St Andrew's Junior College

JC2 Preliminary Examinations

H2 Economics – Paper 1 (9570/01)

Suggested Answers

(a) (i) Explain the likely market structure that global chemical fertiliser companies are likely to be operating in. [2]

- Likely market structure is **oligopoly.**
- From extract 1, it was mentioned that the global fertiliser market is controlled by a handful of companies, which implies a **high 4 firm concentration ratio.**

(ii) Explain how the type of market structure identified in a(i) has allowed these firms to "capture mega profits" (Extract 1). [2]

- Oligopoly firms have **high pricing ability** due to their large market share given the high barriers to entry.
- With a high ability to set high prices at profit maximising point where MC=MR, each **firm can earn high total revenue at a higher price and the corresponding output. High revenue allows high profit,** if cost remains low or remain unchanged.

OR

- Due to their large market share and high output, **each firm can benefit from significant internal economies of scale**, which in turn lowers their average costs. If total revenue remains constant, **the reduction in average costs leads to lower total costs, thereby increasing profit.**

(b) In the light of the current and potential challenges faced by chemical fertiliser firms, discuss whether firms should consider expanding their production of fertilisers. [8]

Introduction:	
First requirement: **Should** • Governments are encouraging increased fertiliser production to address shortages and support agriculture. Firms may benefit from government incentives and support. • High global demand for fertilisers can address food security. Expanding production can increase market share and revenue. Higher demand can lead to increased profits	**Second requirement:** **Should not** • Constrained natural gas supplies are expected to keep production costs high and volatile for nitrogen fertilisers, raising operating expenses and reducing profits for firms as increased costs are passed on to consumers. • Environmental and sustainability concerns are decreasing demand for chemical fertilisers, leading to lower sales and profits for firms as regulatory pressures and shifts towards sustainable practices reduce prices and output.
Synthesis: Consider both sides and come to a valid conclusion	

Intro

As firms aim to maximize profits through expansion, both their costs and revenues are significantly impacted. If the increased output aligns with market demand and effective pricing strategies are implemented, the firm can benefit from improved profitability through higher sales and reduced average costs. Thus, while expansion presents opportunities for greater revenue, it requires careful management of costs and operational efficiency to achieve long-term profit maximization.

Requirement 1:

- Given the current and potential challenges faced by chemical fertiliser firms, there are several reasons why expanding fertiliser production might be considered. Some **governments** are actively seeking to increase chemical fertiliser production as part of

their strategy to address fertiliser shortages and support agricultural productivity. Firms expanding production may benefit from government incentives or support aimed at boosting domestic production and ensuring a stable supply of fertilisers. As a result of government support such as through per-unit subsidies, the MC and AC of the firm will decrease. As a result, profits change from P_1C_1ab to C_2P_2ef.

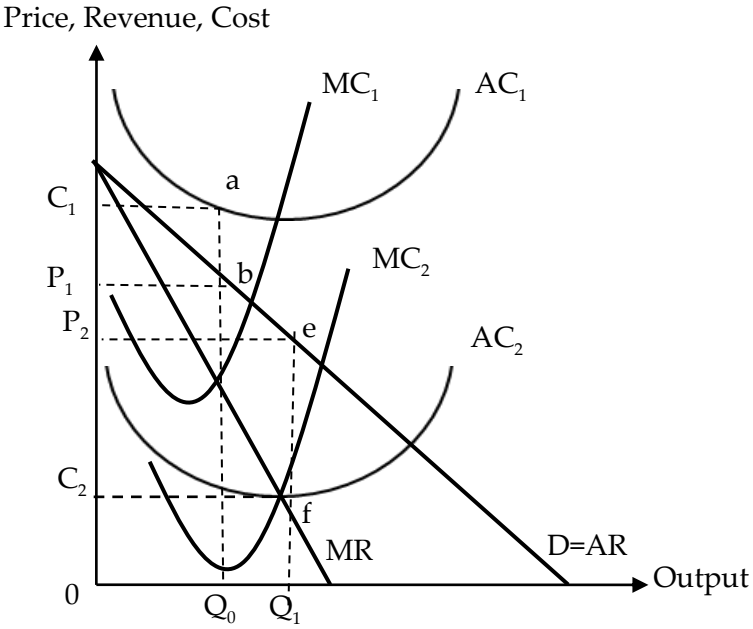


Figure: Effect of government support on profits

- Despite the rising costs and challenges, there remains a substantial global demand for fertilisers to support food production. With the potential for a global food shortage, increasing production can help meet this demand and stabilize food supplies, addressing immediate concerns of food security. Fertiliser firms with significant market control have the opportunity to capture substantial profits. Expanding production can allow these firms to leverage their market power more effectively, potentially **increasing their revenue** by meeting more of the existing demand and capturing additional market share. An increase in demand from AR_1 to AR_2 will result in higher profits from P_1c_1ab to c_2P_2ef.

