Raffles Institution
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ECONOMICS

Higher 1

Syllabus 8823

Examiner's Report

Year 6 Prelims 2022

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ECONOMICS

Y6 H1 Prelims 2022

Paper 8823

Case Study 1

(a) Figure 1 shows the share of population at least partially vaccinated. What are the major trends shown? [2]

Suggested Answer:
- ✓ Share of population at least partially vaccinated in all countries regardless of income levels increased between January 2021 and October 2021.
- ✓ The extent of increase was slowest in low income countries but highest in high income countries.
- ✓ The higher the level of income, the higher the share of population at least partially vaccinated.

(Any one of the above responses will gain 1 mark. Other valid responses will be accepted too.)

Good sample response:
"The share of population at least partially vaccinated generally increased across all (income) groups from January 2021 to October 2021. Higher income groups experienced a great increase in share of population at least partially vaccinated while lower income groups experienced low to minimal increase of share of population at least partially vaccinated." [Abdul Halim. 22S06H]:

Mark Scheme:
1 mark *for each correct observation about a major trend from Figure 1.*

Examiners' Comments:
Most students identified and accurately described two major trends from Figure 1. Mere regurgitation of data was infrequent.

Revision: A trend is the general direction in which something is developing or changing over time. A trend can often be found by establishing a line chart. A trendline is the line formed between a high and a low. If that line is going up, the trend is up. If the trendline is sloping downward, the trend is down. There is no need to provide numerical values unless the question asks you to calculate or to justify why.

(b) Assess whether the statement in Extract 1 that "the public has invested heavily, and these products are theirs' too" is a normative or positive one. [4]

Suggested Answer:

Clarify ambiguity: Define normative statement and define positive statement

Body paragraphs
- **Explain why the phrase "the public has invested heavily" might be a positive statement**

Good sample responses:
"(Based on Extract 1, last paragraph), the statement might be a positive one, which is a factual statement whose accuracy can be tested by simple appeal to facts. The public has "invested

heavily", when research shows development of vaccines "funded primarily by the governments". This is a factual statement, as there is a definite amount of money invested and the larger proportion of funds from public investment is a statistic and fact. [Erina. 22S03J]

"There is clear evidence that the public has contributed tremendously to the production – "impossible without enormous upstream public investment" shows that the public obviously has a major role to play in contributing in the production of vaccines. Hence, the clear facts show the public's contribution and investment, making this statement positive due to ability to appeal with facts." [Quek Yi Xin. 22S06E]

AND/OR

- **Explain why the phrase "the public has invested heavily" might be a normative statement**

Good sample responses:
"The statement can also be a normative one, which is a statement of value of opinion, whose accuracy cannot be tested by simple appeal to facts. The public has "invested heavily", but how much money has to be invested to be considered a high or heavy investment is subjective to the person." [Erina. 22S03J]

AND/OR

- **Explain why the phrase "these products are theirs' too" might be a normative statement**

Good sample responses:
"The statement is normative as the ownership of Covid vaccine technology is subjective, and (if the legal rights have not been issued yet), it is not backed by data, instead being an opinion of the author". [Ang Yock Kang. 22S06I]

AND/OR

- **Explain why the phrase "these products are theirs' too" might be a positive statement**

Good sample responses:
"The statement may be seen as a positive statement as it is a statement of fact. Positive statements can be proven by checking with evidence. According to laws, "patent holders are the rightful owners of their inventions … entitled to existing protections." This means that pharmaceutical companies own the vaccines they invented by law, regardless of stakeholders involved. In that way, this statement is proven inaccurate (false) and is a positive statement." [Shermaine. 22S03J]

Mark Scheme:

Max 1m	• *Define normative and/or positive statements only*
Max 3m	• *Accurate and complete definitions of normative and positive statements* • *AND only makes a judgement on 1 part of the sentence (EITHER "the public has invested heavily" OR "the product is theirs" is a positive and/or normative statement)*
Max 4	• *Accurate and complete definitions of normative and positive statements* • *AND addresses both parts of the sentence ("the public has invested heavily" AND "the product is theirs").* • *AND A judgement is made on whether each part is a positive and/or normative statement. An overall judgement might be provided.*

Examiners' Comments

- A small number of responses did not explain the meaning of "positive" and "normative" statements clearly. Most students, however, correctly explained a "positive" statement as being a factual statement that can be proven true or false using empirical evidence or data, and a "normative" statement as one that is subjective and involves a value judgement or opinion which cannot be proven true or false using empirical evidence or data or statistics. The strongest responses showed awareness that what mattered in characterizing these statements as normative or positive was whether it was in principle of being supported or refuted by reference to evidence. An equally acceptable approach was to argue either that there was, or was not, evidence to confirm it within the Extract(s) provided.
- Weaker responses did not explain the meaning of "normative" and "positive" statements clearly. For instance, they need to go beyond stating that a normative statement is one that is a claim that could not be "quantified" or "measured". They need to explain that a normative statement is is subjective and involves a value judgement which cannot be proven true or false using empirical evidence or data.
- Students are required to recognize that there are two parts to the statement "the public has invested heavily, and these products are theirs' too". To secure full credit, they need to make an assessment on both parts of the statement. Students need to be mindful not to take sides with either the public or the pharmaceutical companies as to which party is the rightful owner of the vaccines, but whether the statement "these products are theirs" can be proven true or false using evidence, statistics and data.
- Note that public spending refers to government spending, as opposed to private sector spending which is undertaken by households and firms. The private sector is the part of the economy that is run by individuals and companies for profit and is not state controlled.

