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# ECONOMICS Higher 2 Syllabus 9757

Examiner's Report

Year 6 Preliminary Examination 2022



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# ECONOMICS

### Y6 H2 Preliminary Examination 2022



#### **Case Study Question 1**

#### a) i) Identify and explain a fixed cost and a variable cost for a pharmaceutical company. [2]

Variable cost – cost of variable factors like biobags or filters or sterilisation gear which increases as the output of pharmaceutical products increases. [1]

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Fixed cost – Rental of manufacturing facilities which does not increase with the output level in the short run. [1]

#### Examiners' comments

Most were able to score full marks, however a significant number of scripts identified vague and weak examples of fixed cost - "maintenance cost of machines" or "maintenance cost of operation". Maintenance costs could arise from wear and tear directly related to the production of drugs, or it could be regular maintenance costs not correlated to the level of production. Students are advised to use very explicit and clear examples and explain how they are variable or fixed costs.

Another common mistake was to give examples which were not related to a pharmaceutical company. Please note that a pharma firm (e.g. Pfizer and Moderna) produce drugs and medicines, they do not operate hospitals and clinics (e.g. Parkway Medical, Raffles Medical).

# ii) Explain how fixed costs may have an impact on the size of firms in the pharmaceutical industry. [2]

If there are high fixed costs involved, e.g. purpose-built factories with specialised equipment to manufacture drugs, then the size of the firm is likely large.

This is because high fixed costs will require a firm to have a large output level before its average cost of production start to fall significantly, i.e., the firm reaps iEOS over a large output level. OR High fixed costs is a large start-up cost which is a high barrier to entry and this allows incumbent firms to have large output and market share and therefore size of firm is likely large.[1]

#### Examiners' comments

This question was poorly done. Most misunderstood the question and explained how size of a firm could affect BTE, which is the opposite of what the question is asking for. Some candidates had the correct idea about iEOS but failed to explicitly bring in the concept of falling average COP as output increases.

# b i) With reference to Figure 1, describe the changes in the level and composition of national healthcare expenditure in USA. [2]

The level of National Health Expenditure (NHE) has increased. [1]

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In terms of composition, out-of-pocket expenses has significantly fallen whereas health insurance's share of National Health Expenditure (NHE) has increased significantly. [1]

#### ii) Discuss whether demand or supply factors are more significant to account for the change in the level of national healthcare expenditure in USA. [8]

#### Suggested Answer:

Total Expenditure = PxQ. There are many factors that caused supply of healthcare services to fall and demand to rise which in turn causes equilibrium P and Q to change, causing the level of National Healthcare Expenditure to change.

Note: Students need not explain every factor. A total of 2 distinct demand and supply factors with PED discussed suffice and the link must be made to total expenditure (TE).

#### Supply Factors

(1) Ext 1 P2: The move to digitalisation in healthcare services has led to an increase in cost of production. E.g., in providing professional consultations, testing and monitoring using the internet, firms need to instal the relevant hardware, technology and services to ensure effective and efficient level of services, and these require additional costs leading to an increase in average cost of production (COP).

(2) Ext 1 P3: The use of newer procedures to treat illnesses which involve use of new advanced technology will increase the COP of healthcare institutions too. Use of new drugs which are highly expensive because of patents contributed to this rise in COP too.

(3) Ext 1 P7: "continued staff shortages with more healthcare workers choosing to leave the profession"  $\rightarrow$  with increasing net number of healthcare workers leaving the profession, possibly due to the long hours and tedious nature of work  $\rightarrow$  results in fall in labour supply in the market and that is likely to drive up wage rate. This increases cost of production of healthcare goods and services.

(4) Ext 1 P1: "Increased provider consolidation has decreased market competition..."  $\rightarrow$  because of mergers and acquisitions, fall in number of producers  $\rightarrow$  fall in supply in the market.

(5) Ext 1 P7: "Inflation affects the costs of operations, supplies, administration, and facilities"  $\rightarrow$  this directly raises the cost of input factors and hence raises cost of production  $\rightarrow$  producers will cut back output to maintain profitability  $\rightarrow$  reduces effective supply.

As a result, firms are less willing and less able to supply at each and every price level. Hence, Supply curve shifts leftwards from S0 to S1.



At the prevailing price, with a shift in supply curve upwards, quantity demanded is greater than quantity supplied and that leads to a shortage in the market. Consumers will bid up price and firms will start to increase output and a new equilibrium will be reached at a higher price P<sub>1</sub> and lower output Q<sub>1</sub>

The demand for healthcare is price inelastic since there are few substitutes to improve health outcomes when one is ill, apart from consuming healthcare products and services. Hence the fall in supply is met with a more than proportionate increase in price from P0 to P1 as compared to a smaller fall in quantity demanded from Q0 to Q1. Hence, total healthcare expenditure increases from  $OQ_0 AP_0$  to  $OQ_1 BP_1$ .

### **Demand Factors**

(1) Ext 1 P4: "Medical advances can improve our health and extend our life, but they can also lead to an increase in spending and the overutilization of expensive technology and drugs." The longer lifespan of Americans increases the need for more medical care because seniors and elderly are more prone to illnesses and have a higher risk of medical complications when ill  $\rightarrow$  contribute to higher demand for healthcare.

(2) Ext 1 P6: "Another prominent concern is that an increasing proportion of the U.S. population has at least one chronic disease"  $\rightarrow$  there is an increase in the proportion of overweight Americans and this is likely due to the diet and sedentary lifestyle  $\rightarrow$  result in high rate of chronic illnesses like diabetes, heart diseases, high blood pressure which require long term treatment  $\rightarrow$  greater demand for healthcare

(3) Ext 1 P5: "Moral hazard issues... encourage a high volume of redundant testing and overtreatment."  $\rightarrow$  Consumers whose medical expenses are covered by health insurance may demand additional but unnecessary treatment, procedures or consultation visits to the doctor because they need not bear these additional charges. These costs are borne by the insurance companies and that led to an increase in demand.



Market for healthcare

The above factors led to an increase in demand for healthcare services  $\rightarrow$  caused a shift in the demand curve to the right. At the prevailing price of P<sub>0</sub>, a shortage arise and through the price adjustment mechanism, there is upward pressure on price to P<sub>1 while</sub> quantity increases to Q<sub>1</sub>. Total expenditure increases from 0Q<sub>0</sub>A P<sub>0</sub> to 0Q<sub>1</sub>B P<sub>1</sub>.

#### Conclusion:

Any reasoned and substantiated conclusion on whether demand or supply factors are more significant in leading to a rise in expenditure. For example:

Demand factors are likely to be more significant in the increase in expenditure in USA because increasingly, most medical expenses are paid through insurance policies, and this has resulted in sharp increase and unnecessary expenditures. Also, in a developed economy like USA which uses plenty of technology and where work is mainly indoor and sedentary and where average lifespan is high, these are strong demand contributors to increases in expenditure. Whereas where supply is concern, the government is likely to intervene in the control of monopoly power and may increase the number of government-run healthcare institutions. Therefore, demand factors are likely to be more significant.

#### Mark Scheme:

Knowledge, Application, Understanding, Analysis		
L1	<ul> <li>Major conceptual inaccuracies</li> <li>Smattering of points not directly linked to question</li> <li>No reference to case material at all</li> <li>Journalistic explanation</li> </ul>	1 - 3
L2	<ul> <li>Good rigour and accurate economic analysis based on price adjustment process, non-price determinants of supply and demand and relevant elasticity concepts</li> <li>Explicit and sustained application of case evidence</li> <li>At least one demand and one supply factor each, well discussed with links made to total expenditure</li> </ul>	4 - 6
	Evaluation/Synthesis (can be in the body and/or in the concluding paragraph)	
E1	<ul> <li>A judgement that considered only either the thesis point(s) or antithesis point(s) and explanation is weak or incomplete</li> <li>A judgement which is purely theoretical without contextual application</li> </ul>	1
E2	<ul> <li>A judgement that is well-reasoned, based on the thesis and anti-thesis points discussed and supported by evidence with accurate economic analysis.</li> <li>A relevant insight reasoned.</li> </ul>	2

#### Examiners' comments

A significant number of responses did not define TE. These candidates went on to equate TE as P or Q, or simply analysed changes in P or/and Q, without analysing the consequent effects of changes in P and Q on TE. This is not good. Candidates must know that TE = PxQ, and changes in both P and Q, jointly determines changes in TR.

While most responses were able to identify some relevant demand or supply factors as directed by the question, a significant number showed poor understanding of the case material. Many students merely copied or hashed quotes from Extract 4 without explaining the underlying factors which led to changes in demand or supply. For example, "an increasing proportion of the US population has at least one chronic disease...", could be explained as how a sedentary lifestyle or an ageing population in USA, led to increasing incidence of chronic diseases which require long term medical treatment  $\rightarrow$  increase in demand for healthcare. Students are reminded that mere quotes from Extracts cannot replace explanation of the underlying cause.

A handful of scripts erroneously described how digital revolution with use of internet and wearable devices (Ext 1 Para 2) led to a fall in demand for healthcare. They reasoned wrongly that these are

new alternatives or substitutes of healthcare. These equipment do not replace but enhance healthcare and so cannot be substitutes. Many students also did not grasp the case material well to see that this factor digital revolution leads to an increase and not a fall in cost of production <u>currently</u>.

In many scripts, mergers and acquisitions leading to greater market dominance are correctly used to explain how price may be driven up and quantity reduced. However, the market demand and supply diagram should be used here because of the phrasing of the question that asks for a demand and supply analysis at the market level. In the given context and case material, scripts that explained how mergers allowed firms to reap iEOS and thus led to an increase in supply is not acceptable.

Candidates must know when to use the PED and PES concepts appropriately when undertaking DD/SS analyses. If you have any doubts, please clarify with your tutors.

# c) (i) Define price discrimination and identify the conditions necessary for price discrimination to take place. [2]

- Price discrimination takes place when different consumers are charged different prices for reasons not due to cost differences.[1]
- In order to undertake price discrimination, a firm needs to possess market power, ability to identify and segment the market (by having market segments with distinct price elasticities of demand) and ability to prevent arbitrage. (2 conditions suffices) [1]

### Examiners' comments

A significant number of scripts did not have an accurate definition of price discrimination – there is a critical omission of the point "no cost difference" in the definition.

### (ii) Explain the challenges to a pharmaceutical firm in undertaking price discrimination.[4]

Challenges must be explained in terms of how the conditions of price discrimination may not be fulfilled for the firms to able to increase or maximise profits. Use of the given context in Extract 4 should be used as far as possible. Any 2 distinct challenges using the context in Extract 4 will be sufficient to score full marks.

The firm is not able to dictate price and not able to charge <u>maximum</u> price that each group is able and willing to pay (based on different PED):

1) In its attempt to segregate the markets, a firm is not able to charge a richer country (which supposedly has lower PED) a higher price. This is because richer countries are also the ones with the greatest negotiating power to demand lower price.

2) Where transparency is allowed and prices are known to all, firms may not be able to charge different prices, i.e., it is not able to charge higher prices on richer countries and lower prices on poorer countries because ALL (including the richest countries) will want to pay only the lowest price. In such a situation, the firm may lose its price discriminating ability and can only practice uniform pricing policy.

#### Resale is possible:

3) A push towards transparency may cause arbitrage. Arbitrage can exist through trade or in the underground economy. Consumers may turn to buying from informal sources abroad if they are charged a higher price as compared to a country that is charged a lower price. For those in a country who are charged a lower price, they have an incentive to participate in arbitrage and resell pharmaceutical products at a higher price to make a profit. Hence, information transparency may lead to arbitrage and firms are not able to increase profits through price discrimination.

4) Corruption may also make resale possible. Corrupted officials of the poorer countries may sell to a richer country and the pharmaceutical firm is not able to increase profits expected from price discrimination.

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#### Examiners' comments

Many scripts simply explained theoretically how firms may not be able to carry out price discrimination. Students are reminded that contextual explanation is needed to score well.

A handful of scripts wrote extensively about corruption, political tensions and inability to achieve equity or "unfairness" which are not concerns of the firm, a profit maximising entity. Such answers do not address the question of "challenges" faced by the firms in terms of ability to segment the market or charge differentiated prices (maximum price that each group of consumers is willing to pay) in order to maximise profits.

# d) Extract 2 suggests that governments should waive intellectual-property protections for COVID fighting technologies.

#### Discuss whether this is justified.

[10]

Introduction: Waiving intellectual-property (IP) protections may be helpful to address issues such as market failure due to income inequality or market dominance by facilitating market entry of new firms. But it might also lead to worse outcomes.

### <u>Thesis 1: waiving IP laws might be justified as it mitigates market failure arising from market</u> <u>dominance due to the IP protection</u>

- Prices are high and output low in the market for COVID fighting technologies due to market dominance.
   IP laws augments market dominance because it affords incumbents legal barriers to entry and allow firms to maintain a large market share.
- The firm makes pricing decision at output level where MC = MR in order to profit maximize. With IP laws, which confer monopoly power to the incumbent firm by preventing other firms from producing similar products, the incumbent firm has a substantial market share and is able to charge a price that is much greater than its MC so as to maximise its profits. Referring to the diagram below, the firm charges P<sub>1</sub>, the profit maximizing price at output level Q<sub>1</sub> where MC = MR<sub>1</sub>.
- However, this price and output level is socially sub-optimal as society's valuation of the good (indicated by price) is higher than the marginal cost of producing the next unit of the good. (P>MC)
- As P<sub>1</sub> is much greater than MC, society stands to benefit from more units of COVID-19 fighting technologies in the market but profit maximizing imperative leads to a lower output Q<sub>1</sub> than socially optimum level Q<sub>0</sub>.
- Waiving IP rules removes legal barriers to entry that facilitates market entry. As such, as more firms enter the market, the number of firms in the market increases while the market share of the incumbent dominant firm fall and price elasticity of demand for the incumbent firm increases as more substitutes are now available in the market.
- This is illustrated by the leftward shift in AR/MR from AR<sub>1</sub>/MR<sub>1</sub> to AR<sub>2</sub>/MR<sub>2</sub> alongside a corresponding fall in the gradient
- With lower market share and price setting ability, firms produce at profit maximizing output level Q<sub>2</sub> where MC = MR<sub>2</sub> and price is at P<sub>2</sub>. As the combined total output in the market increases with new entrants in the market, the market approximates a more allocatively efficient outcome with each firm producing at a price closer to its MC. A lower price of P<sub>2</sub> will make the drug more affordable for all, especially the lower income economies.



# Thesis 2: waiving IP might be justified as it mitigates market failure arising from income inequality

- As noted in extract 2, "deaths, by contrast, are increasingly concentrated in poorer ones, like India" which suggests underconsumption due to excessive income inequality.
- As allocation of resources is ultimately based on dollar votes, for low-income households, they are priced out of the market as they do not possess effective demand for COVID vaccines
- Their inability to consume given income constraints leads to a lower demand DD<sub>1</sub> (excessive income inequality).
- Hence, there is underconsumption and under-allocation of resources → the market consumes Q<sub>1</sub> COVID fighting technologies which is lower than socially optimum level Q<sub>2</sub>.
- As illustrated in the earlier paragraph, as pricing power of incumbents are eroded with more entrants (and more substitutes in the market), the consequent fall in price increases effective demand of lowincome households. With the same level of income, their purchasing power for COVID fighting technologies has increased.
- Hence, consumption levels in the market increases and approximates to Q<sub>2</sub>, thereby addressing market failure.
- Hence, by tackling the issue of underconsumption, IP waivers are justified.



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# Anti-thesis: waiving IP might not be justified as it negatively affects R&D, Innovation and Dynamic Efficiency

- Engaging in R&D to look for effective cures for or treatment of diseases requires a lot of funds and many of these research projects are "risky" as many do not bear any positive outcomes and even if they do, it is usually after a long period and with high level of expenses. If the patents to prevent new entrants or copycats are removed, then there is insufficient financial incentive of profits for firms to undertake such risks (firms are unlikely to innovate) and patients are worse off without more effective treatments.
- Dynamic efficiency gains are therefore foregone in the long run as the firm is pressured to survive rather than reap supernormal profits that may lead to either greater productive efficiency through process improvements or more product innovation/ quality improvements.
- In the long run, threat to allocative efficiency, dynamic efficiency and loss of innovation renders the choice to waive IP protections unjustified.

[NB: positive externalities as a source of market failure is also acceptable in this question if discussed with use of the given context.]

#### **Conclusion**

Threat of firms being unable to survive or lack the incentives to innovate might be unfounded given the existence of extensive government subsidies which already reduced the cost of production to a large extent. This implies that firms are likely to be able to fulfil the survival condition of making at least normal profits in the short run as it is also in the interest of the government to keep such firms alive to produce vaccines/ other life-saving technology. With ref to Ext 2, Pfizer is highly profitable even if its profits from vaccines are excluded. Waiving IP is hence justified since the risk of a problem of no new effective pharmaceutical products for patients is low or non-existent.

# Mark Scheme:

Knowledge, Application, Understanding, Analysis		
L1	<ul> <li>Glaring conceptual errors throughout</li> <li>Journalistic explanation throughout - lack links to economic framework</li> <li>Explanation of thesis and AT points are purely theoretical</li> </ul>	1-4
L2	<ul> <li>Discussion is balanced, shows rigour in economic analysis and depth of explanation/elaboration is evident.</li> <li>Good use of relevant market failure theory/framework.</li> <li>Effective contextual application.</li> </ul>	5-7
	Evaluation/Synthesis	
E1	<ul> <li>Judgement which is purely theoretical without contextual application</li> <li>Judgement that is weak or incomplete</li> </ul>	1
E2	• Judgement that is well-reasoned based on case evidence and supported by strong economic analysis.	2-3

#### Examiners' comments

This question was generally not well done. The main reason was that many students were not able to address the question from the perspective of possible sources of market failure in the given market. For example, many students did not see how IP protection is a barrier to entry (BTE) and confers monopoly power to firms in the pharmaceutical industry. So, there was weak use of the relevant

economic framework to discuss how a waiver of IP protection could mitigate misallocation of resources due to monopoly power in the industry. Instead, a substantial number of scripts were journalistic and descriptive in writing, with no use of the needed economic framework and diagram, which could have been used to provide rigour and depth and to score well.

Some students did not understand the nature and main purpose of IP laws. They inaccurately confined their answer to how IP laws allowed incumbent firms to produce large output to reap iEOS, allowed firms to reduce their average COP and lead to lower prices and larger output and therefore is beneficial to consumers.

Some students also misunderstood the term "<u>waiver</u> of IP protection". This refers to the removal of patents and copyrights for Covid-19 vaccines, not the protection of patents. Many misunderstood this and hence their explanation was the other way round.

Another common mistake seen is that candidates misunderstood the phrase in the question "justified". This means that an explanation of the reasons behind the policy is required. This is not the same as the limitations of a policy. A policy might be very effective (to achieve whatever outcome it wants) with few limitations, but it may not be justified.

Another group of students explained how a waiver of IP protection to reduce BTE allowed many new entrants to make profits and competition will subsequently lead to  $R\&D \rightarrow new$  product and process innovations will take place  $\rightarrow$  better encourage new vaccines. Such a line of reasoning is theoretically sound but such scripts need to consider the following 2 points; 1) the entry of new competition also erodes the ability of firms to make supernormal profits which is required to finance R&D, 2) in the context of this case study, the primary objective of IP waiver is to allow other firms to use existing Covid fighting technologies to deal with the pandemic.

There were much copying and hashing of quotes from the case study in place of the needed economic explanation. Quotes from different parts of the case study are hashed and appeared abrupt and do not link well to the point in discussion.

# Case Study Question 2

# (ai) Summarise the trend in China's real GDP growth rate between 2013 and 2020. [2]

- General Trend: General decline in China's real GDP growth rate between 2013 and 2020. [1m] - Refinement of the Trend: Sharp drop in real GDP growth rate between 2019 and 2020. [1m]

#### Mark Scheme:

- General trend 1m
- Refinement 1m

# Examiner's Comments:

• This question was generally well attempted with many candidates securing full credit.

• Candidates must provide overall trend across the entire time period (2013 to 2020) to secure the first mark. They should not break up the time frame when trying to secure the first mark. For the second mark on trend refinement, students are expected to provide a refinement that is meaningful. In this case students are to identify the **sharp drop** in real GDP growth rate between 2019 to 2020.

• A small proportion of candidates made the mistake of describing the trend in real GDP instead of trend in real GDP growth rate between 2013 and 2020.

• Candidates are also reminded to read the question carefully before attempting, especially with regards to data the question is asking for and the time period stated in the question.

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# (aii) Using a diagram, explain whether the above trend could be attributed to the "trade war" between US and China. [6]

**Approach:** Students are expected to use the AD-AS diagram and provide a balanced analysis to explain the fall in the real GDP growth rate summarised in part a(i).

