2024 A-Level H3 Economics Paper 1
Case Study Question
Suggested Answers

<table>
<tr><th>Qn</th><th>Question / Suggested Answer</th><th>Marks</th></tr>
<tr><td>(a)</td><td>Using game theory, explain how the fear of shortages might lead to panic buying.</td><td>[6]</td></tr>
<tr><td></td><td>
Game theory provides a framework for understanding why the fear of shortages might lead to panic buying even if no actual shortage exists at the point of purchase.

In game theory, in contrast to traditional economic analysis, individuals make decisions based not only on their own preferences but also on what they expect others to do. The classic Prisoner's Dilemma and coordination games illustrate how rational individuals, acting in their own self-interest, can produce collectively suboptimal outcome.

This model can be applied to the case of panic buying, as follows:

Imagine a scenario with two strategies, where the two players in the game are the shopper and everyone else. The shopper has two strategies:

Shop normally (buy what he or she needs)
Panic buy (stockpile excessively)

strategic interdependence

However, the payoff to the shopper depends on what others do as well as the shopper's own action:

If everyone shops normally, supplies remain available, and everyone benefits as they would be able to purchase the necessary supplies the next time they require it and would not need to stockpile supplies which incur an opportunity cost (the other goods that they could have purchased instead of unnecessarily stockpiling)
If others start panic buying, those who shop normally risk being left with nothing.

Nash Equilibrium emerges when each person's strategy is optimal given the strategy of others. If the shopper believes that everyone else will panic buy, the best response is to panic buy as well, to avoid missing out on essentials such as hand santisers. This creates a self-fulfilling prophecy: the fear of shortage leads to stockpiling, which in turn causes the very shortage people feared, meaning both parties 'lose' out. The payoff matrix below provides more detail about the potential gains and losses.

<table>
<tr><td rowspan="3">Shopper</td><td></td><td colspan="2">Everyone Else</td></tr>
<tr><td></td><td>Shop Normally</td><td>Panic Buy</td></tr>
<tr><td>Shop Normally</td><td>(4,4)</td><td>(1,5)</td></tr>
<tr><td>Panic Buy</td><td>(5,1)</td><td>(2,2)</td></tr>
</table>

As shown in the payoff matrix above, the dominant strategy of both players is to 'Panic Buy' as the benefits is higher than the strategy of 'Shop Normally' regardless of the action of the other player. Thus, the Nash equilibrium will be for both players to Panic Buy leading to a scenario of shortages and bare supermarket shelves.
</td><td></td></tr>
<tr><td></td><td>Marker's comments:
Generally, responses were well explained. Candidates demonstrated a strong knowledge and understanding of game theory. A payoff matrix was used to explain how the fear of shortages might lead to panic buying. Stronger responses used the information in the case study to refer to the two players in the game as 'the shopper' and 'everyone else'. They also gave appropriate values for the possible outcomes from the game. Almost all candidates gave clear explanations of how a Nash equilibrium was achieved.</td><td></td></tr>
<tr><td>(b)</td><td>Explain how stockpiling might be considered 'an example of tragedy of the commons'.</td><td></td></tr>
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	The tragedy of the commons most famously articulated by **Garrett Hardin**, an American ecologist, in his influential 1968 essay titled "The Tragedy of the Commons. Hardin used the term to describe how individuals acting in their own self-interest can overuse and ultimately deplete shared resources, leading to collective ruin. While Hardin used the example of a shared grazing field as 'the commons', this concept has been extended to understand diverse problems such as overfishing, air pollution, deforestation and climate change. Stockpiling of essential goods such as hand santisers, toiletries and food staples can be understood to be a form of tragedy of the commons. The commons, meaning goods that are accessible to all members of the society – in this case, as the prices of essential goods are generally low and form a small proportion of household income, most if not all members in society would have access to the goods. Also, as these are considered to be essential goods, it is not feasible to prevent people from purchasing these goods. However, the consumption of these goods are **rival**, in the sense that consuming one additional unit of sanitiser (for example), reduces the availability of these resources for the next user. People who are faced with the possibility that the pandemic would result in quarantine and the inability to go out to purchase essential goods, then make the rational decision to stockpile and ensure a readily available supply of essential goods such as good during the days of quarantine. Others might also rationally assume that the masses would stock up on as many essential goods as possible and to pre-empt this, by also stockpiling on the essential goods. The result is that each individual stockpiles and 'overuses or draws down' on the 'commons' or the essential goods. The 'commons' is also not able to replenish quickly, as the pandemic resulted in global supply chain disruptions such as port closures, making it difficult for supermarkets to restock these essential goods. The result as stated in Extract 2 are entire grocery aisle laying empty or bare, similar to the eroded and bare common grazing grounds described by Hardin.	
	Marker's Comments *Stronger responses applied the economic concept of a common pool resource (i.e. a rival and non-rival excludable good) to explain how stockpiling might lead to tragedy of the commons. These responses made good use of the information in the case study extracts. They explained that it was difficult to exclude consumers from buying some of these 'essential' products, as the price was low and made up a very small part of a household's income. Weaker responses did not give a clear definition of a common pool resource and made limited reference to the case study material. Hence, they were less convincing in their explanation of how stockpiling was an example of the tragedy of the commons.*	
©	Discuss whether buying behaviours during the COVID-19 pandemic are good examples of bounded willpower and bounded self-interest.	[8]
	There are two types of buying behaviour that were exhibited during the COVID-19 pandemic: a) Stockpiling or panic buying b) Buying in a socially responsible manner (i.e. restricting the amount of essential goods the consumer purchases to allow others to have access to the necessary goods) Both of the above buying behaviours diverge from the traditional economic analysis of a rational consumer who weighs their individual costs and benefits to decide whether to purchase or not. **Bounded willpower and bounded self-interest** are concepts which could explain the buying behaviour exhibited above.	