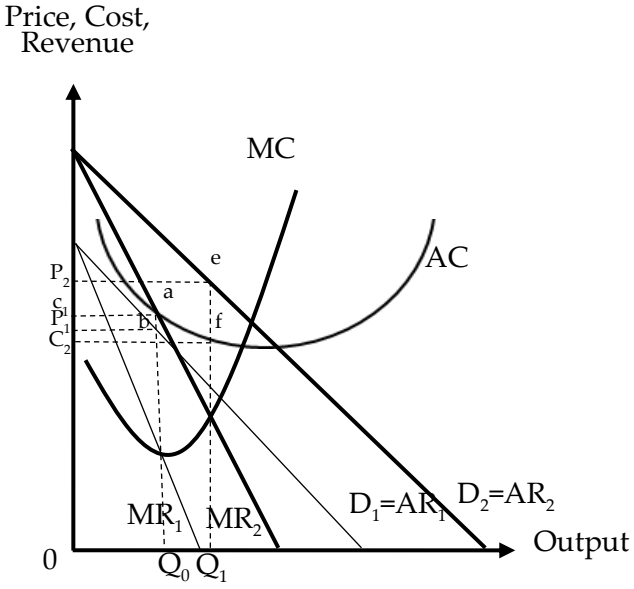


Figure: Effect of higher market share on profits

Requirement 2:

- Natural gas supplies constrained and that could result in costs being too much to bear – both for farmers and government. Prices are strongly influenced by the cost of natural gas, a key raw material for nitrogen fertilisers. The volatility and expected constraints in fossil fuel supplies due to climate change measures suggest that production costs could remain high and volatile in the long term. This poses financial risks to firms heavily reliant on gas-intensive production methods. Higher costs of natural gas can significantly increase the operating expenses for fertiliser firms, which in turn reduces their profits. Natural gas is a key raw material in the production of nitrogen fertilisers, so when its price rises, the cost of producing fertilisers also increases. This directly impacts the firm's profitability as the higher production costs are often passed on to consumers in the form of increased prices. Natural gas, a form of variable cost, will increase MC and AC from MC_1 and AC_1 changing to MC_2 and AC_2 respectively. This will result in a fall in profits from c_1P_1ef changing to P_2c_2ab (subnormal).

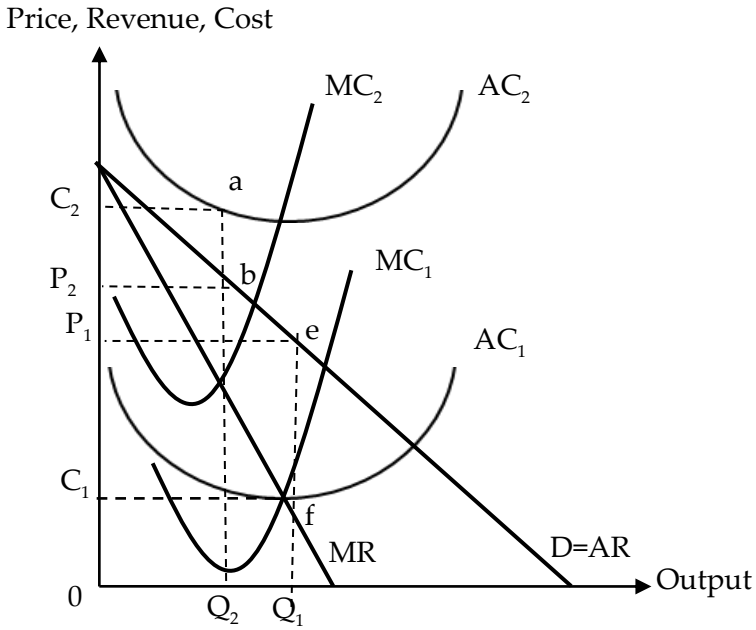


Figure: Effect of higher costs on profits

- Environmental and sustainability considerations are increasingly pressing. The mining and production of fertilisers, whether from natural gas or mineral deposits like potash and phosphate, are energy-intensive processes with significant environmental impacts. There is growing global awareness of these impacts, leading to calls for more sustainable agricultural practices such as agroecology, which reduce reliance on chemical inputs. Hence it is likely that despite government support, demand for chemical fertilisers may eventually dwindle due to such concerns. A fall in demand for fertilisers due to climate concerns could significantly reduce fertiliser firms' profits in several ways. As regulatory pressures and shifting consumer preferences drive farmers away from traditional chemical fertilisers, companies may face a decrease in sales volume. This reduction in demand can lead to lower revenue, especially if firms are unable to quickly pivot to alternative products or markets. With the fall in demand, the new profit maximising output falls to Q_2 and the corresponding price falls to P_2. Profits will fall from c_1P_1ef to P_2c_2ab.