(c) Using demand and supply analysis, to what extent will "waiving intellectual-property (IP) protections for Covid-fighting technologies" make pharmaceutical products more accessible to countries, especially poorer countries. [8]

Suggested Answer:

Introduction:

- Clarify ambiguity
  - Clarify what is meant by Covid-fighting technologies – e.g. vaccines
  - Clarify what is meant by "more accessible" - can refer to more residents being vaccinated (increase in quantity of vaccines) and/or more affordable to residents (fall in prices of vaccines)

Body:

Thesis: Waiving intellectual-property (IP) protection for Covid-fighting technologies" can make pharmaceutical products more accessible (more affordable and increasing its quantity) to countries, especially poorer countries because

- Explain the workings of the measures using market demand and supply framework
- Increase in market supply (rightward shift of the supply curve) as the waiver of IP protection for Covid-fighting technologies will lower barriers to entry into the market for Covid-fighting technologies like vaccines → "increasing the number of manufacturers globally" (Extract 1) → surplus at the original price → downward pressure on price as firms reduce prices to get rid of surplus → quantity demanded increases because real income increases (movement along demand curve) while quantity supplied falls (movement along the new supply curve) as previously profitable units are now not profitable → fall in equilibrium price and an increase in equilibrium quantity of vaccines, ceteris paribus.

Task: Draw a diagram to illustrate the above textual explanation.

Anti-thesis: Limitations of waiving IP protection in achieving its intended aim of increasing accessibility (more affordable and increasing its quantity) of pharmaceutical products to countries, especially poorer countries

- Extent of rightward shift of supply curve might be limited because
    - Extract 1 states that "there is a "limited availability of raw materials". This means that many vaccine suppliers in the industry compete to gain access to the limited raw materials, placing an upward pressure on the price of raw materials. This increases the costs of production for vaccine suppliers and for the same price of a vaccine, they now supply a lower quantity, thus shifting the supply curve to the left (supply decreases). This causes an increase in price of vaccines through the adjustment of the price mechanism as explained earlier, thus making it unaffordable for poorer countries to purchase and gain access to it." [22S03L. Vijaya Madhuita.]
    - "Some constraints are imposed by governments through export restrictions that interfere with supply chains" → limit the sale of vaccines or factor inputs to produce vaccines to smaller countries which limit the increase in supply of vaccines to poorer countries, hence limiting the fall in price and increase in quantity traded of vaccines in poorer countries
- Demand for vaccines is likely to be price inelastic because
    - "Covid-fighting technologies … involves the matter of life or death" [Chen Wendi. 22S03F] and have no close substitutes.
        - This means that when demand is price inelastic, an increase in supply will lead to a fall in price which will in turn lead to a less than proportionate increase in quantity demanded. (Note that when |PED|<1, the fall in price will be more significant than the increase in quantity demanded).
        - Hence, while the waiver will cause a limited increase in quantity demanded of vaccines, the fall in price of vaccines is more significant.
        - EV: Whether accessibility of vaccines has improved depends on whether the government or society prioritises increase in quantity or fall in price of vaccines more. Which would you prioritise?

Task: Draw a diagram to illustrate the above textual explanation.

Evaluation including a conclusion (make a judgement based on T & AT in the context of Covid-19 technologies/pharmaceutical products and poorer countries. Put more weight on either T or AT. Don't sit on the fence.

- "In conclusion, the policy is likely to be effective in the long run, as it can "remove the legal barriers that hinder the scaling-up of the global vaccine production", "minimizing disruptions" of the kind that occurred in India. Manufacturers in poorer countries may be able to produce vaccines and other products in their own countries, thus increasing domestic supply of products which are more available to citizens than foreign products that are subjected to export rules. However, in the short run, it is ineffective as the supply will not increase much due to (rising costs of production as producers push up prices of increasingly scarce factor inputs). (Moving forward), developed countries need to work with poorer countries to develop more production facilities so that they can scale up production in time at a larger scale." [Glenda Tan Hui En. 22S06P.]

