H2 ECONOMICS – PROMOTIONAL EXAM 2018 QP

Section A: Case Study Question [30m]

Economic developments in Singapore and China

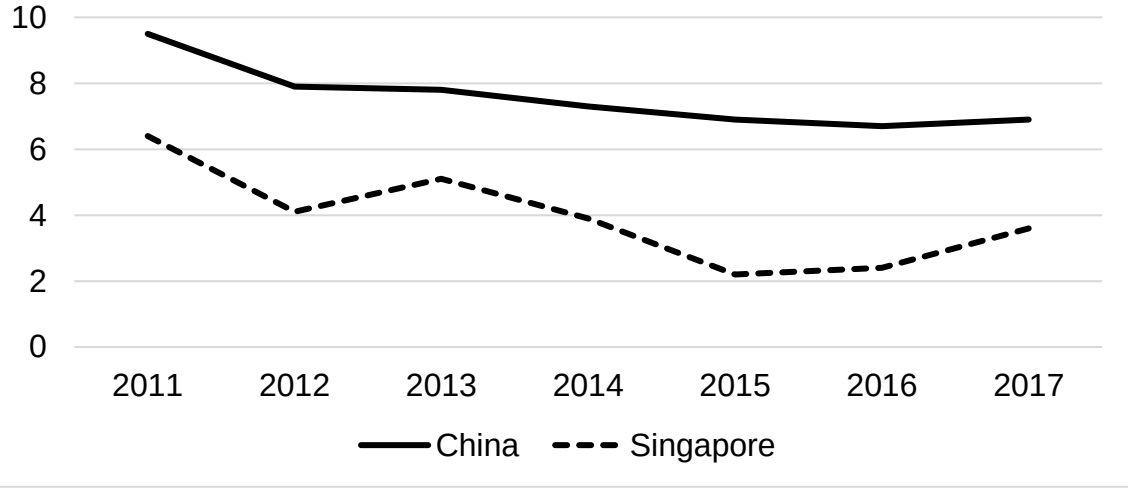
Extract 1: Breaking Singapore's record streak of negative inflation

After a record 24 straight months of negative readings, consumer prices in Singapore have finally stopped falling. The latest reading, which was in line with analysts' expectations, officially put an end to Singapore's longest period of negative price growth.

The rise in prices of consumer goods & services has been partly attributed to production inputs becoming more expensive in recent times. UOB economist Francis Tan also described the non-negative reading in November as an "important milestone", which may indicate "some uplift in global demand".

Source: *Channel NewsAsia*, 29 December 2016

Chart 1: GDP growth at 2010 prices (annual % change)



Source: *World Bank*

Extract 2: Higher expectations for Singapore's 2017 growth

Singapore's economy this year is likely to clock its fastest growth rate in three years as global growth strengthens considerably, according to gross domestic product (GDP) growth data released by the city-state's Ministry of Trade and Industry (MTI) on Thursday.

Notably, trade promotion agency International Enterprise (IE) Singapore on Thursday upgraded its non-oil domestic export (NODX) growth forecast for 2017 considerably. It was previously at 0 to 2 percent; now it's lifted to 4 to 6 percent. This brighter external outlook results from an expected stronger pace of growth in the United States and key Southeast Asian economies.

Source: *The Business Times*, 26 May 2017

Extract 3: China's economic success

China has lifted more people out of poverty than anywhere else in the world: its average income per person increased fivefold between 1990 and 2000, from $200 to $1,000. Between 2000 and 2010, average income per person also rose by the same rate, from $1,000 to $5,000, moving China into the ranks of middle-income countries. This incredible success in uplifting people from poverty was delivered by a protracted period of economic growth and a series of government transfers.

The question now is whether the government can repeat this success and eradicate extreme poverty entirely: after all, up to one person in ten in the country remains poor. The current economic and social five-year plan aims to eliminate all poverty by 2020, and it seems likely that this target will be reiterated in the new five-year plan to be agreed by the Chinese Communist party's central committee next year.

Economic growth will of course also need to be the sustainable kind with lower carbon emissions – no small order for a country where air pollution kills an estimated 4,000 people a day.

Source: *The Guardian*, 19 August 2015

Extract 4: Pollution crisis is choking the Chinese economy

On a Tuesday afternoon, thick white steam billows from glass factories scattered across Shahe, an industrial town in Hebei, China's most polluted province. As in many other factory towns in the country's industrial heartland, the mills that run 24 hours a day have created jobs and boosted government revenue but have also caused serious environmental problems.

Air pollution is clearly very costly to its $11-trillion-plus economy. It reduces China's GDP by about 6.5 percent annually, according to estimates. "Sick days and hospital visits all take a toll on the urban economy," said Anders Hove, associate director of research at the Paulson Institute. High levels of pollution are linked to serious chronic illnesses, like heart disease and lung cancer, which are costly to treat.

Sources: *CNBC*, 16 February 2016; and *South China Morning Post*, 21 September 2017

Extract 5: Are China's new green taxes tough enough to fight pollution?

As China prepares to impose new levies on the discharge of industrial pollutants, environmentalists say the system needs tougher tax rates and more stringent monitoring to deter the country's polluters.

Analysts say that the tax rates are unlikely to be harsh enough to force factories to invest in equipment or new processes to control emissions – as the government hopes. The effectiveness of the environmental tax also depends on the accuracy and authenticity of pollution data, analysts said. The environmental tax law states that enterprises submit tax reports every quarter based on the emission levels recorded with their own monitoring devices.

Source: *South China Morning Post*, 16 December 2017

Extract 6: Carbon tax on greenhouse gas emissions to be levied in Singapore

All facilities producing 25,000 tonnes or more of greenhouse gas emissions in a year will have to pay a carbon tax from 2020, Finance Minister Heng Swee Keat announced on Monday. The carbon tax will initially be $5 per tonne of greenhouse gas emissions from 2019 to 2023. However, the Government will review the carbon tax rate by 2023, with plans to increase it to between $10 and $15 per tonne of emissions by 2030. The finance minister said the Government expects to collect a carbon tax revenue of nearly $1 billion over the first five years, and is prepared to spend more than this in the same period to fund research & development in cleaner production methods.

For households, the impact of the carbon tax will be small, at "about 1 percent of total electricity and gas expenses on average", Mr Heng said. Two companies that will be affected by the new tax expressed reservations about it. A spokesman for ExxonMobil Singapore said the petrochemical firm was committed to working with the Government to reduce the risks of climate change but added that "affordable energy" was important to support economic growth and ensure Singapore's competitiveness.

Adapted from *The Straits Times*, 19 February 2018

Questions

(a) Explain one cause of inflationary pressure experienced by Singapore in November 2016. [2]

Note: This is under the topic of Inflation/Deflation (Book 10) and is not included in the 2023 Promo exam.

(b) Compare the GDP growth rates of China and Singapore from 2011 to 2017. [2]

(c) With reference to the data, explain the reason for the change in Singapore's GDP in 2017. [4]

(d) Economic growth in China has "created jobs and boosted government revenue but has also caused serious environmental problems" (Extract 4).

Discuss whether the Chinese government should always pursue higher rates of economic growth. [8]

Note: This is under Benefits and Costs of EG (Book 8 Section 5) and is not included in the 2023 Promo exam.

(e) (i) Explain how industrial air pollution may lead to market failure. [4]

(ii) With reference to the data, assess the measures that the governments of China and Singapore can adopt to tackle the above market failure. [10]

[Total: 30]

Section B: Essay Questions [50m]

Answer <u>two</u> questions.

1. **Be it for health, environmental or ethical concerns regarding the farming of animals, Americans' appetite for alternative meat made from plants is getting bigger than ever. At the same time, technological progress has made it more financially viable to produce such alternative meat.**

   Discuss the effects of the above developments on the market for plant-based alternative meat and on a related market in the United States. [25]

   *[**Note**: 25m single stem essay questions exist in the old syllabus, but not in the current syllabus, where essay questions come with two parts - part (a) carrying 10 marks and part (b) carrying 15 marks. That said, the content tested here is still relevant to your syllabus.]*

2. **Users of libraries such as the London Library in the United Kingdom and Folio: The Seattle Athenaeum in America are required to pay a fee to borrow books. On the other hand, library loan services in most countries such as Singapore are free.**

   Source: Various

   (a) **Explain why there is allocative inefficiency in the market for library loan services. [10]**

   (b) **Discuss whether offering free library loan services is the best way for a government to tackle this inefficiency. [15]**

3. The Singapore government has awarded two contracts worth S$1.16 billion for the construction of the North-South Corridor (NSC) tunnels. The NSC will be Singapore's eleventh expressway. It is expected to be completed in 2026.

   Source: Channel News Asia, 23 May 2018

   (a) **Explain the possible factors affecting the levels of autonomous consumption and investment in an economy. [10]**

   (b) **Discuss the impact of this rise in infrastructure spending by the Singapore government on the country's economic growth. [15]**

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H2 ECONOMICS – PROMOTIONAL EXAM 2018
SUGGESTED ANSWERS, MARK SCHEMES & MARKERS' COMMENTS

Section A: Case Study Question [30m]

(a) Explain one cause of inflationary pressure experienced by Singapore in November 2016. [2]

Note: This is under the topic of Inflation/Deflation (Book 10) and is not included in the 2023 Promo exam.

From Extract 1, production inputs have become more expensive, which leads to a **rise in unit cost of production** for firms in Singapore. [1]
This results in a **fall in aggregate supply** (upward shift of horizontal AS), and firms pass on the rise in unit cost through a higher general price level, resulting in cost-push inflation. [1]

OR

From Extract 1, there was an "uplift in global demand" which suggests a rise in demand for Singapore's exports. [1]
This results in a **rise in aggregate demand**. Assuming the Singapore economy was operating near full employment, this causes general price level to increase and thus demand-pull inflation. [1]

Markers' Comments:
Content:

- There were errors with regards to the terms 'marginal' and 'unit' cost of production. For the aggregate supply to fall it should be the '**unit** cost of production' that has increased.
- Students who explained the inflationary pressure arising via AD increasing i.e. due to "uplift of global demand", often attributed the factor as exports increasing, without explicitly mentioning export revenue or demand for exports rising.
- A significant number of students merely explained the inflationary pressure in a descriptive way (where firms pass on costs) instead of using the macroeconomic model ("AD-AS model; AS falling"). When unit cost of production increases, it should lead to a fall in AS. Often the link to the change in AS is not provided.
  This reference to AS has to be made because cost-push inflation is about increases in the general price level which is affected by changes in **aggregate supply**, where most if not all firms are lowering their supply.
- A handful of students confused upward shifts in the horizontal AS curve with AS increasing/rising, which is **wrong**.

Skill:

- Many students described the upward shift in the horizontal AS curve but missed out on explaining that AS has fallen/decreased.

(b) Compare the GDP growth rates of China and Singapore from 2011 to 2017. [2]

Both countries' growth rates decreased overall. [1]
OR
China's growth rate was higher than Singapore's throughout the period. [1]
OR
Both countries' growth rates were positive throughout. [1]

Markers' Comments:
Content:

- Some students mistook GDP growth rates as GDP levels, and proceeded to wrongly describe GDP growth rates as increasing at a decreasing rate.

Skill:

- There were a handful of students who did not compare, but merely described two separate trends for Singapore and China respectively. Take note of the command word! Students should make the comparison explicit, e.g. GDP growth rate for both countries decreased.
- There should also be reference to the time period of interest, e.g. GDP growth rate were positive throughout.
- In order to succinctly answer such trend questions, students should refrain from making comparisons for a very specific time period (e.g.: end of 2016) or unnecessarily quoting values from the chart.
- 'Fluctuations' is a vague term that students should not be using. Many students described China's GDP growth rate having more fluctuations than Singapore's GDP growth rate (and vice versa), which is not a significant point of comparison.
- Some students also compared the fall in GDP growth rates between China and Singapore, which is not answering the question.
- Some students wrote the "rate of change" of the GDP growth rates as a refinement, e.g. "GDP growth rate decreased at a decreasing rate". There is generally no need to describe the "rate of change" of a variable that is already in percentage as it is too complicated.