R1

Bounded willpower refers to the idea that people often struggle to follow through on their long-term plans and intentions due to limited self-control. Even when individuals know the optimal choice for their future well-being, they may still opt for immediate gratification, leading to behaviors like impulsive spending. In Extract 4, it states that 'extreme panic buyers in Singapore …indulged in excessive stockpiling more than what they need three times or more', such excessive stockpiling coud be due to fear overcoming their self-control or rationality. While the consumer may understand cognitively that Singapore has ample food supplies and supplies of other essential goods, the overriding fear or concern that these items will not be available leads to them stockpiling at their own detriment. In addition, due to **hyperbolic discounting**, consumers may prioritise or overweight their immediate satisfaction or reward (e.g. the assurance that they have the essential products that they need). As food products are perishable and have a shelf-life, over stock-piling may result in these food products spoiling and them not able to even consume these products in the end. Consumers should instead purchase food products when they actually have a need, where the food products are likely to be fresher.

In the same vein, **bounded self-interest** could explain why consumers engage in 'altruistic buying behaviour' where they intentionally restrict the amount of essential goods that they buy or allow elderly and vulnerable individuals purchase these goods ahead of them. **Bounded self-interest** is the recognition that people are not always purely self-interested. Instead, they often care about others' well-being and are willing to make decisions that benefit others, even at a cost to themselves. In this case, individuals who restrict their own purchases, do so with the awareness that they may not have sufficient supplies of essential food products or essential goods should these goods really run out but they are willing to set aside their own personal benefits to benefit others.

R2

However, the buying behaviour could also be explained by rational decision making. In the case of panic buying, rational consumers include other potential costs in their decision making such as the medical costs if they are infected with the COVID-19 virus. The rational individual may then decide to stockpile so as to reduce the number of visits to the supermarkets to reduce the potential for infection. To elaborate, a consumer when faced with the decision on whether to make additional trips to the grocery store, would weigh the benefits of purchasing essential goods (i.e. the consumer welfare/satisfaction of consuming these goods) against the costs of purchasing these goods. These costs would include both the opportunity cost of the goods that could have been purchased, the time that could have been spent on other activities as well as the potential costs of catching the COVID-19 virus (i.e. the medical costs, loss of income if they are unable to go to work). As the potential cost of catching the COVID-19 virus is high, a rational consumer will not want to make additional trips to the grocery store and will instead choose to purchase more and stockpile at each trip.