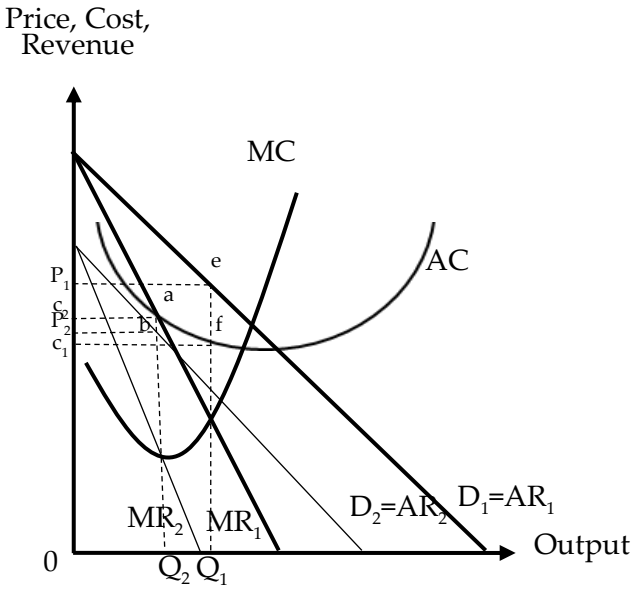


Figure: Effect of lower demand on profits

- However, whether firm's profits fall depends on (1) ability of firm to mitigate through other pricing/non-pricing or cost cutting strategies (2) extent of environmental concerns of consumers or government that will reduce demand. The firm might even suffer from huge losses that results in the firm exiting the industry, if AR<AVC.

Evaluation

- In conclusion, while chemical fertiliser firms may be tempted to expand production to meet short-term market demands and profitability goals, such a strategy could be counterproductive in the face of broader economic, environmental, and social challenges. Governments and firms should instead focus on transitioning towards more sustainable agricultural practices, supporting research and development of alternative fertilisation methods, and ensuring agricultural policies promote long-term food security and environmental health.

L2	Answers at this level will show sound analysis and coherent economic arguments regarding the impact on a fertiliser firm's costs, revenue, and eventually profits due to the firm's decision to expand. The analysis will explore how the expansion affects the firm's cost structure (e.g., increased production costs or economies of scale), revenue generation (e.g., higher output leading to increased sales), and overall profitability.	**4 – 6**
L1	Answers at this level will show limited knowledge, with errors and inaccuracies in the analysis. The discussion may include incorrect or incomplete explanations of how the expansion affects the firm's costs, revenue, and profits. Diagrams used may be inaccurate or poorly labeled, leading to misunderstandings of key economic concepts such as cost structures, revenue changes, or profit margins. The analysis might lack coherence and fail to adequately connect the firm's decision to expand with the resulting impacts.	**1 – 3**
E	Evaluation marks will be awarded for evaluation that considers the advantages and disadvantages of the firm's decision to expand. A conclusion will be provided.	**1-3**

(c) Using a demand and supply diagram and Extract 3, account for the inflation in food prices in Sri Lanka. [6]

Factors

- Fertilisers is a factor of production of food production, hence, an increase in prices of fertilisers will result in higher cost of production for food.
- Higher cost of production of food would imply a fall in supply of food as producers are less willing and able to produce food. This is illustrated by a leftward shift in the supply curve from S_0 to S_1 in the diagram below.
- Also, due to the lack of exports resulting in a depreciation of Sri Lanka's exchange rate (crimping its foreign exchange earnings), imported raw materials and food will experience an increase in cost, and hence a leftward shift in supply.
- Due to imported rice, supply of food would increase slightly.
- Also due to the fact that food is considered as a necessity, the demand is usually price inelastic.

Price Adjustment Process

- Due to the overall leftward shift in supply from S_0 to S_1, there would be a shortage at the original price P_0. This would lead to upward pressure in prices until a new equilibrium is established at a higher price (P_0 to P_1) and quantity (Q_0 to Q_1). Also, due to PED<1, as price increase, it will lead to a less than proportionate decrease in Quantity demanded.