(c) With reference to the data, explain the reason for the change in Singapore's GDP in 2017. [4]

From Extract 2, the US and Southeast Asian countries experienced a rise in income in 2017. This raises the purchasing power of their consumers, leading to a rise in **demand** for Singapore's exports. [1]

As demand for Singapore's exports increases, planned export spending rises leading to an increase in AD. [1]

As AD rises, the total planned expenditure exceeds national output, causing an unplanned fall in firms' inventories. Firms would then respond by increasing their output. [1]

Thus, the rise in export revenue and AD leads to a multiplied rise in Singapore's GDP in 2017 via the multiplier effect. [1]

Markers' Comments:
Content:

- Many students wrote that because income of foreign trade partners increase and their purchasing power increased, SG's exports become relatively cheaper for the trade partners. But the price of exports did **not** change, so this is an erroneous link.
- For the point on 'rise in FDI' in SG, the explanation requires linking the expected stronger pace of growth in US/ SEA to a rise in expected rate of return of FDI in SG. A complete link requires acknowledgement that most MNCs produce in SG for export (which is why external DD affects MNCs' investment decisions in SG).
- The X component in the AD equation stands for export revenue. Many students merely reference a rise of exports which is incorrect because that suggests they are referring to export volume. Note that this is consistent with a rise in demand for exports since that would lead to a rise in both price and quantity, resulting in higher revenue.

Skill:

- For a 4m question that is about the reason (singular) for the rise in SG's GDP in 2017, explanation of only 1 factor would suffice. Identifying and explaining more than one factor will not earn additional marks. Learning point: READ the question carefully.
- Many students lost the last 2 marks as they did not explain / mention the multiplier effect / multiplied increase in Singapore's GDP. There were many who ended with saying AD has increased, but this does not fully answer the question on a change in **GDP**.
- Students tend to just lift the evidence from the extract (without quoting where the evidence came from), and **did not explain** the link between the evidence and the assertion, e.g. "consumption expenditure (C) has increased because of brighter external outlook from an expected stronger pace of growth in the United States and key Southeast Asian economies.". Students need to make clear links to their assertions when they bring in examples/evidences.
- Some students made reference to irrelevant evidence.

(d) Economic growth in China has "created jobs and boosted government revenue but has also caused serious environmental problems" (Extract 4).

Discuss whether the Chinese government should always pursue higher rates of economic growth. [8]

Note: This is under Benefits and Costs of EG (Book 8 Section 5) and is not included in the 2023 Promo exam.

Economic growth refers to increases in the real national output or national income of the country. A government tends to pursue higher rates of economic growth due to the benefits that it brings but there could also be costs involved with higher levels of economic activity.

Government should pursue higher rates of EG (Benefits)

[P] Higher rates of economic growth raises the welfare of society and can help lead to improved equity for the people.

[E,E] If economic growth exceeds population growth and inflation, it will lead to higher real income per capita. This will lead to higher levels of consumption of goods and services as households' purchasing power increases. Since the individual's material well-being is positively related to the level of consumption, higher rates of economic growth provides an obvious gain to households' material standard of living. This can be seen in China where the higher rates of economic growth (Ext. 3) has "lifted more people out of poverty than anywhere else in the world" and "moving China into the ranks of middle-income countries."

[E,E] When the Chinese government pursues higher rates of actual growth, more factors of production such as labour would likely have been employed to produce the increase in national output. If this growth is pursued via increases in AD, this will lead to a multiplier effect. This creates more jobs with every round of the multiplier (i.e. increased spending by households). With more jobs created (Ext. 4) and people being employed, these citizens will earn higher income, leading to improvement in material standard of living.

[E,E] The higher economic activity will also lead to an increase in government tax revenue through corporate tax, sales tax, income tax, stamp duty and various other sources of revenue for the Chinese government (Ext. 4). For example, even if income tax rates remain the same, households earning more income will pay more in taxes. This increase in government revenue enables the

government to increase spending on public goods, merit goods and other aspects that will increase the standard of living of citizens and resolve inequity issues in the country.

Government should not pursue higher rates of EG (Costs)

[P] The pursuit of higher economic growth leads to environmental costs for the people.

[E,E] The more rapid the economic growth, the more waste the environment must absorb as producers in the pursuit of self-interest will ignore the externalities that result from higher levels of production. Production of goods with the use of coal or fossil fuels as energy emits carbon and particle matter into the environment that harm the health of the people in the country. This higher level of pollution that arises from higher economic activity is "linked to serious chronic illnesses, like heart disease and lung cancer, which are costly to treat" (Ext. 4) in China. The air pollution is also estimated to kill 4,000 people a day in the country (Ext. 3). All of these will result in a decrease in the welfare of society as a whole.

Conclusion

[Stand] The Chinese government should not always pursue higher rates of economic growth.
As discussed, even though higher rates of economic growth could bring about considerable benefits to the economy, significant costs that outweigh the benefits could be incurred as well.
[Substantiation] Whether benefits of higher rates of economic growth outweigh the costs depends on various factors such as the level of economic development/poverty or ability of the government to control the negative impact from it. Given the already relatively high economic development in China, the seriousness of the pollution generated by the economic activities is likely to result in the potential costs of higher rates outweighing any potential benefits. As per capita income rises and reaches a level where basic needs are already met (China has reached middle income level – Extract 3), the MB of having additional income begins to be seen as lower than the MC of a deteriorating quality of the environment. As such, the Chinese government should pursue other objectives that will increase the welfare of the people instead.

Level	Descriptor	Marks
L1	Some knowledge of the benefits and costs of EG, or descriptive explanation of the benefits and costs. One-sided answer that only explains the benefits or costs of economic growth.	1 – 3m
L2	Analytical and accurate explanation of the benefits and costs of EG. Answer is applied to China's context, with reference to case evidence.	4 – 6m
E	Evaluative comments on the significance of benefits/costs of EG, and considers factors by which a judgement can be made.	1 – 2m

Markers' Comments:
Content:

- Some students explained that EG leads to an increase in income which will encourage consumption and increase AD, causing AD to shift right, which is **incorrect**. Economic growth

usually results from increase in AD. Also, such an argument does **not** even answer the question! The question is not on how to achieve higher growth but why countries want to achieve higher growth.

- Many students seem to have confused economic growth with increase in AD, resulting in them explaining the benefits and costs of AD increasing instead. This is **incorrect**. Economic growth would mean that there is an increase in real national output (or income). Therefore, students should be explaining the benefits and costs of this happening.
- Students explained that the creation of jobs will lead to an increase in the quantity of labour, therefore increasing productive capacity. This is **wrong**. The total quantity of labour available in a country has not changed; with more jobs created, it just means more of the available labour is now employed.
- Students know that pollution comes about when there is higher economic growth but very few managed to explain why this is so. Just stating that higher economic activity leads to more production and thus greater pollution is insufficient.

Skill:

- Higher (change in level) is not the same as high (level) of economic growth (which implies positive actual growth). The question is asking if the government should accelerate the rate of growth. This nuance was missing from most of the answers.
- Many students did not refer to the case extracts, and instead regurgitated the points from the lecture notes (without proper explanation / analysis).
- For those who did make reference, many just lifted from the extracts without any explanation. There is a need to explain e.g. why/how economic growth led to increase in government revenue or created jobs. Do not just copy from the extracts and take it as a given!
- Many students hijacked the question and organized their answer as "Govt should pursue sustainable growth because..." or "Govt should pursue inclusive growth because..." instead of using the thesis-antithesis-synthesis framework to decide if "Govt should/should not always pursue higher rates of economic growth because...". Explaining different measures to attain EG is also irrelevant to the question. Students need to learn how to accurately interpret the requirement of the question rather than create their own.
- Thus, students should always attempt to answer the question directly in their conclusion (whether the government should <u>always</u> pursue higher rates of economic growth). The subsequent substantiation would be further strengthened with a more in-depth weighing of benefits against costs, instead of merely stating that the government should carry out some form of cost-benefit analysis.
- Pointing out and explaining that there are costs in the pursuit of growth is part of the anti-thesis section of the answer. Thus, arguing that China should therefore not pursue high growth due to these costs is too simplistic. Rejecting an activity/policy just because it has costs shows poor economic thinking because rational decision making requires comparison of costs vis-a-vis the benefits.

(e) (i) Explain how industrial air pollution may lead to market failure. [4]

Industrial air pollution leads to a negative externality problem, where there is an external cost on third parties not involved in the production and consumption of the industrial good. For example, residents living near these factories may experience harmful health effects arising from breathing polluted air thus incurring higher medical costs. (Ext. 4). [1] (*application of negative externality concept to context*)

Due to the marginal external cost (MEC) resulting from the negative externality, the marginal social cost (MSC) of industrial production is higher than the marginal private costs (MPC). [1]

Being self-interested, industrial firms would disregard the MEC and instead only consider their own marginal private benefits (MPB) and MPC to maximise net private benefit. [1] The free market output

level would be determined by the intersection of demand and supply, where MPB=MPC. However, the socially optimal level of output is lower, where MSB=MSC. [1] (*explaining free market vs socially optimal output*)

Thus, a problem of overproduction arises, leading to welfare loss as the total social cost of producing the additional units is greater than the total social benefit OR MSC > MSB for each of the additional units that were over-produced. [1]

Alternative answer that does not require reference to a diagram:

Industrial air pollution results in negative externalities in the form of adverse effects of pollution borne by third parties e.g. respiratory problems and hence additional health costs for residents in the vicinity. [1]
However, this MEC is disregarded in profit-maximisation decision making by firms. [1]
This means SS by firms is based only on MPC leading to price signals becoming distorted – i.e. doesn't indicate MSC. [1]
The distorted price signals lead to overproduction and hence welfare loss because the MSC < MSB of those additional units. [1]

Markers' Comments:
Content:

- Some students drew a diagram for this question but labelled the x-axis as "Quantity of industrial air pollution". This is **wrong** as there can never be a market for air pollution since no one will be interested in buying it! The market here is for industrial goods and the pollution is a cost associated with the production of these goods.
- There was a significant portion of students who said that air pollution is the negative externality. This is **not correct**. Negative externality is the external cost on third parties itself that is brought about because of the pollution.
- Many students cannot identify the correct area of welfare loss on the diagram despite being able to say that "between Q and Q*, MSC>MSB". Students need to have a deeper understanding of the concepts.
- In the explanation of why the market equilibrium output (Q) is higher than the social equilibrium output (Q*), it was quite common to find answers that said that firms aim to maximise 'net profit'. This is wrong. Profit is already in 'net' terms. What firms aim to maximise is **total profits** which is total revenue minus total cost.
- Firms indeed aim to produce where MPB = MPC in their pursuit of total profits maximisation but this sentence alone is inadequate to explain how the market equilibrium quantity is determined. The MPB of production for firms is the MR or price offered by consumers. This is given by the demand curve since rational consumers are willing to pay as high as the MPB they derive from consuming the good. For *any given price offered*, firms will produce up to the point where MPB = MPC which explains why the entire MPC curve is the SS curve of the firms. The interaction of DD and SS determines the market equilibrium.

Skill:

- Students need to be more precise with terminology, e.g. this is a case of over**production** rather than overconsumption**,** instead of regurgitating from notes without considering the context. The question is about 'industrial air pollution' which is pollution from production. Thus, the problem of the market failure is from the production side of the market.
- A purely theoretical answer will not be awarded full marks. For example, the spillover costs to third party must be explained with reference to the extract.

(ii) With reference to the data, assess the measures that the governments of China and Singapore can adopt to tackle the above market failure. [10]

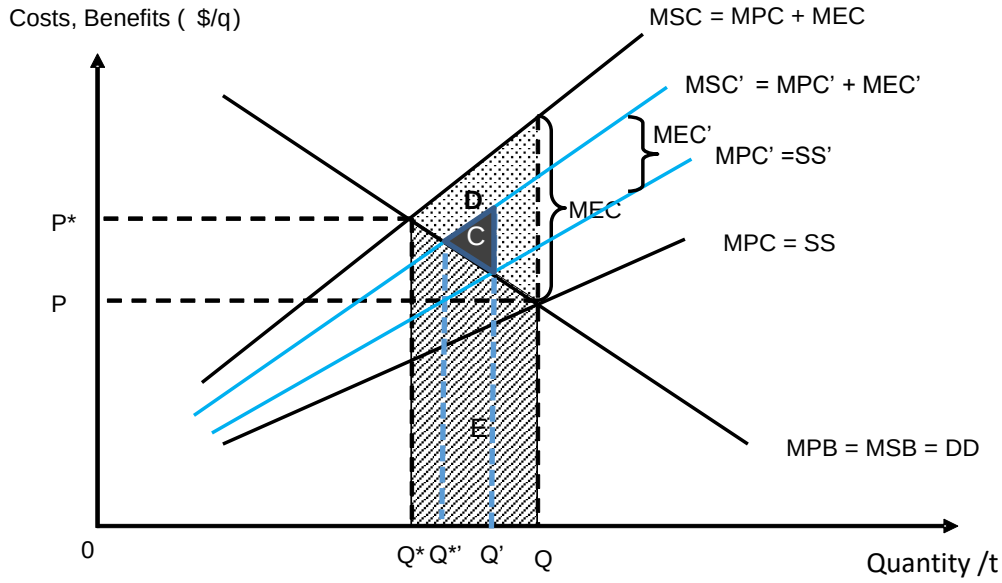
Introduction

To address the market failure arising from industrial air pollution, the governments of China and Singapore have adopted the policies of a pollution tax and grants for R&D for cleaner production methods as described in the extracts.