**Thesis:** The trade war between US and China has led to reduction in trade between the 2 countries as mentioned in Extract 5, Para 4: "Heightened US-China trade tensions... peaked at the end of 2019, the US imposed tariffs on more than US\$360 billion worth of Chinese goods." The imposition of import tariffs on Chinese goods by the US will lead to a reduction in X from China. Additionally, rising US-China trade tensions can also result in global business uncertainty, leading to a reduction in I/FDI for China. This is seen in Extract 5 Para 1 "trade war with the US... weakened sentiment and confidence, weighed on investments in manufacturing" Ceteris paribus, assuming that net X falls together with a fall in I (FDI), the initial increase in AD is dampened by fall in NX and I, thus AD increases by a smaller extent, resulting in a slowdown in the rate of increase in AD for China. Through the multiplier process, RNY increases from Y1 to Y3 instead of Y2 ie. fall in the rate of increase in real GDP seen in (ai). Diagrammatically, this can be proxied by a smaller increase in AD from AD1 to AD<sub>3</sub> instead of AD<sub>2</sub> in Figure 1 as shown below.



- Anti-thesis: China's real GDP growth rate declined not because of the US China trade war but due to other factors seen in Extract 5. According to Extract 5 Para 3, "worries of a resurgence of coronavirus cases and cautious consumer sentiment" had led to a fall in the rate of increase in C, which is a large % of China's AD given the large domestic base. "...shock of the health crisis is expected to depress global demand..." led to weak growth in X for China. Also, seen in Extract 5 Para 4 "... supply chain decoupling and a subdued profit outlook could hit China's corporate sentiment, depress trade and manufacturing activities", China would also face a fall in the rate of increase in FDI/I. Taken together, with smaller increases in C, X and FDI/I or perhaps even a fall in these components, China will experience smaller increments in AD despite the stimulus spending. Hence, since AD rises at a slower pace, through the multiplier process, China will face a slower rate of growth in real GDP seen in (ai)

-**Conclusion/Synthesis**: China's decline in real GDP growth rate is a result of a combination of the effects from both the US China trade war and the Covid-19 pandemic, but effects of the pandemic likely to be the key reason for the sharp drop in real GDP growth seen in Figure 2 since the trade tensions had been ongoing for some time prior to 2019.

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### Examiner's comments:

• This question was generally well attempted with good usage of case material but most candidates failed to realise that the trend identified in (ai) is that real GDP growth rates has dropped and hence real GDP is increasing at a decreasing rate between 2013 and 2020. This in turn led to many scripts explaining the trend as an overall fall in RNY instead.

• Given the mark allocation, full credit is awarded to responses for scripts that are able to explain whether the trade war is able to explain the slower rate of real GDP growth with the use of the AD/AS diagram.

• A handful of scripts also gave the tariff diagram in their answers, but candidates need to understand that as the question's focus is on analysing the impact on economic growth ie. Rate of change of real GDP, hence the more appropriate diagram to use here is the AD/AS diagram. A tariff diagram that is drawn has no direct impact on economic growth rates.

### Break down of Mark Scheme:

Candidate identifies relevant case evidence & explains the negative impact of the US-China trade war on X & I components of AD è slower rate of increase in AD cet par for China & through the multiplier effect, a slowdown in the real GDP growth rate for China (general trend) - 2m

Candidate identifies relevant case evidence and explains why the evidence suggests that other factors are responsible for the slowdown in the rate of increase in AD/fall in AD ie. Covid-19 pandemic and its effects on C, X & I and hence the slowdown in real GDP growth rate for China (refinement of the trend) - 2m

An AD/AS diagram is drawn to illustrate the effects of US-China trade war AND/OR effects of Covid-19 on components of AD and hence the impact on RNY. - 1m

Synthesis/Conclusion made on whether the trend in (ai) was a result of US-China trade war **OR** Covid-19 pandemic **OR** a combination of the effects of both developments. - 1m

# (b) Explain why falling oil prices would be "wonderful news" for some countries while "it's bad for the oil companies". [4]

- Falling oil prices would be "wonderful news" especially to oil importing countries as seen in Extract 7 such as India and China since the reduction in price of imports of raw materials such as oil would lead to a fall in COP for these oil importing countries, ceteris paribus, leading to a rise in production levels as seen from a rise in AS (downward shift of the AS curve) leading to a reduction in import-induced inflation i.e. cost-push inflationary pressures, hence helping to achieve **price stability** for oil-importing countries. [2m]

# Or

- Following the above analysis for oil importing countries, falling oil prices would result in a fall in import expenditures, given that  $PED_{oil} < 1$  due to the lack of close substitutes. Keeping X revenue constant, a fall in M expenditure for these countries would then benefit them by contributing to an **improvement in their BOT** positions. [2m]

# AND

- On the other hand, "it's bad for oil companies" since PED of oil <1 as mentioned above, due to the lack of close substitutes for commodities such as oil, hence a sharp fall in price will lead to a less than proportionate rise in quantity demanded of oil ceteris paribus, hence an **overall fall in TR** for the oil companies. Ceteris paribus, this would result in **a fall in profits** for these companies. [2m]

#### Examiner's comments:

- Majority of the candidates were able to understand the requirement of the question and provided wellthought out responses using the appropriate framework in their analysis.
- A high proportion of candidates correctly analysed the impact on the macro aims for the oil importing countries and analysed the impact on profits for the oil company.

Areas for improvement

- Weaker responses did not apply the PED concept where appropriate, in particular, when it came to explaining the fall in TR for oil producing firms given a fall in oil prices.
- In contrast, better responses understood the need to use PED when analysing the impact on the firm's revenue and in turn profits as well as the need for PEDm of oil when analysing the impact on the BOT of the oil importing countries.
- Some candidates incorrectly explained the fall in TR for firms due to a fall in demand for oil. Such a response does not address the effects of a fall in oil prices.
- A significant number of candidates incorrectly used the market analysis instead of the firm analysis to explain the fall in TR.
- Candidates are reminded that Balance of Trade is a nominal value concept rather than a real concept. To avoid ambiguity, in clarifying what is meant by BOT, they should refer to it as the difference between export revenue and import expenditure ([TRx-TEm) or [PxQx-PmQm]). The notation (X-M) is ambiguous because it can refer to the difference between quantity of exports and quantity of imports (Qx-Qm), like in AD (aggregate demand is a real value concept).

#### Mark Scheme:

- An explanation of the positive impact on price stability (reduction in import-induced inflation) **OR** improvement in BOT for oil-importing countries using the PED concept. 2m
- An explanation of the negative impact on TR & profits of oil-producing companies using the. PED concept.
   2m

# (c) Considering the possible effects on India's economy of attracting firms to relocate their supply chains from China to India, assess the extent to which it is beneficial to India. [8]

**Approach:** Students are expected to consider the possible macroeconomic effects on India given the increase in FDI inflow to the economy. A balanced approach covering both short and long run effects for the analysis is required.

#### Introduction:

- As seen in Extract 6, the Indian government implemented " a set of incentives to entice businesses moving away from China". These include "tax rebates of 4-6% over the next 5 years" (Extract 6 para 1)
- The incentives offered by the Indian government to attract firms to relocate to India would be deemed beneficial to India if it helps India achieve its macroeconomic goals of sustained economic growth, price stability, low unemployment as well as favourable BOP.

#### Body:

### Thesis: To a large extent, attraction of firms to relocate to India is beneficial to India

- India will likely benefit from an increase in FDI inflows from smartphone/electronics manufacturers such as "Samsung Electronics Co. and Apple Inc's assembly partners" and those from "pharmaceutical businesses to automobiles, textiles and food processing" seen in Extract 6 para 1. This rise in I/FDI will lead to increase in AD for India since I is a component of AD. In response, firms will raise production due to the unplanned fall in stocks, hence increasing the hiring of FOP including labour which is a derived demand. **Employment levels rise** in India, moving the economy closer to Yf and **reducing demand-deficient unemployment levels** in India. As factor incomes rise, induced consumption rises, generating further rounds of increases in incomes and induced spending such that through the multiplier effect, which posits that one man's spending is another man's income, India will enjoy a **more than proportionate rise in RNY**, reflecting **actual economic growth**. This is supported by Extract 6 para 2: "... additional investments of \$55 billion over 5 years, adding 0.5% to India's economic output."



Such relocation of supply chains from China to India would enable India to "grow the share of manufacturing in the economy to 25% of its GDP from the current 15% as part of Modi's 'Make In India' program" (Extract 6 para 2). Hence, enabling India to diversify its economy's dependence on agriculture and perhaps even enable the country to **develop its comparative advantage in manufacturing** over time. Hence, over the LR, this can potentially **raise X and AD, contributing to growth over the long term** for India. In the LR, the rise in FDI inflows also contribute to increase in productive capacity due to an increase in the quantity of FOPs - rise in LRAS - **potential growth** experienced in India. Together with the attainment of AG in the SR, India benefits from **sustained economic growth**.

**Externally**, rise in FDI inflows will result in **improvements in the BOP position** for India, ceteris paribus, since FDI inflows are part of the capital & financial account in the BOP.

#### Anti-thesis: Extent to which it is beneficial to India is limited & some trade-offs

#### AT1: Extent to which it is beneficial to India

-However, despite Samsung and Apple Inc being enticed by the incentives provided by Indian government, India may not necessarily benefit largely as seen in Extract 6 Para 3 "... hasn't translated into big gains for India despite the nation making it cheaper for businesses to open shop... Vietnam remains the most favoured destination, followed by Cambodia, Myanmar, Bangladesh and Thailand". The fact that FDIs continue to favour other countries in Southeast Asia reflects that the extent of increase in FDI inflows into India may be less than desired, and hence AD may not increase as desired. This limits the extent to which the relocation of FDIs would be beneficial to India in terms of boosting its growth rates.

#### AT2: Unintended Consequences of attracting FDI inflows into India

- Additionally, the incentives offered by Indian government "... tax rebates of 4-6% over the next five years" may also be presented as a high opportunity cost (unintended consequence) that would put a strain on the Indian government's budget. As seen in Extract 6 para 2, "this loss of corporate tax revenue will create a dent on the government's budget." The tax rebates would reduce the corporate tax revenues that India's government can utilise for spending on areas such as improvements to infrastructure or in education/healthcare services to improve on the literacy and to raise productivity levels amongst its workforce to support the FDI which can in turn further boost the Indian economy.

#### Synthesis:

- Likely to be beneficial to India in terms of helping it attain sustained economic growth over the LR rather than in the SR since it takes time for FDI to alter their preferences towards investment destinations. FDIs © RI 2022 Y6/9757/Prelims/2022

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may also be undertaking a wait-and-see attitude towards investing in India as it remains to be seen whether electronics companies like Samsung and Apple Inc would profit from diversifying their investments away from China towards India. As a developing economy, India may find that incoming FDI could be a real boost to overall investment in the country as domestic investment may be limited. For India to fully benefit from the relocation of investments, its government should also be spending to improve on its infrastructure and workforce in order to support the growth of FDIs.

### Examiner's comments:

- This question was generally well done, with many scoring top tier marks.
- Better scripts were able to elaborate well using the AD/AS framework on how the relocating of supply chains from China to India to analyse the impacts in both the short run and long run.

### Areas for improvement:

- Candidates are required to support their analysis with the use of case evidence instead of giving pure theoretical regurgitation of analysis.
- There is also the need to improve on the rigour in the economic analysis as weaker scripts tend to gloss over how the increase in FDI can lead to potential economic growth. For example, many candidates plainly stated that "when FDI increase, it will lead to increase in productive capacity leading to an increase in AS and potential growth experienced in India." This is incomplete and lacks rigour. What candidates should do is to elaborate on **how** FDI inflows lead to an increase in AS. Eg: The increase in FDI into India can bring in more funds into India that can be used to build new factories and acquire more machinery, hence increasing the quantity/quality of FOP thus increasing India's productive capacity, leading to an increase in Yf levels of output and AS shift to the right. This helps India to attain potential economic growth.
- Candidates are also reminded to link their diagram to the analysis as a way to improve on the economic rigour.
- Some candidates chose to focus the discussion on the microeconomic effects, which was not the focus of the question. Furthermore, there was little if any case evidence to support such a point.

# Marks Scheme:

Knowledge, Application, Understanding, Analysis			
L1	Shows weak understanding of the question ie. Irrelevant answer Glaring conceptual errors evident No use of contextual evidence to support analysis. No AT or <b>One-sided answer</b> that focuses only on <b>SR</b> benefits of FDI inflows to India ie. In terms of the attainment of <b>internal</b> macroeconomic goals of actual economic growth & low unemployment levels	1 - 3	
L2	Answer that focuses only on the extent to which attraction of FDI away from China would be beneficial to India i.e. in terms of attainment of <b>internal</b> macroeconomic goals such as sustained economic growth in the LR & low unemployment & <b>external</b> macroeconomic goal in the form of an improvement in BOP	4	
	Well-balanced and well-developed economic analysis demonstrating use of relevant case evidence and a strong understanding of the impact that FDI inflows would have on India's SR vs LR, internal vs external macroeconomic aims.	5-6	
Evaluation			
E1	An unexplained judgement. An unexplained evaluative conclusion	1	
E2	Evaluative assessment supported by economic analysis	2	

# (d) Extract 7 suggests that supply chains have started to "decouple" from China for some countries while Extract 8 suggests otherwise.

Discuss the extent to	o which countries will be able to "decouple" from China.	[10]

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#### Intro:

- Clarify what is meant by "decouple" from China i.e. According to Extract 7, to "decouple" from China means that **companies around the world are altering their supply chains to be less dependent on China's products**.

- Identify that whether countries would be able to decouple from China depends on cost and revenue factors and factors relating to comparative advantage (CA) vs non-CA reasons.

#### <u>Thesis: Countries are able to "decouple" from China – reduce dependency on China for FOPs due</u> to cost reasons

Supply chains have appeared to decouple from China triggered by the Covid-19 pandemic which "prompted a rethink among businesses as they sought to mitigate supply shocks ... and to diversify their supply chain as much as possible closer to home" (Extract 7 para 1). In fact, many sectors within countries such as the US "have come under pressure amid the global health crisis, as their reliance on economies like China and limitations on international logistics have weighed on supply chains" (Extract 7, para 3).

For many US and Japanese companies who had their manufacturing plants located in China, the Covid-19 pandemic and the Chinese governments' measures to stamp out the pandemic i.e.. "coronavirus-induced factory shutdowns that created supply chain disruptions" (Extract 8, para 1) had led to disruptions in their production units in China, causing shortages in FOP and intermediate goods, hence resulting in increases in unit COP, ceteris paribus, reducing profits of these companies. In response, to **minimize such cost increases that arise from supply chain disruptions**, companies have sought to **diversify and restructure their production chains away from China** towards "alternatives in more local overseas markets like Mexico or Canada... with a likelihood of diversification into places like Vietnam, Bangladesh, Turkey, even Brazil..." (Extract 7, para 2) to provide stability to their profits and to reduce their vulnerability to external shocks in their supply chains. These countries have factor endowments that mirror that of China, with large supply of low cost workers to allow production of labour intensive production at relatively low cost.

This can be corroborated by Figure 3, in which there is a general downward trend in the US imports from China between 2018 and 2020 that corresponded to a general increase in the US imports from other Asian countries such as Vietnam and Thailand within the same period. This seems to suggest that US companies may have relocated their supply-chains to Asian countries like Vietnam and Thailand, hence have "decoupled" from China, reducing their dependency on China.

Extract 6 further supports the notion that countries have decoupled from China as it reflects how the pandemic has also resulted in supply chains decoupling from China with smartphone companies like Samsung Electronics and Apple Inc's assembly partners being enticed by India government's slew of incentives to diversify its production plants away from China towards India.

# Anti- thesis: It is unlikely that countries are/will be able to "decouple" from China due to cost & revenue side factors

- It is unlikely that SS chains have decoupled from China despite the cost disruptions created by the pandemic. This can be seen in Extract 7 where US firms despite "preference for more local overseas markets like Mexico or Canada" it is also noted that "there was no way China's going to be ignored" (Extract 7, para 3). Also, in Extract 8 para 2, for many Japanese companies, SS chain decoupling from China remains "impractical and uneconomical" despite PM Shinzo Abe's attractive stimulus package due to **cost (comparative advantage) and revenue (non-CA) reasons associated with locating their production chains in China**.

For the Japanese companies, "they stress the need to be physically present in China because much of what they make is ultimately for the Chinese consumer, and to meet the demands of "just-in-time" production which prioritises short delivery times for efficient manufacturing" (Extract 8, para 2). Hence, supply chains may not be able to decouple from China since their production is tailored towards the Chinese consumer market. As such, locating production plants within China would allow these firms to **alter their production levels more nimbly with respect to changes in demand by the consumers, enabling them to raise TR more quickly**. In addition, locating their production plants in China also helps to **reduce transportation costs involved in transporting the goods to the consumers, hence reducing TC**. The attraction of higher profits made due to higher TR and lower TC is the reason why Japanese companies are **not able/willing to decouple from China and to reduce their dependency on China**. This is

evidenced in Extract 8, para 3 "the parts we make are so big that we need to be near our customers to control our costs..." Hence, the automobile and electronics industry particularly are finding it extremely difficult to decouple their supply chains from China.

Additionally, the fact that some Japanese companies are unable and unwilling to decouple from China arises from the **comparative advantage China possesses**, **particularly in labour-intensive production** since China is endowed with a relatively larger proportion of low-skilled labour (as compared to Japan), contributing to **relatively lower labour costs incurred by firms that are heavily dependent on labour-intensive production** such as "display panel and television makers Sharp Corp which produces ultra-thin panel cells... that require constant manual testing and machinery adjustments" (Extract 8, para 3). For such firms, locating their labour-intensive production units in China helps them **incur lower opportunity costs in production i.e. lowering their COP, contributing to higher profits**. In addition, "Chinese suppliers had upped their game and now provide a vast range of high quality, low cost parts" (Extract 8, para 3), such that **firms utilizing such high quality intermediate goods in production can potentially improve on the quality of the final products, contributing to higher demand and hence TR, eventually contributing to higher profits**.

### Synthesis:

The Covid-19 pandemic and the resultant governmental responses that had led to supply chain disruptions and hence nationalist sentiments amongst many countries did contribute to growing pressures for supply chains to be restructured and diversified away i.e. decoupled from China. However, despite growing deglobalization trends and strategic reasons for such decoupling, it is unlikely supply chains will be decoupled from China to a large extent as evidenced in Figure 3 in which there is a reversal of the downward trend in US imports from China in 2021. It remains to be seen whether countries can decouple from China since she still largely possesses comparative advantage in labour-intensive production processes and has actively sought to move up the value chain through investments in technological advancements and education ie. Creating dynamic CA that further attracts firms to invest in China via location of SS chains or through purchasing intermediate goods from China.

#### Examiner's comments:

- Quality of answers varied for this question, though responses were generally weak due to the inability to understand the question's intent.
- Stronger responses were able to anchor the reasons for ability/inability to decouple by drawing relevant case material to substantiate their points and linked clearly to an economic analysis that revolves around revenue &/or costs of firms in countries involved. Such responses showed sound understanding and appreciation of the different country and industry contexts represented in the case.

#### Areas for improvement:

- Weaker scripts largely lifted the evidence from the extracts with little to no interpretation of how it affects the ability of the firms within countries to decouple from China. Candidates need to use the case material in their analysis and draw linkages as to how various considerations may affect the cost or revenue facing the firms, hence affecting their profitability, which in turn affects their ability/willingness to decouple. Very often than not, the link was either weak or not well-explained. This resulted in a rather descriptive analysis.
- A significant number of responses interpreted the question incorrectly and explained the benefits/costs of decoupling from China rather than addressing whether firms in the countries involved were able to decouple from China.
- Weaker scripts tend to interpret it as solely Chinese firms relocating from China instead of foreign firms decoupling from China and relocating their supply chains in other alternative destinations.
- The weaker answers also assumed that decoupling from China implies self-reliance which is not the case.

Knowledge, Application, Understanding, Analysis		
L1	<ul> <li>Smattering of points not directly linked to question</li> </ul>	1 - 4
	<ul> <li>Glaring conceptual errors evident</li> </ul>	
	<ul> <li>Purely journalistic answer that only relies on lifting evidence from case material</li> </ul>	
	without linkages made to theoretical framework of cost & revenue reasons for	
	decoupling	
	<ul> <li>One-sided weak analysis of countries decoupling from China or otherwise</li> </ul>	
	<ul> <li>No reference to case material.</li> </ul>	
L2	<ul> <li>Balanced argument and good scope that includes explanation of why countries have decoupled from China due to cost reasons and the revenue and cost reasons for why decoupling would not be possible for other countries.</li> <li>A well explained economic analysis with reference to accurate and well-labelled</li> </ul>	5 - 7
	diagram/s.	
	<ul> <li>Effective use of case evidence to develop and support analysis.</li> </ul>	
Evaluation		
E1	An unexplained judgement. An unexplained evaluative conclusion/comment	1
E2	Evaluative assessment supported by economic analysis	2 - 3

### Paper 2: Essays

**Q1.** As the millennials and Gen X start entering the workforce and move up the corporate ladder, they begin to be attracted to plant-based meat derived from plant proteins like soybeans, leading to a boom in sales revenue in this industry. However, costs of sourcing and processing plant proteins are on the rise.