Diagram
Market for food/crops

(d) Describe the Sri Lankan government's fiscal position from 2018 – 2022. [2]

- There was budget deficit throughout 2018-2022
- The deficit worsens throughout 2018-2022

(e) Assess the microeconomic and macroeconomic impact of the Sri Lankan government's decision to ban the use of chemical fertilisers. [10]

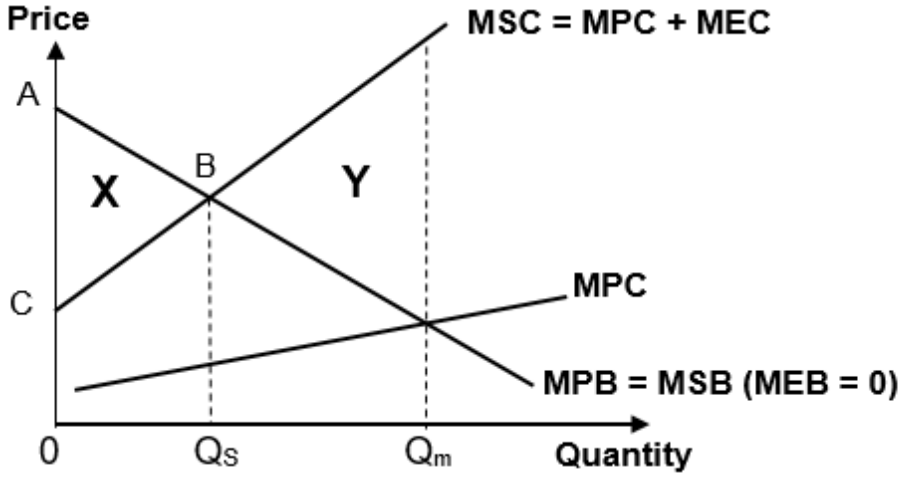
<table>
<tr><td colspan="2">Introduction:
Microeconomic and macroeconomic impact refers to allocative efficiency, equity, growth, inflation, unemployment, and trade</td></tr>
<tr><td>First requirement:
Microeconomic impact
Positive impact on environment due to ban on fertilisers, hence improve allocative inefficiency.
Equity will also be affected as food prices rise. Ban in fertilisers results in higher food prices</td><td>Second requirement:
Macroeconomic impact
Overall fall in SRAS & LRAS resulting in fall in national income and higher GPL
As fertiliser is a critical factor of production for an agricultural economy like Sri Lanka, banning the use of chemical fertiliser and switching to organic farming will drastically reduce farmers' productivity, especially many are not familiar of organic farming
Organic farming is likely more expensive given the abrupt rise in demand for organic fertiliser.
Trade deficit also worsened as agricultural export lost price competitiveness. Inadequate food production domestically led to increase import of food (e.g. rice)
This is further perpetuated by worsening exchange rate that results in further imported inflation as imported raw material (fuel) becomes more expensive. Imported essential goods and service such as food and medicines are more expensive too.</td></tr>
<tr><td colspan="2">Synthesis:
The severity of the impact depends on the context as well as the government's ability to mitigate the situation</td></tr>
</table>

Microeconomic impact

- The ban on the use of chemical fertiliser by the Sri Lankan's government is based on environmental directives aimed at reducing the negative costs that 3rd parties can experience in consumption of chemical fertilisers by farmers. E.g. medical cost and loss of income due to water pollution, and other environmental harm as then live nearby farms that uses chemical fertilizers.
- In a free market, profit-maximizing farmers will only consider their private benefits and costs. Thus, the market equilibrium quantity is at Qp where Marginal Private Benefit (MPB) equals Marginal Private Cost (MPC). However, the socially efficient quantity, Q_S, is where Marginal Social Benefit (MSB) equals Marginal Social Cost (MSC), as this is the quantity that maximizes social welfare. Hence, there is an overuse of fertilisers by the quantity Qp - Q_S, resulting in a deadweight welfare loss represented by Area Y.
- When there is a total ban on fertiliser use, the quantity generated drops to zero. In such a scenario, there would be a loss of Area X, measured as the potential net welfare benefit forgone if the socially efficient quantity of fertilisers were allowed to be used. On the other hand, a stoppage in fertiliser use would result in a welfare gain of Area Y from the removal of the deadweight welfare loss caused by the overuse (Qp – QS). If Area Y is greater than Area X, there would be a net welfare gain from imposing the ban—an outcome that may justify the ban on fertiliser use, particularly in contexts with significant environmental and health costs associated with fertiliser overuse. This results in achieving improved allocative inefficiency given the smaller deadweight loss.