Body - Pollution Tax

[P] The governments of China and Singapore can implement a pollution tax to tackle the inefficiency arising from industrial air pollution (Ext. 5 & 6).

[E,E] A pollution tax is a compulsory levy imposed on producers, where firms have to pay the government a fixed fee per unit of pollution generated. The tax is aimed at encouraging firms to install equipment that reduces carbon emissions or to utilise cleaner production methods (Ext 5). With this tax, rational firms will choose to lower pollution if the marginal benefit of lowering pollution (which is avoiding having to pay the pollution tax) outweighs the marginal cost of lowering pollution (e.g. installing equipment to reduce emissions). With the reduction of pollution emitted, the extent of the negative impact on third parties is reduced from MEC to MEC'. This would result in lesser welfare loss to society from area D and area C, resulting in an improvement in allocative efficiency. If the firms choose to pay the tax, their cost of production will rise and as profits decrease, they will also end up cutting back production. This will also lower the levels of pollution in society and result in a more efficient allocation of resources.



[Eval] However, to be effective, the pollution tax requires accurate information on the level of pollution on which to base the tax amount on. If the reported pollution level from industries is lower than the actual, the pollution tax levied will be lower and firms may not be sufficiently incentivised to utilise cleaner production methods (Ext. 5). Furthermore, the pollution tax rate also needs to be set high enough to encourage firms to clean up production (Ext. 5).

[Eval] The pollution tax would also raise unit cost of production for industries. This may lead to a fall in AS (upward shift of horizontal AS), resulting in a rise in GPL. This may negatively impact the price

competitiveness of the country's exports, causing real GDP to fall via the international substitution effect (Ext. 6). This is a more significant issue for Singapore because as an open economy, the higher cost of production might affect the price competitiveness of exports or drive away crucial foreign direct investments.

In addition, the rise in unit COP may translate to higher prices of essential goods & services such as electricity, which would raise the cost of living for households (Ext. 6).

Body - Grants for R&D for cleaner production methods

[P] The governments of China and Singapore can provide grants for R&D into cleaner production methods (Ext. 6).

[E,E] By providing grants to firms to undertake R&D projects into cleaner production methods, it increases the ability of firms to afford such R&D projects. If successful, these R&D projects would give rise to new technology or production processes that enable industries to reduce emissions. With the fall in costs of these technology or machinery, firms will be incentivised to switch to using them for their production of goods and services. With more usage of environmentally friendly equipment, there will be less pollution emitted, reducing the marginal external cost to society leading to a smaller gap between MPC and MSC. As the negative impact on third parties is reduced, there will be lesser welfare loss to society, resulting in an improvement in allocative efficiency.

[Eval] However, while the government can offer these grants, it is still up to the firms to decide whether to take up the grants to undertake R&D projects as well as whether it is cost effective to switch to the new methods of production. Hence, the effectiveness of this measure depends on the responsiveness of the firms. The grants and cost savings would thus need to be of a significant enough amount to incentivise firms to be willing to undertake R&D and switch from using the cheaper machinery or methods that result in pollution.

[Eval] The effectiveness of such grants may also be uncertain and only take effect in the long term, as R&D may not be successful and significant time is required for research and development of new equipment or processes.

Conclusion

[Stand] The governments of China and Singapore should utilise both pollution tax and grants for R&D into cleaner production methods. However, a pollution tax would be more effective in Singapore than in China.

[Substantiation]
Both pollution tax and grants for R&D should be utilised because they are complementary in tackling the market failure problem. A pollution tax is a more immediate measure that can be used in the short term (although the effectiveness will depend on financially viable alternative production methods currently available), whilst grants for R&D would be a long term measure that provides a more permanent solution to reducing pollution. Furthermore, the tax revenue generated from the pollution tax can be used to offset the cost of grants provided for R&D.

The pollution tax would be more effective in Singapore as the smaller nature of the country allows for easier monitoring of factory emissions and enforcement of tax collection by the government. In China however, the large size of the country implies having to rely on self-reported emission levels

by firms and greater challenges in enforcement of taxes, potentially limiting the effectiveness of such a policy.

Level	Descriptor	Marks
L1	Some knowledge of how the measures work, or descriptive explanation of the workings of the measures. One-sided answer that only explains the working of only one type of measure suggested in the extracts.	1 – 3m
L2	Analytical and accurate explanation of the workings of 2 different measures in addressing the market failure problem. Answer is applied to the relevant context, with reference to case evidence.	4 – 7m
E	In-body evaluation which recognises the contextual limitations and/or advantages of 2 different measures. Evaluative conclusion on the appropriateness of the measures based on the context of the countries.	1 – 3m

Markers' Comments:
Content:

- Some students **incorrectly** interpreted the taxes in Ext 5. as a production tax instead of a pollution tax.
- For students who correctly identified the carbon tax in the extracts as pollution tax, they **incorrectly** used the explanation for production tax to explain pollution tax.
- A proper explanation of how a pollution tax works require first showing understanding that the pollution tax is set at the level where the marginal social cost of lowering pollution equals the marginal social benefit of lowering pollution. [Thus, pollution tax is **NOT** equal to the MEC at the social optimal output level of the product and here lies the difference between a production tax and a pollution tax.] Once this level of tax is determined and applied to all firms, firms will decide on their course of action to i) continue to pollute and pay the tax or 2) clean up to avoid the tax. This is done by comparing the MB of lowering pollution (not having to pay the tax) and the MC of lowering pollution (clean-up cost). Firms who face high cost in lowering pollution will pay the tax and continue to pollute. Firms who face low cost in lowering pollution would rather clean up and avoid the tax. And this means overall pollution level will be lowered at least cost. The limitation is that it is hard for the government to estimate the correct pollution tax level because it is hard to measure the marginal social cost of lowering pollution and the marginal social benefit of lowering pollution.
- It is also wrong to imply that the social optimal level of pollution is zero. Social optimal level of pollution is reached at the point where MB of lowering pollution = MC of lowering pollution. This is a positive level of pollution (not 0). Thus, the criticism that pollution still occurs in a pollution tax scheme (i.e. firm just pays the tax and continues to pollute) is not a valid one.
- A significant number of students drew the graph for a production tax without showing the initial market failure caused by negative externalities (i.e. diagram only contains DD and SS curves). If the initial welfare loss is not shown, such diagrams also **cannot** show the improvement in welfare following the measure(s) imposed.
- The diagram where there is SS(MPC) and DD (MPB) with MPC rising (shifting left) due to either production tax or pollution tax is a diagram for the product (i.e. the X axis should be labelled as 'quantity per time period' and **NOT** 'pollution per time period'). There is NO DD for pollution because it is not something that is desired or wanted by anyone.
- There is the misconception of pollution tax working like a fine to support regulation and this leads to the wrong assertion that a pollution tax has certainty of outcome. A pollution tax like

other market-oriented measures do not have certainty of outcome because the onus is on the firms to react to the tax (disincentive).

- Many students could explain that carbon tax and R&D will reduce the negative externality but very few could link back to the theory by asserting that these policies will lower the level of MSC closer to MPC due to falling MEC, reducing the area of welfare loss. This is a comparatively more rigorous analysis. Students should learn to explain with a strong economic theory underpinning/driving the analysis, and if possible, illustrate using a diagram.
- When students brought in pollution permits as a possible measure, it was usually inadequately / wrongly explained and so this is one measure that requires more revision.

Skill:

- Many students went straight into evaluating the policies without explaining how they work. This limits their analysis because they need to tell how these policies can theoretically solve the "market failure" to address the question.
  For example, in the case of pollution tax, the few students who were able to bring in the marginalist principle (MB against MC of lowering pollution) stopped short there and did not continue to explain how this will enable the producers to reduce pollution closer to the social optimal level. Without a clear reference as to how the social optimal quantity is achieved, students have not answered the question. To gain the most amount of marks in an exam, students need to learn and discern what goes into analysis and what goes into evaluation for a higher-order thinking question.
- For students who could identify the market failure as allocative inefficiency due to negative externalities in e(i) but focused on market failure to achieve equity in e(ii), they clearly failed to dissect the question properly as they are required to assess policies to tackle "the above market failure". Students need to dissect the question very thoroughly lest they spend a long time writing irrelevant analysis
- Many did not include their concluding paragraph. Among those who did so, a majority of their concluding substantiation was very weak. Students should refrain from repeating points already mentioned in their in-body paragraphs and need to consider the contexts of SG and China in their analysis.
- Many of the 'limitations' students brought in were just regurgitated from notes without consideration of context. Rather than spam several limitations of measures, students should be picking the most relevant to explain, and support their explanation with case evidence where possible.

Section B: Essay Question [25m each]

Question 1

Be it for health, environmental or ethical concerns regarding the farming of animals, Americans' appetite for alternative meat made from plants is getting bigger than ever. At the same time, technological progress has made it more financially viable to produce such alternative meat.

Discuss the effects of the above developments on the market for plant-based alternative meat and on a related market in the United States. [25]

*[**Note**: 25m single stem essay questions exist in the old syllabus, but not in the current syllabus, where essay questions come with two parts - part (a) carrying 10 marks and part (b) carrying 15 marks. That said, the content tested here is still relevant to your syllabus.]*

R1: Explain effects of above developments in preamble on the market for plant-based alternative meat in the US **R2**: Explain effects of above developments in preamble on a market related to plant-based alternative meat in the US (e.g. substitute)

Introduction

One market related to that of plant-based alternative meat is that of meat sourced from animals. The two types of meat are substitutes, for they can be consumed in place of the other. In this essay, the focus will be on how equilibrium price and quantity, as well as total revenue earned by producers of these two types of meat have been impacted by the changes highlighted in the question.

Body

Market for plant-based alternative meat

[P] Demand has increased for plant-based alternative meat.
[E,E] Demand for plant-based alternative meat is the quantity of such alternative meat that consumers are willing and able to buy at various prices. As American consumers become more concerned about the cons of consuming animals, such as the environmental damage rearing livestock can lead to e.g. methane is released in large quantities by cattle, they will be less willing to consume meat and have increased preference for substitutes that would not lead to such negative impacts. This increases the consumers' willingness to consume plant-based alternative meat instead, leading to an increase in demand for it from D_1 to D_2 (Fig. 1).

[P] Supply has also increased for plant-based alternative meat.
[E,E] Supply for plant-based alternative meat is the quantity of such alternative meat that producers are willing and able to supply at various prices. Technological progress has led to newer and cheaper ways of producing plant-based alternative meat, e.g. by reducing the number of steps required to make the meat substitute. As marginal cost of producing plant-based alternative meat falls, it becomes more profitable to produce it at every price level, thus producers will be more willing and able to produce it. Supply of such alternative meat increases from S_1 to S_2 (Fig. 1).

[P] With the increase in both demand and supply, equilibrium quantity of plant-based alternative meat will increase. However, the change in price is indeterminate and will depend on the relative extents of change in demand and supply.
[E,E] For example, when increase in supply is greater than the increase in demand, there would be a surplus of Q'Q" units at initial price level P_1. This leads to a downward pressure on price, with producers willing to accept lower prices in order to sell off the excess. As price decreases, there is a movement along D_2 as quantity demanded increases from Q' to Q_2 due to more consumers becoming willing and able to consume plant-based meat. Simultaneously, as price decreases, there is a movement along S_2 as quantity supplied decreases from Q" to Q_2 since it is now less profitable to produce plant-based meat. This process stops when price has fallen till P_2 where quantity demanded once more equals quantity supplied. Equilibrium quantity has increased from Q_1 to Q_2.

