping inflation.

Running Inflation:
Under running inflation, the prices increase at a still faster rate. The price rise may be above 10 % but less than 20% per annum.

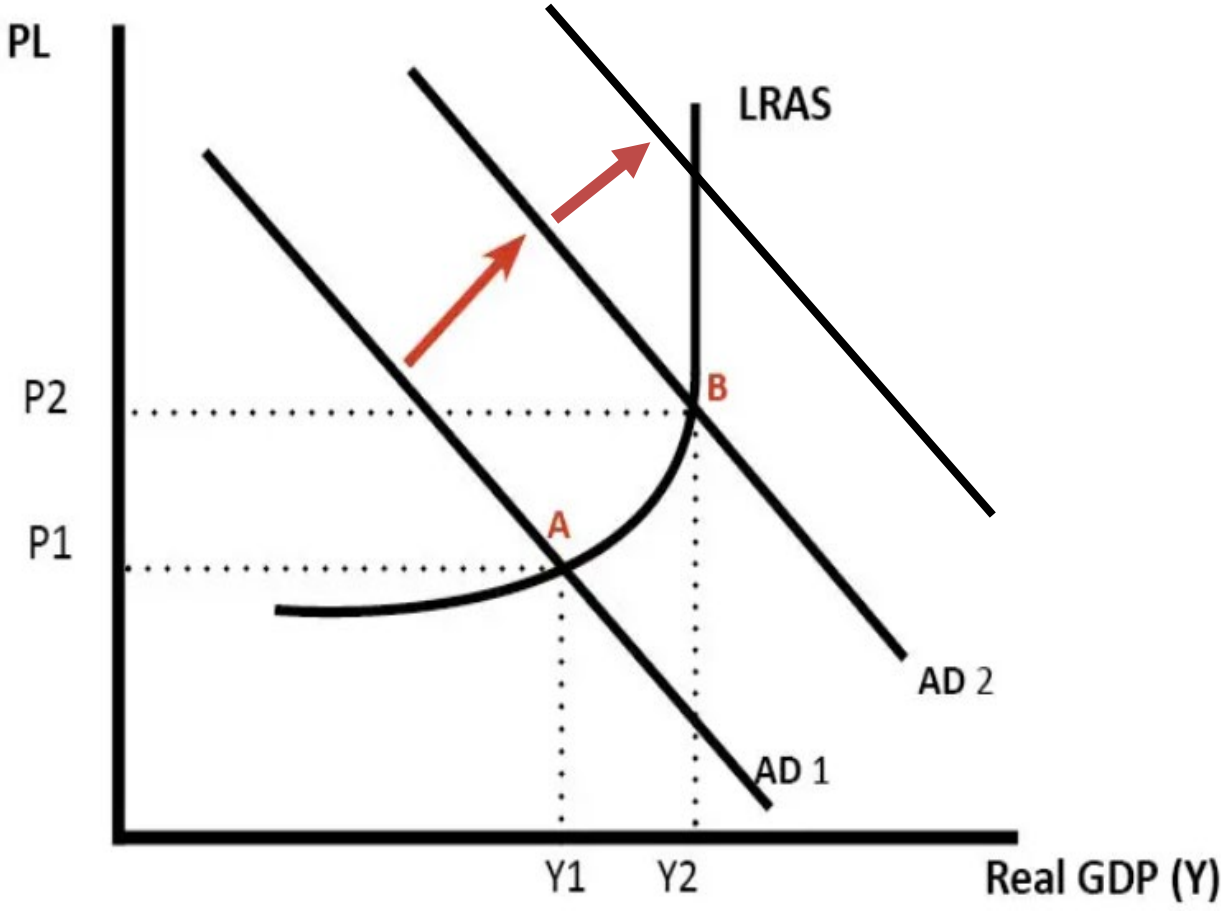
Galloping or Hyper-Inflation:
Under the galloping inflation, the prices rise every month by a rate that is above 50% and there is no upper limit to the price level rise. Keynes considers this type of inflation as the true inflation.

Classification of inflation according to causes:

Demand-pull inflation, Cost-push inflation, Structural inflation, and imported inflation

1. Demand-Pull Inflation
This type of inflation results when the four macroeconomic sectors (household, business, government, and foreign) collectively try to purchase more output than the economy is capable of producing. They compete to purchase the limited amounts of goods and services and this bids up prices causing inflation. This excessive demand, also referred to as “too much money chasing too few goods”, usually occurs in an expanding economy.