- In the case of Sri Lanka, however, the ban seemed to have worsen allocative inefficiency given that the overnight ban plunged the farmer community into distress (i.e. Area X > Areas Y). Most farmers did not have the knowledge and skills to successfully implement organic farming practices, and in protest, many refused to plant altogether. Nine in 10 Sri Lankan families are skipping meals The significant shortage of food produce that cut export earnings and prompted import of food indicated that Sri Lanka is not producing the amount of food that is needed to maximise the society's welfare, upon the ban in the use of chemical fertiliser**. The ban is unlikely to be justified given that Sri Lanka is foregoing a significant amount of net benefit from the use of the fertiliser between 0 to Qs. Area X is likely to be greater than Area Y.**

Market for Chemical Fertilizer

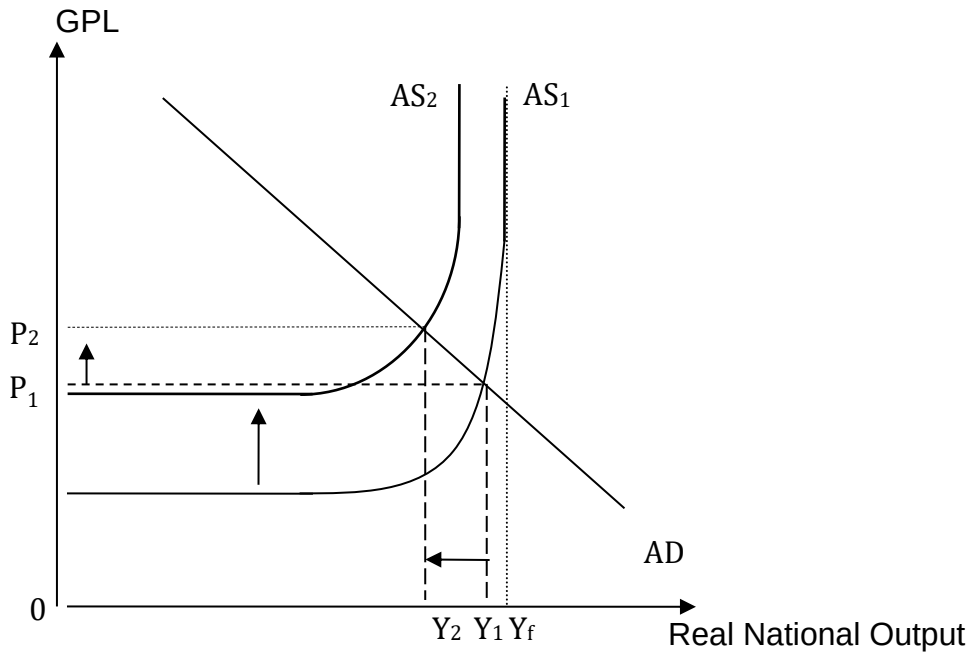


- In addition, **inequity worsened**. As food is a necessity and in Sri Lanka. A spike in food prices can make this essential good out of reach for lower-income households. This situation can lead to wealthier individuals being able to gain access to food despite higher prices, exacerbating the situation and potentially denying access to those who need it most. As a result, the way the free market allocates food due to its higher prices can be seen as worsening equity.

Macroeconomic impact

- Given the ban, there is a dramatic fall in crop yields throughout the country due to significantly fall in productive capacity and higher cost of production in the agriculture industry. This was due to the following:

- Without the use of chemical fertilisers and little knowledge of organic farming, farmers' productivity fell significantly.
- The much higher price of organic fertilisers given the surge in demand for this alternative fertiliser



- Given that the agriculture industry is a key driver of Sri Lanka's economy, **LRAS fell immediately overnight.** The result was a **fall in real national output from Y_1 to Y_2,** especially in terms of agricultural output. Rice, which used to be Sri Lanka's dietary staple that it used to produce adequately and even exported, saw average yields slashed by some 30%.