Adapted from CNBC, 25 Aug 2021

- (a) Explain the boom in sales revenue in the market for plant-based meat. [10]
- (b) Assess how changes in the plant-based meat market affect consumers and producers in its related markets. [15]

# Suggested answer (a)

# Introduction

- Clarify boom in sales revenue as rise in total revenue and revenue is given by price x quantity
- Changes in demand and supply caused by the different developments in the plant-based meat market affects the total revenue as a result
- Define demand and supply

# <u>Body</u>

Rising demand for plant-based meat from Millennials and Gen Z due to:

 rising income which increases their purchasing power for plant-based meat as they enter workforce and climb the corporate ladder. Plant-based meat is likely to be perceived as a luxurious good with YED > 1, rise in demand is more than proportionate to rise in income, resulting in large extent of rightward shift in demand curve to D1  taste and preferences for plant-based meat with rising concerns about environmental sustainability; production of plant-based meat is believed to release lower carbon emissions than animal agriculture. Rising health concerns of higher risk of cardiovascular diseases from meat consumption also increased taste and preferences towards plant-based meat, leading to shift in demand curve to D<sub>1</sub>.

Fall in supply of plant-based meat due to higher costs of production from sourcing and processing of plant proteins, quantity falls at each price level as producers are less willing and able to produce given falling profitability, leading to leftward shift of supply to S<sub>1</sub>



Given that demand for plant-based meat is income elastic and coupled with rising taste and preferences towards plant-based meat, the demand is likely to increase more than the fall in supply as seen in Figure 1.

At the original price P, a shortage is created leading to upward pressure on prices. Consumers respond by reducing quantity demanded while producers are incentivized to increase quantity supplied. Upward rise in price will stop until the shortage is eliminated where quantity demanded is equal to quantity supplied. The market equilibrium price and quantity increase to  $P_1$  and  $Q_1$  respectively. Hence total revenue increases from 0PAQ to  $0P_1BQ_1$ .

The boom in sales revenue is also reinforced by the relatively price inelastic demand (PED < 1) for plantbased meat due to the lack of closed substitutes, especially for vegans and those who prefer a healthier version of meat since the plant-based meat is created to have the same texture and flavour as real meat.

Given the fall in supply due to rising cost of production, ceteris paribus and fall in supply leads to leftward shift in SS curve to SS<sub>1</sub>. Price rises to  $P_1$  and quantity falls to  $Q_1$  via the market adjustment process in Figure 2.



Quantity falls less than proportionately to the rise in price since demand for plant-based meat is price inelastic. As the rise in total revenue due to rise in price (area A) is greater than the fall in total revenue due to fall in quantity (area b), leading to overall rise in total revenue.

# **Conclusion**

Rise in demand greater than the fall in supply, coupled with demand price inelasticity of plant-based meat led to the boom in sales revenue.

# Mark Scheme

Knowledge, Application, Understanding, Analysis		
L1	<ul> <li>A smattering of valid point with no relevant framework applied / largely descriptive answer with very little or no economic framework applied.</li> <li>Glaring conceptual gaps in explanation whereby question requirements are not clearly addressed.</li> </ul>	1 - 4
L2	<ul> <li>Relevant answer but theory may be incompletely explained</li> <li>Attempts to apply elasticity concepts e.g., PED, YED, but lacks adequate analysis</li> <li>Some ability at graphs but incomplete explanation in MAP</li> <li>Partial analysis of events on the plant-based meat on either changes in demand or changes in supply and link to TR</li> </ul>	5 - 7
L3	<ul> <li>For a well-developed analysis on how the events lead to an increase in TR, with the use of well-labelled and well-explained graphs</li> <li>Application and analysis of the relevant elasticity concepts, PED and YED to explain the increase in TR</li> </ul>	8 - 10

# Examiner's Comments

- This part of the question was relatively well done; however many did not get top level marks due to a lack of detailed analysis
- Most candidates were able to identify the demand and supply factors in the question, however many failed to realise that there was a rise in income in the preamble, hence did not use YED to analyse the changes in the market
- While most responses included a hint at the market adjustment process, the detailed explanation of this is required to get top level marks. Most responses did not include an explanation of the income and substitution effect, while some others did not identify the shortage explicitly on the diagram / identified incorrectly
- As the question requires that the outcome in the market is a significant rise in TR, there should be a
  more significant rise in demand compared to the rise in supply. However, many students failed to
  explain the extent of shifts. Similarly, a PED < 1 adds to the significant rise in TR, however some scripts
  failed to realise this and instead used PED > 1 in their analysis, which resulted in a smaller rise in TR
- Most scripts made an attempt at defining key concepts, such as PED, demand etc., however, please note that the definitions have to be specific and complete. Many failed to include terms such as "ceteris paribus" in their definitions
- Common areas of concern:
  - Using PED when analysing a shift in demand, using PES when analysing a shift in supply. Typically, it should be the other way round.

- Explaining PED as the extent of shift in demand this is not the case, as PED reflects the steepness of the curve, not how much the curve has shifted by
- Common bad habits that <u>need to be changed</u>:
  - Drawing diagrams freehand (i.e., no ruler) and with pen this results in very messy diagrams
  - Drawing diagrams that are too small your analysis will be problematic later
  - Not labelling diagrams fully
  - Using too many shortforms in the answer. This negatively affects the readability of your answer. Symbols such as arrow signs are not acceptable.
  - Squeezing of answers and diagrams this makes it difficult to read which means difficult to award marks
  - Bad handwriting same problem as above

### Suggested answer (b)

### Introduction

- Identify how impact on consumers and producers is measured consumer surplus and producer surplus
- Consumer surplus: difference between consumer's willingness and ability to pay and what they actually
  pay OR difference between maximum amount consumers are willing and able to pay and what they
  actually pay
- Producer surplus: difference between producer's willingness and ability to receive and what they actually receive OR difference between maximum amount producers are willing and able to receive and what they actually receive
- Identify the related markets: substitutes such as regular meats; market for vegetarian cooked food that uses plant-based meat as a factor of production

Any 2 out of the 3 markets are accepted

#### <u>Body</u>

# Market #1: Vegan / Vegetarian restaurant food (that uses plant-based meat as a FOP)

With the rise in price of vegan meat, vegetarian / vegan restaurants (or restaurants that are not fully vegetarian but use plant-based meat in their menu such as Swenson's) see a rise in the cost of production. This reduces the profitability for firms; hence they are less willing and able to produce at every given price level, thus supply shifts left from  $S_0$  to  $S_1$  (refer to Figure 3).

With the shift in taste and preferences towards plant-based meat (whether for its health benefits, or its smaller impact on the environment), coupled with the rise in income with vegan / restaurant food being a normal good, these restaurants are likely to see a rise in demand from  $D_0$  to  $D_1$ . Further, with the rise in incomes and restaurant food likely being a luxury good with YED > 1, the demand for such food is likely to increase more than the supply.

This generates a shortage at the original price level, and prices rise from  $P_0$  to  $P_1$  and equilibrium quantity falls from  $Q_0$  to  $Q_1$  via the price adjustment process. Hence total revenue and total expenditure rises from  $P_0Q_0$  to  $P_1Q_1$ . Consumer surplus rises from  $BE_0P_0$  to  $AE_1P_1$  due to the combined effect of higher willingness and ability, and higher quantity made available for consumers (which outweighs the rise in price effect) while producer surplus rises from  $CE_0P_0$  to  $DE_1P_1$  because vegan restaurants are selling more meals at higher prices.



# Market #2: Substitutes market such as regular meats

Vegan meat and regular meats such as chicken or pork are substitutes as they meet the same wants. Given the shift in taste and preferences towards plant-based meats, demand for regular meats will fall.

However, there is the effect of the rise in price of plant-based meats (as observed in part (a) of response) on regular meats. Cross elasticity of demand (CED) is a measure of the responsiveness of the demand of a good to a change in the price of another good, ceteris paribus. As plant-based meats and regular meats are unlikely to be close substitutes for most consumers as they still have a different texture, taste and nutritional value, hence the value is positive but less than 1. With the rise in price of plant-based meat, there will be a less than proportionate rise in the demand for regular meat, as consumers switch to the relatively cheaper regular meats.

Overall, there is likely to be a fall in demand for regular meat as the effect of changing taste and preference of millennials for plant based meat (causing consumers to decrease demand for regular meat) is likely to dominate the effect of increasing price of plant-based meat (causing consumers to increase demand for regular meat).



Market for regular meat such as chicken and pork

Arising from the fall in demand for regular meat, there is a fall in price and quantity.

Given that PES is relatively low in the short term due to the time it takes to grow cattle, equilibrium price is likely to fall more than proportionate to the fall in equilibrium quantity.

Due to the fall in demand, there is a fall in producer surplus from  $0E_0P_0$  to  $0E_1P_1$  as regular meat producers are selling less meat at lower prices. While consumers see a fall in prices, they also have a lower willingness and ability to purchase regular meat, and are also buying less regular meat, hence they are likely to see an overall fall in consumer surplus from  $AE_0P_0$  to  $BE_1P_1$ .

# Evaluation:

Over the longer term, if the fad for plant based meat dies down, they may shift back to consuming more regular meats, the fall in demand in the regular meat market will be moderated. Consequently, the fall in CS and PS in this market will be reduced as well.

Other accepted evaluative points:

- The substitutability of different types of meat viz a viz plant based meat are likely to be different, e.g. pork, beef and mutton, thus the extent of fall in demand would be different.
- The shift in taste and preferences is unlikely to occur for the older generation, hence the fall in demand for regular meats will be moderated.

#### Market #3: FOP market such as Soybean

With the overall rise in quantities in the plant-based market, more soybeans will be required as a factor of production. Hence there will be a rise in the demand for soybeans (derived demand) from  $D_0$  to  $D_1$ . Coupled with a PES < 1 due to the long gestation period for soybeans, there will be a rise in price from  $P_0$  to  $P_1$  and a more than proportionate increase in quantity from  $Q_0$  to  $Q_1$ .

Even though there is a rise in price for soybeans, the rise in demand reflects a higher willingness and ability to purchase soybeans and these consumers are now able to enjoy higher quantities, hence consumer surplus rises. Producer surplus rises with the higher prices and quantity.



# Evaluation:

The extent of rise of demand depends on the intensity of use of soybeans in plant-based meats. As a large proportion of plant-based meats are made from soybeans, there is likely to be a large rise in demand for soybeans, hence a large increase in both producer and consumer surplus.

# **Conclusion**

Developments in the plant based meat market will significantly affect its related markets. The extent to which these markets are affected depends on several factors including;

- Whether the trend towards plant based meat takes off in a big way and affects the dietary preferences of the rest of the population. If it does, the impact on the related markets will be intensified. For example, welfare of producers in the regular meats market will significantly affected.
- Whether producers in the regular meats market are able to effectively respond to the "threat" of plant based meats. These producers could R&D to innovate heathier meats or improve yields of regular meats to ease its demands on limited earth's natural resources. Marketing of regular meats to increase the appeal of regular meats to millennials will also be important. If regular meats producers are able to respond effectively, they may be able to reduce the negative impact of the emergence of plant based meats competitors,
- Whether plant based meat producers are able to innovate to further improve the taste of their products and improve production efficiency. If plant based mat producers are successful with their R&D attempts to bring better tasting and cheaper products to the market, markets utilizing plant based meats will boom while regular meats market will come under greater pressure.

#### Mark Scheme

Knowledge, Application, Understanding, Analysis		
L1	<ul> <li>A smattering of valid point with no relevant framework applied / largely descripti answer with very little or no economic framework applied.</li> <li>Glaring conceptual gaps in explanation whereby question requirements are no clearly addressed.</li> </ul>	ve t <b>1 - 4</b>
L2	<ul> <li>Relevant answer but theory may be incompletely explained.</li> <li>Attempts to apply elasticity concepts but lacks adequate analysis.</li> <li>Uses economic framework to explain impact on producers and consumers in related market; OR</li> <li>Uses economic framework to explain impact on producers (only) or consun (only) in two related markets.</li> </ul>	one 5 - 7 ners
L3	<ul> <li>For a well-developed analysis on how the events lead to a change in consume and producer surplus across the different markets, with the use of well-labelled and well-explained graphs.</li> <li>Application and analysis of the relevant elasticity concepts</li> </ul>	r 1 8 - 10
	Evaluation	
E1	- Unexplained judgment.	1
E2	- Judgment with some (but limited) explanation on what would be the overall impact on producers versus consumers in the different markets, considering different contexts / sub-markets, or other key assumptions / trends	2 - 3
E3	<ul> <li>Judgment with clear, detailed explanation on what would be the overall impact producers versus consumers in the different markets, considering different contexts / sub-markets, or other key assumptions / trends</li> </ul>	on <b>4 - 5</b>

#### Examiner's Comments

This question was generally poorly done. While it is a standard related markets question, it requires a good understanding of the relationships between the different goods, and also a good grasp of consumer and producer surplus.

Hence while most responses identified a few related markets correctly, the triggers for each market were not fully identified, neither were the consumer and producer surplus correctly identified. Many did not use their final outcome in the plant-based meat market in (a) in terms of the final equilibrium price and quantity to explain the changes in (b).

For each of the markets above, there were multiple factors occurring, and hence it was insufficient to merely identify e.g., a change in tastes and preferences. This is incomplete. Furthermore, many candidates did not realise that without the multiple factors changing in each market, their analysis was very repetitive and with little scope (e.g., all markets only see a rise in demand due to change in taste and preferences).

Furthermore, candidates are not required to repeat content – a market adjustment process done well once is sufficient in (a), hence a repetition, no matter how detailed, is not required in (b). Similarly, across the markets, a good explanation of the identification of the consumer and producer surplus done once, and why it changes suffices.

- Other common areas of concern:
  - Identifying FOPs as complements. These are not the same. Complements are items you consume together to obtain utility. Worse still, some responses identified labour as a complement to plant-based meat.
  - Note that the application of CED concept in an anlysis requires a change in price of another good.
  - Simply stating that consumer surplus falls because prices rise and vice versa. This is not the case the diagram needs to be analysed carefully to identify the change.
  - Stating that because demand increases, supply increases. This is wrong. Demand increases, hence QUANTITY supplied rises.
  - Using demand and quantity demanded interchangeably, using supply and quantity supplied interchangeably.
  - Using PED when analysing a shift in demand, using PES when analysing a shift in supply. Typically, it should be the other way round. Candidates must know when to use the PED and PES concepts appropriately when undertaking DD/SS analyses. If you have any doubts, please clarify with your tutors.
  - Explaining PED as the extent of shift in demand this is not the case, as PED reflects the steepness of the curve, not how much the curve has shifted by
- Common bad habits that need to be changed:
  - Drawing diagrams freehand (i.e., no ruler) and with pen this results in very messy diagrams
  - Drawing diagrams that are too small your analysis will be problematic later
  - Not labelling diagrams fully
  - Using too many shortforms in the answer. This negatively affects the readability of your answer. Symbols such as arrow signs are not acceptable.
  - Squeezing of answers and diagrams this makes it difficult to read which means difficult to award marks
  - Bad handwriting same problem as above

**Q2.** The circuit-breaker period during the Covid-19 pandemic has accelerated the growth of cloud kitchens in Singapore. Cloud kitchens are cooking facilities that produce food for delivery only, without a dine-in or customer-facing space. This helps to overcome problems of high shopfront rental costs and manpower crunch for service staff faced by conventional restaurants.

Source: EdgeProp Singapore, 21 Aug 2020

- (a) Using relevant examples, explain how barriers to entry determine the price setting ability of firms in different market structures. [10]
- (b) To what extent can a conventional restaurant survive in the face of competition from cloud kitchens and rising costs. [15]

#### Introduction

- Define barriers to entry any impediment that prevents new firms from competing on an equal basis with existing firms in an industry
- Barriers to entry can be classified into structural/natural barriers to entry and artificial barriers to entry.
  - Examples structural/natural BTE includes substantial economies of scale and high overhead cost/capital outlay.
  - Examples of artificial BTE includes strategic such as advertising and limit pricing, while statutory BTE includes patents and licenses.

- Barriers to entry determines the level of competition faced by firms in an industry, which influences their price setting ability in the different market structures
  - Complete or high BTE lead to monopoly and oligopolistic competition
  - Low or no BTE lead to monopolistic competition and perfect competition
- Clarify price setting ability it is the extent to which firms can set price above the marginal cost of production of their product.

# <u>Body</u>

# Explain how the existence of high BTE and exit result in high market concentration ratio within the oligopoly $\rightarrow$ e.g. ride-hailing firms, fast food chains etc.

Structural/ natural BTE can arise from differences in production and costs between incumbent and the potential entrant. In the ride-hailing industry which consists of Gojek, Grab, Ryde, Comfort Delgro, huge initial capital outlay is required to set up the firm as ride-hailing firms need to purchase fleet of cars, garages, develop a ride-hailing app and platform by investing in expensive technology. Substantial internal economies of scale enjoyed by these firms also allow their long run average cost to fall over a very large output. High structural BTE deters entry of new firms as they may not have financial resources to enter this industry. New firms are also deterred from entering as they incur a significantly higher unit cost of operation given the lack of economies of scale compared to incumbents since new firms produce on a smaller scale of production upon entry.

Strategic BTE includes intensive and large-scale marketing campaigns adopted by ride-hailing firms to deepen brand loyalty by creating disincentives for consumers to new ride-hailing operators. For example, customers who regularly use ride hailing services may sign up for subscription plans with Grab (Grab Unlimited) or Gojek (925 Pass Vouchers for Off-Peak Rides) or accumulate points for using their services that can be redeemed for rewards such as free rides, vouchers and other gifts. As such, many customers are less likely to switch to new operators for fear of losing out on the rewards that could be redeemed using their accumulated points. New potential entrants will thus be deterred from entering if they are unable to incentivize users to switch to their services.

In the ride-hailing industry, these high BTE result in a few large firms dominating the industry, each holding a significant share of the market. Market concentration ratio tends to be significantly high in the ride-hailing industry. This low level of competition meant that the oligopolist has a steeper downward sloping firm demand curve and it is relatively less price elastic due to the lack of close substitutes. This meant ability to restrict output to set a very high price.

# Explain how the existence of low BTE and exit result in large number of small firms relative to market size in the MPC market structure $\rightarrow$ e.g. hawker stalls, bubble tea shops

The structural BTE tend to be very low for hawker stalls. The start-up costs are significantly lower than the ride-hailing industry. These start-up costs include cost of purchasing cooking utensils and cutleries, cooking stoves, a stall in a hawker center etc. New firms do not need a large amount of capital to set up a hawker stall. Hence hawker stalls reach a minimum efficient scale at a lower output level compared to a ride-hailing firm.

Strategic BTE also tend to be significantly lower for hawker stalls than the ride-hailing industry as the scale of advertising is very low and comprises of advertising mainly on social media, pasting newspaper article in front of the shop. As a result, the degree of brand loyalty tends to be significantly weaker than observed in the ride-hailing industry. Consumers are more willing to switch to another hawker stall selling mee soto that tastes similar since the cost of switching to other substitutes is significantly very low.

With such low BTE, it is easy for new firms attracted by the supernormal profits in the short run to enter until all the supernormal profits are eroded and firms only make long-run normal profits. This results in a large number of small firms in MPC market structure, each with a limited market share. In Singapore, each hawker stall operates on a limited scale, e.g. small stall space, each stall owner only hires one or two helpers.

Such high level of competition where firms sell a slightly differentiated product with a large number of close substitutes meant that the MPC firm faces a gentler downward sloping demand facing a and demand is relatively more price elastic. This indicates some price-setting ability but limited.

# Explain how BTE affects ability to set prices above marginal cost by firms in oligopoly and MPC market structure



A profit maximizing firm typically sets their profit maximizing quantity at MR=MC. At MR > MC, the last unit sold adds on more to revenue earned by the firm than to costs incurred by the firm. Hence, a rational profit-maximising firm continues to sell more so as to gain additional profit margin. Similarly, at MR < MC, the last unit sold adds on less to revenue earned by the firm than to costs incurred by the firm. Hence, a rational profit-maximising firm cuts back on output so as to minimise their losses. The firm then sets the profit maximizing price which is determined by its average revenue at the profit maximizing output.

The price setting ability of oligopolists such as Grab operating in the ride-hailing industry tends to be significantly higher than a MPC firm like a hawker stall owner, given the less price elastic demand due to lower degree of substitutability in the former.

With reference to the diagrams above, at profit-maximizing quantity, oligopolists are able to charge a price of P1 that is way above MC1 given their market power in the ride hailing industry compared to a hawker stall owner where the ability to set price is lower at P2 which is only slightly above MC2. Oligopolists therefore have higher price setting ability than monopolistic competitive firms as shown by the larger divergence between price and marginal cost in the diagram above.