Similarly, 'altruistic' purchasing behaviour where consumers intentionally restrict the quantity of essential goods that they purchase to allow others to purchase these essential goods could be considered rational behaviour as well. If we regard the purchase of essential goods as a repeated Nash game where consumers know each other and where there is a dynamic of repeated interactions as well as the potential for cooperation and reputation effects. One example would be consumers in a small town with a single grocery store where the majority of consumers know each other and have friendly social ties.

In such a scenario, each participant knows they will interact with the same group repeatedly. If someone stockpiles excessively, others will remember this behavior and may retaliate in future rounds (for example, by not cooperating or by stockpiling themselves in response. In addition, participants will also consider their reputation and social standing. Because actions today affect future relationships, participants have an

incentive to cooperate (i.e., not stockpile) to maintain good standing and ensure mutual benefit over time. The threat of future punishment (such as exclusion from informal sharing networks or social disapproval) would result in 'altruistic' behaviour where participants only purchase what they need. This will result in a stable Nash equilibrium where both participants shop normally with a better social outcome:

		Everyone Else	
		Shop normally	Panic Buy
Shopper	Shop normally	**(4,4)**	(1,5)
	Panic Buy	(5,1)	(2,2)

Marker's Comments

Most candidates demonstrated a clear and firm understanding of both bounded willpower and bounded self-interest. Generally, responses were well-explained. Stronger responses made good use of the material in the case study to explain why buying behaviours during the COVID-19 pandemic were examples of both bounded willpower and bounded self-interes. were examples of both bounded willpower and bounded self-interest. The former was explained through a good application and understanding of hyperbolic discounting. The latter was explained through reference to altruistic behaviour. There were also some good evaluative judgements on whether these buying behaviours are good examples of both bounded willpower and bounded self-interest, based on huge uncertainty about Covid-19 and its possible dangers leading to serious health issues.

(d) Discuss whether the use of nudges is the best approach to reduce panic buying. [10]

A nudge is defined as: *"any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives."* This concept relies on the insight that humans are not fully rational decision-makers and structuring choices in a certain way can "nudge" individuals toward better outcomes. In the case of panic buying, the nudge would address the anxiety and fear that supplies of essential goods would run out.

Some possible nudges to address or allay that anxiety could be to:

a) Government to advise newspapers to reduce the number of articiles highlighting bare grocery shelves and instead reassure the public that supply chains are robust and that there is no need to hoard items. This was done in Singapore with PM Lee Hsien Loong providing calm and clear information on the robustness of our supply chains and reassuring the public that there was no need to panic buy. This leverages on the **authority bias** where individuals have a tendency to attribute greater accurace to the messages of an authority figure (in this case, PM Lee) and be more influenced by that messaging.
b) Supermarkets can reinforce this messaging using **social norm and reciprocity nudges**, for example: 'there is enough for everyone if we all buy responsibly', and 'Please buy only what you need and think of others. Most people do the right thing.'

However, nudges alone may be insufficient to address panic buying. Studies conducted on nudges indicate that they produce only short-term effects and are context-sensitive. While individuals do take into account pro-social messaging and other nudges, they are also weighing other sources of information (e.g. social media posts from other consumers who are stockpiling) which may lead to herding behaviour despite the best efforts of the government to reassure the public.

In addition to nudges, we should impose limits on the number of items that people can buy for popular or essential goods. This was done in a number of countries including the UK where stores introduced limits on high-demand items and accompanied these limits with proosocial framing. Limits would help to reduce panic buying and give grocery stores