Figure 1: Demand Pull Inflation



Where PL is the Price Level; AD is the Aggregate Demand curve; LRAS is the Long-run Aggregate Supply Curve
Y2 denotes the real GPD that corresponds with full employment/full capacity, i.e, the maximum attainable Real GDP of the economy during a particular period.

Causes of demand pull inflation

1. **Demand pull inflation may occur when:**
   a. There is a quick increase in consumption and investment along with extremely confident firms.
   b. There is a sudden increase in exports.
   c. There is a lot of government spending especially on nonproductive projects.
   d. There is excessive monetary growth – when they is too much money in the

system chasing few goods. The price of goods will thus increase.

Policies to reduce demand pull inflation

a. Restrictive monetary policy should be used to reduce money in circulation. Policies such as increasing the bank rate, moral suasion, increase of the legal reserve requirement.
b. Restrictive fiscal Policy: Government can reduce its expenditure such as reducing on the wage bill and increase spending on other productive sectors. Government can also impose higher direct taxes (causing a fall in disposable income)

c. Adoption of price such as fixing prices of goods and services.

2. Cost-Push Inflation:

Demand-pull inflation is "driven" by stimulative fiscal and monetary policies. For Cost-push inflation, however, the inflation is caused by exogenous nonpolicy factors such as oil crises, terrorist shocks, and weather-related events. This inflation, also referred to as "commodity inflation," results in an overall decline in national output productivity, which translates to a leftward shift in the aggregate supply curve, as shown in Figure 2.

This is inflation is often attributed to decreases in AS due to sudden increases in the cost of production. This type of inflation results when the cost of inputs increases. In effect, the cost of producing output on the supply side of the aggregate market "pushes" the price level higher because increased costs are passed on to consumers, causing a rise in the general price level.

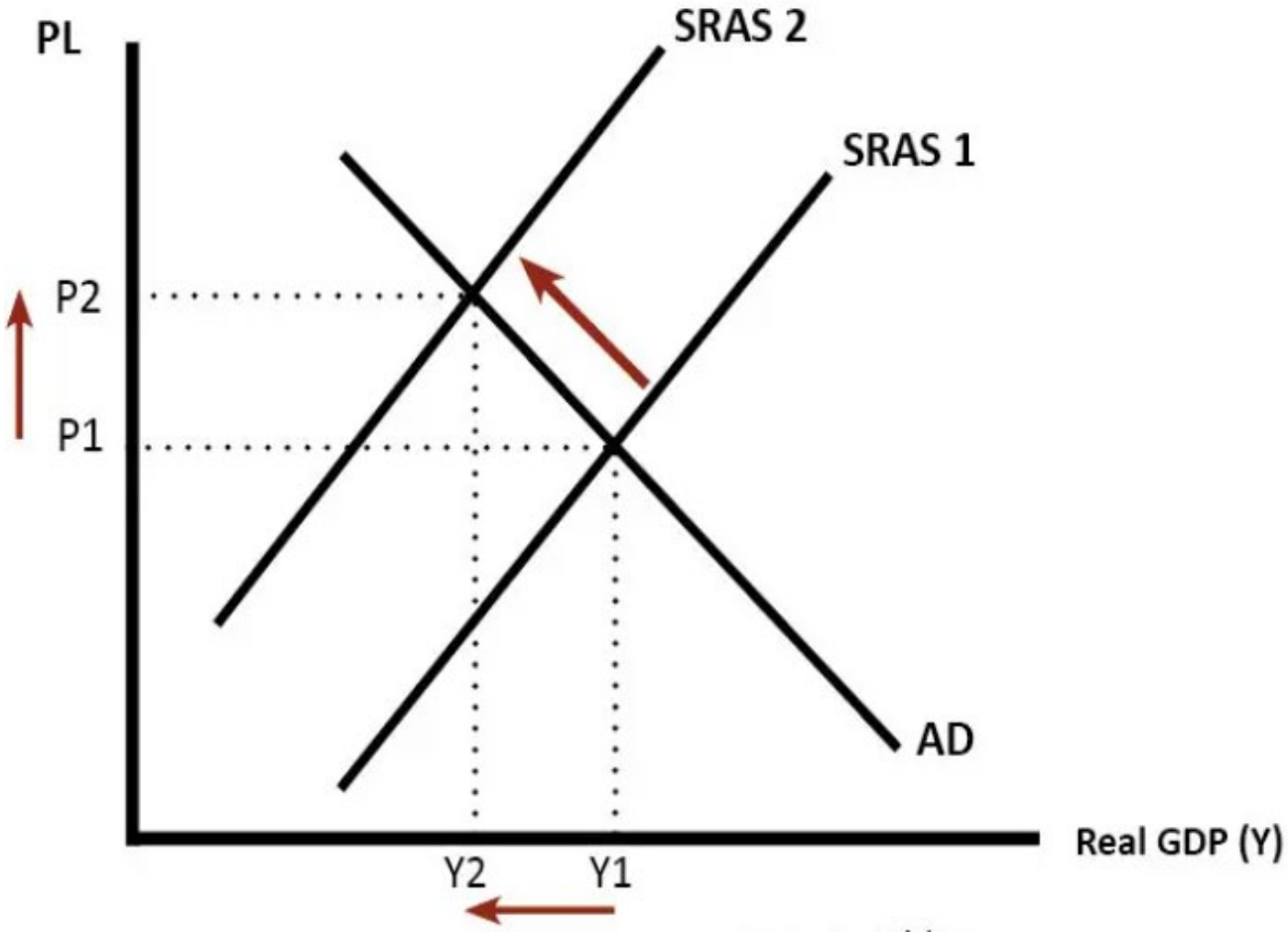
Types of cost push inflation include profit-push, wage-push inflation and supply shock inflation.