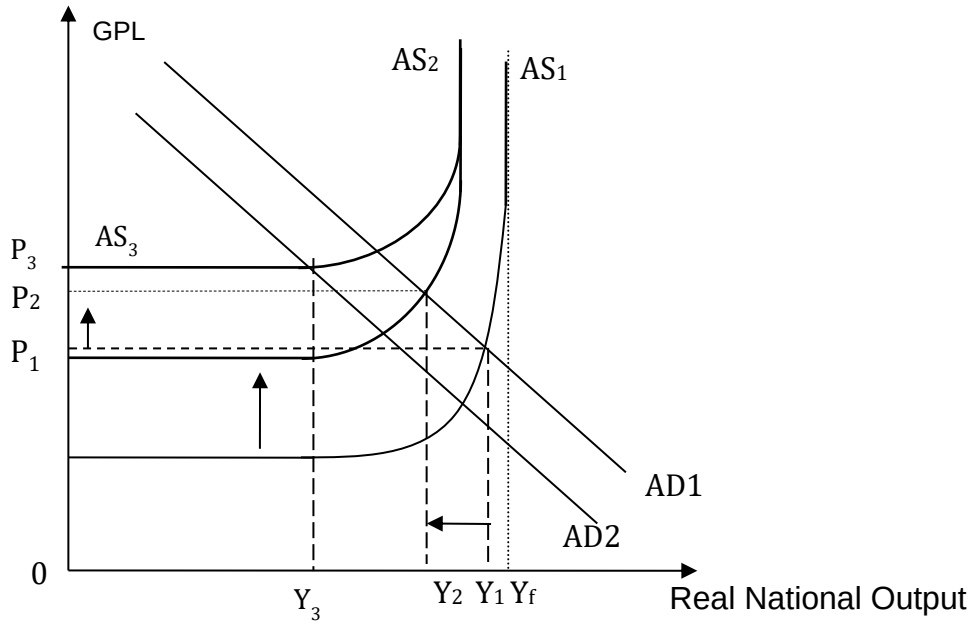
- **GPL increased from P_1 to P_2.**Sri Lankans would experience a higher domestic inflation, especially through higher food prices. This was particularly so when Sri Lankans spend a significant portion of their expenditure on food that had risen sharply in price. *(Note that CPI is based on a basket of goods. In this case, food will constitute a large proportion in this basket of goods)*

    - Additionally, given the fall in domestic agricultural output and rise in GPL, **there will not only be insufficient quantity for export and export price competitiveness would have been eroded**. **Hence export revenue fell.** E.g. the production of tea, the country's prime export, fell by 18%, crimping its foreign exchange earnings. **Sri Lanka's balance of trade (BOT) will also be worsened.**

- **Subsequently, the lack of domestic food production prompted food imports.** For the first time, Sri Lankan had to imported rice for consumption, an **excessive increase in import expenditure will result in a worsening of the balance of trade.**
    - **Worsening BOT deficit caused a further weakening in its currency.** This meant that imported essential goods such as food and medicine would become more expensive in rupees, resulting in an even wide BOT deficit.

- **A BOT deficit,** i.e. decrease in (X-M) **reduced Aggregate Demand (AD)** . This meant that real National Income (NY) would fall further via the multiplier process, dampening actual growth and increase unemployment throughout the economy.

- **Coupled by the fact that the weakened currency could also cause SRAS to fall further when the country was forced to import critical factors of productions such as fuel**. This would worsen inflation **with higher imported inflation.**



All in all, Sri Lanka's macroeconomy will experience a downward spiral resulting in a much higher GPL at P_3 and a lower national income at Y_3, and in turn high unemployment.

Evaluation

- The severity of the impact depends on the specific context of the situation. For instance, as Sri Lanka is a developing country, the impact on the many lower-income households may be considered more serious because it directly affects their ability to meet basic nutritional needs, exacerbating poverty and inequality.
- With the government's fiscal debt, it is unlikely for it to provide any substantial financial assistance to the low-income households as unemployment. Even food ration would be a problem with limited food produced and more expensive food imports.
- Overall, the macroeconomy impacts seemed more serious without the possibility of being resolved quickly in the near term and having the potential to even further worsen any inequity as a result.

Level	Knowledge, Application, Understanding, Analysis	Marks
L2	Answers at this level will consider Sri Lanka's microeconomic and macroeconomic impacts due to rising food prices.	4 - 7
L1	Answers at this level will show a limited understanding of Sri Lanka's microeconomic and macroeconomic impacts. The discussion may lack depth in explaining how rising food prices affect individual markets, as well as how these price increases contribute to broader economic challenges like inflation and growth.	1 – 3
	Allow up to 3 additional marks for evaluation	

E	Evaluation marks will be awarded for a realistic assessment of Sri Lanka's microeconomic and macroeconomic impacts, focusing on how rising food prices affect both individual markets and broader economic conditions. A conclusion must be provided, summarizing the key findings and offering a clear judgment on the overall impact of the price increase, considering the challenges and constraints faced by Sri Lanka's economy.	1 - 3

Question 2: Singapore and the global economy

(a) (i) Identify the trend in Singapore's general price level from 2019 to 2023. [1]

- Singapore's GPL is generally increasing except 2020.