Mark Scheme:

Knowledge, Application, Understanding, Analysis		
L1	*Glaring conceptual errors throughout* *OR No use of case evidence at all (purely theoretical response)* *OR No use economic framework at all (no use of market dd/ss framework)*	***1-2***
L2	*One-sided answer, meaning no limitations (AT) - max 4m.* *OR Lapses in scope* *OR Lapses in rigour of analysis*	***3-4***
L3	*Well-balanced answer (TAS) with good scope (impact on both price and quantity) and depth of elaboration*	***5-6***
Evaluation		
E	*Make 2 points of judgement that is explained based on T & AT in the body including a conclusion that considers the context of pharmaceutical products, COVID-19 pandemic and poorer countries (put more weight on T or AT), Can include a recommendation.* *1 judgement point that is explained based on T & AT in the body, max 1m* *Summary of T and AT, 0 marks*	***1-2***

Examiner's Comments:

- *There are many responses that use availability of spare capacity as a supply determinant (meaning to shift the supply curve to the right). Note that availability of spare capacity is a PES determinant, while cost of production is a supply determinant. Revise what factors affect PES (relative slope of supply curve) again (C-MIST) and what factors causes supply curve to shift again (ECOP-ING). Do you know what C-MIST stands for and what ECOP-ING stands for? Please find out from your friends or your tutor/lecturer.*
- *For simplicity, apply PED when supply curve shifts and apply PES when demand curve shifts. In reality, however, PED and PES can be applied when supply curve shifts. Likewise when demand curve shifts. If you want to apply PES when supply curve shifts, then you must do so correctly and accurately.*
    - *For instance, supply of vaccines is likely to be price inelastic because*
        - *""Most of the world's vaccine-making is already in use" suggests that globally, firms are operating close to full capacity and spare capacity is (limited in) availability to increase the (production) of output… as depicted by the "limited availability of raw materials and expertise." This makes supply price inelastic as there is a low level of stock/inventories to increase quantity supplied…" [Shermaine Lee. 22S03J]*
        - *The correct analysis based on PES<1 and supply curve shifting to the right is:*
            - *This implies that when PES<1, for a given increase in supply (as reflected by the rightward shift of the supply curve), the fall in price will cause a less than proportionate fall in quantity supplied in vaccines (movement along the new supply curve). In order words, the fall in quantity supplied (due to a fall in price brought about by an increase in supply) is limited when PES<1.*
            - *Hence, waiving IP protection will increase affordability and quantity traded of vaccines by a significant extent, ceteris paribus.*
            - ***Task: Draw a diagram to illustrate the above textual explanation.***
- *There are still responses that provided only a one-sided answer. Students are advised to pay careful attention to the command word and provide a balanced response if the command word requires them to do so. In this case, the command word is "to what extent" which clearly requires a balanced (TAS) response. Not providing a TAS structure will mean not being able to secure the higher end Level marks and EV marks.*
- *Students should always write a conclusion. If necessary, students can start with "In conclusion" to make it clear to the marker that they are attempting to write a conclusion.*

(d) Explain the meanings of both non-rivalry and non-excludability, and comment on the extent to which new technologies (ideas) to fight Covid-19 has these characteristics. [7]

Suggested Answer:

Introduction:

- Clarify ambiguity
  - Clarify what is meant by non-rivalry
    - Consumption of a good by one person does not reduce the amount available for others. This implies that the cost of providing it to a marginal (additional) individual is zero.
  - Clarify what is meant by non-excludability
    - It is impossible to prevent a non-payer from consuming the good once the good is provided. This leads to the free-rider problem.
  - Clarify what is meant by new technologies to fight Covid-19
    - E.g. Vaccines, blue-tooth contact tracing tokens and so on

Body:

The ideas behind the new technologies to fight Covid-19 is non-rivalrous because

- Intellectual works falling under the domains of copyright, patent, and trade secret protection are non-rivalrous. As more and more people use an idea/a technology to fight Covid-19, there is not less and less of the idea to go around. Ideas are not depleted by use, and it is technologically feasible for any number of people to use an idea simultaneously once it has been invented.

New technologies to fight Covid-19 like vaccines are rivalrous because

- "(the) number of vaccines is inherently limited by the scarcity of resources used to produce it, hence one consumer using the vaccine will decrease the number of vaccines available for others." [Christine Kwek. 22S06E]

New technologies to fight Covid-19 including vaccines and the ideas behind these new technologies are excludable in the short run because

- Covid-19 fighting technologies or ideas can be made excludable with patents – the one possessing the patent can charge others for using the idea.
- "New technologies to fight Covid-19 are not non-excludable due to "IP protections", meaning only those who invented these technologies can use it free of charge. Others who do not hold the patent for these technologies cannot use the technology, or build their own version without compensating the inventors." [Christine Kwek. 22S06E]

New technologies to fight Covid-19 might, however, be non-excludable because

- Once the patent expires, the invention will become non-excludable. The inventor's intellectual property will be part of the public domain; Others will be free to use and market his/her invention. He or she may stop receiving patent-related royalties. Patent-related licensing agreements will no longer be enforceable.

Concluding paragraph (EV):

- In conclusion, whether these new technologies might be non-rivalrous or rivalrous, and why they might be non-excludable or excludable, depending on the time frame (short run and long run), type of Covid-fighting technologies and whether they are referring to the ideas behind the technologies or the product itself.