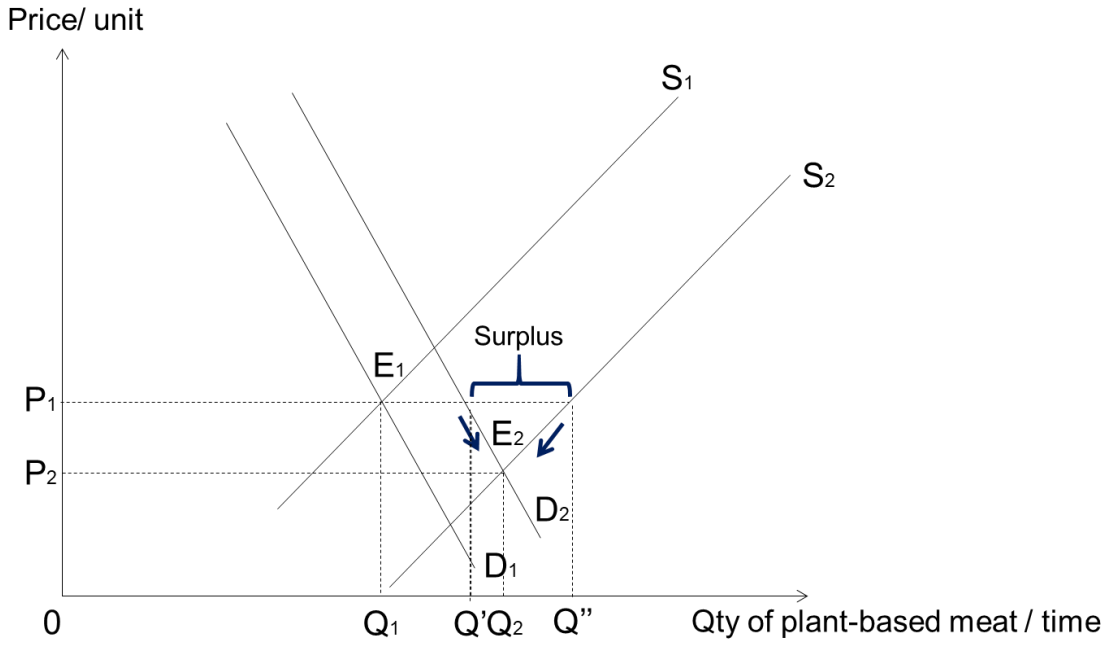


Fig. 1: Market for plant-based alternative meat

[Stand] It is likely that the increase in supply is larger than the increase in demand.
[Substantiation] This is because there has been much research conducted on developing plant-based alternative meat in recent years, with significant results achieved in lowering the cost of producing such alternative meat. Furthermore, many remain unaware of the negative impacts of consuming meat, and thus the number of people who now prefer alternative meat and increase their demand for it is limited.

[P] Total revenue received by producers is likely to decrease.

[E] An increase in demand, ceteris paribus, leads to an increase in total revenue.
[E] Holding supply constant at S_1, an increase in demand will lead to an increase in both price and quantity. As a result, total revenue, which is calculated by price multiplied by quantity sold, will unambiguously increase.

[E] An increase in supply, ceteris paribus, leads to an indeterminate change in total revenue. Whether total revenue increases or decreases depends on price elasticity of demand for plant-based alternative meat. Price elasticity of demand measures the responsiveness of quantity demanded to a change in price of the good itself, ceteris paribus.

[E] Holding demand constant at D_1 (Fig. 2), an increase in supply from S_1 to S_2 will lead to a fall in price and an increase in quantity. Demand for plant-based meat is likely to be price inelastic i.e. |PED| < 1 because there is a lack of close substitutes within the same price range. In general, plant-based meat is more expensive than regular meat. As such, even as price falls, consumers may not find it easy to switch to plant-based meat, thus quantity demanded will increase less than proportionately. With |PED| < 1, the loss in total revenue due to a fall in price from P_1 to P_3 (Area A in Fig. 2) is more than the gain in total revenue from the less than proportionate increase in quantity demanded from Q_1 to Q_3 (Area B), ceteris paribus. Total revenue has thus fallen due to the increase in supply.

Overall, as the increase in supply is more significant than the increase in demand, total revenue will decrease for the case of plant-based alternative meat.

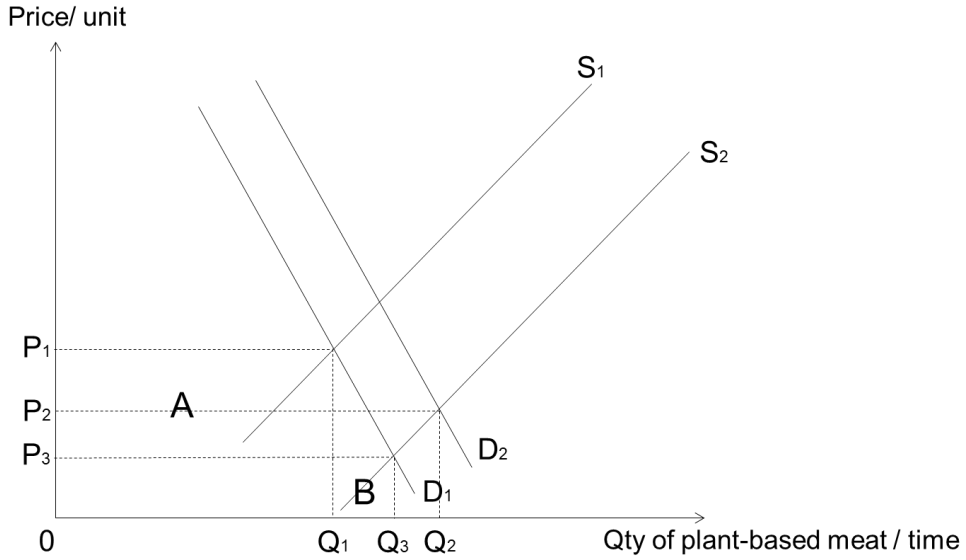


Fig. 2: Impact of SS increase on TR earned by plant-based meat producers

<u>Market for meat</u>

[P] Decreased preference for meat will reduce the demand for meat.

[E,E] As more people have concerns over the negative impacts consuming meat will have on health, the environment and how livestock is raised, they will prefer to eat less meat. Willingness to consume meat thus fall, leading to a fall in demand.

[P] A fall in price of plant-based meat will lead to a fall in demand for meat.

[E,E] Cross-price elasticity of demand (XED) for meat with respect to price of plant-based meat measures the responsiveness of demand for meat when price of plant-based meat changes, ceteris paribus. XED is positive (XED > 0) as the two goods are substitutes. As price of plant-based meat falls, more consumers will switch to relatively cheaper plant-based meat and away from regular meat. This leads to a fall in demand for meat.

[P] With a fall in demand of meat from D_1 to D_2 (Fig. 3), equilibrium quantity and price of meat will fall.

[E,E] The fall in demand for meat, ceteris paribus, leads to a surplus of $Q'Q_1$ units at initial price level P_1. This leads to a downward pressure on price, with producers willing to accept lower prices in order to sell off the excess. As price decreases, quantity demanded increases from Q' to Q_2 while quantity

supplied decreases from Q_1 to Q_2. This process stops when price has fallen till P_2 where quantity demanded once more equals quantity supplied. Equilibrium quantity has fallen from Q_1 to Q_2.

[P] Total revenue received by producers of meat has fallen.
[E,E] With a fall in both price and quantity sold, total revenue has fallen from $P_1E_1Q_10$ to $P_2E_2Q_20$.

[Stand] The extent of fall in equilibrium price, quantity and total revenue is likely to be small since the fall in demand is likely to be marginal.
[Substantiation] This is because not many consumers have changed their preference away from actual meat. Furthermore, the extent of fall in demand due to a decrease in price of plant-based meat depends on how close the two goods are as substitutes. XED value is likely to be small (XED < 1) i.e. plant-based meat and meat are considered to be poor substitutes since they are not within the same price range, and many consumers remain unconvinced that plant-based meat will taste similar to actual meat. Therefore, demand for meat will likely fall less than proportionately to the fall in price of plant-based meat.

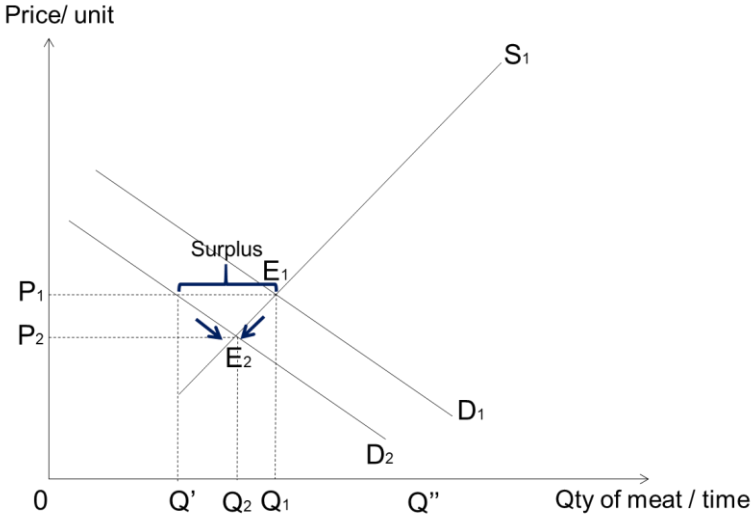


Fig. 3: Market for Meat

Conclusion

[Stand] In conclusion, equilibrium quantity is likely to increase in the market for plant-based meat, while equilibrium price and total revenue falls. On the other hand, in the market of a substitute good, meat, equilibrium price, quantity and total revenue will fall.

[Substantiation] In the longer term, these impacts will likely be observed to a larger extent as more Americans become health or environmentally conscious and make the switch, while further research and development lowers the marginal cost of producing plant-based meat even more. It is also possible that as more Americans become concerned with consuming too much meat and make the switch, the increase in demand may outweigh the increase in supply, leading to increases in price, quantity and total revenue instead.

While the above analysis assumes ceteris paribus, this assumption is unlikely to hold in the real world. Other factors such as increase in income due to improving economic growth in the United States will lead to increases in demand for both types of meat, leading to changes in the market. If rise in income is significant, demand for meat may increase instead of fall. Plant-based meat may

also become closer substitutes to meat as researchers discover ways to better mimic the taste and texture of actual meat.

Mark Scheme

Knowledge, Application/Understanding and Analysis		
Level	**Descriptor**	**Marks**
L3	For an answer that uses given demand and supply factors and relevant elasticity concepts to thoroughly analyse the impact on respective markets. Higher level of rigour in analysis is observed.	18 - 20
	For an answer that uses given demand and supply factors to analyse the impact on respective markets (i.e. change in price, quantity, total revenue / total expenditure). Accurate application of relevant elasticity concepts is required.	15 - 17
L2	For an answer that either gives a descriptive explanation of given demand and supply factors and how that impacts the respective markets OR a detailed explanation of given demand or supply factors and how that impacts either the market for plant-based meat or a related market.	12 - 14
	For an answer that mostly addresses the question, but explanation of how demand and/or supply factors lead to impact on the respective market(s) is undeveloped or descriptive. No mention of impact on total revenue/ expenditure.	9 - 11
L1	For an answer that shows some relevance and knowledge of given demand and supply factors, or impact on the market for plant-based meat or a related product. However, points remain largely unexplained.	5 - 8
	For an answer that is mostly irrelevant. There could be listing of some demand and supply factors without explanation.	1 – 4

Note: Please ignore the above mark scheme as 25-mark questions are no longer tested in your syllabus.

E3	For an answer that uses contextualised analysis to support an evaluative conclusion on the impact of the events on the market for plant-based meat and on a related market in the United States.	5
E2	For an answer which shows attempt to explain and support evaluative statement(s) made.	3 – 4
E1	For an answer that gives unsupported evaluative statement(s) on the impact of the events on the market for plant-based meat and on a related market.	1 – 2

Markers' Comments:
Content:

- Many students argue that SS increases more than the DD in their analysis but illustrates otherwise on their diagrams. This is often because their demand curve is relatively flat, which means that a 'seemingly' small shift of the DD curve is in reality very significant. As a result, such students find themselves having a 'shortage' on their diagram when they should be observing a 'surplus' based on their assertion that SS increases more than DD. Students need to check if their diagrams match their analysis to avoid such errors in the future.
- Some students are still unable to do the analysis for the market adjustment process. Stronger analysis would address why quantity demanded and quantity supplied change in light of the price adjustment.
- Given that firms have no price setting ability since the implicit assumption is that firms are perfectly competitive here, it would be better for students to argue that firms are '**willing to accept lower prices**' when faced with a surplus as opposed to them directly lowering prices.