i. **Wage Push Inflation** – It is a type of inflation which is caused due to increase in wages of labor more than increase in their productivity in work. Since the producers have to pay more to workers they will increase the price of goods and hence increasing inflation. Usually this type of inflation occurs when there are strong labor unions.

ii. **Profit Push Inflation** – This type of inflation is caused when entrepreneurs or producers in their drive for greater profits raise prices of goods and services than required and hence inflation. Such price fixing is common practice with all monopolies, oligopolistic firms or firms enjoying some market power in their respective industries. In the case of such administered prices, mark-ups or profit margins are pushed up, without any increase in costs or in demand. Once started by a few powerful firms, other firms in the economy enjoying some market power also tend to mark-up their profit margins, partly following the example of leading firms and partly because through inter-industry relations their material costs might have gone up. The resulting inflation is profit push inflation.

iii. **Supply Shock Inflation** – A supply shock implies a drastic reduction in the supply of goods for example the recent COVID-19 pandemic and oil crisis between 2020 to 2022 led to global shortages in quantities of goods and services, subsequent increase in the prices of most goods and services and ultimately leading to global inflation (that we are still experiencing in 2023).

Figure 2: Cost-push inflation



Where PL is the Price Level; AD is the Aggregate Demand curve; SRAS is the Short-run Aggregate Supply Curve.

Cost-push inflation is considered to be counter-cyclical because; as inflation increases in cost-push inflation, GDP growth falls from Y1 to Y2.

Measures to reduce cost push inflation

1. Supply-side policies; The long-term solution to cost-push inflation could be better supply-side policies which help to increase productivity and shift the AS curve to the right. But, these policies would take a long time to have an effect. These include;

   a. Regulations that impede monopoly powers and create competition such as anti-trust laws in crucial sectors.
   b. Investment towards infrastructural development to reduce the cost of production.
   c. Investment towards alternative energy sources such as wind, hydro-power to minimize the exposure to oil shocks.

2. Reduction of Value Added Taxes/ Provision of subsidies to key sectors to reduce the production costs. Subsidies can however be costly on the government and difficult to implement.
3. Intervention in the foreign exchange market to strengthen the exchange rate to reduce the cost of imported inputs.

3. Structural inflation

This is inflation that is embedded in institutional rigidities faced by a country, such that a complete change in institutional structures would be needed in order to address inflation. According to the structuralists, this type of inflation is common in developing countries.