Mark Scheme:

Knowledge, Application, Understanding, Analysis		
L1	*Accurate and complete definitions of non-rivalry and non-excludability only* *OR Glaring conceptual errors throughout* *OR No use of case evidence at all (purely theoretical response)* *OR No use economic framework at all*	***1-2***
L2	*OR Lapses in scope* - *EITHER explain why new technologies to fight Covid-19 is non-rivalry OR non-excludability concept (correctly), or vice-versa, max 4* *OR Lapses in rigour of analysis* *Accurate and complete definitions of non-rivalry and non-excludability and addresses both issues, max 5*	***3-5***
Evaluation		
E	*Provide alternative perspective(s)* *Summary of T and AT, 0 marks*	***1-2***

Examiner's Comments:

- *Students are reminded to be precise in their definitions. For example, for non-excludability, please specify it is "non-payers" who cannot be prevented from consuming the good once the good is provided, rather than simply saying others cannot be prevented. Clarify that "others" refer to "non-payers".*
- *Some students argue that vaccines are non-excludable because they improve society's herd immunity to the virus, so the non-consumers may be protected from the virus although they did not pay for the good… turning them into free riders. This argument is contentious because it is safer to tackle the question from the perspective of whether it is possible to prevent those who do not pay for the vaccines from being injected with a dose of the vaccine, rather than focusing on the spill-over effects which is more of a positive consumption externality argument.*
- *Some students argue that vaccines can be non-rivalrous, especially when the country has a surplus of vaccine doses enough to ensure that everyone is able to obtain a dose. This argument is flawed because non-rivalrous means that for a given dose of vaccine, when one person is injected with it, that dose of vaccine is still available for someone to be injected with, which is clearly impossible. The surplus issue is more of a scarcity-related issue, and not related to whether the vaccine is rivalrous or not. (Note that street lighting is non-rivalrous but the resources (e.g. fossil fuels used to generate electricity) to produce street lighting are scarce.)*
- *Note that there is a difference between marginal costs of producing an additional unit of a good and marginal costs of providing the good to an additional user. When a good is non-rivalrous, this implies that the marginal costs of providing it to an additional user once it is produced is zero. This does not imply that the marginal costs of producing that unit of the good is zero as scarce resources are used to produce the good.*
- *There is no need to justify if Covid-fighting technologies are public goods or not because the question did not require you to do so.*
- *Students are reminded to pay attention to the command word. The command word "comment on" requires a TAS structure. Students are required to provide different perspectives on why these new technologies might be non-rivalrous or rivalrous, and why they might be non-excludable or excludable.*

(e) With reference to Extract 3, explain the concepts of scarcity, choice and opportunity costs that governments face during the Covid-19 pandemic. [2]

Suggested Answer:

- The aim of the government is to maximise social welfare.
- "During the Covid-19 pandemic, there is a scarcity of resources for healthcare such as hospitals, healthcare workers and medical equipment. This is due to unlimited wants for healthcare such as patients with "Covid-19" and "cardiovascular diseases" requiring treatments but limited healthcare resources to satisfy their wants as hospitals may exceed their capacity and workers are overwhelmed." [Glenda Tan Hui En. 22S06P]
- "The government had to make decisions on who to save first, or give priority to, Covid-patients or non-Covid patients with severe health issues like AIDs and cardiovascular diseases. Both Covid and other severe health issues are resulting in deaths and making a choice to save a Covid patient may lead to death of a non-Covid patient and vice versa. [Mervell Tan. 22S06T]
- "Opportunity costs is the value of the next best alternative forgone… By choosing to spend more budget on the Covid-19 vaccines over others such as healthcare for non-AIDs and AIDS patients, there is an opportunity costs. The opportunity costs is the value of the lives that could have been saved, who lost their lives due to non-Covid related causes." [Waverly Wu. 22S03F.]

Mark Scheme:

- *Only accurate and complete definitions of scarcity, and opportunity costs concepts**, max 1***
- *Accurate and complete definitions of the scarcity and opportunity costs concepts AND applies all 3 concepts to Extract 3 and what the governments face during the Covid-19 pandemic**, max 3 [**anything missing**, max 2]***

Examiners' Comments:

- *Some students explained that the opportunity costs of spending more resources on Covid-19 vaccines is the deaths of other patients due to other non-Covid related causes. This is not addressing the concept of opportunity costs directly as the concept requires students to highlight the benefits that society forgoes from not choosing the next best alternative.*

(f) Explain <u>one</u> possible unintended consequence in each of the following situation:

(i) "Export prohibitions" in the market for food in a country imposing these restrictions.

(ii) A "price cap" in the market for an "essential good" like rice. [6]

Suggested Answer:

<u>Clarify Unintended consequences</u>

- An unintended consequence refers to an outcome that was not expected.
- A negative unintended consequence is an outcome that was not expected but turned out to have a negative impact. Perverse consequence where the outcome is the opposite of what the policy intended is typically negative.

<u>Unintended consequences arising from "export prohibitions" in the market for food in the food exporting country</u>

- "When export prohibitions are put in place, producers in the country which prohibited exports will experience an unplanned rise in inventory levels. This creates a surplus in the domestic market because there is a large quantity of food exports not allowed to leave the country. This causes a surplus at the current market price, causing a downward pressure on price as producers reduce their prices to get rid of the surplus. Prices fall until the surplus is eliminated." The fall in price will lead to a less than proportionate increase in quantity demanded for rice

because the demand for rice is price inelastic as it is habitually consumed. Hence total revenue generated from the sale of rice falls. Assuming costs remain unchanged, profits will fall. "In the long run, since producers see an unplanned rise in inventory levels, they will scale back production to minimise losses from selling their products at reduced prices. In the long run, this may result in a shortage of food in the country as producers are no longer producing enough food. This can cause price levels to increase, leading to inflation of food prices in the long run." [Ng Linus. 22S06I.]