- The supply curve reflects **marginal** cost of production. Therefore, it is a fall in **marginal** cost of production and **not** unit cost of production that led to a rise in SS.
- Some students **incorrectly** used PED and PES to justify the extent of DD and SS shifts e.g. "Since demand is price inelastic, extent of DD increase is small". Students need to unlearn this misconception. PED tells you the responsiveness of quantity demanded to a change in price, ceteris paribus, which is a movement along the DD curve. It has **nothing** to do with extent of shift in DD.
- A few students confused the factors affecting PED with those affecting YED, e.g. using degree of necessity and income level of households to explain whether demand for plant-based meat is price elastic or price inelastic. This is **wrong**. PED is affected by number of close substitutes available and proportion of income spent on the good.
- Many students fail to understand that they need to use **both** PES and PED if they wish to explain the extent of the change in price and/or quantity.
- When students explain the impact on total revenue/expenditure, only PED is relevant. When there is a shift in SS, holding DD constant, both price and quantity will change in the opposite direction. Therefore, PED is required to analyse how TR/TE will change. On the other hand, PES is irrelevant. When DD shifts, holding SS constant, both price and quantity change in the same direction, thus change in TR/TE is unambiguous.
- Many students explained that because plant-based meat is made of 'plants' and these will take a long time to 'harvest', the supply of plant based meat is therefore price inelastic. This explanation is **wrong** as plant-based meat is actually a manufactured food product (the plant-based ingredient is just its factor input) and the production is not 'tied to land'. PES is related to the ease of accessing factors of production, so supply should be relatively price elastic in this case.
- Some students argued that plant-based meat and real meat are in competitive supply. These are two separate industries and it comes across as somewhat far-fetched that meat producers will switch over to producing plant-based meat.

Skill:

- Students were able to identify the factors for the alternative meat market (i.e. change in preferences and tech progress), but they did not explain the factors well. Many just quoted from the preamble but did not explain.
- Some students did not mention TR at all in the entire answer. On the other hand, there are a few scripts that focused only on the analysis of TR, leaving out the change in equilibrium price and quantity (and also market adjustment process). This boils down to dissecting the key phrase "impact on the market", requiring students to analyse the impact on all three variables.
- To score in L3 for this question, there must be a broad range of conceptual applications e.g. application of elasticity concepts. For students who argued that demand rose by more than supply, leading to a rise in both equilibrium price and quantity and hence TR, they would not need to apply PED in the analysis on the impact on TR. That being the case, one way for them to score more marks via application of elasticity concepts is to consider the extent of impact on the market equilibrium price i.e. significance of price change by applying PED and PES.
- A lot of students explained elasticity concepts without any reference to the extent of change in price or quantity or change in total revenue/expenditure. These concepts should only be inserted where relevant to the analysis and not spammed indiscriminately. Little credit is given for explaining them without actually using them to address the question because markers can only credit for knowledge of the concepts but not application.
- A few students hijacked the question by coming up with their own factors such as "an increase in income". This is perhaps an attempt to show off their capability to apply YED concept but such essays ignore the key phrase of "effects of the above developments", which means that their essay is not addressing the question. Students need to learn how to dissect the question and plan for it very thoroughly to avoid putting irrelevant analysis into their answer.
- Some students were inconsistent in their analysis, e.g. saying that meat and plant-based meat are close substitutes in one paragraph but reversing that stand in the next.

- Quite a number of students just brought in another market, without explaining how it is related to the market for plant-based meat.
- The change in technology as stated in the preamble does not apply to the related market. Students who went on to explain that the SS in the related market also changes, has made an unnecessary argument and will just make the analysis more complex than required.
- Many students are still not justifying the extent of DD and SS shifts. Many scripts simply say “Based on the diagram, SS curve shifts more than DD curve”. Without some sensible justification, such essays are descriptive and lose rigour. Students also lose the chance to score for evaluation. Students need to learn that for a simultaneous double shift analysis, it is imperative for them to justify the relative extent of shifts.
- It is good practice to label the diagrams for questions involving more than one market. This makes it easier for the marker to follow the students’ analysis.

Question 2

Users of libraries such as the London Library in the United Kingdom and Folio: The Seattle Athenaeum in America are required to pay a fee to borrow books. On the other hand, library loan services in most countries such as Singapore are free.

Source: Various

(a) Explain why there is allocative inefficiency in the market for library loan services. [10]
(b) Discuss whether offering free library loan services is the best way for a government to tackle this inefficiency. [15]

Part (a)

R1: Explain one reason for allocative inefficiency in the market for library loan services (consumer ignorance).
R2: Explain another reason for allocative inefficiency in the market for library loan services (positive externalities).

Introduction

The market for library loan services is allocative inefficient as library loan services is a merit good that is under-consumed when left to market forces. This results in market failure where society's welfare is not maximised, thus leading to allocative inefficiency.

Note: The concept of a "merit good" or "demerit good" is no longer in your syllabus, but it essentially means a good that is deemed socially desirable/undesirable by the government, where there is consumer ignorance, and whose consumption generates positive/negative externalities. So the two sources of market failure are still relevant to you.

Body

[A] There is allocative inefficiency in the market for library loan services as it is a merit good. **[C+E]** Merit goods are goods or services that are deemed socially desirable by the government and are under-consumed when left to the price mechanism because of consumers' failure to recognise expected benefits to the consumers themselves from the consumption of the good, as well as the external benefits that could be enjoyed by third parties. Third parties are those who are not involved in the consumption or production of the good or service, in this case library loan services.

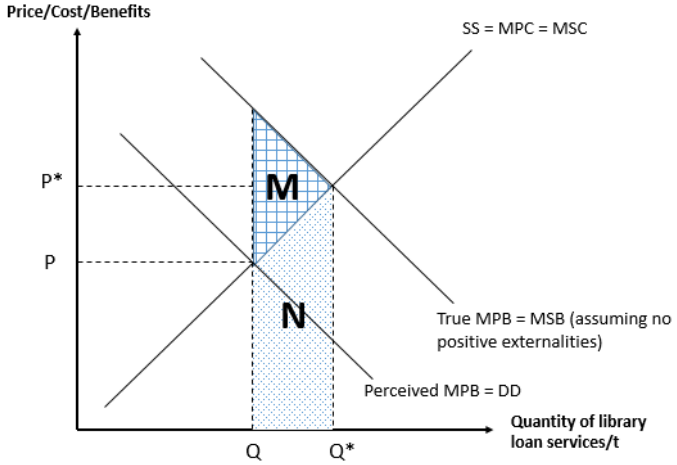


Figure 1: Consumer Ignorance in the Market for Library Loan Services

[A] There is consumer ignorance in the market for library loan services. **[C]** Due to imperfect information, consumers may be ignorant about the true benefits of consuming library loan services to themselves. For example, borrowing books from the library for reading can improve one's knowledge. **[E]** However, due to ignorance, consumers under-estimate the true benefits that consuming library loan services provides. This causes the perceived marginal private benefit (MPB) to be lower than the true MPB of consuming library loan services. Under the free market, consumers would base their consumption decision on their perceived MPB, and will consume up till the point where perceived MPB = MPC to maximise their net total private benefits resulting in a demand (DD) that is lower than what it would be if consumers had full information. Based on this demand and supply, market equilibrium output is Q. However, the socially optimal output is at quantity Q*, where 'true' MPB = MPC (i.e. MSB = MSC when there is no externalities), and societal welfare is maximised. Hence, under the free market, there is an under-consumption of library loan services of Q* - Q units. For Q to Q*, the true MPB to consumers (i.e. MSB) is greater than the MSC, which means that there is a net gain to society's welfare that can be reaped if there was greater consumption of library loan services. At the market output of Q, a deadweight welfare loss of area M is incurred by society, as the total social benefit (area M+N) of consuming Q to Q* units is greater than the total social cost (area N).

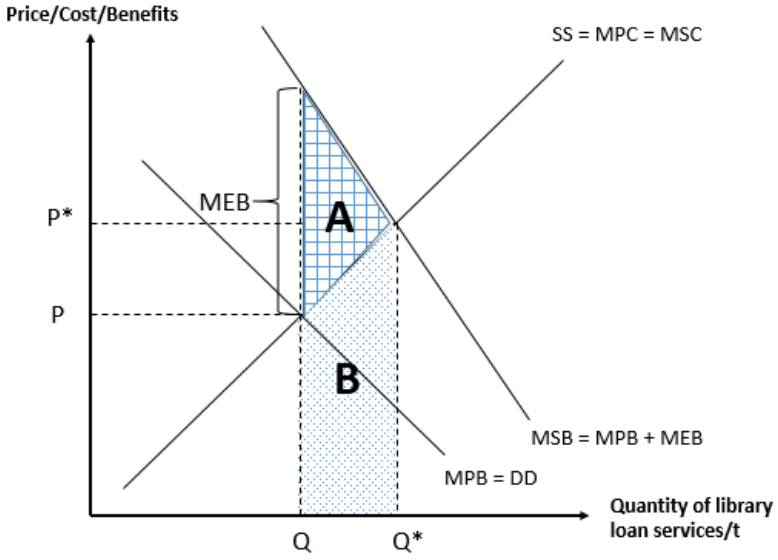


Figure 2: Positive Externalities in the Market for Library Loan Services

[A] The consumption of library loan services also generates positive externalities. **[C]** Positive externalities are external benefits to third parties who are not involved in the consumption or production of the good. For example, the use of library loan services would not only make individual consumers more knowledgeable, but also bring about external benefits in terms of the spread of knowledge to those around the library user who do not visit libraries. Also, the firms who hire the more knowledgeable individual (but do not pay them extra) would also benefit from higher productivity as a third party.

[E] The positive externality causes the MSB to be higher than MPB, i.e. MSB curve to be greater than the MPB curve by the amount of marginal external benefit (MEB), since MSB includes both the MPB and the MEB to third parties in society and MEB > 0 here. Under the free market, consumers would only consider their MPB, which is the benefit to themselves from consuming library loan services, and disregard the MEB as they are private agents who are driven by self-interest. Thus, they will consume up to the point where MPB = MPC to maximise their net total private benefits, and the market equilibrium output, Q, will be where DD=SS. However, the socially optimal output where

society's welfare is maximised is at Q*, where MSB = MSC. Hence, under the free market, there is an under-consumption of library loan services of Q* - Q. Assuming no negative externalities, MPC = MSC. For units Q to Q*, the MSB is greater than the MSC, which means that there is additional net gain to society's welfare that can be reaped if there was greater consumption of library loan services. At the market output of Q, a deadweight welfare loss of area A is incurred by society, as the total social benefit of consuming Q to Q* units (area A+B) is greater than the total social cost (area B).

Therefore, there is allocative inefficiency in the market for library loan services as society's welfare is not maximised due to the presence of consumer ignorance and positive externalities.

Mark Scheme

Knowledge, Understanding, Application, and Analysis		
Level	**Descriptor**	**Marks**
L3	• Well-explained answer that demonstrates understanding of how consumer ignorance and positive externality lead to allocative inefficiency in the case of library loan services • Diagrams are used appropriately and accurately • Includes contextualised examples in the explanation	8-10
L2	• A good and thorough explanation of **<u>either</u>** positive externalities or consumer ignorance OR • Under-developed answer with gaps in the explanation of how consumer ignorance and positive externality lead to allocative inefficiency	5-7
L1	• Demonstrates understanding of what market failure / positive externalities / info failure / merit good is • Knowledge of concepts but little or no explanation and application of concepts • Conceptual errors and inaccuracies in explanation	1-4

Markers' Comments:
Content:

- Quite a number of students jumbled up the explanation for externalities with ignorance, i.e. "consumers are ignorant of the positive externalities on third parties not involved in the production nor consumption of library services". This is **wrong** as ignorance (due to imperfect information) and externalities are two completely different and **separate** reasons for why the market fails. Economic agents ignore externalities because they are only concerned with maximising their net total **private** benefits, and hence ignore impacts on third parties.
- There was a tendency to suggest that the quantity consumed in the market is determined solely by consumers' decision who consume up to the point where perceived MPB = MPC. Consumers do consume up to the point where MPB = MPC but students should note that the MPC for the consumer is the price of the service. So before declaring that consumers consume up to the point where perceived MPB = MPC, a more complete answer would acknowledge that the market equilibrium price and quantity are determined by the market forces of demand and supply, with demand based on perceived MPB rather than true MPB or MSB.
- Many students argued that increased reading of books lead to increase in productivity and benefit the employers. However, it should be noted that if employers actually pay a higher wage rate for a worker that is found to be more productive, then the benefit of employing a more productive worker is not a positive externality of consuming library loan services.
- With regards to external benefits, students tend to merely regurgitate the idea that more knowledge citizens lead to reduced crime rate. This link is not necessarily true and needs a bit more elaboration. There are other better examples to use.