	enough time to restock and maintain supplies. However, this approach has its own limitations- we cannot prevent customers from returning again to the same supermarket to purchase additional quantities of the essential items or visiting other nearby supermarkets. Such behaviour would limit the effectiveness of imposing purchase limits. Another measure to ensure that the vulnerable have access to essential goods is to have dedicated shopping hours for the elderly and those with disabilities or health conditions. In the UK, this was carried out in several grocery stores which set aside the early morning hours for such customers. When used in combination with purchase limits, this would ensure that the customers who are most in need of such essential goods and need to self-isolate will be able to do so. However, in the long-run, what is most necessary is to ensure robust supply chains and prevent 'store shelves from going empty and bare'. If consumers are assured of a reliable supply of essential goods, they are unlikely to see the need to panic buy or stockpile. This is why many governments made it a priority to secure alternative food sources and strengthen existing supply chains. While nudges and purchase limits can help to mitigate the rise in demand, the supply side also needs to be addressed. In conclusion, nudges alone would not be the best approach to address panic buying. We would need a combination of policies including regulation, limits and ensuring robust supply chains to effectively reduce panic buying.	
	Marker's Report: *Candidates demonstrate a clear understanding of nudges to reduce panic buying. They supported their explanation of how nudges might work with appropriate examples, such as 'fewer newspaper articles showing empty shelves.' Stronger responses also sued the case study extracts to make evaluative judgements about the likely success of this type of approach. The most common alternative approach offered was the use of rationing of essential goods by restricting the amount of the good that customers could purcase at eahc visit to the supermarket. They also included evaluative judgements, such as "While it may be easy to restrict customers to one pack of toilet rolls, it would be difficult or impossible to prevent them from returning later or visiting another nearby supermarket for a second pack.' Some candidates further argued that limiting sales by increasing the price would be inequitable on low-income families.*	

2024 H3 Economics Essay 2

'Behavioural economics combines elements of economics and psychology to understand how and why people behave the way they do in the real world. It differs from neoclassical economics, which assumes that most people have well-defined preferences and make well-informed, self-interested decisions based on those preferences.'

Source: Max Witynski, What is behavioural economics? 30 April 2022

Discuss the extent to which behavioural economics has improved the understanding of decision making by economic agents. [35]

Examiner's comments
This was a popular question. Stronger responses gave an in-depth and analytically based explanation of both behavioural economics and neoclassical economics. Such explanation was applied to consumers, firms and governments, with good examples of how outcomes suggested by both schools of thought might be used by these economic agents in their decision-making. Several weaker responses concentrated on behavioural economics and gave little or no explanation of neoclassical economics. There were some good evaluative judgements made about each school of thought. Stronger responses came to a summative conclusion about the extent to which behavioural economics had improved understanding of decision-making by economic agents.

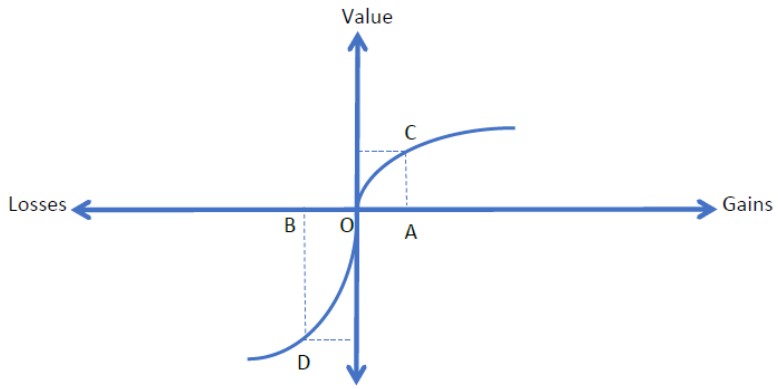
Neoclassical economics assumes that economic agents are rational, self-interested, and operate with perfect information. Consumers aim to maximise utility, firms aim to maximise profits, and governments aim to maximise societal welfare and intervene to correct market failures. However, real-world decisions often deviate from this ideal. Behavioural economics recognises that people often deviate from the assumptions of perfect rationality and self-interest due to cognitive biases. This essay explores how behavioural economics has improved our understanding of decision-making by consumers, firms, and governments, and evaluates whether it offers a more accurate and useful framework than neoclassical economics.	**Introduction**
Neoclassical economics assumes that consumers are rational and seek to maximise utility by weighing the marginal benefit (MB) of consuming an additional unit of a good against its marginal cost (MC). It also assumes that consumers have perfect information. For example, in deciding how often to drive his car, a car owner will weigh his MB such as the convenience and time saved, against his MC such as the additional cost of petrol and parking. He will use his car to the point where his MB is equal to his MC of driving. However, behavioural economics suggests that human behaviour may deviate from the predictions of standard economic model due to bounded rationality, bounded will-power and bounded self-interest. Bounded rationality reflects the limited cognitive abilities that affects problem-solving abilities. Bounded will-power causes people to sometimes make choices that are not in their long-term interest. Bounded self-interest explains why humans are often willing to sacrifice their own interests for others' well-being. Behavioural economics	**R1: Explain how neoclassical and behavioural economics explain how consumers make decisions**