Task: Draw a diagram to illustrate the above textual explanation.

- "Export prohibitions in the long run may hurt the countries imposing restrictions as export prohibitions means that the country will no longer be able to sell certain goods to foreign markets. Exports will fall and ceteris paribus, net exports which is a component of aggregate demand (AD) will fall. This causes autonomous AD to fall which will lead to a more than proportionate fall in real national income (RNY) via the multiplier process and hence, a fall in actual economic growth. This is especially applicable for countries whose GDP is dependent on exports." [Erina Tjin Yi Ying. 22S03J.]

Consequences arising from a price cap in the market for an "essential good" like rice

- "A "price cap" for an "essential good" will lead to illegal activities such as a black market. Due to the price cap (where the maximum price is set below the free market equilibrium price), quantity demanded (Qd) is more than quantity supplied (Qs), resulting in a shortage at Pmax. However those who are able to obtain Qs quantity of rice can sell it in a black market at the maximum price consumers are willing and able to pay (Pb). This is because there will definitely be consumers who are willing and able to purchase rice at a price higher than Pmax because rice is a habitually consumed food item." [Estella Lim. 22S03R.]
- The extent of shortage is not likely to be significant because the demand for rice is likely to be price inelastic because rice is habitually consumed. In addition, supply of rice is likely to be price inelastic because it takes time to grow and harvest rice. However, the extent of the increase in price in the black market is likely to be significant given that demand for rice is price inelastic.

Task: Draw a diagram to illustrate the above textual explanation.

Mark Scheme:

- Max 3 marks for each part

Examiner's Comments:

- *For part (fi), a small proportion of students analysed the impact of food export prohibitions on countries that import food, rather than what the question specifies which is on food exporting countries which restrict the export of food.*
- *For part (fii), students are reminded to be careful in their use of terms like "demand" and "quantity demanded", "supply" and "quantity supplied". When referring to the entire curve, students should use the concepts "demand" or "supply", but when referring to a point on the demand (or supply) curve, students should use the term "quantity demanded" (or "quantity supplied").*

(g) Taking the aviation industry as an example, explain carefully what is meant by a 'negative externality'. [3]

Suggested Answer:

"The aviation industry only produces according to its own self-interests which are profit-maximising. They thus produce at the free market equ8ilibrium and do not account of external costs they impose on third parties. By producing and allowing flights to take off, they produce a lot of pollution which (reduces air quality) and can negatively affect the health of people living near the airport, leading to diseases (e.g. respiratory problems) that must be treated medically, incurring a cost for these individuals that are not involved in the transaction between the industry and its consumers, (but these third parties are not be compensated by the aviation industry). This is a negative externality from producing air travel. [Jack Kirkwood. 22S06Q.]

"In the aviation industry, (producing) a flight would generate negative externalities in (production), which are costs imposed on third parties who are not the producer and consumer, and those third parties are not compensated by the producers or consumers. Flying in an airplane uses fossil fuels and generates a lot of carbon emissions and pollution. Pollution would reduce the air quality, leading to more health problems like asthma in other people, which reduces their productivity, reducing profits for their employers. Carbon emissions also contribute to global warming, which results in severe flooding in some countries, damaging buildings, and incurring costs to the government to repair them." [Erina Tjin Yi Ying. 22S03J.]

Mark Scheme:
1 mark *for correct definition for negative externality*
2 marks for careful explanation about what is meant by a negative externality in the context of the aviation industry (include specific examples of spillover costs and who the third parties are, and the activities undertaken by the aviation industry which generate the negative externality)

Examiners' Comments:
- *Some students drew the externality (MSB/MSC/MPB/MPC) diagram and explained the derivation of the free market output and socially optimal output levels, as well as the deadweight loss. This is not required by the question because the question did not ask us to explain why the market fails when there is negative externality in the aviation market. The question only requires us to explain what is meant by negative externality, hence a precise and complete definition of negative externality and examples highlighting clearly what the spillover costs and who the third parties are suffice for this question.*

(h) Some people claim that governments "propping up polluting industries" by releasing more pollution permits and reducing carbon taxes (Extract 5) does more harm than good to the economy.

Discuss the extent to which you agree with this view. [12]

Suggested Answer:

Introductory paragraph: Clarify ambiguity:
- Clarify what is meant by more harm than good to the economy:
    - Whether the impact on macroeconomic goals (including actual and potential economic growth and/or sustainable growth, unemployment and inflation) and impact on micro goals (efficiency and equity) are positive or negative
- Economic tools of analysis
    - Externality (MSB/MSC/MPB/MSC) diagram and concepts
    - AD/AS diagram and concepts (multiplier if a shift in AD curve is involved)

Body paragraphs
- **Explain why "propping up polluting industries" by releasing more pollution permits and reducing carbon taxes does harm to the economy:**
    - Worsens allocative inefficiency as these polluting industries generate negative production externalities which is a source of market failure

- Results in unsustainable economic growth in the long run

"As explained in part (g), the production activities of such polluting industries lead to negative externalities being generated. There is overproduction of such activities since the in the pursuit of self-interests, profit maximizing firms ignore the negative production externalities generated and hence, the free market output level is at Qe where MPC of production equals MPB of consumption (MPC=MPB) which is higher than the socially optimal quantity is at Qs where MSB equals MSB (MSC=MSB). There is a deadweight loss given by the shaded area since the overproduction of QeQS units generates more costs than benefits to society. Hence there is market failure due to overproduction of such activities.