- Students who studied for this topic (and did a bit of memory work) would have no problem explaining the theory behind this market failure well. However, the difference between a low L3 and a high L3 script lies in the ability to critically apply the concept of consumer's ignorance and positive externality in this context. A high L3 script is able to critically pinpoint what consumers of library loan services may be ignorant about and what are some sensible external benefits that library books readers can offer to third parties. This is something that pure regurgitation of theoretical examples cannot accomplish. Moving forward, students can perhaps try to come up with their own examples in their revision and test their application of economic concepts.
- A handful of students wrongly identified library loan services as a public good that is non-excludable and non-rivalrous. However, it should be noted that library loan services are excludable, since a library membership / library card is usually needed for one to use the library loan services, and one could possibly be prevented from using this service without paying for a membership.
- For students who mistakenly believed that the service in question is a public good, the recommendation is to approach the study of Economics by focusing on understanding (rather than memorising) as the key to mastering the subject. There are instances in examinations when you are confronted with goods and issues which you have to reason out.

Skill:

- Most students correctly identified the causes of the market failure but in general, there is still a need for many students to improve in providing a sufficiently developed analytical explanation. As such, their marks fell only in the L2 range.
- For this question, it is actually more expedient to consider both causes on market failure in the same diagram. This saves much time when explaining the welfare loss areas. A good number of students successfully analysed this way.
- If the combined diagram is opted for, students need to pay special attention to differentiate the respective impact of both causes on allocative efficiency. Most answers merely explained both causes and considered the market equilibrium relative to the social optimal level. A strong analytical answer would consider the level of underconsumption (and welfare loss) due to ignorance and that due to positive externalities.
- On the other hand, it is also acceptable to explain the 2 causes separately. However, care must be taken not to waste time repeating the explanation of the welfare loss area. Detailed explanation of the welfare loss area for either diagrams would suffice. Rather, it would be more important to develop the explanation of the 2 causes and how these 2 causes lead to the under-consumption of library loan services.
- Some students merely pointed out that there was a shaded area of welfare loss in the diagram, and therefore there is market failure. Instead, they should explain how the welfare loss area arises by considering TSB and TSC of the underconsumed units.

Part (b)

R1: Discuss how offering free library loan services (free direct provision) can tackle the allocative inefficiency in the market for library loan services. **R2**: Discuss how another policy can tackle the allocative inefficiency in the market for library loan services.

Introduction

To tackle allocative inefficiency in the market for library loan services, governments can make use of policies such as free provision, partial subsidies, and public education. This essay will evaluate the three policies using various criteria to determine if offering free library loan services is the best measure that a government can employ. These criteria include the effectiveness, as well as the trade-offs, of the policy.

Body

[P] Offering free library loan services would tackle the problem of allocative efficiency as it would increase the quantity demanded of library loan services.

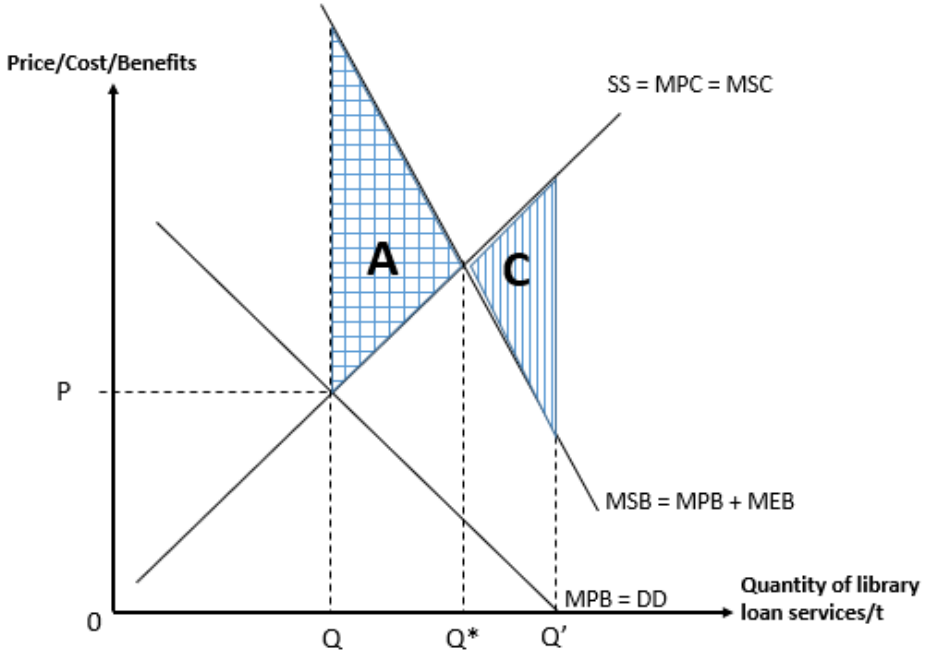


Figure 3: Free Provision in the Market for Library Loan Services

[E,E] Initially, the free market equilibrium is at Q, where MPB = MPC. When library loan services are offered for free, the price of library loan services is lowered to zero and quantity demanded rises to Q' units. Thus, with free provision, there would be a potential welfare gain of area A, as the units Q to Q* are now consumed. At the same time, as the total social benefit (TSB) from the overconsumption of units Q* to Q' is less than the total social cost (TSC), there is welfare loss of area C. In the situation where the initial market failure i.e. extent of market failure without government intervention (Area A) is large, such that the welfare loss from government intervention (Area C) is smaller, there would be an improvement in allocative efficiency.

[Ev] However, in countries like Singapore, the level of positive externalities is likely to be low. As majority of the Singaporean population is well educated, the external benefits of additional units of library loan services to third parties are likely to be small. Therefore, the extent of market failure

without government intervention is likely to be small, and area C is likely to be greater than area A. Government intervention would thus have led to a lower welfare for society as compared to the free market outcome.

[Ev] Furthermore, offering library loan services for free can only tackle the problem of externalities in the market for library loan services as it forces consumers to internalise the MEB, raising consumption of library loan services closer to Q*, the socially optimal output level. However, free provision does not tackle the root cause of consumer ignorance.

There is therefore a need for other measures to tackle the problem of allocative inefficiency in the market for library loan services, such as providing partial subsidies, as well as public education to raise awareness of the true benefits of library loan services to its users.

[P] Partial subsidies can be used in the market for library loan services as it would raise consumption to the socially optimal level, thus achieving allocative efficiency.

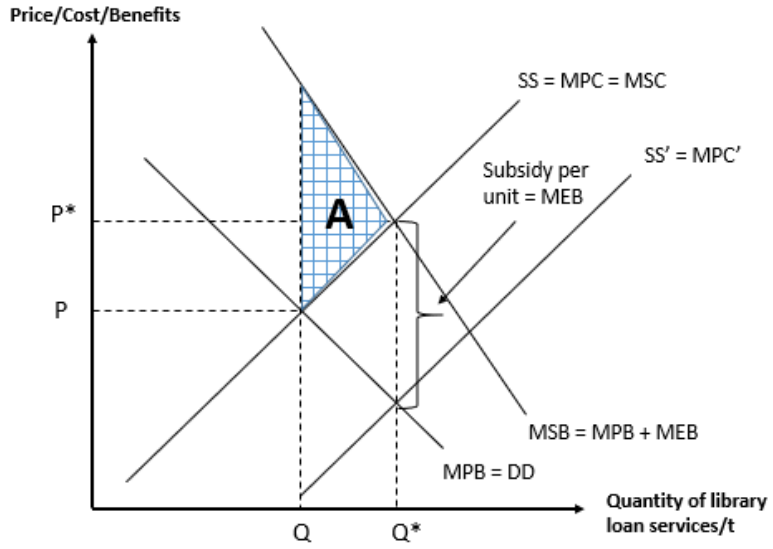


Figure 4: Subsidy in the Market for Library Loan Services

[E,E] A production subsidy is a payment made by the government to producers to encourage the production of certain goods or services, but not made in exchange for any goods or services. **[E]** It works by lowering the marginal cost of production for firms, and supply increases as firms will be more willing and able to produce. A per unit subsidy equal to the MEB at the socially optimal output level, Q*, could be given to producers of library loan services. This would lower the producers' marginal private costs of production (MPC), and the MPC curve will shift vertically downwards to MPC' by the amount of MEB at Q*. With the subsidy, the new market equilibrium output where SS' = DD (i.e. MPC' = MPB) will coincide with the socially optimal output Q*, causing the welfare loss of area A to be eliminated and allocative efficiency to be restored.

[Ev] Compared to free provision, the use of partial subsidies would be more effective in achieving allocative efficiency as the measure is more flexible. Unlike free provision, where the government fully subsidises library loan services, the amount of per unit subsidy that is given can be varied depending on the level of MEB that consuming library loan services would bring, thus enabling the socially optimal output to be achieved.

[P] A government can also make use of public education to solve the problem of consumer ignorance due to imperfect information.

E,E] Information would have to be provided to consumers to educate them on the true marginal private benefits of using library loan services. For example, campaigns can be put in place to encourage library users to borrow and read more library books by letting them know of the knowledge they can gain. This would reduce the extent of information failure in the market and perceived MPB will increase as a result. As perceived MPB increases, consumers become more willing to use library loan services, and demand will rise to match the true MPB, as shown in Figure 1 in part (a). This would bring the market to the socially optimal quantity to be consumed, resolving the allocative inefficiency problem.

Conclusion

[Stand] In conclusion, offering library loan services for free may not be the best way to achieve allocative efficiency.

[Substantiation] To decide on the best measure to achieve allocative efficiency in the market for library loan services, there are some criteria to be considered.

The first criteria that can be considered is the effectiveness of the policies. While all three policies can be used to improve the problem of allocative inefficiency in the market for library loan services, the policies target different root problems. Free provision and partial subsidies can be used to address the issue of positive externalities, while public education would better address the root cause of consumer ignorance in the market for library loan services. Also, for free provision and partial subsidies, the effectiveness of the policies depends largely on the extent of market failure, as well as whether the government has perfect information on MEB. On the other hand, the effectiveness of public education would largely depend on consumers' responsiveness, as not all consumers would be convinced of the information provided to them.

Besides effectiveness, the appropriateness of these policies also depends on the unintended consequences they create. In the case of free provision and partial subsidies, a larger amount of funds would be needed, which may lead to a larger trade-off in government spending. In contrast, public education would be relatively less expensive to implement.

All in all, after considering the above criteria, offering library loan services for free may not be the best way to achieve allocative efficiency as free provision does not address the problem of consumer ignorance and is therefore limited in its effectiveness. Perhaps a multi-faceted approach needs to be adopted, such that both the root causes of positive externalities and consumer ignorance can be better targeted to achieve allocative efficiency in the market for library loan services. In the short run, a government can offer library loan services for free to increase consumption of loan services. However, in the long run, public education can be used to tackle consumer ignorance, while partial subsidies can be used to tackle positive externalities so that allocative efficiency can be achieved.