(ii) Using AD/AS analysis, account for the change in Singapore's inflation rate in 2022. [4]

- Due to combination of external and domestic factors or
  Due to strong DD and constrained SS

Demand-pull inflation
- Household able to draw on savings that they accumulated during the pandemic → as restrictions gradually eased → resumed shopping & dining → C rise → AD rise
- Countries re-open economies → export rise → AD rise→demand-pull inflation

Cost-push inflation
- Pandemic-related restrictions affected logistics, transportation and production supply chains in many countries → delays and supply shortage → COP rise → SRAS fall
- Global food & energy prices rise → pushed up prices of Spore imports → COP rise → SRAS fall.
- Labour shortages → wages rose → COP rise → SRAS fall→ cost-push inflation

- With both AD rise and SRAS fall → Assuming the economy is nearing full employment, these lead to an upward pressure on the general price level in Singapore. As GPL continue to rise, this will result in higher inflation rate in 2022.

(b) (i) With the help of a supply and demand diagram, explain how the rise in the US interest rate is expected to affect the value of Singapore's currency against the USD. [3]

- Given the rise in interest rate the in US → this will lead to an inflow of hot money as expected rate of return is higher.
- The outflow of hot money from Singapore to the US, will lead to a decrease in demand for SGD or increase in supply of SGD → SGD will depreciate.
- Diagram showing a fall in DD of SGD that must be aligned with the explanation given.

(ii) State the components of the current account. [1]

- Balance of trade in goods and services, primary income balance and unilateral transfers balance.

(iii) Given the change in the value of Singapore's currency in b(i), explain how it might affect Singapore's balance of trade. [3]

- Current account → particularly BOT [export and import].
- In b(i) SGD depreciated → this means that export (X) will be relatively cheaper to foreigners → leading to an increase in X revenue.
- At the same time, import (M) becomes relatively more expensive in domestic currency → M will rise, **assume PEDm<1**
- Assume $|PED_X + PED_M| > 1$, **balance of trade improves** → trade surplus.

(c) Discuss whether fiscal sustainability for an economy (Extract 6) can be achieved via raising the GST and reshaping corporate and personal tax. [8]

As stated in Extract 6, fiscal sustainability is the ability of a government to maintain public finances at a credible and serviceable position over the long term.

Raising the Goods and Services Tax (GST) and reshaping corporate and personal taxes can be a strategy to achieve fiscal sustainability. However, there are various considerations and potential implications associated with these measures.

First Requirement:
Raising GST and reshaping corporate and personal taxes can be a strategy to achieve fiscal sustainability.

- ➔ Raising GST can contribute to fiscal sustainability by increasing government revenue. This can help to fund public services, reduce budget deficits, and manage public debt. If government increases their expenditure in infrastructure etc. via the revenue collected from raising GST → this will also lead to a rise in G.
- ➔ Reshaping corporate and personal taxes can also play a role in achieving fiscal sustainability.
- ➔ With a fall in corporate tax → after tax profit rise → increase firm's expected rate of return → rise in I.
- ➔ With a fall in personal tax → increase in consumers' disposable income → thus purchasing power → rise in C.

Rise in G, C and I will lead to an increase in AD → real NY will rise → allowing government to collect more tax revenue in return.

The initial autonomous increase in AD leads to subsequent increases in induced C.
As total expenditure increases, firms will need to employ more factors of production in order to increase their production to meet the increase in demand for goods and services.
As a result, real national income (which is the sum of all factor incomes) will rise via the multiplier effect → this means more income tax collected → positive cycle of continuous rise in government revenue → increase government's capacity to increase G.

Alternative answer:
- ➔ If government reshapes corporate and personal taxes by increasing personal and corporate taxes instead,
- ➔ With a rise in corporate tax and personal tax → generate higher tax revenue→ increase govt's capacity to increase G. Thus ensuring fiscal sustainability.

Second Requirement:
However, there are various considerations and potential implications associated with these measures.

- ➔ *As stated in Extract 6, government also needs to reduce spending since to maintain fiscal sustainability, both revenue and expenditure need to be considered especially those who are facing high and increasing debt level → be* ***more prudent in their spending****.*

- ➔ For investors, the increase in the GST rate will also affect COP → this may reduce abilities and willingness of firms to invest → which may offset the initial rise in I via reduction of corporate tax. At the same time, the increase in COP will reduce SRAS → reducing economic growth and employment.