"Reducing carbon taxes" and "releasing more pollution permits" seek to worsen the market failure. The carbon tax reduction shifts the MPC curve to the right since a fall in carbon as the effect of lowering costs of production which increases profit-maximising producers' willingness and ability to produce. This can lead to a larger deadweight loss incurred of blue shaded area.

Task: Draw a diagram to illustrate the above textual explanation.

Releasing more pollution permits also have the effect of reducing costs of production as (price of permits to pollute will fall when the supply of these permits increase in the market for permits to pollute. This means firms pay less to buy these permits from other firms. If these permits are given away free to the firms, this means that firms in these polluting industries like the aviation industry do not need to buy as many permits in the market to pollute as before, which reduces their costs of production.)

This worsens the problem of the market failure and overproduction in the economy since the production of activities have increased to a quantity more than before. Resource misallocation thus generates a larger welfare loss to society and citizens.

Furthermore, citizens have to endure with a larger amount of pollution with the use of "oil, gas and coal" which are major sources of pollutants. Thus, they incur healthcare costs, suffer lower non-material standard of living as they smell the polluted air everyday. They also take Medical Care leave more often, leading to a decrease in productivity of labour which causes a leftward shift of AS curve from AS0 to AS1 in the long run. The productive capacity of the country is lowered and thus ability of achieving potential economic growth in the long run is lowered." [Prisca Quek Yi Xin. 22S06E.]

Task: Draw a diagram to illustrate the above textual explanation.

"These policies can do harm as they encourage polluting industries to pollute more. These industries use large amounts of "oil, gas and coal", thus they will deplete natural resources and lead to a loss of quantity of factors of production in the future. This causes productive capacity to decrease and long run aggregate supply (AS) falls from AS0 to AS1, hence potential growth falls. As firms compete increasingly for scarce resources, unit costs of production rise and they pass on the higher costs to consumers, thus GPL rises from P0 to P1, and if the increase in GPL is sustained, this worsens cost-push inflation which is accompanied by a fall in actual economic growth. Thus, these policies can hinder countries from achieving sustainable economic growth over the long run." [Glenda. 22S06P]

Task: Draw a diagram to illustrate the above textual explanation.

- **Explain why "propping up polluting industries" by releasing more pollution permits and reducing carbon taxes does good to the economy:**
    - Reduces cost-push inflation and reduces demand-deficient unemployment and promotes actual economic growth in the short run, which helps to boost economic recovery

"By releasing pollution permits and reducing taxes, the government decreases the costs of running an aviation business and other businesses, and incentivizes employers to keep employers on the payroll, giving them more stable jobs as well as enabling them to contribute to GDP and thus the economy by more fully utilizing the productive capacity of the economy." [Christine Kwek. 22S06E]

(When industries across the economy experience a fall in costs of production due to the fall in carbon taxes and fall in price of permits to pollute, the aggregate supply curve (AS curve) will shift downwards which will lead to a fall in general price level (GPL) accompanied by an increase in real NY (due to the increase in real income as GPL falls). Hence, the fall in cost-push inflation is accompanied by an increase in actual economic growth, ceteris paribus. Letting polluting industries "return to their carbon-intensive activities" can provide "an economic quick fix" in the short run.)

Task: Draw a diagram to illustrate the above textual explanation.

Evaluation including a conclusion

"In conclusion, these policies do more good than harm in the short run as "the UK air transport sector contributes about 4.5% towards its GDP and supports 1.6 million jobs". These polluting industries generate a large percentage of the countries' GDP and revenue for citizens, thus these policies can minimise reduction in economic growth and reduce unemployment to a large extent, especially in a pandemic where the incomes of citizens are uncertain and they need the income to support their families all the more. Thus, ensuring these priorities is more pressing than the environment. To minimise harmful impacts on the environment, when the economy recovers and the government has greater ability to collect taxes, the government can slowly introduce green technology to these polluting industries to minimise their pollution, achieving sustainable economic growth in the long run." [Glenda. 22S06P.]

"In conclusion, I think that viewing the country's situation in the long run and in the context of COVID-19, these measures do more good than harm to the economy. The COVID-19 situation has caused deterioration of the country's economic growth and unemployment – "30,000 jobs could be lost because of the pandemic and the current low oil price". It is not a smart move to impose these measures and risk having the economy deteriorating even further which can lead to other longstanding problems like recession or hysteresis due to prolonged unemployment in the economically weak country, causing a fall in productive capacity and potential economic growth. Instead there can be measures implemented like "firms agreeing to offset their emissions, by planting trees" to make the effect of their polluting less severe, decreasing MEC and the consequences that citizens suffer from inhaling pollutants. This would allow the economy to progress, while minimising environmental damage on society and decreased citizen welfare." [Prisca Quek Yi Xin. 22S06E.]