suggests that decision-making is often influenced by cognitive biases such as loss aversion and sunk cost fallacy.

Loss aversion is a cognitive bias in which the pain of losing something could be as much as twice as powerful as the pleasure of gaining the same thing. People hate losing, and they hate it much more than they like gaining.

Through a series of cleverly designed experiments, psychologists known for their work on the psychology of judgment and decision-making, were able to show that the pain of losing any amount of money is much greater than the joy of gaining the same amount of money.

In one of such experiments, players were told that for a coin flip game, they will lose $100 if tails appear. There is an equal chance of getting heads or tails. They were asked how much they must be paid for heads to appear before they would accept the risk of playing this coin flip game. At the end of the exercise, they found that few people will accept a fair bet (i.e. accept $100 for heads when faced with a loss of $100 for tails). This is due to the pain of losing $100 looming much larger than the joy of gaining $100, and the larger the loss, the greater the aversion to the fair bet. This led them to come up with the following diagram to illustrate loss aversion:

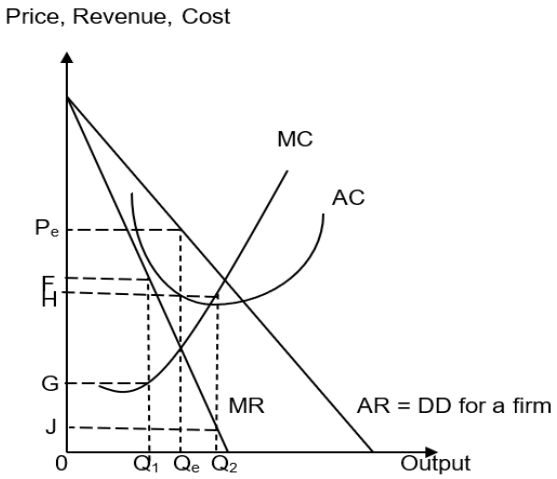


As can been seen from the diagram above, for the same amount of gains and losses (OA = OB), economic agents attribute a much larger negative value (BD) to the losses than the positive value (AC) that they attribute to the same amount of gains.

Another concept of cognitive bias is sunk cost fallacy. Classical economics states that sunk costs are irrelevant to current decisions, and we should make decisions based on the marginalist principle. However, in reality, a person may make their decision based on total costs and benefits, rather than compare the marginal costs with the marginal benefits.

In the earlier example, a self-interested and rational consumer would weigh his MB against his MC when deciding how often to drive his vehicle. However, car owners in Singapore have to pay a hefty amount of approximately $100,000 for a certificate of entitlement to be able to