Mark Scheme

Knowledge, Understanding, Application, and Analysis		
Level	**Descriptors**	**Marks**
L3	• Three policies covered with analytical explanation of how the policies work • Analysis is accurate and clear, with good use of diagrams	8-10
L2	• Descriptive explanation of policies used to tackle allocative inefficiency in the market for library loan services OR • Analytical explanation of only one policy e.g. free provision in tackling allocative inefficiency in the market for library loan services	5-7
L1	• An answer that shows some knowledge of policies used to tackle allocative inefficiency in the market for library loan services but lacks clarity due to conceptual errors and/or irrelevant points. • A response that is largely lacking in explanations or economic analysis.	1-4
E3	**Explained and evaluative judgement:** • Builds on appropriate analysis to critically analyse the policy choices. • Synthesized the economic arguments to arrive at a well-reasoned overall conclusion on whether offering free library services is the best way for a government to tackle this inefficiency.	5
E2	**Largely unexplained judgement:** • For an answer which shows attempt to explain and support evaluative statement(s) made.	3-4
E1	**Unsupported judgement:** • Evaluative statement that lacks explanation.	1-2

Markers' Comments:
Content:

- The question merely stated 'free provision' rather than 'free direct provision'. For 'free provision', the government may not be the producer. It could subcontract to a private firm to produce the service and not charge users for the service.
- It would be good to have more precision in explaining how the measure of 'free provision' works as this would affect the outcome of the measure. For example, many students drew the diagram with price falling to zero and quantity demanded rising to the point where the DD curve cuts the X axis. This is correct. However, to claim that this is also the point of consumption (quantity bought) requires the assumption that the government will meet any excess demand by producing more. And if it were not the producer, it would have to give enough subsidy per unit such that the new SS curve cuts DD curve at price zero.
  On the other hand, if the government is the producer, has perfect knowledge and chooses to produce the quantity where MSB = MSC (and no more than this quantity), and provide this for free, there should not be any over-consumption.
- Students that said free provision results in a rightward shift of the DD curve showed severe **lack of understanding** of DD and SS analysis and need a thorough revision of the topic. In general, there was poor explanation as to the level of consumption that results from free direct provision. Some students used the marginalist principle but demand and supply analysis would be more ideal in light of the market diagram used. Given the change in price

to zero, students ought to highlight that it is the quantity demanded that has risen as opposed to demand or simply skirting this part of the explanation.

- The criticism that free provision or production subsidy result in opportunity cost does not provide much mileage in scoring E marks. This is because all measures involve opportunity cost. Instead, students should consider how high the cost is relative to the benefit of the intervention.
- In addition, the criticism of the government lacking perfect information is also a poor choice of evaluative point here. Unlike the partial subsidy which is adjustable, this policy basically sets the price at zero - no specific information is needed. The government does not set the new market equilibrium quantity - that is subjected to the market response.
- Some students suggested policies that may work in theory but may not be feasible in reality. These include policies like regulations to make borrowing books compulsory. It is best to avoid discussing such policies.

Skill:

- There was a tendency to give either hardly any explanation or merely descriptive explanation of how the measures work resulting in marks falling only within L1 or very low L2.
- There is a need to pay attention to the content words of the question. When asked whether a certain measure is the best measure, there is a need to compare it with other measures in the evaluation. Also, the stand must directly relate to whether 'free provision' is the best way to address the market failure.
- Since the question is whether 'free provision' is the **best** way to address the market failure, students should explain the policy of 'free provision' and two other policies (i.e. 3 policies in total).
- Students must be more strategic in choosing the limitations to include. Do not attempt to reproduce all the limitations found in the lecture notes. Choose the more salient ones based on the context of the problem. For example, the point on free provision leading to budget deficit may not be that significant for the case of library loan services (e.g. as compared to free health care).
- Remember that the bulk of the marks are awarded for the analysis of policy mechanics and their impact on efficiency. Evaluation marks are capped and based on quality - writing more points, especially generic ones, will not earn more credit.

Question 3

The Singapore government has awarded two contracts worth S$1.16 billion for the construction of the North-South Corridor (NSC) tunnels. The NSC will be Singapore's eleventh expressway. It is expected to be completed in 2026.

Source: Channel News Asia, 23 May 2018

(a) **Explain the possible factors affecting the levels of autonomous consumption and investment in an economy.**
[10]

(b) **Discuss the impact of this rise in infrastructure spending by the Singapore government on the country's economic growth. [15]**

Part (a)

R1: Explain possible factors affecting the level of autonomous consumption in an economy. **R2**: Explain possible factors affecting the level of autonomous investment in an economy.

CONSUMPTION

- Consumption is income that households spend on consumer goods and services to satisfy their current wants. E.g. of consumer goods / services include food, clothing, personal computer, smart phone, healthcare.
- Autonomous consumption in the AD-AS model refer to planned consumption that is affected by factors other than change in income.
- Factors that affects autonomous consumption

[A] Interest rate is a key factor that affects an economy's consumption level.

[C+E] When households save and place their savings in a bank, they earn interest as a reward for postponing consumption. Interest is the opportunity cost of consumption. Spending one's income on consumption goods/services entail forgoing the interest earned with saving being the next best alternative use of the income. When there is a fall in interest rate, the opportunity cost of consumption falls and households are encouraged to spend more in the current period.

[C+E] Moreover, when households have insufficient disposable income to finance their consumption expenditure on big-ticket items like cars, they could borrow the funds from banks and the latter would charge them interest. Interest is the reward to the lender (bank) for undertaking the risk of lending. When there is a fall in interest rate, the cost of borrowing falls and households would be more willing and able to borrow more for consumption, leading to a rise in consumption expenditure.

[A] Expectations about future income level is another factor that affects an economy's consumption level.

[C+E] When an economy is in a recession, households tend to become worried that they will lose their jobs and lose their source of income. As such, they tend to feel compelled to save more in the current period and build up their savings as a precautionary measure against the possibility of being retrenched and having to rely on their savings to finance their consumption spending in the future. This leads to a fall in consumption expenditure.

Note: Other acceptable arguments – Expectations about future GPL level; wealth effect

INVESTMENT

- Investment is expenditure on capital goods like plant and equipment and semi-finished goods. It is undertaken by local firms and MNCs who produce in the country.
- Factors that affect investment

[A] Interest rate is a key determinant of the level of investment by private firms in a country.

[C] When firms undertake investment, they finance it by either using their savings or borrowing (either from banks or borrow by issuing bonds). For the former, interest is forgone since they could have placed the savings in a bank or use it to buy bonds which yield them interest. For the latter, interest has to be paid. Applying the marginalist principle, profit-maximising firms borrow and invest till the point where the expected rate of return on investment equals the interest rate. If interest rate falls, with expected rate of return held constant, some previous unprofitable investments become profitable and investment is thus encouraged.

[A] Business outlook is another key determinant of the level of investments by private firms in a country.

[C] Business outlook affects investment level because it affects the expected rate of return of investment.

[E] For e.g., rising protectionism in the world will result in many firms in Singapore becoming uncertain about the revenue they can earn from selling in overseas markets. This lowers the expected rate of return of investment causing more investment projects to become unprofitable (expected rate of return of investment < interest rate), and will result in a fall in overall investment level in the country.

Note: Arguments that pertain to factors that determine government investment decisions are also accepted.

Mark Scheme

Knowledge, Understanding, Application, and Analysis		
Level	**Descriptors**	**Marks**
L1	Shows some relevant knowledge. E.g. Defines autonomous C and I and identifies relevant determinants but no/hardly any explanation of the factors.	1-4
L2	Explanation of the factors that determine autonomous C and I are undeveloped or largely descriptive. OR Well-developed analytical explanations of the determinants of either autonomous C or I	5-7
L3	Well-developed and accurate analytical (applies relevant economic concepts / principles) explanation of the factors that determine autonomous C and I with illustration using hypothetical examples.	8-10

Markers' Comments:
Content:

- Misconceptions
    - The question is about overall consumption (C) which includes imported consumer goods/services and not only about consumption of domestically produced goods/services (Cd). As such, scripts that considered foreign exchange rate or change in preferences (local vs imported) are not accepted. For example, if forex rate appreciates and M rises, concurrently, Cd falls and so overall C is unchanged.

- Consumption is not an injection. Cd is part of the circular flow while M (in C) is a withdrawal.
- When interest rates rise, it does not lead to a fall in expected rate of return of an investment. Expected rate of return (ROR) is calculated based on the expected revenue and the price of the capital good. For example, if a machine that has a lifespan of 1year costs $100 and its use can enable the firm to earn $110 in revenue, then the expected ROR is 10%. The interest rate does not enter into the calculation of expected ROR.
  Rather, the interest rate is the cost of the investment. E.g. to obtain the $100 to buy the capital good, the firm may have to pay the bank an interest rate of 4%.

- When a variable, like consumption or investment, is described as autonomous, it means it is affected by factors that are not featured within the model. So, when consumption is described as autonomous, it refers to consumption that are affected by factors other than GPL and real national income (Y) in the AD-AS model.
- There was a tendency for a minority of students to link the changes in C to a change in AD. While this is correct, it is irrelevant to the question.
- While change in GPL and change in income are not factors that affect autonomous C, ***expectations*** of change in GPL and ***expectations*** of change in income are acceptable.
- A handful of students incorrectly linked changes in interest rate to changes in marginal propensity to save. This question is on **levels** of autonomous consumption, and so students should be considering changes in **levels** of savings instead.
- Some students were inconsistent in their use of 'levels' instead of 'changes' (i.e. "when future GPL is expected to be high, C will increase because….." or "when future GPL is expected to increase, C will be high because…."). It should be 'when future GPL is expected to **increase**, C will **increase** because…'
- There was a lack of understanding of the factor credit crunch. Many failed to use examples to illustrate this point. Very brief statements on how banks were unwilling to lend were brought up with no further elaboration. Explaining this factor requires some background knowledge, thus if students are unsure, they should omit discussing this factor.
- In drawing the ADAS diagram, the horizontal axis should be labelled as real GDP/t (i.e. a flow concept) and not real GDP alone.

Skill:

- A large number of students provided many factors, but did not fully explain how they lead to changes in levels of autonomous consumption or investment. To have a better chance of scoring within L3, it is better to give fewer factors but a well-developed explanation with economic analysis of each factor.
- It is thus good practice to ask oneself what economic principles/concepts underlie the explanation of various factors and bring them in when explaining each factor.
- Do not waste time giving the vice-versa of how a factor works, e.g. Do not provide explanation of both a fall in C when interest rate rises and rise in C when interest rate falls. No additional marks are awarded for merely giving the opposite scenario.
- Students must learn to be more strategic in choice of factors to include. There isn't much mileage in scoring marks by considering both 'expectations of change in income' and 'expectation of change in wealth'. While income and wealth are not the same, the way the factors work is similar.
- There is a small handful of students who thought that "the possible factors affecting the levels of autonomous consumption and investment" must be factors that affect both C and I. Fortunately there are such factors in this case e.g. interest rate and expectations of future economic outlook. However moving forward, these students need to realise that such phrasing does not require them to bring in factors that affect both of the variables A and B. Most likely the question is asking for factors affecting A and factors affecting B and not factors affecting both A and B (of course it depends on the exact phrasing of the question).

Part (b)

R1: Discuss impact of rise in infrastructure spending by the SG government on SG's actual growth.
R2: Discuss impact of rise in infrastructure spending by the SG government on SG's potential growth.

Introduction

- Infrastructure spending by the government is spending on building the transportation, communication, sewage, water and electric systems of the country. Such infrastructure are capital goods as these systems are needed for the production of other goods and services. Since spending is by the government, it is part of overall government expenditure (G).
- Rise in infrastructure spending by the government would impact Singapore's actual growth and potential growth performance.
- To analyse the impact on SG's growth, the **AD-AS model** and the **theory of the multiplier** (K) will be applied and to assess the impact, the **initial state of economy** (near Yf) and **nature of SG economy** (small, open, ageing population) will be taken into consideration.

Body

I. Impact on actual growth

[P] The increase in infrastructure spending by the government would lead to a multiplied rise in the country's actual GDP, thereby generating actual growth.