Mark Scheme:

Knowledge, Application, Understanding, Analysis		
L1	• *Conceptual errors in analysis throughout or descriptive responses throughout* • *No use of case evidence at all* • *No use of economic tools of analysis*	***1 – 2***
L2	• *Lapses in rigour and use of case evidence* • *Lapses in scope of coverage*	***3 – 5***

	• *One sided answer*	
L3	• *Good rigour, scope, use of case evidence to support economic analysis* • *1 source of market failure (with economic analysis) and policies stated in the question* *L1:1-2 – No case evidence OR economics framework OR glaring conceptual errors OR listing throughout* *L2:3-5 – Explain why releasing more pollution permits and reducing carbon taxes is effective in achieving actual economic growth and reducing unemployment and lowering cost-push inflation during Covid-19 pandemic. But no limitations and other adverse effects.* *L3: 6-9 – Explain why releasing more pollution permits and reducing carbon taxes is effective in achieving actual economic growth and reducing unemployment and lowering cost-push inflation during Covid-19 pandemic, with limitations and other adverse effects (e.g. increase allocative inefficiency in polluting industries, hence environment sustainable growth might fall in the long run, OR less tax revenue collected in the short run, hence less ability to spend on unemployment and other welfare benefits in the short run, hence less ability to redistribute to the poor and reduce income inequity OR less tax revenues to fund green energy and achieve environmental sustainable economic growth in the long run).* *E: 1-3 – Make a judgement on whether the above policies are able to achieve both micro and macroeconomic aims during Covid-19 pandemic.*	***6 – 9***
E1	*1 judgement point that is explained based on T and AT, max 1m*	***1***
E2	*2 judgement points that is explained based on T and AT in the context of Covid-19 pandemic and evidence in the case material but no conclusion*	***2***
E3	*2 judgement points that is explained based on T and AT in the context of Covid-19 pandemic and evidence in the case material AND a concluding judgement about the extent to which releasing more pollution permits and reducing carbon taxes does more harm than good to the economy. AND Provide a recommendation forward.*	***3***
	Summary, 0 marks *(Must put more weight on one side of the fence based on T & AT & context. Pure summary or sit on the fence, no credit.)*	***0***

Examiners' Comments

- Given the command word, students are expected to provide a TAS structure. Most students who completed the question did so. Given the key words in the question, students were expected to explain the positive and negative effects of releasing more pollution permits and reducing carbon taxes on economic goals like economic growth, unemployment, inflation, efficiency and equity (if relevant).
- A significant proportion of students did not address the two policies stated in the question (releasing more pollution permits and reducing carbon taxes) at all or did so in a cursory/superficial manner and hence could not obtain the higher end marks.
- Most students explained that releasing more pollution permits and reducing carbon taxes will lead to an increase in profits for polluting firms because their costs of production will fall. With higher profits, these firms will have greater ability to invest in machines and new factories which will cause an increase in aggregate demand (AD) because investment is a component of AD. The increase in autonomous AD will lead to a more than proportionate increase in real NY via the multiplier process as one person's

spending is another person's income and income generates more spending, ceteris paribus and assuming sufficient spare capacity which is likely during the COVID-19 pandemic. Hence actual economic growth increases and demand-deficient unemployment (labour is a derived demand) falls while demand-pull inflation increases as the economy moves closer towards full employment.

Such responses were accepted, but the more immediate and direct consequence of releasing more pollution permits and cutting carbon taxes is an increase in aggregate supply as reflected by a downward shift of the AS curve. The downward shift of the AS curve will similarly promote actual economic growth and a fall in demand-deficient unemployment but a fall in cost-push inflation.

Increasing carbon taxes and reducing permits to pollute tend to lead to cost-push inflationary pressures while reducing carbon taxes and releasing more permits to pollute tend to reduce cost-push inflation, which is not captured in the analysis if the AD curve, rather than the AS curve, is shifted.

- When explaining the impact on economic growth, unemployment and inflation, students are reminded to provide rigour in economic analysis by integrating the ADAS diagram and concepts into their analysis.
- A small proportion of candidates still drew diagrams without providing a textual explanation of their diagrams. The examiners will only credit diagrams with accompanying textual explanations.
- Candidates are reminded to provide complete and accurate labelling of their diagrams. They should use a ruler to draw straight lines.
- Minimise the use of short forms/abbreviations to those that are commonly found in textbooks and lecture notes. Short forms/abbreviations that are not used in textbooks and lecture notes are likely not accepted at the A Levels! In addition, too many short forms/abbreviations will adversely affect the ease of reading and hence, clarity of your response.