# Explain how lack of BTE leads inability of perfectly competitive firms to set prices $\rightarrow$ price takers e.g. wet market stalls selling fish

The lack of barriers to entry in perfectly competitive markets means that new firms can enter easily without restrictions. This results in large number of small firms where each firm has no significant market share of total market output. As the fish sold by Aunty Ah Huay is almost identical to the fish sold by Uncle Ah Huat, buyers will show no preference for any stall in a perfectly competitive market. Given insignificant market share and product homogeneity, a perfectly competitive firm faces a perfectly price elastic demand due to large number of perfect substitutes. It is thus unable to determine the price of its own product and has to sell at the price determined by the market demand and supply. With reference to the diagram below, at the profit maximising output of MR = MC, the perfectly competitive firm's price is equal to the marginal cost, indicating no price setting ability.



# <u>Conclusion</u>

In summary, the degree of barriers to entry affects the extent of market power which in turn affects whether a firm has strong or weak price setting ability as seen in oligopolistic and monopolistic competition. The lack of barriers to entry, on the other hand, results in perfectly competitive firms to be price takers since they have no market power to determine prices.

# Mark Scheme

Knowledge, Application, Understanding, Analysis			
L1	-	A smattering of valid point with no relevant framework applied / largely descriptive answer with very little or no economic framework applied. Glaring conceptual gaps in explanation whereby question requirements are not clearly addressed.	1 - 4
L2	-	Under-developed explanation of how barriers to entry determine the price setting abilities of firms in different market structures i.e. oligopoly, MPC, PC Lacking scope or depth of explanation. Some use of examples of barriers to entry with respect to the different market structures	5 - 7

<ul> <li>Well-developed analysis of how barriers to entry determine the level of prisetting abilities of firms operating in different market structures i.e. oligopoly, MPC and PC</li> <li>Good use of real world examples of barriers to entry with respect to the diffmarket structures</li> </ul>	ent <b>8 - 10</b>
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### Markers Comments:

- 1. This question was not attempted well as many students did not make use of the firm's analysis framework. Many mostly gave journalistic answers.
- 2. Explanation of types of barriers to entry with respect to the different market structures was poorly done. Students often did not link how the different types of barriers to entry affected the ease of entry by new entrants and market power and hence the effect on price setting ability of the various firms. These students also often wrote high barriers to entry like patents deter new entrants but did not explain how patents deter new entrants.
- 3. Not many students explained how price setting ability is the ability to price above the firm's marginal cost and the extent of P>MC divergence is affected by the types of barriers to entry in the different market structures. Many students instead wrote extensively about the ability to earn supernormal profits given the barriers to entry.
- 4. Given the need to link price setting ability to the extent of P>MC divergence, the firm's analysis is required as it gives clarity to the economic analysis. As this question is about price-setting, the explanation of profit maximizing condition at MR=MC is thus required in the analysis which was overlooked by majority of the students.
- 5. Diagrams were also poorly drawn without labels of curves and axes and many also did not make references to the diagrams in their analysis. In such instances, the drawing of diagram will not earn any credit as it has not been explained. There were also many who would write phrases like "as seen from the diagram, P>MC ....", but yet on the diagram, there was no indication of where P and MC were. Mere writing of the phrase "as seen from diagram" is not equivalent to explanation of diagram if the points are not labelled properly. On the contrary, nothing could be seen from the diagram.
- 6. Given the 4 types of market structures perfect competition, monopoly, oligopoly and monopolistic competition, the choice should be to focus on monopolistic competition, oligopoly OR monopoly and perfect competition given that MPC firms have low price setting ability due to low barriers to entry, PC firms are price takers (no price setting ability) due to absence of barriers to entry while monopoly and oligopoly have high price setting ability due to high barriers to entry. As a result of the similarity in analysis, there is NO need to write both monopoly and oligopoly. This is a reminder to spend some time in planning of answers to ensure that analysis captures arguments that exhibit different outcomes. Due to time constraint, it is not feasible to write everything which again emphasizes the importance of planning prior to writing of answers.
- 7. There were also concept errors like how MPC are price takers as they have low price setting ability. Low price setting ability means ability to price above MC is low but it is not equivalent to unable to set price. Price takers are unable to set prices above MC and accept the price determined by market. There were also many who wrote that MPC earn normal profits and thus have no price setting ability. From the diagram of the MPC firm who is earning normal profits, at the profit-maximizing output where MR=MC, the price of the MPC is still above MC albeit small. As long as it can price above MC, and its AR curve is downward sloping, it will be a price setter.

Y6/9757/Prelims/2022

(b)

### Introduction

- Clarify conventional restaurant restaurants with dine-in and customer-facing front
- Clarify survive ability to earn at least long run normal profits
- Clarify that competition from cloud kitchen and rise costs from both fixed and variable (shopfront rental and service staff) has effects on decreasing the conventional restaurant's average revenue and increasing its average cost and marginal costs.

# Body

# Thesis: Conventional restaurant may not be able to survive in face of rising competition from cloud kitchens and rising costs

### Effects of rising competition from cloud kitchens

The entry of cloud kitchens would lead to increase in the number of firms in the food & beverage industry and reduce the market share of the incumbent conventional restaurant as illustrated in diagram below, assuming the market size remains constant.

With the circuit-breaker during the Covid-19 pandemic where many people worked from home and dining-outs are restricted, many consumers switched to food delivery services provided by the cloud kitchens instead.

Hence demand of incumbent conventional restaurant falls and becomes more price elastic due to the increase in the number of competitors, AR and MR curves shift inwards from AR<sub>1</sub> to AR<sub>2</sub> and MR<sub>1</sub> to MR<sub>2</sub> respectively and become gentler. The profit-maximising equilibrium output and price of the conventional restaurant fall from Q<sub>1</sub> to Q<sub>2</sub> and P<sub>1</sub> to P<sub>2</sub> respectively, resulting in normal profits (P<sub>2</sub>DQ<sub>2</sub>0). Price/Revenue/Cost



#### Effects of rising costs

However, rising shopfront rentals lead to rising fixed costs for a conventional restaurant as these are costs which are incurred regardless of output level. Variable costs like food ingredients and wages which account for about two-thirds of cost of production for restaurant are also rising due to Covid-19 pandemic supplychain disruptions as well as a tighter labour market. As seen in the diagram below, rise in variable costs leads to rising marginal costs for the restaurant, represented by upward shift from MC to MC<sub>1</sub>. Both the rise in fixed and variable costs result in average costs increasing from AC to AC<sub>1</sub>.

Coupled with a fall in demand from competition and rising costs, the initial normal profit of the conventional restaurant becomes a loss indicated by the shaded area, leading to shut down in the long run if its TR cannot cover its TC.



# Anti-Thesis: Conventional restaurant may be able survive by earning at least long run profits in face of rising competition from cloud kitchens and rising costs

- Extent of fall in AR for the conventional restaurant may not be significant if cloud kitchens are not deemed to be close substitutes to conventional restaurant by consumers and demand may not necessarily become more price elastic since consumers may not switch totally away from conventional restaurants
  - Dine-in restaurants have their unique appeal to consumers which the cloud kitchens may not be able to replicate. For instance, in-person dining experience is hard to replicate when ordering takeaway food from cloud kitchens. Elements in the atmosphere such as food display, music, service, lighting and décor that play a role in creating the overall dining experience may be what consumers look for and they can be provided by a conventional restaurant with dine-in space. For instance, a French fine dining restaurant like Les Amis would be able to retain its appeal and brand loyalty despite competition from cloud kitchens.
  - Furthermore, with the removal of Covid-19 restrictions and resumption of normal activities, consumers being social creatures, would prefer the dine-in experience as they can mingle and socialize with their friends and families in a conventional restaurant.

- In addition, consumers may perceive food quality to be better when it is served fresh in the dine-in restaurants as certain types of food like fried food does not remain crunchy and loses its original texture during the delivery process from the cloud kitchens.
- Given the above reasons, the conventional restaurant may not suffer a huge decline in demand and market share even in the face of rising competition from cloud kitchens. Fall in TR may thus not be significant.
- 2. Adoption of revenue-increasing and cost-reducing strategies by conventional restaurant to ensure at least long run profits

# Revenue-increasing strategy to increase demand and make demand less price elastic

- Food/service innovation by Japanese restaurants in serving Omakase menu where the chef prepares a meal in accordance to seasonal specialties, at a specified price.
  - Such service brings about an element of surprise and novelty to consumers who never know what exactly to expect, as the dishes vary according to the seasons and availability of ingredients.
  - Coupled with the environment, pacing and variety of the courses, along with personality of the chef, this strategy creates a different dining experience which is vastly different from cloud kitchens for consumers and help mitigate the fall in demand for conventional restaurant in the face competition from cloud kitchens
- Collaboration with celebrity chefs like Gordon Ramsey, Wolfgang Puck, Jamie Oliver
  - create fusion of East-meets-West dishes that are different from those produced by the cloud kitchens
  - $\circ$  further reducing substitutability of food with that produced by the cloud kitchen
- Advertisements
  - Intensive marketing can be adopted to advertise the freshness and quality of high-end ingredients used in its dishes
    - For instance, Les Amis advertises that its collection of recipes features a selection of the finest ingredients sourced from France and that every element presented on each plate is prepared with finesse to give consumers a taste of France.

**Evaluation:** These revenue increasing strategies are only possible if the restaurant has previous accumulated past profits to tap on. It may be difficult for restaurants with limited funding to adopt such strategies to cushion the fall in demand.

Such revenue increasing strategies also incur higher costs. As such, firms will only be better-off if these strategies are popular with consumers, allowing firms to earn revenue which can more than offset the increase in costs in pursuing these revenue increasing strategies.

#### Cost-reducing strategy

Cost-reducing strategy by adopting automation to manage the rising labour costs from manpower crunch. Automation helps to streamline and optimize manpower. For instance, repetitive, manual tasks such as measuring, scooping and assembling ingredients in the correct sequence can be done by automation which can dramatically reduce the amount of physical labour needed to produce a dish. Use of digital menus, digital ordering to cashless payment choices and robots to serve food can also help a conventional restaurant in reducing the number of service staff hired. These help the restaurant cope with the rising manpower crunch for service staff, leading to fall in variable and hence average costs, helping the restaurant earn long run normal profits.

**Evaluation:** Investment in automation and digitalization requires considerable amount of fund and initial costs may be very high. It may not be viable for some restaurants without financial ability. At the same time, the success of the digitalization takes some time and restaurant may need to solve the teething issues that come with it, average costs may even be higher in the short run.

For fine dining restaurants, they may not be able to cut down on the number of service staff significantly. These restaurants place great emphasis on quality customer service provision whereby each service staff takes charge of serving and providing detailed explanation of every dish that is served to the customers under their charge.

On the whole, the success of these revenue and cost cutting strategies will help firms earn at least normal profits by mitigating fall in total revenue/ increasing total revenue and reduce costs in face of competition from cloud kitchens and rising costs.

# Conclusion/Synthesis

In conclusion, whether a conventional restaurant can survive by earning at least long run normal profits in the face of rising competition from cloud kitchens and rising costs depends on the financial ability of the conventional restaurant to adopt relevant strategies to distinguish itself apart from cloud kitchens and how fast it adopts digitalization to streamline its work processes. The reputable and high-end restaurants may have more financial ability to cope given their strong brand presence and huge past accumulated supernormal profits in comparison to the smaller restaurants.

In addition, cloud kitchens and conventional restaurant fulfill very different needs. Cloud kitchens deliver food that fulfills the need for convenience, but it cannot achieve the same plating and presentation as dining in provided by the conventional restaurant. Hence survival of conventional restaurants is possible. Instead of seeing cloud kitchens as competitors, the conventional restaurant can also set up their own cloud kitchens to reach out to more consumers to increase total revenue without constraint on physical space. For instance, the Da Paolo Group operates from a cloud kitchen to widen the reach of its brick and mortar brands Da Paolo Gastronomia and Da Paolo PizzaBar and use cloud kitchens to launch two virtual brands – Panini Italiani by Da Paolo selling sandwiches and Da Paolo Pasta Bar selling pasta.

Cloud kitchens can also be used by the conventional restaurant for food research and development or to test the market for new food concepts before deciding to sell the dishes in its shopfront. These may increase total revenue and profits by potentially expanding restaurant's presence more quickly and in a cost-effective manner via setup of virtual restaurants in the cloud kitchens.

Knowledge, Application, Understanding, Analysis			
L1	-	Smattering of points	1 - 4
	-	Descriptive answer lacking in economic analysis on the strategies used by firms	
	-	Significant lapses in explanation / analysis	
L2	-	An answer that has a narrow scope - discusses how conventional restaurant cannot earn normal profit in face of rising competition from cloud kitchens and rising costs. A balanced answer - discusses how conventional restaurant cannot survive and with discussion of how it may be able to survive Answer shows depth of analysis with good use of relevant economic framework and examples	5 - 7

L3	<ul> <li>An answer that has great scope, discusses how conventional restaurant cannot survive (both revenue and cost analysis), with discussion on insignificant fall in AR and with 1 revenue /1 cost strategy to increase profits</li> </ul>	8 - 10
	Evaluation	
E1	- An unsubstantiated conclusion	1
E2	<ul> <li>Evaluation or judgement shows some attempt to draw conclusions from the points discussed, and somewhat substantiated. Some attempt at addressing how some types of restaurants may be able survive better than others but with little further insights.</li> </ul>	2 - 3
E3	<ul> <li>Evaluation and judgement show good attempt to draw conclusions from the analysis discussed and are well substantiated. Further insights and relevant ideas are substantiated, for instance how conventional restaurants can tap on the use of cloud kitchens to enhance their presence instead of seeing cloud kitchens as their competitors</li> </ul>	4 - 5

### Markers Comments:

- 1. Many students gave journalistic answers and did not use the firm's analysis framework for this question. Some even used demand and supply analysis for this question. Analyses relating to firm profits must be undertaken using firm diagrams. Many diagrams were either poorly drawn or inaccurately drawn. Elaboration with reference to the diagram drawn was of poor quality. While the answers wrote about subnormal profits being seen in the diagram, the AC curve was absent on the diagram and the profits was nowhere to be seen!
- 2. Many did not plan their answers before writing and ended up writing irrelevant analysis. Many regurgitated pros and cons of strategies which conventional restaurant can adopt for the entire essay. But question is not solely about success of strategies. Strategies form only a part of the answer.
- 3. Many answers were one sided as they did not address how the effects of rising competition from cloud kitchens and costs may lead to conventional restaurant shutting down. For those who did, the quality of explanation was sub-par as analysis was not done in the context of cloud kitchens, circuit breaker, pandemic etc. Analysis was mainly generic without application to the question.
- 4. Many students also merely wrote generic strategies like "restaurant can embark on product and process innovation" without giving examples of such innovation in the context of restaurant. There should be specific examples of what product and process innovation entail in the context of restaurants and how it may help them to combat the challenges from cloud kitchens' competition and rising fixed and variable costs in the question. Very often, these requirements were severely lacking and affect the quality of analysis which appeared to be memorized from a previous essay question. Explanations of these strategies were often not linked back to TR or TC and hence effects on profits to relate back to survival of firms or otherwise.
- 5. The same error raised in previous examiner reports is still present in many answers despite repeated reminders. Students still wrote about how decreasing costs help to raise total revenue or increasing revenue leads to decline in costs. Costs and revenue are two different concepts. Cost strategies affect total costs while revenue strategies affect total revenue.
- 6. Many wrote extensively about the effects on cloud kitchens instead of effects on conventional restaurant given rising competition from cloud kitchens and costs. Students are again reminded to read the question carefully to understand the requirements of the questions.
- 7. Conclusions were also not well done as many rehashed what they have written in their analysis without any further insights in the context of question.

**Q3.** Carbon emissions in the US have been rising significantly over the past few decades, with industrial activity being one of the top contributors. In response, the US Environmental Protection Agency (EPA) introduced emissions trading, also known as "cap and trade".

Adapted from International Monetary Fund, 6 February 2020

Discuss whether tradeable permits are the best policy in addressing the market failure arising from industrial carbon emissions. [25]

#### Suggested answer

#### Introduction

- Identify that this market failure is a negative externality in production
- Identify that tradable permits are one possible policy, but there are other possible policies such as carbon taxes and subsidies for green technology

#### Explain market failure arising from industrial carbon emissions

Negative production externality occurs when external costs are imposed on third parties from the production of a good or service by firms, but they are not compensated by the firms.

Petro-chemical factories, in the pursuit of their self-interests, would only consider their own private costs of production (e.g. electricity and manpower costs) and private benefits from producing the good (e.g. the price they receive for selling the good), while consumers only consider the private benefits (e.g. satisfaction or utility) and the private costs (e.g. the free market price they pay) from the consumption of the manufactured goods and services. Profit-maximising firms will ignore the external costs imposed on the surrounding residents.

Third parties – parties who are not involved in the transaction, incur a cost such as higher medical bills due to health conditions from breathing in the polluted air. Further, this contributes to global warming, and with the rising temperatures, results in more extreme weather and rising sea levels, destroying infrastructure and reducing available land. This combined results in lower crop yield and less food production, driving up food prices and reducing the affordability for lower income groups.

The presence of external costs (MEC > 0) creates a divergence between the marginal private costs (MPC) and marginal social costs (MSC) of producing manufactured goods.

Assuming no externality in consumption, the demand curve for manufactured goods is represented by the marginal private benefit MPB = MSB.


Assuming perfect competition, the free market equilibrium output of the industry is  $OQ_e$  units where MPC of production (or supply curve) = MPB of consumption (or demand curve). However, at this  $OQ_e$  level of output, MSC for producing petro-chemicals ( $AQ_e$ ) exceeds MSB for consuming them ( $EQ_e$ ), meaning that the opportunity costs to society of producing the  $OQ_e$ -th unit is higher than the benefits that society gains from consuming this unit. The society welfare would increase if fewer units are produced. Thus, output  $Q_e$  is allocatively inefficient.

The socially optimal output level is at  $OQ_s$  units, where MSC of production = MSB of consumption. Market failure arises as the free market equilibrium results in an overproduction of the chemicals by  $Q_eQ_s$  units. The deadweight loss, equals the sum of the excess of MSC over MSB for the overproduced units  $Q_eQ_s$ , represented by area AEE<sub>1</sub>.

Self-interested petro-chemical factories will not voluntarily reduce their profit-maximising output. Hence, there is a need for the government to intervene through the use of policies like carbon taxes on negative production externalities.

## Policy #1 - Tradable permits: how it works and its advantages

To implement tradable permits, the government decides on the total amount of emission allowed, and the number of permits it wants to have. The government can either give away the permits to pollute free of charge to firms and allow them to trade with one another, or auction the permits to the firms which will earn the government revenue from the sale of the permits.



By setting a limit or a quota on the level of permissible pollution in the market for permits to pollute (or market for carbon emissions), a socially optimal level of emissions can be targeted and a reduction in overall emission level is possible. The government can thus achieve its desired level with greater certainty than using taxes and subsidies. Every year, the government can progressively reduce the number of permits issued according to the magnitude of the current emission problem, shifting S<sub>1</sub> leftwards to S<sub>2</sub> in Figure 2 above. As a result, total emissions in the affected industry will be reduced over time.

As the number of permits is fixed, its supply is perfectly price inelastic. Together with the demand for permits, the equilibrium price of permits is determined. Firms can purchase permits from other firms who may have excess permits, hence firms are forced to pay more for each unit of emission. Firms that buy permits from other firms will experience an increase in their costs of production, which is reflected by an upward shift of the MPC curve (in Figure 3). This will result in an increase in the price of output in the market for petro-

chemicals from P0 to P1 which in turn will cause a fall in the quantity demanded from Qe to Qs1 and hence, quantity traded in the market for petro-chemicals.



# Figure 3: Market for Petro-chemicals Under Tradable Permits Policy

Tradable permits are more cost-effective than regulation and taxes. If firms can cut back on their emissions at a relatively low cost, it is in its interests to do so and sell excess permits for a profit. Firms that can only reduce pollution at high cost will be forced to buy additional permits. In this way, most of the greenhouse gases are reduced by firms that can reduce emissions using relatively low-cost procedures. This allows pollution to be reduced at a lower cost to society than using regulation or taxes.

Cap-and-trade policy provides firms with the incentives to R&D less pollutive methods of production to reduce their emissions further since they can sell any of their excess permits for a price and hence add to their revenue and profits. In doing so, the MEC will fall which will lead to a downward shift of the MSC curve and in turn the allocative efficient output level will increase from Qs to Qs1 (Figure 3). This means that the divergence between MPC and MSC curves becomes smaller and hence the extent of allocative inefficiency in the market for petro-chemicals fall or be eliminated.