register and use a vehicle for a period of 10 years. This substantially raise the costs of owning a car in Singapore and drivers will likely commit the sunk cost fallacy when they continue using the car extensively because of previously invested resources - money spent to obtain the COE. They would want to make the most out of the sunk cost that has been paid, thus driving much more often, perhaps even to the point where the MC exceeds the MB. For example the time spent waiting to enter the carpark of a nearby but crowded shopping mall might be longer than the time taken to walk to the mall. Adding the carpark charges, the MC of driving may exceed the MB from the convenience of driving. Another cognitive bias is salience bias which describes people's tendency to focus on items and information that are more noticeable and observable, and to ignore those that do not grab our attention. Consumers may overpay for branded products simply because advertisements make them seem superior, and the salience of branding and packaging influences buying decisions more than rational price comparisons, possibly making them spend beyond their means, incurring higher costs than benefits from their decision. In addition to bounded rationality, people often display bounded willpower. This term refers to the observation that economic agents often take actions which are against their long-term interest. For example, the reason why consumers may choose an inactive lifestyle can be explained through behavioural economics. Due to hyperbolic discounting, which is a mathematical model that describes that a reward available immediately is much more valued than the same reward received after a delay, rewards of a good health in the future is heavily discounted and undervalued, whereas the rewards of relaxing and engaging in sedentary activities is overvalued in the present. With bounded willpower, which is the finite capacity of individuals to exert self-control to pursue long-term goals, consumers may not be able to overcome the immediate allure of sedentary behaviour. Over time, procrastination sets in, which in an economic context, refers to the tendency to delay or postpone actions that are beneficial in the long run but require effort or sacrifice in the present, causing one to eventually lead an overall inactive lifestyle.	
The assumption in neoclassical economics that consumers are rational and seek to maximise utility provides the underpinnings to understand decision-making by consumers. However, it cannot account for many behaviours observed in real-world settings, such as why consumers often respond more strongly to losses than equivalent gains (loss aversion), impulse buying (salience bias), and procrastination – which is a common behavioural outcome of bounded willpower where people delay doing a task even though it is not in their best long-term interest to do so. Thus behavioural economics provides a more realistic understanding of consumer behaviour. This has led to more effective policy interventions, which will be explained in the later part of this essay. However, behavioural insights may not always apply in every situation, because people's behaviour can change depending on the context, and	**E1: Evaluation of whether behavioural economics has improved the understanding of decision-making by consumers**

different individuals respond in different ways. This makes it difficult to generalise or predict behaviour consistently, which would have policy implications as what works for one group of people or in one setting may not work the same way for others.	
Behavioural economics has also improved understanding of decision-making by another group of economic agents – firms. In neoclassical theory, firms are assumed to be rational and aim to maximise profits by producing at the output where marginal cost (MC) equals marginal revenue (MR).  **Fig. 1 Profit Maximising Firm** The diagram above illustrates the price and output decisions of a profit-maximising firm operating in a non-perfectly competitive market. At output level below Q_e, such as Q_1, MR (at F) > MC (at G). This means that producing an additional unit of output adds more to the firm's revenue than to cost. The additional unit produced is making a profit and adds to the total profits of the firm. Thus the firm would raise output level to Q_e to maximise profits. Conversely, at output quantities above Q_e, such as Q_2, MC (at H) > MR (at J). The additional cost incurred from selling one additional unit of good is more than the additional revenue generated from selling that one additional unit of good. This means that the additional unit is making a loss and this reduces the firm's total profits. The firm would reduce its output level from Q_2 to Q_e to maximise profits. Thus, a profit maximising firm would produce Q_e units where MR=MC and MC is rising. The additional revenue generated from selling one additional unit of good is equal to the additional cost incurred from selling that one additional unit of good. After the firm decides on its profit-maximising level of output, the price charged will be determined by the AR or demand curve. From the demand curve (AR), the firm charges a price of P_e, the price consumers are willing and able to pay for at quantity level Q_e.	**R2: Explain how neoclassical and behavioural economics explain how firms make decisions**