Causes of structural inflation:

i. High population growth rate that exceeds labour productivity rates.
ii. Low productive capacity of the economy for example limited fixed capital stock.
iii. Foreign exchange bottle necks.
iv. Constrained access to advanced technology that would yield higher productivity.
v. Limited access to capital markets which impedes private investment.
vi. Infrastructural bottlenecks with respect to electricity, transport and communication, and telecommunication.
vii. Political insecurity.

Policy measures to control structural inflation

i. Government can incentivise private investment for example through tax holidays to increase the level of investment.
ii. Improve sectors that are failing for example the agricultural sector by setting up irrigation schemes, storage systems, electricity and other relevant support.
iii. Improvement of infrastructure.
iv. Land reforms for equitable allocation of land.

4. Imported inflation

This is a type of inflation experienced through importation of goods and services from countries already experiencing inflation. Sometimes it is simply a result of importing in highly

priced goods.

Policy measures to control imported inflation:

i. Import restrictions especially on imports from countries with inflation for as long as there are other available alternatives.
ii. Subsidization of imports.
iii. Import substitution strategy.

Effects of inflation:

Inflation can have widespread negative effects on various sectors of the economy, and high inflation prompts those affected to seek to protect the real value of their incomes. This makes the maintenance of relative price stability a paramount objective of economic policy.

1. First, inflation affects the purchasing power of money, i.e. it reduces the quantity of goods that can be purchased with a given amount of money. The higher the inflation rate, the faster one's purchasing power is eroded. Thus, for example, if inflation averaged 7% a year for three consecutive years, then over the period, individuals would have effectively lost ugx196 out of every ugx1,000 held in cash.

2. Second, inflation distorts incentives to save. Under inflationary conditions, one's purchasing power is eroded over time and this encourages consumption rather than savings. For this reason, high inflation puts upward pressure on interest rates as savers demand compensation to forego consumption.

3. Inflation also affects investment decisions as it adds greater uncertainty to the future and this complicates business planning.

4. Economic agents seek to protect themselves from the consequences of inflation in several ways. For example, savers seek to protect themselves by demanding higher interest rates. They also avoid making long-term commitments and tend to prefer to hold short-term assets. More generally, in an inflationary environment, savers tend to avoid fixed-income investments in favor of assets where returns may adjust in line with inflation, such as indexed bonds or equities. On the lending side, in inflationary conditions, lenders tend to eschew fixed interest rate for variable interest rate loans (including mortgages).

5. Wage earners protect themselves by seeking larger wage settlements. In fact, especially when inflation is on the rise, trade unions tend to insist that wage agreements contain cost of living clauses as a means of protecting workers against inflation. Ironically, wage indexation has an inherent inflationary bias and can easily lead to a wage-price spiral – a situation in which one round of wage increases results in subsequent rounds of price increases which prompt further wage increases.

6. High inflation, or even moderate inflation sustained for a prolonged period, could foster an inflation psychology or inflationary expectations. For example, if workers believe that inflation would remain high or is likely to be higher in the future, their wage demands

are likely to reflect these expectations. Experience in non-competitive markets has shown that manufacturers and distributors are inclined to increase prices in anticipation of cost increases. While some are able to protect themselves, inflation affects disproportionately those who are on fixed incomes, like pensioners and the poor. These groups face major hardships also because a significant part of their income is spent on basic necessities which are most affected by inflation.

7. Inflation can haphazardly redistribute income and wealth in ways that society might not want. While inflation is an increase in the average price level, all prices do not increase at the same rate. When prices change at different rates, the owners of resources used in the production of goods with above-"average price increases" receive more real income. Resource owners involved in the production of goods with below-"average price increases" (even declining prices) get relatively less real income. The end result is the income and wealth are redistributed from some resource owners to others.

8. Social, economic and political disorders.
9. Failure to achieve macroeconomic goals

Exercise:

A. Computation of CPI

$$CPI = \frac{Cost\ of\ CPI\ basket\ at\ current\ year\ prices}{Cost\ of\ CPI\ basket\ at\ base\ year\ prices} \times 100$$

Consider the following the average consumer prices and quantities by households to be as follows;

$$Inflation\ rate = \frac{CPI\ in\ current\ year - CPI\ in\ previous\ year}{CPI\ in\ previous\ year} \times 100\%$$