# Policy #1 - Tradable permits: limitations

The government may still face information issues and may not be able to determine the maximum level of emissions. It is difficult to measure the optimal level of emissions and setting it too high or low still results in welfare loss.

Furthermore, the distribution of permits to firms may come under political pressure and lobby groups may force the government to provide preferential treatment and allocate more permits to them. Administrative costs may also be high as the government will need to monitor the firms' emissions over time to ensure that they do not exceed the amounts indicated by their permits. Sufficiently harsh penalties are required to ensure that firms do not cheat the system and emit over their limit.

Such a policy is not feasible for countries like Singapore to implement on their own has the amount of pollution from industry is too small compared to the rest of the world, and from other sources.

#### Policy #2 - Indirect tax, e.g. tax on output/petro-chemicals: how it works and its advantages

Other than tradable permits, the government can levy a tax on output. With reference to Figure 4 below, the free-market output and price levels are OQe and OP<sub>0</sub> respectively, where MPB=MPC. The tax amount is charged on each unit of petrol-chemicals and is equal to the monetary valuation of the MEC at the socially desired level of output Qs. Indirect taxes adds on to the costs of producing petro-chemicals which shifts the MPC curve upwards, and in turn the price of petro-chemicals increases from P0 to P1, causing a fall in market output towards the socially desired output level from Qe to Qs.



# Figure 4: Indirect Tax

# Policy #2 – Indirect tax: limitations

However, it is difficult to accurately quantify the impact of carbon emissions in monetary terms as it is difficult to impute a monetary value to the harm of carbon emissions such as poorer health and standard of living of third parties and the impact of globa warming. Hence the government may over or under estimate the MEC causing the socially desired output level not to be achieved.

In addition, too low a carbon tax will not provide sufficient incentive for producers and consumers to switch, while too high a carbon tax may severely impact income inequality and economic growth (as firms shift overseas in a bid to reduce costs via avoiding the carbon tax), particularly in the short run when firms have yet to adjust their production methods.

Furthermore, similar to that of tradable permits, the government will need to constantly monitor the amount of carbon emitted by firms so as to tax them accurately, resulting in higher administrative costs. In the event that such monitoring technology and systems are not readily available, this policy may not be feasible.

# Evaluation:

Carbon tax is a better indirect tax policy than a tax on output. This is because a tax on the output of the polluter does not have this effect of encouraging producers to adopt new technologies to solve the pollution problem; it only reduces the amount of output produced. A carbon tax, similar to the tradable permits policy, creates incentives for the firm to use fewer polluting resources (such as fossil fuels) and to switch to less polluting technologies in order to pay less tax. As the firms switch, the marginal external costs of producing each additional unit of output will fall, thereby reducing the divergence between the MSC and MPC curves.

The MSC curve thus shifts downwards. With the fall in external costs, the social optimal quantity rises. The extent of deadweight loss is now reduced or eliminated in the case of the above diagram. Hence, a tax on pollutants spurs producers to adopt new technologies and facilities to solve the environmental pollution problem.

# Policy #3 – Subsidy for green technology: how it works and its advantages

Another policy that the government can implement is a subsidy for green technology. With the subsidy, the cost of using green technology is now lower, while using pollutive technology is relatively higher. This provides an incentive for firms to switch to green technology, thereby reducing the extent of MEC. As more firms switch to cleaner energy, MSC shifts downwards closer to MPC, reducing the amount of deadweight loss to society.

# Policy #3 – Subsidy for green technology: limitations

However, this entails significant government expenditure, since green technology tends to be more expensive than current production methods, particularly if the green technology is employed on a large scale.

The significant government expenditure may result in large budget deficits and public debt in the long run, which could result in the worsening of intergenerational equity, as taxes are raised in future to pay off the debt. The higher taxes would also have a negative impact on economic growth. Hence such a policy is only feasible for governments with healthy fiscal reserves, and even so, is not a sustainable approach in the long term.

Furthermore, the development of more productive green technology tends to require a long time, and in the meantime, it is likely to be difficult to convince firms to change their mindset, hence the effect of carbon emissions will still be present in the long run.

# Evaluation & Conclusion

Overall, whether the tradable permit policy is the best policy to tackle carbon emissions arising from industrial production depends on a few factors. Feasibility is a key consideration, and this depends on the country's situation. For countries with budget deficits, subsidies on developing green technology are less feasible. A cap-and-trade policy and an indirect tax system would be the most feasible for these countries as they allow these countries to generate government revenue. In addition, the tradable permits policy and the carbon taxes are preferred to the tax on output policy because the former two policies encourage firms to adopt cleaner sources of production, while the latter does not.

Whether the carbon tax is preferred to the tradable permits policy also depends on how sensitive the level of environmental damage is to changes in emissions, compared with how sensitive the cost of reducing pollution is to the same changes. If the level of environmental damage is more sensitive, then it is important to be sure what the quantity of emissions is, cap-and-trade policy would be the better policy as there is greater certainty in terms of the quantity of carbon emitted. Conversely if the cost of reducing pollution is more highly sensitive to changes in emissions, it is better to be sure about the cost of cutting emissions, hence a carbon tax would be more superior.

As the reduction in carbon emissions resulting in lower global warming has a free-rider problem – the benefits of a reduction in carbon emissions by one country can be enjoyed by all other countries in the region. Thus, each country has the incentive to push the responsibility to other countries. Hence global coordination is likely to be required for it to be effective.

#### **Mark Scheme**

	Knowledge, Application, Understanding, Analysis	
L1	<ul> <li>A smattering of valid point with no relevant framework applied / largely descriptive answer with very little or no economic framework applied.</li> <li>Glaring conceptual gaps in explanation whereby question requirements are not clearly addressed.</li> <li>Only explain source of market failure (no policies at all), max L1=8</li> </ul>	1 - 8
L2	<ul> <li>Relevant answer but theory may be incompletely explained.</li> <li>Uses economic framework to explain negative externality in production but with some gaps in analysis</li> <li>One-sided answer, meaning no discussion of policies at all, max L2=14</li> </ul>	9 - 14
L3	<ul> <li>Negative externality in production well-explained with use of relevant diagrams and economic frameworks and at least 3 policies discussed in detail, with policies integrated into the source of market failure economic framework/diagram</li> </ul>	15 - 20
	Evaluation	
E1	- Judgment is not substantiated	1
E2	<ul> <li>Judgment on what would be considered a best policy, but with limited explanation.</li> <li>Judgement shows some attempt to draw conclusions from the points discussed, and somewhat substantiated. Some attempt at comparison of the different policies but with little further insights. Judgement is supported by economic analysis of the source(s) of market failure and discussion of policies as well as application specific to carbon emissions from industrial production.</li> </ul>	2 - 3
E3	<ul> <li>Arrive at a judgement about which is the best policy in the context of carbon emissions from industrial production. There is good attempt to draw conclusions from the policies discussed and are well substantiated. This is supported by good comparison of the different policies. Further insights and relevant ideas are substantiated. Judgement is also supported by accurate and well-developed economic analysis of the source of market failure and discussion of at least 3 policies.</li> </ul>	4 - 5

#### **Examiner's Comments**

- In view of the 25 marks allocation and the question set on industrial carbon emissions, responses that
  provided 4 distinctly different points, with each point demonstrating rigour in economic analysis and
  application specific to the context of carbon emissions from industrial production are awarded L3 marks.
  Such responses typically provided a well-developed explanation of the source of market failure (in this
  case, negative production externalities), and the strengths and weaknesses of 3 distinctly different
  policies. Candidates are advised not to provide a long list of different policies as such responses
  typically ended up providing a cursory treatment on the source of market failure and each policy,
  meaning that they failed to develop each point sufficiently.
  - Note that if the question is split into 2 parts, with part (a) requiring a response on why the market fails, usually 2 sources of market failure are expected. Again, this depends on the context. For instance, in the 2021 A level question on "Explain how pollution leads to market failure", the preamble states that "discarded plastics and carbon emissions" causes "environmental damage to air and water", as well as to "our health" and "also our food supply". Based on the

preamble and the question, students should identify and explain 2 sources of market failure arising from "discarded plastics and carbon emissions" – firstly, negative externalities generated from discarding plastics and from producing or consuming goods that emit carbon, and secondly, how income inequality leads to inequity in distribution of goods and services when the price of food increases as a result of damage to the environment, and how the increase in price of food which is a necessity affects the low-income more than the rich.

- For part (b) on "Discuss the extent to which government policy measures are likely to address this market failure", students are required to provide a well-balanced response to 2 welldeveloped policy measures (with pros and cons for each policy measure).
- It is heartening to note that majority of the students provided well-balanced responses, addressing both the strengths and limitations of different policies.
- Weaker responses did not set their responses in the context given by the preamble and question. They explained why the market fails from activities such as using cars (or producing car journeys). Unfortunately, such activities generate negative consumption externalities which are irrelevant in the context of the question on "industrial carbon emissions". The question requires students to be able to identify that carbon is emitted when industries produce goods. Examples of industries that generate significant carbon emissions when producing goods include the petroleum refining industry, electricity industry, chemicals and metal/mineral industry, and iron and steel industry. Carbon is emitted when these industries burn fossil fuels for energy or from certain chemical reactions necessary to produce goods from raw materials.
- Majority of the responses provided a detailed explanation of why industrial carbon emissions is a
  negative production externality which causes the market for industrial goods like electricity to fail in
  achieving efficient allocation of resources. The quality varies in terms of the details provided. Good
  quality responses will include an accurate and comprehensive explanation of the following:
  - o Definition of market failure and negative production externalities
  - Exemplification of third-party costs from industrial carbon emissions and MPC from production, as well as MPB from consumption
    - Examples of third-party effects should be better developed. For instance, carbon emissions can lead to climate change which can cause devastating impacts such as extreme weather events like flooding and deadly storms; the spread of disease; sea level rise; increased food insecurity; and other disasters. These events impact those who are not involved in the production and consumption of such goods through rising health care costs, destruction of property, increased food prices, and so on.
  - Reason why negative production externalities are not internalized by producers ignored/disregarded by producers because of the pursuit of self-interest, meaning that producers seek to maximise their profits
    - Note that ignore means disregard which is not the same as ignorant which means not aware, does not know
  - Assume that MPB=MSB from consumption because no consumption externalities
  - o Derivation of free market output level and socially optimal output level
  - Explanation of deadweight loss
    - Weaker responses shaded the wrong deadweight loss area or just stated the area without explaining why.
- Stronger responses not only used the externality framework to explain how market failure arises from
  negative production externalities, but also linked the policies back to the externality framework. Weaker
  responses, however, either did not use the externality framework to explain the source and/or did not
  link the policies back to the externality framework (meaning the MSB/MSC-MPB/MPC diagram and/or
  concepts).
- Some students brought in imperfect information as a source of market failure, but the quality of such responses varied to a greater extent.

- Responses that brought in negative production externalities (ignored due to pursuit of self-interests) and then also brought in imperfect information and linked it back to imperfect information about negative production externalities are not given additional credit because such responses touched only on 1 source <u>negative production externality and the main reason</u> why it is ignored is due to the pursuit of self-interests, not imperfect information. For imperfect information to be given credit, the imperfect information must be linked back to the impact on producers or consumers themselves, not to third parties. This means the imperfect information argument must be linked back to how carbon emissions can either affect the producers' long run profits or affect the health of consumers themselves in the long run, but producers and consumers are not aware of the impact carbon emissions have on themselves because these effects are felt only in the long run.
- Weaker responses were vague on how tradable permits work, meaning that they failed to provide sufficient details on how the cap aspect of the tradeable permits function and on the impact on the market for industrial output when firms trade permits with one another.
  - Some students argue unconvincingly that cap-and-trade is a short run policy but while capand-trade has the immediate effect of reducing pollution by a level targeted by the government, it incentivizes firms to innovate and adopt green technology over the long run.
  - Some students argued that a black market will arise when firms trade carbon permits with one another, but this is incorrect. Revise when a black market will arise again.
- Weaker responses were confused about the difference between quota on industrial output and quota on carbon emissions.
  - Note that a quota on industrial output results in a perfectly price inelastic supply curve in the market for industrial output that emits carbon in production. A quota on emissions, however, does not cause the market supply for industrial output curve to be perfectly price inelastic. As the quota is set in the market for permits to pollute, the market supply for permits to pollute is perfectly price inelastic at the maximum number of permits allowed by the government. When there is an increase in the demand for permits to pollute, the shortage of permits will drive up the price of permits which will in turn increase the costs of production for the firms buying these permits. Hence, the MPC curve in the market for industrial output shifts upwards by the price of the permits. This will in turn cause a shortage in the market for the industrial output which will in turn cause prices to increase in the market for output and a fall in quantity demanded and hence, quantity traded towards the allocative efficient output level.
- A high proportion of candidates lack details in explaining how different microeconomic policies can help reduce carbon emissions from industrial activities.
  - In explaining indirect taxes, some responses lack of clarity in explaining whether the indirect tax is a tax on output that emits carbon, or whether it is a tax on the pollutant itself (e.g. carbon tax). Likewise, when explaining quota, they were not clear whether the quota is a maximum limit on the output that emits carbon in production, or whether it is a quota on the pollutant (carbon) itself. Hence, explanation of how these policies work, including cap and trade, lacked sufficient details.
  - Many students asserted that it is difficult to put a price on carbon but did not explain why. Students need to explain each limitation or weakness in the policy that they highlighted. For instance, some climate impacts can have socioeconomic impacts that are difficult to translate into a dollar cost. Impacts that are "identifiable but hard to quantify (meaning hard to assign a monetary value)" include civil conflict and human migration, biodiversity loss and ecosystem services. In addition, the effects of climate change will be felt over many hundreds of years but cutting emissions costs money now.
  - There were some misconceptions in terms of the similarities and differences between these policies. For instance, while carbon taxes and cap and trade possess the advantage of allowing emissions reductions to take place wherever abatement costs (or costs of reducing pollution) are lowest and in turn, encourage firms to switch to cleaner sources of energy, indirect tax on

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the output that generates the pollution and quota on output do not have such an advantage. To facilitate candidates' understanding of these different types of microeconomic policies, a table of comparison of these policies is provided after this section.

- A few candidates brought in quota on carbon emissions after explaining cap and trade policy, without realizing that the cap-and-trade policy already incorporates quota on carbon emissions in its policy. Students are advised to provide distinctly different policies.
- Some students brought in education and campaigns as a policy, but their explanation was too theoretical, lacking in contextualization. Students are reminded to set their policies in context. For instance, what message should the education and campaigns policy highlight in the context of industrial carbon emissions? Who should the message be targeted at? Should the message seek only to provide information and raise awareness or should the message go beyond that to try to change mindsets and values to instill social responsibility and bring about a greater care for the environment, and why?
- A significant proportion of candidates mention tackling the root cause of the problem, but did not specify what the root cause is.
- A small proportion of candidates still drew diagrams without providing a textual explanation of their diagrams. The examiners will only credit diagrams with accompanying textual explanations.
- Candidates are reminded to provide complete and accurate labelling of their diagrams. They should use a ruler to draw straight lines.
- Minimise the use of short forms/abbreviations to those that are commonly found in textbooks and lecture notes. Short forms/abbreviations that are not used in textbooks and lecture notes are likely not accepted at the A Levels! In addition, too many short forms/abbreviations will adversely affect the ease of reading and hence, clarity of your response.

	Tax on output	Carbon tax	Tradable permits / Cap	Quota in the	Subsidising
	that emits	(Tax on pollutant)	and Trade	output market	green
	carbon			-	technology
Classification /	Market-based	Market-based	Hybrid	Command and	Market-based
Type of policy			-	control	
How it works	In the market for	A carbon tax directly	1 <sup>st</sup> part comprises of a	Quota on output $\rightarrow$	Green technology
	the output that	establishes a price	cap/quota on carbon	Government sets a	that reduces the
	generates	on greenhouse gas	emissions whereby the	limit on output $\rightarrow$	MEC of
	pollution, this has	emissions—so	government sets a limit	targeted output	production will
	the effect of	companies are	on the maximum	level falls closer to	reduce the
	increasing costs	charged a dollar	amount of pollutants	AE output level	divergence
	of production	amount for every ton	firms are allowed to emit		between MSC
	(MPC curve shifts	of emissions they	by giving out a limited		and MPC curves
	upwards) →	produce	number of emissions		of production in
	increases the	-	permits each year		the output market
	price consumers	In the market for the			→ smaller
	pay but reduces	output that generates	These permits can be		deadweight loss
	the price retained	carbon, for firms that	given free of charge to		$\Box \rightarrow$ reduce extent
	by producers,	choose to pollute $\rightarrow$	the firms or auctioned to		of allocative
	hence both Qd	COP increases (shift	the highest bidder.		inefficiency
	and Qs falls	MPC curve upwards)	Hence, a quota on		
	respectively.	→ price consumers	pollutant is set by using		•
		pay increases but	permits → max limit on		
	If the indirect tax =	price producers	pollutant		
	MEC at	retained falls, hence			
	allocatively	Qd and Qs falls	PLUS		
	efficient output	respectively $\rightarrow$			
	level, allocative	market output level	The second part		
	efficiency is	falls.	comprises of trading of		
	achieved		permits to pollute		
		Carbon tax	between firms in the		
		incentivizes firms to	secondary market for		
		switch to cleaner	carbon permits		
		energy → reduces			
		MEC (shift MSC			

# Table of Comparison (Revision)

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		curve downwards) → allocatively efficient output level increases Overall divergence between MPC and MSC curves is reduced → extent of allocative inefficiency is reduced.	Firms that can reduce their emissions at low cost would be incentivized to adopt cleaner production methods → fall in MEC → downward shift of MSC curve → Q <sub>AE</sub> increases. Firms that do not have the ability to reduce their emissions at low cost will buy permits to pollute from firms that are able to do so → price of permits will add on to MPC of production → shift MPC curve upwards → fall in Q <sub>FME</sub> In this way, the overall reduction in emissions would be achieved at least resource cost. The wider the coverage of the tradable permits market, the better.		
Certainty in fixing an environmental outcome	8	Content of the entities of the entites of the entits of the entites	Provides certainty about the quantity of emissions (it cannot exceed the cap), but uncertainty about the cost of achieving these reductions	8	8
Allows emissions reductions to take place wherever the abatement costs (or costs of reducing carbon emissions) are lowest	No. The tax is on the output and not on the pollution itself.	Yes. Carbon tax does so without anyone needing to know beforehand when and where these emissions reductions will occur	Same as carbon tax Yes. By putting a price on pollution itself, firms have the incentive to reduce pollution if the cost of reducing pollution is lower than the price of the permit. Hence, those who can reduce emissions most cheaply will do so, achieving the pollution reduction at the lowest cost to society.	Ro. The quota is on the output and not on the pollution itself.	
Encourage firms to develop new low-carbon technologies	8	To avoid paying carbon tax, firms have the incentive to develop new low- carbon technologies	Firms have incentive to develop and adopt new low-carbon tech so that they can sell their excess permits to pollute and earn	8	©
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[Turn Over

			revenue which		
			increases their profits		
Generate revenue for private firms	Does not generat fi In addition, wit immediate cost fo post-tay	e revenue for private rms. h a tax there is an or businesses to pay, c profits fall	Generates revenue for private firms who are able to adopt cleaner methods of production (sell their permits to those who cannot)	8	8
			government gives out the rights to pollute free of charge or sells them to firms; And depends on whether the firms have to buy the rights to pollute from other firms		
Ability to		0			
generate revenue for the government	Tax revenue car environmental prote Or "recycled" back reducing taxes on minimising the adv growth in the short r	be used to fund ction activities. into the economy by income, labour, hence erse impact on actual un.	Government has the potential to earn revenue, but only if permits are auctioned instead of merely allocated free-of-charge to firms.		
Impact on cost of living / inflation	Yes, indirect tax ir AS curve upwards costs of living increa is sustained, cost	acreases COP → shift → GPL increases → ases; if increase in GPL push inflation results	To buy the right to pollute, firms incur costs → shift AS curve upwards (similar to indirect taxes) but less inflationary than indirect taxes	By limiting the quantity of output directly, prices of goods will increase	
Lase of implementation	Easy and flexible to implement	Both cap-and-trade and a carbon tax need to be enforced – emissions must be determined for various sources and penalties imposed if a source does not have the requisite allowances or does not pay the required taxes. A tax on fuels used for transportation, heating, and cooling is less expensive to administer than cap and trade, hence the preferred way to promote CO2 emissions abatement in these sectors.	Emissions trading proposals can be administratively more costly than carbon taxes because emissions trading is highly complicated and technical, which need to be resolved before trading can begin, including treatment of different GHGs, monitoring, enforcement, etc. It also has an additional administrative requirement – the allocation of allowances. Cap-and-trade would also be prohibitively expensive to administer if applied to automobile transportation or residential heating and cooling due to the number of participants involved		Burden on government's resources

https://www.globalpolicy.org/global-taxes/45883-carbon-taxes-vs-emissions-trading.html https://www.brookings.edu/blog/planetpolicy/2014/08/12/pricing-carbon-a-carbon-tax-or-cap-and-trade

## **Question 4**

Global growth remains subdued. Trade tensions between the United States and China have escalated and threatened supply chains involved in the production of key intermediate goods. The threat of military conflicts impacting Middle East oil production has put upward pressure on energy prices.