Table of Comparison (Revision)

	Tax on output that emits carbon	**Carbon tax (Tax on pollutant)**	**Tradable permits / Cap and Trade**	**Quota in the output market**	**Subsidising green technology**
Classification / Type of policy	Market-based	Market-based	Hybrid but overall considered a market-based policy because It incentivizes firms to invest in fossil fuel alternatives and energy efficiency (adopt cleaner production methods)	Command and control	Market-based
How it works	In the market for the output that generates pollution, this has the effect of increasing costs of production (MPC curve shifts upwards) → increases the price consumers pay but reduces the price retained by producers, hence both Qd and Qs falls respectively. If the indirect tax = MEC at allocatively efficient output level, allocative efficiency is achieved	A carbon tax directly establishes a price on greenhouse gas emissions—so companies are charged a dollar amount for every ton of emissions they produce In the market for the output that generates carbon, for firms that choose to pollute → COP increases (shift MPC curve upwards) → price consumers pay increases but price producers retained falls, hence Qd and Qs falls respectively → market output level falls. Carbon tax incentivizes firms to switch to cleaner energy → reduces MEC (shift MSC curve downwards) → allocatively efficient output level increases Overall divergence between MPC and MSC curves is reduced → extent of allocative inefficiency is reduced.	1st part comprises of a cap/quota on carbon emissions whereby the government sets a limit on the maximum amount of pollutants firms are allowed to emit by giving out a limited number of emissions permits each year These permits can be given free of charge to the firms or auctioned to the highest bidder. Hence, a quota on pollutant is set by using permits → max limit on pollutant PLUS The second part comprises of trading of permits to pollute between firms in the secondary market for carbon permits Firms that can reduce their emissions at low cost would be incentivized to adopt cleaner production methods → fall in MEC → downward shift of MSC curve → Q_{AE} increases. Firms that do not have the ability to reduce their emissions at low cost will buy permits to pollute from firms that are able to do so → price of permits will add on to MPC of production → shift MPC curve upwards → fall in Q_{FME} In this way, the overall reduction in emissions would be achieved at least resource cost. The wider the coverage of the tradable permits market, the better.	Quota on output → Government sets a limit on output → targeted output level falls closer to AE output level	Green technology that reduces the MEC of production will reduce the divergence between MSC and MPC curves of production in the output market → smaller deadweight loss □→ reduce extent of allocative inefficiency .

Certainty in fixing an environmental outcome	☹	☹ The price of emitting a unit of pollution is set, but the total quantity of emissions is not → everyone knows the price being paid (at least for the immediate future) for each unit of carbon dioxide emitted, but uncertainty remains about the actual quantity of emissions	☺ Provides certainty about the quantity of emissions (it cannot exceed the cap), but uncertainty about the cost of achieving these reductions	☺	☹
Allows emissions reductions to take place wherever the abatement costs (or costs of reducing carbon emissions) are lowest	☹ No. The tax is on the output and not on the pollution itself.	☺ Yes. Carbon tax does so without anyone needing to know beforehand when and where these emissions reductions will occur	☺ Same as carbon tax Yes. By putting a price on pollution itself, firms have the incentive to reduce pollution if the cost of reducing pollution is lower than the price of the permit. Hence, those who can reduce emissions most cheaply will do so, achieving the pollution reduction at the lowest cost to society.	☹ No. The quota is on the output and not on the pollution itself.	
Encourage firms to develop new low-carbon technologies	☹	☺ To avoid paying carbon tax, firms have the incentive to develop new low-carbon technologies	☺ Firms have incentive to develop and adopt new low-carbon tech so that they can sell their excess permits to pollute and earn revenue which increases their profits	☹	☺
Generate revenue for private firms	☹ Does not generate revenue for private firms. In addition, with a tax there is an immediate cost for businesses to pay, post-tax profits fall		☺ Generates revenue for private firms who are able to adopt cleaner methods of production (sell their permits to those who cannot) Depends on whether the government gives out the rights to pollute free of charge or sells them to firms; And depends on whether the firms have to buy the rights to pollute from other firms	☹	☹
Ability to generate revenue for the government	☺ Tax revenue can be used to fund environmental protection activities. Or "recycled" back into the economy by reducing taxes on income, labour, hence minimising the adverse impact on actual growth in the short run.		☺/☹ Government has the potential to earn revenue, but only if permits are auctioned instead of merely allocated free-of-charge to firms.		

Impact on cost of living / inflation	Yes, indirect tax increases COP → shift AS curve upwards → GPL increases → costs of living increases; if increase in GPL is sustained, cost-push inflation results		To buy the right to pollute, firms incur costs → shift AS curve upwards (similar to indirect taxes) but less inflationary than indirect taxes	By limiting the quantity of output directly, prices of goods will increase	
Ease of implementation	😊 Easy and flexible to implement	😊 Both cap-and-trade and a carbon tax need to be enforced – emissions must be determined for various sources and penalties imposed if a source does not have the requisite allowances or does not pay the required taxes. A tax on fuels used for transportation, heating, and cooling is less expensive to administer than cap and trade, hence the preferred way to promote CO2 emissions abatement in these sectors.	☹ Emissions trading proposals can be administratively more costly than carbon taxes because emissions trading is highly complicated and technical, which need to be resolved before trading can begin, including treatment of different GHGs, monitoring, enforcement, etc. It also has an additional administrative requirement – the allocation of allowances. Cap-and-trade would also be prohibitively expensive to administer if applied to automobile transportation or residential heating and cooling due to the number of participants involved		☹ Burden on government's resources

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

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