[E+E]

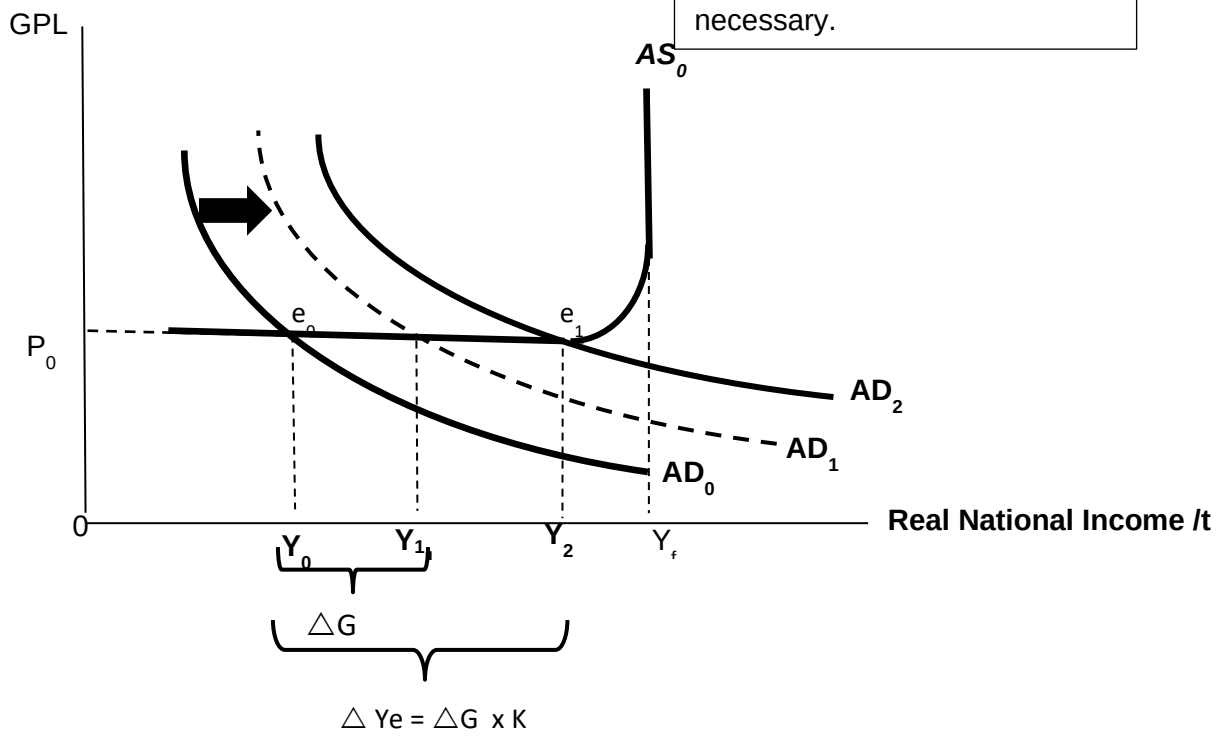
According to AD/AS model, national income is in equilibrium when AD = AS. Assume initial national equilibrium at Y_0.

Assume

- there is a rise in G by $10 million
- Marginal propensity to consume domestic goods/services (MPC_D) = 0.6,
- Marginal propensity to withdraw (MPW) = 0.4, with MPW consisting of marginal propensity to save, marginal propensity to tax and marginal propensity to import.
- The multiplier, which is the number of times by which a rise in equilibrium national income exceeds the rise in autonomous expenditure is equal to 1/0.4 = 2.5

There is spare capacity in the economy

Note: Numbers are not necessary.



△ Ye = △G x K

The rise in G causes AD, which is the demand for the country's domestic final output, to shift right from AD_0 to AD_1.

→ As such, AD now exceeds Y. Firms that produce capital goods would draw from inventories to meet the excess demand causing their inventories to fall below planned levels. These firms will replenish their inventories by increasing output by \$10m (hence Y increase from Y_0 to Y_1).

→ The \$10m rise in income will induce consumption of domestic goods/services (C_D) to rise by \$6m and W to rise by \$4m, given MPCd of 0.6 and MPW of 0.4

[Note: If numbers are not used, possible to explain this part by - The rise in income from Y_0 to Y_1 will induce consumption of domestic goods/services (C_D) to rise by the extent of MPCd multiplied by the change in income and induce withdrawals to rise by the extent of MPW multiplied by the change in income.]

→ The rise in Cd will result in unplanned fall in inventories <u>in the C_D industries, causing firms in these industries</u> to increase production thereby causing income to rise by \$6m.

→ The rise in income will induce further rounds of increase in C_D and W by the extent of MPCd and MPW.

→ NY equilibrium restored at Y_2 when rise in W = initial rise in J

→ Thus, in total, the increase in equilibrium income will be more than the rise in G due to the multiplier effect.

→ $\triangle Y = \Delta G \times K$ = \$10mx 2.5 = \$25m.

[P] The strength of the multiplier effect depends on size of MPW
[E] This is because the higher is MPW, the lower is MPCd since MPCd + MPW = 1. When MPCd is low, this means induced Cd is low in each round of the multiplier process. Thus, the increment in output and income in each round will be low, giving rise to overall limited rise in NY.

EVALUATION

[Stand] The rise in Singapore's equilibrium national income will be limited.
[Substantiate] because

1. SG's national output is initially very near full-employment. Without adequate production capacity in the economy, firms will not be able to increase production by much when there is a rise in AD. Rather, the rise in G will mainly lead to inflation in the short-term.
2. SG's multiplier is very small. This is due to her i) high MPS, which, in turn is due to strong Asian valuation of thrift and the government's compulsory saving scheme (CPF), and ii) high MPM, which is due to her lack of natural resources.
   Moreover, much of the income earned by construction workers employed to build the infrastructure would be repatriated back home to their families because there is a high proportion of foreign workers working in the construction sector.
3. The initial rise in AD caused by the rise in infrastructure spending is limited. This is because of the high import content in the government's infrastructure spending – e.g. sand and bricks needed to build the highways are imported.

II. Impact on potential growth

[P] The rise in infrastructure spending by the government would boost the country's potential growth.

[E+E] This is because the production of new infrastructure will add to the country's capital stock, assuming the level of investment exceeds the level of capital depreciation. The rise in capital stock will lead to rise in the country's production capacity. Moreover, the building of a new infrastructure like highways will result in a more efficient transport network which can boost labour productivity – e.g. workers can get to their work place more quickly. The reduced tiredness in travelling will result in higher labour productivity in the work place, with workers producing more output per man hour resulting in increase in the maximum possible output that can be produced

with the same quantity of labour. This also helps to lower unit cost of production in the country. Improvement in efficiency of transport may also boost FDI, resulting in further expansion of the country's productive capacity. Thus, AS rises. Graphically, the AS curve shifts right and downwards.

EVALUATION
[Stand] This would be a significant source of potential growth
[Substantiation] because it helps to overcome a key constraint to SG's potential growth which is its ageing population. An ageing population, ceteris paribus, will result in contraction of the labour force which causes the AS to shift left. Efforts that can boost labour productivity can thus enable SG to enjoy sustained actual economic growth.

Conclusion
[Stand] The rise in infrastructure spending would be more impactful for SG's PG compared to AG but the impact on AG could be rather substantial in the long term.
[Substantiation]
- As explained above, given the nature of the SG economy, the rise in G leads to limited rise in her actual national output (Ye) but a significant rise in its potential national output (Yf)
- However, since the rise in infrastructure spending is likely to boost FDI in the long term, over time, SG's exports should rise too, since a lot of FDI in SG are engaged in in export-oriented production. The rise in FDI and X would enable SG's AD to keep pace with the rise in AS, leading to sustained economic growth.

Mark Scheme

Knowledge, Understanding, Application, and Analysis		
Level	**Descriptors**	**Marks**
L1	Shows some relevant knowledge For example, response defines the two types of growth and states (with no or hardly any explanation) the impact of rise in infrastructure spending on a country's actual (Ye) and potential (Yf) national output.	1-4
L2	Undeveloped explanation of impact on Ye and Yf (explanation is more descriptive than analytical) OR Developed analytical explanation of impact on either Ye or Yf	5-7
L3	Developed analytical explanation of impact on Ye and Yf Supported by AD-AS diagram	8-10

E1	Unsubstantiated evaluation	1-2
E2	Substantiated judgment on impact on either Ye or Yf by considering initial state of SG economy (for judgment of impact on Ye) or nature of SG economy (for judgment of impact on Ye or Yf)	3-4
E3	Substantiated judgment of impact on Ye and Yf by considering initial state of SG economy (for judgment of impact on Ye) and nature of SG economy (for judgment of impact on Ye or Yf) The Singapore context must be considered.	5

Markers' Comments:
Content:
- There is a need to spell out the terms before using the symbols (AD, C, I G X, M, MPCd etc).
- The statement 'the rise in G causes planned expenditure to exceed planned national output' is **wrong**. It should be 'the rise in G causes planned expenditure to exceed **actual** national output'.
- If a student is referring to a rise in equilibrium national income (Ye), then this is to be described as 'actual growth' and NOT 'rise in actual growth'.

Similarly, if a student is referring to a rise in potential national income (Yf), then this is to be described as 'potential growth' and NOT 'rise in potential growth'.

- The statement 'equilibrium is restored when 'rate of W = rate of J' is wrong. It should be 'equilibrium is restored when 'the **change** in W = the initial **change** of J' or 'equilibrium is restored when '**level** of W = **level** of J'.
- A few students did not start with a rise in G and interpreted the factor as a rise in I because an improvement in a country's infrastructure could potentially encourage more FDI. While the highway construction could lead to more foreign investments, the analysis should focus on the most direct impact and start with government expenditure instead.
- It is not sufficient to merely refer to the formula to 'explain' that a high MPW leads to a small multiplier. This approach is merely math. There is a need to show understanding by linking the high MPW to small induced Cd and hence fewer rounds of the multiplier process.
- The explanation for a high MPM in Singapore was rather weak. Students should point to Singapore being resource poor and extremely reliant on imports. Therefore, for a marginal increase in income (not average), a high proportion leaks out in terms of import.
- When explaining the multiplier process with reference to the AD-AS model, the AD must be shifted over the horizontal segment of the AS curve, to abide by the assumption of sufficient capacity in the economy to support the expansion of output.
- While most scripts correctly interpreted the question as being about the impact on actual growth, and hence elaborated on how a rise in G and hence AD would lead to a multiplied rise in actual equilibrium national income, a good number omitted the impact on potential growth. Doing so creates a rather big hole in the analysis because this question is about spending on *infrastructure,* which is spending on capital goods and hence a country's Yf is affected.
- For those who considered the impact on Yf, the explanation tended to be weaker and so more revision is needed for this sub-topic.
- The argument that improved infrastructure leads to inflow of foreign workers is weak - foreigners do not come to Singapore to work simply because of a more efficient transport system. The main pull factor is higher wage rate compared to their home country.
- Also, inflow of more workers does not result in a rise in productivity. It only results in a rise in production capacity due to an increase in *quantity* of workers.
- There are a few scripts asserting that a rise in employment of workers will result in a rise in the quantity of labour in the economy, therefore resulting in potential growth. This is inaccurate. The quantity of labour, which is a factor of production, consists of both employed and unemployed citizens in the country. This means that when more workers are employed, the quantity of labour will not increase since they are already accounted for in this statistics.
- A handful of students were able to link an increase in labour productivity to a fall in unit cost of production, resulting in a rise in horizontal AS which will further improve actual economic growth in Singapore. However, some of them did not make the assumption that wage rate must remain constant or does not increase as much as the increase in labour productivity in order for unit cost of production to fall. Students need to state this assumption explicitly in subsequent assessments.

Skill:

- To score high for L, a well-developed and precise explanation is required. For the explanation of the multiplier, typical key ideas that were missing pertained to omitting to mention
    - Which sector is the first one to expand
    - Which sector subsequently expands
    - that withdrawals rise as well while Cd rises in each round
    - The assumptions of the theory - there is sufficient spare capacity
- If a numerical example is used to illustrate the working of the multiplier, it is best to use numbers that are easy to manage. There were students who used $1.16 b as the rise in G, based on the preamble. This unnecessarily leads to unwieldy calculations which wastes time. It is also useful to note that when the government announces its plan to spend $1.16 b, it takes place over the period of construction (over a few years) and so it is not likely for AD to shift right by $ 1.16 b if the time period of the AD-AS diagram is in terms of GDP *per year* for the X axis.

- Stick to the question - there was a tendency for some students to bring in changes in standard of living which is not relevant to the question.
- There are also some scripts that spent a substantial amount of effort explaining how increase in G on infrastructure will lead to demand-pull inflation in Singapore. They may have missed out the key phrase “on the country’s economic growth” in the question, which means that the bulk of their analysis should be on the impact on actual and potential economic growth. Moving forward, students need to dissect the question and plan for the essay more thoroughly to stay focused on the core question and not be distracted along the way.
- A handful of students used the circular flow of income model to answer this question, which is their prerogative and they can do so. However, the limitation of using this model instead of the AD-AS model is they cannot analyse changes on the supply-side. In this case, a rise in infrastructure spending will improve the productive capacity, resulting in a rise of the vertical AS. Using the circular flow of income model cannot help students come to this conclusion, which limits their analysis marks. Therefore, in deciding which model to use for any macro question, students need to ask themselves if there are any changes in the supply-side (either horizontal AS or vertical AS). If there is, then they must use the AD-AS model instead of circular flow.