Source: World Economic Outlook, 2019

- (a) In light of the above developments, explain how demand and supply-side factors account for a fall in the rate of economic growth in a small and open economy like Singapore. [10]
- (b) Discuss the extent to which exchange rate and supply-side policies to prevent a fall in economic growth in Singapore are appropriate for all countries. [15]

## Suggested Answer

(a) In light of the above developments, explain how demand and supply-side factors account for a fall in the rate of economic growth in a small and open economy like Singapore. [10]

#### Approach:

- Clarify the key developments as stated in the preamble
- From the key developments, identify and link clearly to fall in AD and AS
- Use AD-AS combined analysis to explain the fall in actual growth for SG
- Demonstrate application to SG context by considering the significance of small and openness impacting the extent of fall in AD and AS and the consequent effect on fall in actual growth.

#### Introduction:

1. Identify clearly the key developments as indicated in the preamble and link to AD or AS factor

### AD factors:

- Weak global growth
- Trade tensions/war between U.S and China that leads to falling exports from U.S and China, lowering AD and RNY  $\rightarrow$  curtailing DD for X from SG

#### AS factors

- Trade tensions/war between U.S and China leading to supply chain disruptions of key intermediate inputs
- $\circ$  Military conflicts  $\rightarrow$  disruptions in oil supply in Middle East contributing to rising oil prices
- 2. Clarify the meaning of small and open economy for SG
  - Small domestic market lack of natural resources, thus highly dependent on imports. Global price taker especially for commodities
  - Openness to trade and capital flows highly M-reliant, X-oriented with X contributing to about 200% of SG's GDP, high dependence on FDI

#### Analysis: Structure analysis by AD, AS factors then provide a combined AD-AS analysis

• Fall in AD - [Explain how individual components of AD falls]

# Subdued Global Growth → Fall in C and I

With a subdued global growth, this weakness in global economic growth suggests poor business and consumer sentiments. The poor business sentiment can be attributed to the poor profit expectations, owing to the fall in economic activities as economies around the world weakens. As a result, FDI inflows to SG is expected to fall as MNCs hold back investment decisions until there is greater business certainty  $\rightarrow$  fall in I. On the part of poor consumer sentiment, domestic households may have greater incentive to save rather than spend due to the expectations of future job losses and/or poorer wage growth prospects  $\rightarrow$  fall in C

SG Context: FDI inflows has a huge impact on overall investment in the country. In 2019, Singapore is the fourth largest recipient of FDI inflows in the world, after the US, China and Hong Kong.

#### Subdued Global Growth $\rightarrow$ Fall in X

With a subdued global growth, when examined from perspective of SG's key trading partners experiencing a recession, this suggests a fall in RNY of SG trade partners such as U.S and China  $\rightarrow$  fall in income for foreign households hence reducing demand for SG's X, assuming normal good, a fall in X revenue for SG.

SG Context: Given SG's high dependence on the external DD to drive its economic growth, it is likely that the fall in X and I is likely to be **severe, causing a sharp fall in AD**.

#### Trade-War between U.S and China → Fall in X

Taking the case of U.S imposing tariffs on Chinese goods such as electronics and manufactured goods, this will lead to slowing X growth from China to the U.S. This may in turn cause a fall in demand from China for intermediate goods such as electrical components from SG causing a fall in X revenue for SG. If the trade-war between U.S and China amounts to a full-scale fall-out, with U.S slapping tariffs on all Chinese imports, the fall in X and I with consequent China's economic slowdown will have wider spill-over effects in the rest of the world's economies, dampening global economic outlook and a more **severe fall in demand for X from SG**. This fall in X is **especially significant for SG** given that X is almost 200% of its GDP.

#### [Briefly explain the reverse k effect]

The multiplier works on the principle that one man's lack of spending is another man's loss of income, the initial fall in autonomous AD due to the fall in C,I and X will lead to many rounds of lower induced consumption, causing multiple leftwards shift of AD curve from  $AD_0$  to  $AD_1$ , hence resulting in a more than proportionate fall in real national income from Y<sub>0</sub> to Y<sub>1</sub>, and a fall in actual growth due to a fall in utilisation of resources as the economy moves further away from the full employment level of output. Hence economy experiences a lower rate of economic growth and a fall in actual growth.



# Fall in AS [Explain pertinent factor(s] that may result in a fall in AS]

# (i) Trade-War between U.S and China $\rightarrow$ rise in cost of production

Taking the perspective that U.S imposes tariffs on imports from China on intermediate goods such as metals and coils, making Chinese exports to the U.S less price competitive. This has the effect of causing China-based manufacturers that supply such goods to the U.S to reconfigure their supply chain away from China to other locations, which places a cost burden to make those adjustments to their supply chain, which raises their COP. This increase in COP has the effect of causing a fall in SG's AS due to the likely increase in import prices of key intermediate inputs as such manufacturers pass on the higher COP to their goods that may also be exported to SG. With the fall in AS  $\rightarrow$  cet par, causing a fall in RNY, SG economy experiences a lower rate of economic growth and actual growth.

# (ii) <u>Military conflicts in the Middle East</u> $\rightarrow$ rise in oil prices

Such Middle East military conflicts causes disruptions in oil supply, with a fall in SS of oil, ceteris paribus, this contributes to rising oil prices. With **SG being highly M-reliant** due to tack of natural resources like crude oil, it is especially **vulnerable to sharp increases in oil prices**, which raises COP for most economic activities in SG. Oil prices indirectly affect costs such as transportation and manufacturing. This **significant increase** in COP has the effect of causing a **sharp fall in AS**, cet par, causing a **significant fall** in RNY, economy can be expected to experience a **sharply lower** rate of economic growth and actual growth.

Illustrate using AD-AS diagram. See Fig 2 below



#### Explain the combined effect of a fall in AD and AS

The fall in AD and AS reinforces each other and exacerbates the fall in actual growth for SG, with RNY falling further to Y<sub>2</sub>, causing a **significantly lower** rate of economic growth. See Fig 3 below



# Conclusion

The fall in AD is likely to be more significant than the fall in AS, assuming that the supply-side disruptions due to the rise in oil prices and intermediate inputs is a transient phenomenon. Given the expected fall in economic growth rate, it is imperative that the SG implements appropriate DD and SS policies to mitigate the adverse effects.

#### Marks Scheme

	Knowledge, Application, Understanding, Analysis				
L1	<ul> <li>Lack of economic framework in analysis</li> <li>Irrelevancies in explanation.</li> <li>Substantial and glaring conceptual errors.</li> <li>Mere listing of points.</li> <li>Considers only <u>DD or SS side factor</u></li> <li>No application to SG context</li> </ul>	1–4			
L2	<ul> <li>Good use of economic analysis in the explanation of the AD and AS factors causing a fall in economic growth rate</li> <li>Lapses in analysis evident.</li> <li>Lacks depth in analysis</li> <li>Some attempt to link the fall in AD and AS to the key economic developments in the preamble</li> <li>Analysis shows some awareness of the SG context</li> </ul>	5 - 7			
L3	<ul> <li>A well-developed answer that demonstrates:</li> <li>Good scope of analysis: able to consider a range of AD and AS factors, inferred from key developments in the preamble</li> <li>Good depth of analysis: able to provide a well-structured, coherent and thorough analysis, well-supported with AD-AS diagram(s) and strong application to SG context that brings out the severity of the factors adversely impacting AD and/or AS and hence lower economic growth rate.</li> </ul>	8 - 10			

#### Examiners' comments

#### Scope of analysis

- Strong responses were able to make clear and explicit links to all 3 events in the preamble: (i) Subdued Global Growth (ii) Trade tensions between US and China, (iii) Military Conflicts in the Middle East. However, weaker responses often left out one or more of the events, which severely limited the scope of analysis. Others brought in events outside of the preamble, eg. Ukraine Russia war, when the question clearly directed students to the preamble "In light of the above developments..."
- A significant number of responses went beyond the scope of the question to include an analysis of potential growth effects. This was unnecessary as the question is focused only on actual growth, which is measured by the rate if change in economic growth.
- The question being set in the SG context expected an analysis of a fall in X revenue on SG's economic growth. Responses which left out the X component limited the scope of analysis and do not demonstrate a good application to the SG context.

#### Depth of analysis

- A significant number of students left glaring gaps in their analysis of the demand and/or supply factor in relation to a fall in AD and/or AS. Eg. AD (or AS) falls, hence economic growth is lowered. Often the effect on RNY was left out. For the case of AD, the multiplier effect causing a more than proportionate fall in RNY was either left out entirely or given a very brief mention.
- Many students did not provide a good elaboration of how the events affected AD or AS. Eg. Military conflicts in the Middle East caused rising energy prices and hence rise in COP. The link to fall in SS of oil, cet par, rise in oil prices was often not made.
- Strong responses were able to anchor their analysis on the SOE context of SG and intentionally weave in a discussion of the significance of high export dependence and import reliance on the extent of fall in AD and AS.

#### Common errors

- A number of responses confused X-M with X+M. X-M cannot be 300% of GDP!
- Some responses were not well directed to the question in terms of explaining the fall in economic growth.
   Eg. When explaining how a rise in prices of intermediate goods and/or price of oil prices results in COP, this was often linked to a rise in GPL and hence imported inflation. Some also went on to discuss the secondary effect of a rise in GPL on loss of export price competitiveness, worsening of BOT.
- Avoid explaining the k-effect together with a fall in AS. Often times, students made the error to explain
  a more than proportionate fall in RNY with reference the AD curve intersecting the new AS curve, when
  the original RNY was on the old AS curve.

(b) Discuss the extent to which exchange rate and supply-side policies to prevent a fall in economic growth in Singapore are appropriate for all countries. [15]

#### Suggested Answer

#### Approach:

Frame the exchange rate and supply-side policies for SG with the objective of raising actual growth
and potential growth while considering the differing context between SG and that of the choice of
other countries used for discussion, as well as the possible reasons for the fall in economic growth
facing each country.

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- Discussion of appropriateness to be anchored on the yardsticks of:
  - (i) Effectiveness ability of policy to solve the root cause(s) of a fall in economic growth
  - (ii) Desirability possible trade-offs against other macroeconomic goals, eg. imported inflation, structural unemployment etc.
  - (iii) Feasibility ability of government to implement the policy, eg. budget constraints, other more immediate macroeconomic problems to address eg. cost-push inflation
  - (iv) Sustainability ability of government to implement the policy over time, eg. government may be constrained by persistent budget deficit issues, government spending on training subsidies cannot be sustained overtime without incurring a bigger national debt.

# Introduction:

- Appropriateness of exchange rate and supply-side policies would very much depend on the country context and the underlying reasons for the fall in economic growth.
- Clarify nature of SG being small and open vs that of relative larger and less open countries like China and U.S.

## Analysis:

## 1. Explain how exchange rate policy can help to boost actual growth in SG

A weaker SGD or a policy of zero appreciation of SGD relative to a trade-weighted basket of foreign currencies of SG's major trading partners results in:

- ➔ Fall in price of exports in foreign currency terms foreign consumers will increase consumption of SG's goods. Rise in import prices in domestic currency terms, as a unit of SGD now buys fewer units of a foreign trading partner's currency cause local households to switch away from imports to domestically produced goods/services. Resulting in an increase in quantity of SG's exports and a fall in quantity for imports as SG's ability to buy foreign goods and services decreases.
- → Increase in net X → Increase in AD, more than proportionate increase in RNY from Y<sub>1</sub> to Y<sub>2</sub> due to k effect (elaborated in part a) → mitigates the fall in actual growth



Illustrate using AD-AS diagram – see Fig 4 below

Given that X as mentioned earlier contributes almost 200% of GDP for SG, this policy is helpful as it targets the fall in X attributed to a fall in external DD due to the weak global economy.

#### 2. Explain how SS-side policies can help to boost economic growth in SG

- In response to the fall in actual growth brought about by the rise in COP as explained earlier in part a, the SG govt can make use of interventionist SS-side policies such as skill retraining schemes (such as SkillsFuture), grants for R&D to boost process innovation → increase productivity, if wage increase < productivity increase → reduce unit cost of production and AS increases, represented by downward shift of AS curve → increase in RNY from mitigates the fall in RNY from Y<sub>2</sub> to Y<sub>3</sub> and dampens the fall in actual growth
- Skills and retraining schemes and grants for R&D to boost process innovation that raises productivity, may also be argued to increase the productive capacity of the SG economy → increase AS, shifting AS curve to the right, promotes potential growth [Illustrate with AD-AS diagram].
- SG govt may make use of talent and foreign labour policies to increase the quantity and quality of labour. For example, the recent government initiative to introduce the Overseas Networks & Expertise Pass aims to attract top talent in the respective industries to Singapore, which if successful would help to enhance the quality of labour in SG. In addition, government may also reduce foreign worker levy to increase the quantity of labour in SG. These have the effect of increasing productive capacity for the SG economy which increase AS, shifting AS curve to the right, promotes potential growth [Illustrate with AD-AS diagram].

[Students may also explore other supply-side measures like population policies, lowering retirement age, increasing female labour force participation rates etc]

SG govt may also make use of wage guideposts via tripartite labour market system, to promote downward wage flexibility during economic downturns. SG under the tripartite partnership of the NWC (comprising the MOM, the SNEF and the NTUC) encourages businesses to adopt a flexible wage system where the variable component of wages can be adjusted quickly by firms to reduce wage costs during business slowdowns → decreases in COP → increase in AS → represented by downward shift of AS curve → increase in RNY from Y<sub>1</sub> to Y<sub>2</sub> mitigates the fall initial fall in RNY from Y<sub>0</sub> to Y<sub>1</sub> and dampens the fall in actual growth.

Illustrate and explain using AD-AS diagram, see Fig 5 below



Y6/9757/Prelims/2022

#### 3. Discuss appropriateness of policies to ALL countries (give context accordingly)

#### One limitation of exchange rate policy: May not be appropriate for all countries

#### [Ineffective]

Countries that are relatively less reliant on exports  $\rightarrow$  exchange rate policy not effective in boosting exports significantly to increase AD, RNY and actual growth. X may be a small component of AD eg. countries like China and the U.S where the contribution to GDP from domestic C is relatively high, internally driven fall in AD, eg fall in C is likely the main source of weakness in actual growth. Exchange rate policy is ineffective to boost domestic C. Instead demand management policies like expansionary FP and MP more effective in stimulating internal DD.

#### [Undesirable and Ineffective]

For countries like China and the U.S already in a trade war, an exchange rate policy to weaken the domestic currency will likely invite even more trade retaliation as the exchange rate policy can be perceived as a deliberate and unfair attempt to gain an unfair trade advantage by artificially boosting export price competitiveness. The trade retaliation that ensues via more import tariffs on the countries goods would negate the gains from any increase in X revenue as a result of the weak currency, rendering limited effectiveness as well in boosting AD, RNY and actual growth.

#### One limitation of SS-side policies: May not be appropriate for all countries

#### [Ineffective]

Firms and workers in other countries may not be as receptive and incentivised to undertake training and skills upgrading as compared to SG. In particular, for developing countries with weak governance, there is often the lack of strong government support to develop an eco-system that facilitates the identification of essential skill sets for workers as needed by firms, while tapping into government resources and learning from private enterprises to co-develop and deliver re-skilling and upskilling initiatives. This is unlike SG which has the government providing the framework such as the SkillsFuture Queen Bee initiative to drive skills and training.

#### [Not feasible, Undesirable]

- May not be feasible for all countries: lack of government budget to fund training/R&D and/or provide wage subsidies. Supply-side policies to promote training and skills upgrading may also be costly → high trade-off especially for developing countries with more pressing challenges.
- May not be feasible for all countries facing pressing need to lower COP due to cost-push pressures. Skills upgrading and training takes time for workers to acquire the skills and knowledge and then apply them in the work-setting, hence suffer long-time lags.

#### **Reasoned Conclusion:**

Weigh relative appropriateness of the policies – Exchange rate vs SS-side policies. Suggest alternative policies – MP, FP, FTAs etc

• [Judgement] Weigh up exchange rate policy and SSP: SS-side policies may be more likely to be appropriate for most economies as compared to exchange rate policy. The use of exchange rate policy may be more appropriate for SG and less so for other economies.

• [Substantiate with reference to context]

Given the small and open nature of the Singapore economy and the high dependence on external demand for economic growth, with SG being well-plugged into the global value chains, exchange rate policy would be more effective as compared to a relatively larger and less open economy like to U.S where internal demand in the form of domestic consumption is a more important driver of its growth. This suggests that it is important to take into account the **nature of the economy** as well as the **root causes of the fall in economic growth**.

On the other hand, in the context of globalization and the more rapid erosion of a country's comparative advantage, SSP to help develop new comparative advantage would be appropriate not just for SG but also for other economies similar in nature to it, so as to help sustain economic growth over time.

Supply-side policies to prevent a fall in economic growth in Singapore may only be appropriate for other economies to the extent that these economies have the resources to finance their spending.

The assessment of appropriateness of exchange rate and supply-side policies for other economies may also have to take into account other competing macroeconomic aims that is different from SG. For instance, if SG economy does not face the pressing issue of demand-pull and/or cost-push inflation but the other economy does, then a policy of weak exchange rate while boosting exports and actual growth may result in severe trade-offs against the price stability objective, rendering the use of exchange rate policy highly undesirable.

	Knowledge, Application, Understanding, Analysis				
L1	•	Lack of economic framework in analysis	1–4		
	•	Irrelevancies in explanation			
	•	Substantial and glaring conceptual errors			
	•	Mere listing of points			
	•	No application to SG context and/or other economies			
L2	•	Able to explain accurately the use of exchange rate and supply side policies to prevent a fall in economic growth using economic analysis Lacks sufficient scope in analysis:	5 - 7		
		application to other economies	0		
L3	•	A well-developed answer that demonstrates:	8 - 10		
		<ul> <li>Good scope of analysis:         <ul> <li>Able to explain the use of exchange rate and supply-side policies that covers actual and potential growth</li> <li>Policies analysis covers both SG and other economies</li> </ul> </li> <li>Good depth of analysis:</li> </ul>			

#### **Marks Scheme**

	<ul> <li>Able to provide a well-structured, coherent and rigorous analysis, well-supported with AD-AS diagram(s) and strong application to SG context and other economies</li> <li>Appropriateness is assessed with clear reference to relevant yardsticks of effectiveness, desirability, feasibility/sustainability</li> </ul>				
Evaluation					
<ul> <li>An attempt at judgement but not explained.</li> </ul>					
E2	<ul> <li>Judgement that answers the question with some attempt at justification. Justification is incomplete or not well-substantiated.</li> </ul>	2-3			
E3	• Judgement that answers the question that is well-substantiated with respect to context. Well-elaborated and insightful justification.	4-5			

## Examiners' comments

## Scope of analysis

- Strong responses were able to explain how the use of exchange rate and supply side policies helped to promote both actual and potential growth. This was then followed by careful consideration of the SOE context of Singapore against that of other relevant economies, with suitable country specific examples provided. A critical analysis of why such policies were not appropriate for some economies was then performed by using relevant yardsticks of effectiveness, desirability and feasibility/sustainability.
- Weaker responses, on the other hand, often limited the range of discussion points to either actual or potential growth or only on the aspect of policy effectiveness.

# Depth of analysis

- A good number of responses failed to link clearly to AD or AS effects. Eg. SSPs such as training for workers were often explained as having the benefit of increasing productivity, hence lowering COP. However, there were no clear linkages to the increase in AS, real national income and the consequent effects on actual growth.
- Others did not demonstrate logical analysis. Such responses often began by explaining how SSP would lower COP but proceeded to explain the effects of improving export price competitiveness and the resulting increase in AD and economic growth. Such responses were rather odd, as SSPs are meant to increase AS instead of AD in the context of the analysis. Any subsequent effects on AD are secondary. Candidates are reminded again to focus on the primary effects analysis.
- In terms of the critique of exchange rate policy and why it may be of limited effectiveness for relatively less open and larger economies, a significant number of responses chose to focus on the effects of depreciation on higher imported inflation. While this trade-off is valid, the opportunity was lost in putting forward a stronger argument based on the relatively larger domestic consumption and investment for countries like the U.S, rendering the use of exchange rate policy ineffective, while demand management policies like fiscal and monetary policy would be more effective to better target weakness in internal demand in order to boost actual growth.

#### Common errors/flaws in analysis

- A significant number of responses did not demonstrate a sound grasp of the use of exchange rate policy to stimulate economic growth in the SG context. With respect to a fall in external demand, the appropriate policy stance expected here would be a once-off depreciation or zero appreciation of the

SGD policy stance. This was in contrast to the often-rehearsed responses that adopted a gradual modest appreciation of SGD, which is meant to achieve price stability instead of the required boost to actual growth with more price competitive exports by weakening the SGD.