➔ Pessimistic econ outlook may also affect both consumers and investors → thus affecting spending patterns and overall economic activity. **Reduce govt revenue**.

Alternative answer:

➔ If government reshapes corporate and personal taxes by increasing personal and corporate taxes instead, key limitation include the fall in I and C, dampening rise in AD and thus affecting tax revenue collected.

Evaluation:

In conclusion, raising the GST and reshaping corporate and personal taxes can be part of a broader strategy to achieve fiscal sustainability. However, it is essential to carefully consider the potential impacts on businesses, consumers, and the overall economy. I.e. taking into consideration other economic agents in their decision making. Since to reduce fiscal deficit include both increase in revenue and reduce expenditure. Government can also consider putting in place ss side strategy to assist private sector to maximise productivity without substantial government spending.

(d) Extract 7 states 'Growth needs to depend less on structural policies but rely more on international co-operation'.

Discuss the validity of this statement. [10]

- **Introduction:**
  To discuss the validity of the above statement, we will need to analyze the impacts of structural policies and international cooperation on economic growth, considering both short-run and long-run effects in Singapore.

- **First Requirement: Impact of Structural Policies on Growth**

- As stated in the Extract, "Singapore has relied heavily on structural policies to fuel its economic growth, implementing regulatory reforms to attract foreign investment, emphasizing education to create a skilled workforce, and investing in infrastructure to boost productivity."

  a) Short-run effects:
- Improvements in education and skills development initiatives (e.g., SkillsFuture) can increase labor productivity → more output per man hour → reduce COP → shifting SRAS right.
- b) Long-run effects:
- Regulatory reforms to attract FDI can increase capital accumulation → shifting the LRAS curve rightward, increasing the economy's productive capacity.
- Improvements in education and infrastructure also contribute to long-term productivity gains, further shifting LRAS right.

  Overall, AS curve shifts right → allowing Singapore to achieve both actual and potential growth without inflationary pressure → contributing to sustained economic growth.

- **Second Requirement**: **Impact of International Cooperation on AD-AS**

  a) Short-run effects:
  - Free Trade Agreements (FTAs) like the EU-Singapore FTA can increase export demand → increase in X → shifting the AD curve rightward.

- Participation in regional initiatives (e.g., ASEAN Economic Community) can boost trade and investment → both shift net X and I → further shifting AD right.

b) Long-run effects:

- Increased access to larger markets through international cooperation can lead to economies of scale → lower average costs enable firms to be more competitive and profitable → encourages investment in new technologies and expansion of production facilities → overall productive capacity of the economy increases → LRAS increase.
- Knowledge and technology transfer from international partnerships can enhance productivity → increase both SRAS and LRAS.

- **Evaluation:**

a) Complementarity:

- Structural policies and international cooperation can have reinforcing effects on both AD and AS.
- Strong domestic institutions resulting from structural policies can enhance Singapore's ability to benefit from international cooperation, magnifying the rightward shifts in both AD and AS curves.

- b) Changing Global Economic Landscape:
- The increasing interconnectedness of economies suggests that the AD curve may become more responsive to international factors.
- Global challenges may require collaborative solutions, potentially making international cooperation more critical for sustained LRAS growth.

- c) Singapore's Context:
- As a small, open economy, Singapore may see larger shifts in its AD curve from international cooperation compared to domestic structural policies alone.
- However, structural policies remain crucial for shifting the LRAS curve and maintaining competitiveness in the global market.

- **Conclusion:**

While the statement highlights the growing importance of international cooperation, it would be inaccurate to suggest that growth should depend less on structural policies. The AD-AS analysis demonstrates that both approaches contribute to economic growth through different mechanisms. Structural policies primarily affect the supply side (SRAS and LRAS), while international cooperation can significantly impact both demand (AD) and supply sides. For Singapore, a balanced approach leveraging both structural policies and international cooperation is likely to be most effective in promoting sustainable economic growth. This strategy allows for simultaneous shifts in both AD and AS curves, potentially leading to non-inflationary growth and increased economic resilience. The optimal balance may evolve over time as the global economic landscape changes, but completely diminishing the role of structural policies would likely limit Singapore's ability to fully benefit from international cooperation. Therefore, while the statement has some validity in emphasizing the increasing importance of international cooperation, it oversimplifies the complex relationship between domestic policies and global engagement in driving economic growth.