Year		Consumer Price (in UGX1000)	Quantity	CPI	Inflation rate
2019	Food	8	40	$\frac{(8*40)+(24*2)+(50*1)}{(8*40)+(24*2)+(50*1)} \times 100$ =**100**	–
	Energy	24	2		
	Housing	50	1		
2020	Food	12	50	$\frac{(12*40)+(30*2)+(70*1)}{(8*40)+(24*2)+(50*1)} \times 100$ =145.93	$=\frac{145.93-100}{100} \times 100\%$ =45.93%
	Energy	30	1		
	Housing	70	1		
2021	Food	25	55	=284.68	=95.08%
	Energy	45	2		
	Housing	100	1		
2022	Food	30	52	=330.14	=15.96%
	Energy	50	3		
	Housing	80	1		

The base year is 2019. Compute the CPIs for each year and the corresponding inflation rates. Comment about the annual trend of inflation.

Note: The computation of PPI is similar to CPI. The difference is PPI uses the selling prices

Nominal vs Real wage rate

Nominal Wage: The average hourly wage measured in current actual monetary amount.

Real Wage: The average hourly wage measured in monetary amount adjusted for inflation. It shows that the quantity of goods and services that an hour of work can buy, i.e; the real wage is the purchasing power of the one's money income.

Real wage = (Nominal wage in current -year/ CPI in current year) x CPI in base year.

Example: nominal wage =100,000/- in 2022. Calculate the real wage. Use the CPI in the previous example.

Nominal vs Real interest rate

Nominal Interest Rate (i): percentage return on a loan expressed in monetary terms.
Real Interest Rate (r): percentage return on a loan expressed in purchasing power of money i.e., the nominal interest rate adjusted for the effects of inflation.
Real interest rate = nominal interest rate - inflation rate.$r = i - \Pi$

Suppose the nominal interest rate in 2022 is 27%. Calculate the real interest rate.

B. GDP Price Deflator

$$\textbf{GDP Price Deflator} = \frac{\textbf{Nominal GDP}}{\textbf{Real GDP}} \times 100$$

In thousands of UGX

Year	Nominal GDP (GDP in current prices)	Real GDP (GDP in constant prices)	GDP Price Deflator	Inflation rate
2020	200,000	240,000	83.33	_
2021	288,000	288,000	100	$=\frac{100-83.33}{83.33} \times 100\%$ =20%
2022	338,000	312,000	108.33	=8.33%

Take 2021 as the base year. Compute the GDP price deflator and inflation rate in each year.

PART A

Excerpts from the UBOS Statistical Abstract 2021 on Uganda's key economic indicators

Table 4.1 A: GDP Summary Statistics, Fiscal Year 2015/16-2020/21

	2016/17	2017/18	2018/19	2019/20	2020/21
GDP at market prices					
At current prices (Billion shillings)	**108,518**	**120,485**	**132,090**	**139,689**	**147,962**
At constant 2016/17 prices (Billion shillings)	108,518	115,359	122,787	126,410	130,683
Quantity index (2016/17=100)	100.0	106.3	113.1	116.5	120.4
Constant price growth rates (%)	**3.1%**	**6.3%**	**6.4%**	**3.0%**	**3.4%**
Implied deflators (2016/17=100)	100%	104%	108%	111%	113%
GDP per capita at current prices					
GDP per capita (UGS '000)	2,908	3,127	3,321	3,403	3,492
GDP per capita (US $)	824	855	889	916	954
Memorandum items					
Mid-Year Population ('000)	37,319	38,525	39,772	41,054	42,369
Exchange rate UGS per US $	3,530	3,659	3,736	3,715	3,659

Source: Uganda Bureau of Statistics

1. Compute the annual GDP deflator and inflation rate for each year.
2. Compare the nominal GDP growth rates to the constant price (real) growth rates, and explain the discrepancy between the two.
3. By computation, show how the figures of GDP per capita at current prices were computed.
4. Calculate the GDP per capita at constant prices and compare these figures to the GDP per capita at current prices.
5. "In international comparisons of national accounts data, such as GDP per capita, it is desirable not only to express the figures in a common currency, but also to adjust for differences in price levels. Failing to do so would result in an overestimation of GDP levels for countries with high price levels, relative to countries with low price levels." Validate this statement.

PART B:

Supply and demand shocks are responsible for the prevailing high global post-COVID inflation. With the use of clearly illustrations and examples, validate this statement.