- Some candidates wrongly associated FTAs and/or direct tax cuts as supply-side policies. For the latter, direct tax cuts to increase disposable income or post-tax profits are expansionary demand management policies with SS-side effects.
- For the multiplier process, there were notable instances of responses that explained a more than proportionate increase in AD when it should have been RNY.
- In the critique of exchange rate policy for SG, some students attributed the small k size rendering a weaker SGD ineffective in boosting RNY and economic growth. However, this argument on k size also extends to demand management policies like FP and MP, which means that this limitation of small k size is not a limitation specific to exchange rate policy. This weakens the argument when it is used to justify why other economies should not use exchange rate policy.
- Evaluative comments were generally weak and not well-thought out. A significant number of responses were framed as summative conclusions that often repeated the preceding main points of analysis or sounded rather rehearsed, eg. SR vs LR, use of policy mix.

# Question 5

- (a) Explain how globalisation can improve a country's export competitiveness. [10]
- (b) Discuss whether conflicts between macroeconomic objectives are the main consideration in the choice of policies adopted by a country to reduce its balance of trade deficit. [15]

# (a) Explain how globalisation can improve a country's export competitiveness. [10]

#### Suggested answer

#### Approach:

Students are expected to explain how globalisation (in terms of the increase trade, capital, and labour flows) can improve a country's export competitiveness (in terms of the price and quality of exports). Students are expected to use AD-AS framework or any other appropriate economic framework (MR-MC or DD-SS), to explain their analysis. Students should briefly explain how globalisation increase trade, capital, and labour flows before explaining how they improve a country's exports competitiveness.

# Introduction:

Define export competitiveness:

- Export competitiveness the ability of a country to sell goods and services competitively in a foreign country. Such external competitiveness can be determined by:
  - Cost competitiveness: this is primarily determined by differences in unit labour costs and is reflected by producer prices.
  - Non price competitiveness: this involves product quality, design, reliability and performance, choice, after-sales services, marketing, branding and the availability and cost of replacement parts.

Define globalisation:

• Increase interconnectedness between countries in terms of increase trade, capital, and labour flows.

### Analysis:

### Explain how globalisation improve export competitiveness:

### Increase trade flows – increase volume and variety of cross-border flow of goods:

Through the removal of trade barriers, countries who are resource-poor, like Singapore can access imported raw materials or intermediate goods at a lower cost. Consequently, the price of imported raw materials will be lower → Helps to lower cost of production (COP) significantly especially for import reliant countries → increase AS, while holding AD unchanged → producers can pass on the lower COP to consumers in the form of lower prices (P1 compared to P2) → GPL lower → Relatively lower inflation rate compared to competitors → Improve export price competitiveness



- Increased trade flows also allow countries to obtain better quality raw materials to improve the quality of their exports and better produce a variety of models and features to cater to the different taste and preferences of foreign consumers.
- Increased trade flows allow counties to expand their consumer base and embark on larger scale production → Fully reap internal economies of scale → Lower average cost → Cost savings passed on to consumers hence prices are lowered → improved export competitiveness.
- Increased trade flows → Increase firms' exposure to international competition → Profit-maximising firms will be incentivized to engage in product and process innovation → Lower COP hence price competitiveness and better quality products.

### Increase capital flows:

- Globalisation facilitates increase capital flows across borders through the improve ease of doing business in other countries and market liberalisation
- Small economies (small number of home-grown firms) rely on FDI inflows to increase capital accumulation and hence investment:
  - Inflow of FDI allows for the sharing of knowledge and aids in technological transfer which can help to enhance and develop our domestic industries to become more productive, efficient, and competitive through local-foreign partnerships and collaborative projects.
  - Improve efficiency in production → Lower unit COP → Increase AS → Fall in GPL hence lower relative inflation rates → Improve price competitiveness of exports
  - R&D by foreign producers based in Singapore can provide positive technological spillovers that can help to improve the quality of exports (e.g. Results of the R&D by GlaxoSmithKline can help our local biomedical firms to produce better quality and resistant pharmaceutical exports and products).

#### Increase labour flows:

- The removal of immigration restrictions such as in cross border migration of labour between EU countries and also in countries that are welcoming of foreign workers help to facilitate greater mobility of people for work purposes.
- Increase the size and skills of labour force → Improving the quantity and quality of labour force → Increase in efficiency or labour productivity → Increase productive capacity → AS increases → Fall in GPL hence lower relative inflation rates compared to competitors → Improve export price competitiveness.
- Ease labour shortages in both low-skilled and high-skilled workers → Minimise the probability of wage-push inflation arising from labour shortages → Minimise the need to increase prices of goods and service → improve export price competitiveness.



#### Mark Scheme:

		Knowledge, Application, Understanding, Analysis	
L1	•	Misinterpretation of question/Fail to understand question's requirements. Unable to relate how globalisation improve export competitiveness.	1 – 4
L2	•	Able to explain at least 2 out of the 3 flow of globalisation and how it can help to improve exports competitiveness. Answer provides scope that discuss <u>either</u> the price or quality aspect of improving exports competitiveness but may contain gaps or lack clarity in analysis or lack scope.	5 - 7
L3	•	Depth of analysis: Analytical explanation of all 3 flows of globalisation and how it can help to improve exports competitiveness using the appropriate economic analysis e.g. AD-AS, MR-MC or DD-SS. Answer provides scope that discuss both the price and quality aspect of improving exports competitiveness. Answer briefly explains the reason for the increase flows of trade, capital, and labour.	8 - 10

#### Comments:

 Most students had no difficulty understanding the question requirements. Most answers displayed awareness that export competitiveness can be improved with increased trade, capital and labour flows. However, there were varied abilities in providing in-depth economic analysis. Better answers made good use of appropriate economic framework while weaker scripts tended to be descriptive in nature. (b) Discuss whether conflicts between macroeconomic objectives are the main consideration in the choice of policies adopted by a country to reduce its balance of trade deficit. [15]

### Approach:

Students are expected to explain why conflicts between macroeconomic objectives need to be considered in the choice of policies to decrease BOT deficit. Students should contrast this with other factors which are important considerations in the choice of policy to decrease BOT deficit. Evaluative comments should anchor on weighing the significance of conflicts against other factors that influence the choice of policies adopted to reduce a balance of trade deficit.

#### Introduction:

In the choice of macroeconomic policies aimed to reduce balance of trade (BOT) deficit, the government should consider the potential conflicts between macroeconomic objectives that may arise. However, there are other factors that the government should consider as well; such as the state of the economy and the openness of the economy. A BOT deficit implies that the export revenue is less than the import expenditure and a government would not want the BOT deficit to be large and persistent.

# THESIS: Conflicts between macroeconomic objectives is a consideration in the choice of policies to reduce BOT deficit.

#### T1: Use of exchange rate policy to reduce BOT deficit results in inflation

Explain how a depreciation to reduce BOT deficit may result in demand-pull and/or cost-push inflation

- Depreciation → ↓ Px in foreign currency → Foreign consumers will now consume more exports as it is relatively cheaper in foreign currency terms.
- ↑ Pm in SGD → Domestic consumer will switch away from imports to the consumption of domestic produced goods and services since imports become more expensive in domestic currency terms.
- Assuming Marshal Lerner Condition holds, where |PEDx+PEDm| > 1 → Improvement in BOT.

Conflict 1: Cost-push inflation

Since imports become more expensive in domestic currency terms, price of imported raw materials
 ↑ → COP ↑ → ↓ AS (shifts up) → GPL ↑ (P<sub>0</sub> to P<sub>1</sub>) → Import induced cost push inflation.

Conflict 2: Demand-pull inflation

- Increase in  $NX \rightarrow AD \uparrow \rightarrow$  via multiplier process  $\rightarrow RNY \uparrow$
- Assuming lack of spare capacity, the increase in AD will lead to depletion of limited resources as firms hire more factors of production (FOP) to produce more output.
- Firms compete for limited resources and bid up the prices of FOP → Prices of FOP increase → COP increase (movement along the AS<sub>1</sub> curve) → Firms pass on the higher COP to consumers in the form of higher prices → GPL increases.



[Link] Therefore, government needs to consider the above conflicts when deciding when to use monetary exchange rate policy. For example, in Singapore, due consideration of the trade-off results in the adoption

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of a zero-appreciation stance rather than depreciation stance to reduce a BOT deficit. Depreciation of the Singapore dollar is a last resort and once-off policy option for the purpose of stabilizing its economy in times of severe economic recession caused by weakened global demand for Singapore's exports.

Evaluation: However, it can be argued that the main consideration in Singapore's choice (a long term approach) to use a gradual and modest appreciation stance (rather than depreciation) is due to the nature of Singapore being a small and open economy which is susceptible to imported inflation. Though an appreciation of exchange rate will raise the price of exports in foreign currency, more importantly it will keep the price of imported raw materials or intermediate goods low. Given that majority of SG's exports have a high import content, an appreciation stance will help SG achieve lower inflation rate relative to competitors which will lead to price competitiveness of our exports in the longer term and thus reduce BOT deficit.

# ANTI-THESIS: There are other considerations in the choice of policies to reduce BOT deficit.

## AT1: Use of supply-side policies to reduce BOP results in increased structural unemployment, but is nonetheless adopted to deal with the root cause of the BOT deficit.

Explain how SSP to reduce BOT deficit (in LR) may result in structural unemployment

- R&D grants provided to producers to encourage the increase of engagement in R&D to improve product and process innovation can help to reduce BOT deficit.
- Through process innovation such as improving production efficiency and the use of labour-saving • technology, firms can reduce their unit COP and charge lower and more competitive prices of their goods and services
- Through product innovation such as in the improvement the quality and features of their products, • firms can improve the quality of their exports
- In the long-run, when R&D is successful, a country's exports can gain competitiveness -> Increase • in demand for its exports -> Reduce BOT deficit, ceteris paribus

#### Conflict 1: Structural unemployment

With the adoption of labour-saving technology, the displaced workers might not be equipped with new skills to be employed in high-tech sector, and this mismatch will lead to an increase in structural unemployment

[Link] However, in SG, the use of SSP to promote automation continues to be adopted despite the conflict in macroeconomic aims. This shows that the government views dealing with the root cause as a main consideration, rather than policy conflicts.

#### Evaluation:

That said, this does not mean that the conflicts are ignored, but rather not the main consideration. This is because the SG government also adopts other SSP in conjunction with R&D grants, such as training and education, to ensure that workers are equipped to perform more complex tasks and remain relevant for the changing work environment brought about by grants to promote technological advances, hence still giving due consideration to the conflicts.

#### AT2: Use of contractionary fiscal policy to reduce BOT deficit results in fall in actual economic growth and rise in unemployment, but is nonetheless adopted due to lack of funds/high debt/persistent budget deficit.

Explain how the use of contractionary FP to reduce BOT deficit may result in fall in actual growth and rise in cyclical unemployment

- Contractionary fiscal policy is an example of an expenditure reducing policy which is designed to lower real incomes and aggregate demand and thereby cut the demand for imports.
- Through the increase in personal income tax and corporate tax, there will be a fall in disposable income and fall in after-tax profits  $\rightarrow$  Fall in autonomous consumption (as consumers are less

willing able to consume more goods and service) and investment (as producers are not willing to invest more)

- In the short-run, the fall in C and I and hence AD fall (shift to the left) will trigger the reverse multiplier effect → An increase in unemployment (demand-deficient) as fewer factors of production are required to produce the reduced level of national output. With lower employment levels, factor incomes fall, leading to a fall in induced consumption which generates further rounds of reduction in incomes and induced spending as postulated by the multiplier process in which one man's spending creates another man's increase in incomes. Households will spend a proportion of this income on buying domestically produced goods and services (induced consumption) but some of it will be leaked out in the form of savings, taxes or imports. This eventually stops when cumulative sum of withdrawals equals the initial fall in AD. The decrease in C and I will lead to a multiplied fall in real national income from Y<sub>0</sub> to Y<sub>1</sub>.
- Holding AS unchanged, fall RNY → Import expenditure falls as consumers cut down on import spending.
- Fall in GPL (P<sub>0</sub> to P<sub>1</sub>) also helps to improve export price competitiveness (if inflation rate is lower than that of trading partners); if a country's exports are close substitutes to domestically produced goods and services, foreign consumers will switch to consuming more of the country's exports since they are relatively cheaper → BOT deficit can be reduced.



Conflict 1: Fall in actual growth

• However, contractionary fiscal policy leads to a fall in actual growth ( $Y_0$  to  $Y_1$ ). Conflict 2: Rise in cyclical unemployment

• As real output falls, firms hire less factors of production -> Fall in derived demand for labour -> This would also increase cyclical / demand deficient unemployment.

*[Link]* However, a government may still choose to adopt contractionary fiscal policy over SSP due to the lack of funds or budget constraints. E.g. A government may recognize that BOT deficit can be reduced with the use of SSP such as subsidies to promote R&D or training of workers to target the root cause which is the loss of export competitiveness. However, due to budget constraints, SSPs which require government funding cannot be adopted. The government may hence decide to adopt contractionary FP (through decrease G and increase T) which can concurrently decrease budget deficit and BOT deficit, accepting the fall in economic growth and rise in cyclical unemployment.

# Alternative thesis points:

- Use of contractionary fiscal/monetary policy to reduce BOT deficit → Fall in actual economic growth and rise in unemployment, especially in a period of recession accompanied by rising unemployment.
  - Works through fall in C &/or I, mitigated by rise in net exports → AD may fall (assuming fall in C&I outweighs rise in net X) → BOT deficit is reduced together with fall in economic growth and rise in unemployment.
  - In contrast, exchange rate depreciation → rise in Net X. However, C & I are unaffected → BOT deficit is corrected together with increase in RNY and fall in unemployment.

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- During recession, inflationary pressure may not be as high or there may be previously unemployed labour (hence sufficient spare capacity) → will not result in higher demand pull inflation rate (i.e. AD rise along horizontal or upwards sloping portion of AS)
- [Link] In view of the potential conflict, countries may hence choose to use expenditure switching policies instead.

## Alternative anti-thesis points:

- Use of expenditure switching policies e.g. protectionists measures like imposition of tariffs are
  adopted despite conflicts with inflation. Example in the case of US-China trade war, in order to
  protect certain key industries in the US, tariffs are imposed on Chinese goods that are in direct
  competition with those produced by these key industries in the US. In the case of US, it may be
  due to nationalistic considerations.
- High degree of openness is a main consideration.
  - While both exchange rate policy (depreciation) and contractionary FP/MP (expenditure-reducing policies) can be used to decrease BOT deficit, a country may choose depreciation over expenditure-reducing policies due to high degree of openness. Depreciation will more directly reduce import expenditure and raise export revenue while FP and MP work through decrease in C & I → decrease AD → Decrease RNY hence import expenditure or decrease relative inflation rate hence increase export revenue. High total trade to GDP ratio suggests that demand management policies that target domestic demand e.g. increase in direct taxes under contractionary FP will not be able to influence AD significantly since C and I are smaller than X.
  - Based on the open economy trilemma, a country must choose between free capital mobility, exchange-rate management and control of the interest rate. Only two of the three outcomes are possible. If the exchange rate is managed but the country is open to cross-border capital flows, it must relinquish control of the interest rate. Small differences between domestic and foreign interest rates will lead to large inflow/outflow of hot money thus making it difficult for MAS to control money supply/interest rates effectively. Thus, for a country with free mobility of capital, the inability to influence interest rate would determine and must be considered because it implies that interest rate monetary policy is not feasible to implement to reduce BOT deficit. This may result in governments using contractionary fiscal policy instead of contractionary MP. Or in the case of Singapore, choice of exchange rate rather than interest rate as a monetary policy tool to reduce BOT deficit

#### **Reasoned Conclusion**

- The presence of conflicts may explain why a country like SG tend not to adopt depreciation of exchange rate as a primary tool to reduce BOT deficit.
- However, other important considerations include the root cause of the BOT deficit and the nature of the economy (high degree of openness), as well as the state of the economy (whether the country is in high debt, whether it is currently facing inflation or low growth etc).
- Arguably, the root cause of the BOT deficit is the most important consideration, and this is the main reason why SSP is adopted to reduce BOT deficit despite it resulting in increased structural unemployment. The nature of the economy may matter more than the conflicts as demonstrated by SG's choice of an appreciation stance.
- However, this does not mean that conflicts are ignored. In fact, many governments will decrease BOT deficit by adopting a combination of policies, such that these conflicts are mitigated.
- In conclusion, conflicts between macro-objectives are important factors but unlikely to be the main consideration.

#### Mark Scheme:

Knowledge, Application, Understanding, Analysis						
L1	•	Misinterpretation of question/Fail to understand question requirements e.g. explaining conflicts that do not arise from policies used to decrease BOT deficit OR explaining policies that will increase BOT deficit. Superficial answer that lacks depth: No/Very limited use of economic framework and concepts	1 – 4			
L2	•	Balanced answer: Valid conflicts between macro goals when a policy is used to reduce BOT deficit + Valid alternative factors when considering a policy to reduce BOT deficit. Employs good use of the AD-AS framework and/or relevant concepts to explain the conflicts between macro-objectives in the implementation of policies to reduce BOT deficit, but some gaps may be evident in economic analysis.	5 - 7			
L3	•	Well-balanced response: In depth analysis of conflicts between macro goals when a policy is used to reduce BOT deficit + Valid alternative factors + Clear linkages made to how the considerations affect choice of policies adopted. Contextualising arguments and analysis to Singapore or other countries are demonstrated well.	8 - 10			
Evaluation						
E1	•	An attempt at judgement but not explained.	1			
E2	•	Judgement that answers the question with some attempt at justification. Justification is incomplete or weak.	2-3			
E3	•	Judgement that answers the question with well-elaborated and insightful justification.	4-5			

#### Comments:

- This question was, on the whole, poorly attempted. Many answers did not demonstrate full understanding of the question requirements.
- Majority of answers were able to surface relevant conflicts between macroeconomic objectives when certain policies were adopted to reduce BOT deficit e.g. depreciation resulting in inflationary pressures, supply-side policies resulting in increased structural unemployment and contractionary FP/MP resulting in lower economic growth and increased cyclical unemployment. However, there were very few answers which went on to discuss the implications of such conflicts on the 'choice of policies'.
- There were also many answers which were able to surface relevant alternative considerations in the use of policies to correct BOT deficit e.g. root cause of the BOT deficit, nature or the state of the economy. However, many of the scripts stated that these factors ought to be the main consideration rather than provide convincing arguments that these considerations are more important than the conflict between macro aims.
- Students are reminded that they need to pay attention to the question stem i.e. the country [aims] to reduce its balance of trade deficit. There were some answers which totally ignored this question stem. For example, answers which explained how use of a particular policy results in conflicts between macroeconomic objectives without reference to reduction in BOT deficit or which would increase the BOT deficit.
- Some students argued that expansionary monetary policy (via decreased interest rates) could be used to decrease BOT deficit. These answers then focus on how BOT deficit can be reduced due to depreciation of exchange rate caused by hot money outflows (external effect of i/r policy). While the analysis of depreciation of exchange rate leading to decrease BOT deficit was largely correct, these answers ignored the internal effects i.e. increase in AD hence RNY which would lead to an

increase in demand for imports. Students are reminded that conventional policies used to decrease BOT deficit are expenditure reducing polices (Contractionary FP and MP) and expenditure switching policies (Depreciation/devaluation and imposition of protectionist measure such as import tariffs)

 Lastly, many students were not able to form valid evaluative comments or provided weak justification. Some students argued that reducing BOT deficit should not be the main priority of the government. This (again) ignores the question stem that policies are primarily aimed to reduce BOT deficit. There were others who argued that when policies used do not result in conflicts, this is proof that conflicts are not the main considerations. The most common being SSP (education and upskilling). This is at best an unsubstantiated claim.

## Question 6

To increase labour productivity, the Singapore government has encouraged workers to continually upgrade their skills as well as firms to push for greater automation and innovation.

(a) Explain why a government may be concerned about a fall in labour productivity. [10]

## Approach:

Question requires an analysis of the possible adverse consequences of a fall in labour productivity on an economy. Students should link the impact of the fall in labour productivity to the macroeconomic goals. Students are expected to use ADAS analysis to explain the negative impacts of the fall in labour productivity.

## Suggested Answer

### Introduction:

- Clarify the meaning of labour productivity: Labour productivity is the measure of how much output is produced per unit of labour input.
- Clarify possible concerns of the government:
  - Comprise lack of ability to sustain economic growth, possible cost-push inflation, loss of economic competitiveness – inability to attract FDI and promote export price competitiveness, compromise ability to improve SOL in LR etc.

#### <u>Analysis:</u>

# AS effect

# 1. Fall in actual growth

Fall in labour productivity implies a fall in output per unit worker. Assuming wage growth remains unchanged, firms will need to hire more workers to produce the same amount of output  $\rightarrow$  Rise in unit-labour costs  $\rightarrow$  Increase in cost of production (COP)  $\rightarrow$  Decreases AS, shifting AS curve upwards from AS<sub>0</sub> to AS<sub>1</sub>. See Figure 1 below.



The upward shift in AS curve results in a fall in RNY from  $Y_0$  to  $Y_1$ , moving economy further away from Yf, resulting in a fall in actual growth.

#### 2. Cost-push inflation

Due to the increase in COP, firms cut back on production at each and every price level to maintain profitability. Hence AS shifts upwards. At the same time, firms also pass on the increase in COP to consumers through increase general price level (GPL). The increase in GPL (from  $P_0$  to  $P_1$ ) will cause real national income (RNY) to fall (from  $Y_0$  to  $Y_1$ ) because spending for goods and services will fall due to the wealth, interest rate and international trade effects (and this is represented by a movement along the AD curve). If workers expect prices to continue to increase, they will demand for higher nominal wages to maintain their purchasing power, and this will cause a further rise in the costs of production. This is reflected by a further upward shift of the AS curve from AS<sub>1</sub> to AS<sub>2</sub>. As a result, the general price level will increase further from  $P_1$  to  $P_2$ , resulting in higher cost-push inflationary pressures. See Fig 1 above

#### [Exemplify with contextual examples]

In labour scarce countries, like Singapore, wage-push induced cost-push inflation can have a severe impact on its economy, especially in the current (2022) elevated inflationary environment with wage-push inflation exacerbating inflationary pressures.

#### 3. Fall in potential growth or negative potential growth

A lower labour productivity can also result in a fall in a country's productive capacity in a few ways. When the output per unit of labour falls, each worker's capacity to produce can be argued to fall and hence lower the productive capacity of the economy (due to fall in quality of labour)  $\rightarrow$  Leftward shift of AS curve from AS<sub>0</sub> to AS<sub>1</sub>. Due to the fall in productive capacity, there is a fall in a country's ability to produce goods and services  $\rightarrow$  Fall in potential growth or negative potential growth from Y<sub>f0</sub> to Y<sub>f1</sub>. See Figure 2 below.



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4. Fall in standard of living (SOL)

For economic growth to translate into rising wages and standard of living standards, labour productivity growth is critical. As output per worker grows, it will be easier for wages to grow as well. If labour productivity falls, wage growth tend to slow in order to keep down unit labour costs, and the average citizen in the country will find it harder to achieve a wage growth that enables them to consume goods and services that matches their aspirations. Further, as explained previously, a fall in labour productivity that reduces actual growth and causes RNY to fall, can in the short-run, compromise current material SOL, as real GDP per capita falls, assuming population size remains unchanged. In the long run, with a fall in potential growth, the ability of a country to produce goods and services for consumption in the future will also fall, resulting in a fall in future material SOL.

[Students may also consider non-material SOL effects]

#### AD effect

A fall in labour productivity that raises COP & GPL can result in a loss of export competitiveness due to higher relative inflation. In the longer term, as the country's goods and services see increase in prices faster than their trade competitors, foreign consumers will switch to other cheaper imports or their domestic goods/services while local consumers will switch to imports  $\rightarrow$  Fall in X - M, AD - leftward shift in AD curve from AD<sub>1</sub> to AD<sub>2</sub> (see Figure 2 below), causing a more than proportionate fall in RNY (more than proportionately due to reverse k effect).

[Students may also consider the fall in I, particularly the fall in FDI as foreign firms invest in other countries with higher labour productivity]

#### • [Briefly explain the reverse k effect]

The multiplier works on the principle that one man's lack of spending is another man's loss of income, the initial fall in autonomous AD due to the fall in X-M will lead to many rounds of lower induced consumption, causing multiple leftwards shift of AD curve from AD<sub>1</sub> to AD<sub>2</sub>, hence resulting in a more than proportionate fall in real national income from  $Y_1$  to  $Y_2$ , and a fall in actual growth due to a fall in utilisation of resources as the economy moves further away from the full employment level of output,  $Y_f$ . Hence economy experiences a lower rate of economic growth and a fall in actual growth. See Figure 3 below.



## Conclusion

Given the wide-ranging adverse effects of a fall in labour productivity on the economy, it is important that a government takes appropriate policy measures to boost labour productivity in the country through measures such as upgrading the skills of workers while promoting greater automation and innovation for firms.

Knowledge, Application, Understanding, Analysis					
L1	<ul> <li>Lack of economic framework in analysis</li> <li>Irrelevancies in explanation</li> <li>Substantial and glaring conceptual errors</li> <li>Mere listing of points</li> </ul>	1– 4			
L2	<ul> <li>Good use of economic analysis in the explanation of the fall in labour productivity</li> <li>Lacks scope in analysis: Considers only AD or AS effects, limited range of analysis of economic effects, eg. Considers only SOL effects</li> <li>Lacks depth in analysis: no or poor use of diagram(s), with lapses in analysis.</li> </ul>	5 - 7			
L3	<ul> <li>A well-developed answer that demonstrates:         <ul> <li>Good scope of analysis:</li> <li>Able to consider the AD and AS effects from a fall in labour productivity</li> <li>Able to consider a good range of economic effects: eg. relevant macro aims, SOL</li> <li>Good depth of analysis: able to provide a well-structured, coherent and rigorous analysis, well-supported with AD-AS diagrams, exemplification with appropriate contextual examples</li> </ul> </li> </ul>	8- 10			

# **Marks Scheme**

## Examiners' comments:

- This question is not a difficult question; yet, not many scored well for this question.
- Students should recognise that when labour productivity falls, students should prioritise explaining the AS effect and hence the likelihood of cost-push inflation in their analysis. This is because, the AS effect is the direct or primary impact on the economy when labour productivity falls.
- Weak responses fail to link analysis to macro goals and explain the impact on RNY and GPL

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Errors in understanding:

- Fall in AS result in a movement along the AD curve rather than a shift; a fall in AS curve does not trigger the reverse multiplier effect.
- Fall in labour productivity does not mean a lack of spare capacity; spare capacity refers to the large pool of idle resources that is not engaged in production of goods and services.
- When workers become unemployed, income falls. However, the fall in income does not lead to a fall in autonomous consumption. This is incorrect. Autonomous consumption changes due to non-income factors for example, consumer confidence, interest rates, expectation of future prices. To improve, students can instead explain that workers expect lower future incomes, pessimistic about future of economy -> fall in consumer confidence -> fall in autonomous consumption.

Gaps in analysis:

- Many did not explain why COP increase or why productive capacity falls but just stating it
- When linking the impact of the fall in labour productivity to fall in material SOL, students should explain via the fall in RNY and state the assumption of population changes.
- Many did not explain why GPL increase. Students should provide an explanation why GPL increase to support the rigour in analysis.

# (b) Evaluate whether policies to increase labour productivity would improve the standard of living of a country. [15]

#### Approach:

Students are expected to explain how policies to increase labour productivity can improve standard of living (in terms of material SOL and non-material SOL). Students should also explain the limitations of the policies to improve SOL. Stronger scripts would explain how the policies increase labour productivity first before going on to explain how the polices to increase labour productivity improve or may not improve SOL.

#### Suggested Answer

#### Introduction:

Supply-side policies to improve labour productivity include subsidies for education and training and grants to incentivise firms to innovate and adopt automation technologies can help to improve material and non-material standard of living (SOL). However, such policies also have its limitations.

THESIS: Education and Training + Grants to encourage greater adoption of automation and innovation to increase labour productivity can improve both material and non-material SOL [discuss separately]

## Explain how the use of subsidies to encourage education and training increase labour productivity

• Subsidies are provided to encourage workers to attend courses to upgrade or pick up new skills under the SkillsFuture programme. For example, workers can attend heavily subsidised IT training

programmes to help them pick up basic IT and computing skills. This will allow each worker to increase his output level when they are able to harness technology, leading to increase in labour productivity.

OR

- Education and training such as the Career Conversion Programme (CCP) where the government offers course fee subsidies and salary support to help reskill Singaporeans to allow them to develop new capabilities to take on jobs in growth areas or redesigned job roles that increase efficiency at work. Through job shadowing, training and industry attachment, mid-career individuals can move into new occupations or sectors that have good prospects & opportunities for progression. This will allow each worker to increase his output level when they are able to harness technology, leading to increase in labour productivity.
- Given the context of rapid technological changes, such education and training programmes or schemes become ever more necessary. This helps workers to smoothen the transition process to other industries away from industries where their skills have become obsolete or redundant due to technological advancement and also better cope with the evolving nature and skills required in their current job in light of technological shifts
- [Link] Overtime, workers will be able to gain new skills and knowledge and improve efficiency at work -> CCP increases the quality and quantity of productive labour -> Assuming these policies are successful and effective, there will be an improvement in labour productivity in our workforce.

# Explain how grants to incentivise firms to innovate and adopt automation technologies increase labour productivity

- Government R&D grants can encourage producers to undertake R&D and adopt automation technologies and innovate.
- R&D and innovation carries significant risks and uncertainty about the outcome -> the cost of failure may also be too high for smaller producers to bear -> unfeasible for small producers to carry out such R&D at scale and adopt automation technologies
- By sharing the cost of R&D efforts and the high adoption cost of automation technologies, firms (especially smaller firms) are more willing and able to adopt automation technologies and undertake innovation efforts to improve efficiency in production.
- Successful R&D efforts leading to technological breakthroughs and greater adoption of automation technologies help raise labour productivity as workers can be off-loaded from more laborious, mundane and simple tasks to perform more complex tasks and generate more output with the help of automation technologies per time period.
- Such automation technologies help to improve labour productivity and output by minimising defects in products arising from human error and also allow workers to perform multiple tasks simultaneously
- Workers are also able to use more efficient and productive capital equipment to produce output in a more efficient manner.

# Other policies outside of preamble that can be considered:

#### Welcoming of foreign talents -> relaxation of foreign worker quota -> Improve labour productivity

• Relaxation of foreign worker quota allow employers to bring in more foreign talents into Singapore (this can be justified particular in times of a manpower shortage due to the lack of specific skillsets in the labour force)

- Given that time is required to train local workers to be equipped with the right skills and knowledge especially when the conditions of the workplace has evolved due to technology advancement, employers need to hire foreign talent to supplement the workforce in Singapore for example
- This is also prevalent in the case of senior level positions in many MNCs based in Singapore where many positions are filled by foreign talents [lack of such profile of candidates in Singapore available to take on senior and leadership roles necessitates employers to employ foreign talent who can be more experienced given our small talent pool]
- Through collaboration and projects with the firm, foreign talents and local workers can assimilate new knowledge and learn best practices from each other => Improve labour productivity as locals can learn new knowledge and gain experience by working alongside these foreign talents

# Explain how policies to increase labour productivity improve material and non-material SOL

## AS effects

- The increase in labour productivity from both Education and training and the greater push for more innovation and the adoption of automation technologies help to lower unit cost of production (COP) as for the same level of output, firms produced with less resources, assume the increase in labour productivity is greater than the increase in wages -> Downward shift of the AS curve.
- Improvement in labour productivity also help to improve the overall quality of the workforce as the workforce become more skillful and more knowledgeable -> Increase in productivity capacity -> Outward shift of the AS curve -> Higher potential economic growth (Y<sub>F0</sub> to Y<sub>F1</sub>)
- [Link to material SOL] The increase in AS, holding AD constant, would result in the increase in real national income (RNY). This can improve material SOL because higher real national incomes (Y<sub>0</sub> to Y<sub>1</sub>) [refer to Figure 4] improve households' ability to purchase more goods and services, improve housing and education, given that GPL fell from P<sub>0</sub> to P<sub>1</sub>. Assuming population remain unchanged, a rise in RNY over time indicates presumably higher material SOL because of the greater output of goods and services available for consumption.



OR

#### AD effects

• With higher labour productivity, foreign direct investors (especially MNCs requiring high skilled workers) will be more willing to invest in Singapore as they are able to produce more output with a given number of resources, given that labour is now more skilled and efficient

- Increases the expected profitability from investment which increases FDI inflow -> Increase in AD due to FDI inflow will lead to an increase in AD -> Multiplied rise in RNY through the multiplier process, resulting in higher actual economic growth of Singapore
- [Link to material SOL: mSOL] The increase in AD, holding AS constant, would result in the increase in real national income. This can improve <u>material</u> SOL because higher real national incomes (Y<sub>0</sub> to Y<sub>1</sub>) [refer to Figure 5] improve households' ability to purchase more goods and services, improve housing and education. Assuming population remain unchanged, a rise in RNY over time indicates presumably higher material SOL because of the greater output of goods and services available for consumption.

[Extension] The subsequent increase in capital stock and FDI attracted due to improvement in labour productivity will further increase the AS in the long run as there are more spending on capital goods -> Increase quantity and quality of FOP -> Increase productive capacity



# [Link to non-material SOL]

- Education and training when targeted to help specific low-income groups or occupations with poorer wage and career progression can also help to improve income mobility of lower income groups where they could move to higher skilled jobs that are paid with higher wages and thus narrow income disparity.
- Consumers are also more able to indulge in leisure activities to improve their non-material SOL as RNY improves
- Higher labour productivity may also increase the work-life balance of workers in Singapore. If more output can be produced with the same amount of labour hours, workers in Singapore may be able to work less hours and have more leisure time to spend with their family, increasing their non-material SOL

# ANTI-THESIS: Policies to increase labour productivity may not help to improve SOL

# Explain how Education and Training may not improve SOL

- The success of Education and Training depends on the receptivity and abilities of workers to retain and be equipped with the knowledge and skills
- Workers may lack the receptivity and attitude to attend such training if workers see no point in the success of such programmes in improving labour productivity or allowing them to obtain better job prospects [this can be due to the lack of good paying jobs for locals / poor implementation of programmes / high opportunity costs of attending such training as they may lose part-time supplementary income if they attend such training]
- Depending on the literacy and education level of the population, countries whose population possess a poorer literacy and education level, may require a longer time to be trained
- Firms may be reluctant to send workers for training as workers may be temporarily out of work if they undergo full-time training and hence negatively affecting labour productively levels of the firm (Remaining workers may become overworked, stretched and struggle to cope with multiple roles on top of their existing duties)

[Link to SOL] Increase in labour productivity may not necessarily be achieved or achieved to a limited extent -> Inability to attract FDI to the country to provide good employment opportunities for locals to get better paying jobs -> RNY may not necessarily improve or may even fall if over time, poor improvement in labour productivity may lead to FDI outflow to other countries (stagnation or decline of mSOL)

# Explain how grants to incentivise firms to innovate and adopt automation technologies may not improve SOL

- Rapid adoption of automation labour-saving technology can lead to the retrenchment (displacement) of unwanted workers as the tasks are now performed by automation technology -> Firms are then incentivise to utilise less labour so as to "economise" on the use of labour, which can be relatively more expensive than capital
- Automation technology has led to the skills possess by the retrenched obsolete
- If the skills set of the retrenched are not transferable or they lack the necessary skills in other industries, the mismatch of skills between the retrenched and the employers in other sectors will lead to structural unemployment
- If the retrenched become out of employment for a long duration, hysteresis can occur where workers become demoralise and lose their skills -> Worsening structural unemployment

*[Link to SOL]* The increase in structural unemployment can lead to significant loss of one's income assuming no unemployment benefits. Such consumers are unable to consume goods and services with their given fall in income and would have to draw down on their savings to meet ends meet. Overall, there would be a fall in material SOL for the unemployed. The stress from prolonged unemployment also results in poor mental health and well-being -> Fall in non-material SOL

## Effects of either of the policies to increase higher labour productivity -> May not improve nonmaterial SOL due to negative externality in production

- If higher labour productivity is achieved by greater use of physical capital that emit negative externalities in production, there could be more noise and air pollution which worsens the non-material aspect of SOL.
- Health of the workers may also deteriorate due to rise in stress levels as they could be working harder in the same amount of time in order to be efficient -> Can contribute to a fall in non-material SOL.

## **Reasoned Conclusion**

- In conclusion, policies to increase labour productivity play an important role in improving SOL in the context of Singapore in the long run given the characteristics of the Singapore economy where labour resource is scarce and FDI takes up a large proportion of investment expenditure. Moreover, since Singapore is not a welfare state, workers do need to depend largely on their income levels to maintain and improve their SOL over time. In order to see an improvement in one's SOL, real income needs to increase and wage growth is directly related with labour productivity improvements.
- Whether higher labour productivity is able to improve SOL in Singapore depends on whether there are adequate employment opportunities for workers. If there is a lack of employment opportunities

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here in Singapore, improved labour productivity amongst workers can help to improve the wages of existing workers but may not be the case for jobseekers.

- In addition, SOL in Singapore may also not increase as much if other economies are able to attract FDIs away from Singapore when their productivity rates are relatively higher.
- To minimise large scale labour displacement due to the automation technology in the short-term, the implementation of automation technology can be implemented in stages to buy some time for workers skillsets to be upgraded to take on more productive roles.

#### Marks Scheme

Knowledge, Application, Understanding, Analysis			
L1	- Superficial answer th	hat lacks depth: No/Very limited use of economic framework	1 – 4
	and concepts		
	- Briefly explain the p	olicies to improve labour productivity and not address how	
	Increase in labour pr	roductivity improves SOL	
	- Explain policies that	are not related to improvement in labour productivity	
L2	<ul> <li>Balanced answer: Discussion shows how <u>1</u> policy to improve labour produce</li> </ul>		5 - 7
	can improve SOL ar	nd also may not improve SOL	
	- Scope: Discussion o	Scope: Discussion covers <i>either</i> material or non-material SOI	
	<ul> <li>Depth: Employs goo</li> </ul>	Depth: Employs good use of the AD-AS framework and/or relevant concepts to	
	explain how labour p	productivity helps to improve SOL	
13	Well-balanced response: Discussion shows how <b>two</b> policies to improve labour		8 - 10
20	productivity can imp	productivity can improve SOL and also may not improve SOL	
	- Good scope: Discus	Good scope: Discussion covers both material and non-material SOL	
	- Contextualising argu	uments and analysis to Singapore or other countries are	
	demonstrated well.		
Evaluation			
E1	- An attempt at judger	ment but not explained.	1
E2	- Judgement that an	nswers the question with some attempt at justification.	2-3
	Justification is incom	nplete or weak.	
E3	- Judgement that an	nswers the question with well-elaborated and insightful	4-5
	justification.		

#### Examiners' comments:

- Generally, there is good scope in the coverage of both material and non-material SOL across most scripts. However, there could be stronger links and elaboration made about the indicator of SOL.
   For example, many scripts simply wrote that when ability to spend on healthcare increases, nonmaterial SOL rises. This could be developed to explain how when one is able to seek medical help when sick, the quality of life increases.
- Weak scripts did not use the ADAS framework in their analysis to explain the link to SOL and were hence descriptive in their responses.
  - For example: "Improve labour productivity allows workers to command higher wages and hence increase in their ability to consume more goods and services -> higher mSOL"
- A handful did not contextualise the policies and provide a specific example of the policy discussed.

- A handful did not explain how the policies help to improve labour productivity but jump straight to explaining the impact of the increase in labour productivity. This is especially the case for the policy on the push towards adopting automation technologies.
- While the preamble is helpful to guide students on relevant policies that they can discuss, some students choose to discuss other policies. Some policies were appropriate for the question while others were not. Students need to be careful with the choice of policies that they choose to answer the question. This question requires students to select policies that improve labour productivity but not other policies that could also improve SOL. Thus, explaining how the policies help to increase labour productivity become quite important to show relevance of the policies to the question.
  - Policies that demonstrate weak interpretation and relevance to the question include minimum wage, tariffs, cash transfers to consumers, decrease income tax, decrease corporate tax.
  - So long as students do not show reference to how such a policy can directly raise labour productivity, there will not be credit given to development of the policy.
  - For the policy on relaxation of the foreign worker quota, students should be sharp to explain that we are referring to specifically foreign talent (ie. High-skilled labour). This is because the inflow of foreign talent can help to improve labour productivity rather than low-skilled workers.

Errors in understanding:

• A similar mistake is made in the link to the increase in autonomous consumption and hence AD during the explanation of how the policies improve mSOL. [refer to part a examiners' comments for the explanation]

Gaps in analysis:

- Many scripts explained the anti-thesis in a very brief fashion, and some not tied back to how SOL could be negative affected.
  - For example: Students state that the effectiveness of Education and Training depends on the receptiveness of workers without explaining why workers might not be receptive.
- In explaining the adoption of automation technologies, some students explain the increase in I and hence AD with no reference to the improvement in labour productivity. While the effect on the increase in I is correct, students should pay attention to the phrasing of the question and first explain how labour productivity can increase to show policy relevance to the question.

\*\*\*\*\*\***END**\*\*\*\*\*\*

"Learn from yesterday. Live for today. Hope for tomorrow." ~ Albert Einstein