However, behavioural economics recognises that firms often operate in complex environments where the gathering and processing of all relevant information is costly or impossible, and hence do not have the time and information to identify the exact profit-maximising level. In rapidly changing markets, calculating MR and MC precisely would also be impractical. As a result, firms may choose to be profit satisficing, deciding to produce a level of output that yields a satisfactory level of profits, or satisfactory share of the market, instead of the highest possible profits. For example, a new tech start-up might focus on meeting production deadlines and gaining market share rather than calculating the exact profit-maximising output, due to limited resources and data. Behavioural economics also recognises that firms are run by individuals who are influenced by cognitive biases. As a result, firms may fear losses more than they value equivalent gains. For example, managers might avoid increasing output, even if it could increase profits, due to fear of over-production or increasing costs substantially. On the other hand, a manufacturing firm facing declining demand may resist reducing output, even when MR is less than MC, as cutting output could appear as if the firm is losing market share and erodes shareholders' confidence in the firm.	
The price and output decision of a firm depends largely on the objective of the firm. Conventional economic theory assumes that firms are profit driven and would set price and output at profit maximising level. However, in the real world, imperfect information and alternative objectives, will also affect the price and output decisions of firms. Thus, behavioural economics provides a richer understanding of firms' behaviour by recognising the cognitive, emotional, and organisational factors that influence decisions. These insights explain why, in practice, firms often do not produce at the neoclassical profit-maximising level, especially in uncertain market conditions. Notwithstanding, it is important to note that the level of competition in a market will affect firms' behaviour and decisions. Highly competitive markets tend to push firms closer to rational behaviour because the pressures of competition force them to make decisions that maximise efficiency and profit in order to survive. In highly competitive markets, supernormal profits are eroded in the long run due to new entrants. Firms must therefore minimise costs and allocate resources efficiently to remain viable. Thus, behavioural influences may be more evident in less competitive environments where firms have more market power.	**E2: Evaluation of whether behavioural economics has improved the understanding of decision-making by firms**
Behavioural economics has also improved the understanding of policy decision making by governments. Governments are typically seen as rational agents that seek to maximise societal welfare, making policy decisions by weighing marginal social benefits against marginal social costs. To maximise societal welfare, governments intervene to correct market failure through policies based on rational cost-benefit analysis. Thus taxes are used to reduce the over-production or over-consumption of goods that generate negative externalities as taxes increase the MPC of production/consumption and would incentivise rational producers/consumers to cut production/consumption to the socially	**R3: Explain how neoclassical and behavioural economics explain how governments make policy decisions**

optimal level where MPB=MPC+tax. Similarly in the case of consumption of goods that generate positive externalities, such as vaccination, governments provide subsidies which would reduce the MPC of consumption and increase consumption to the socially optimal level where MPB=MPC with subsidies. Governments also use rules and regulation to force consumers and producers to behave in a manner that aligns with societal welfare. Another common policy tool is the provision of information by government agencies to help consumers and producers value the actual cost and benefit of a good or service, so as to consume/produce at the socially optimal level that will maximise welfare. Notwithstanding, the application of behavioural economics to influence behaviours and achieve policy objectives has gained much traction amongst governments in recent years. For example, loss aversion, a key concept in behavioural economics, suggests that people are more motivated to avoid losses than to seek equivalent gains. Regulations can harness this bias by imposing penalties or mandatory charges, leading to higher compliance rates and better achieve efficiency in resource allocation. For example, to reduce the over-usage of plastic bags, charging a fee per plastic bag is more effective than offering a rebate of the same monetary value for bringing a reusable bag. This is because consumers respond more strongly to a loss (fee) than to an equivalent gain (rebate). Similarly, to encourage recycling closer to the social optimal level, fines may work better than giving equivalent rewards as the fear of a loss drives stronger behavioral change. The Singapore government has also leveraged on salience bias to supplement its policies to reduce the over-consumption of goods that generate negative externalities. For example, all tobacco products sold at retail in Singapore must display mandatory health warnings on their packaging. These warnings are graphic and must cover at least 75% of the package's surface area. This regulation utilises salience bias to grab consumers' attention on the dire consequences of excessive smoking and making it more salient, so that the actual costs to consumers are brought to the fore for consumers to consider in their decision making. The government also leverage on salience bias to enhance the effectiveness of its Electronic Road Pricing, which is a tax on car usage. Large signs showing the costs of ERP are made more explicit and visible and there is a "beep" sound such that the payment and deduction is made more noticeable and observable. Furthermore, governments have also used 'nudge' strategies to guide consumers towards better outcomes without restricting freedom of choice. Nudge theory is a concept in behavioral economics that suggests influencing behavior by subtly altering the choice architecture of a situation, making desired options more appealing without restricting	

choices. It focuses on designing the environment in which choices are made to subtly influence choices. Nudges preserve the freedom of choice and do not alter the financial incentives (prices). The following are examples of how governments use nudge to influence behaviour. • Leveraging on status quo bias to encourage organ donation: Make donation opt-out (automatically enrolled, but can opt-out) rather than opt-in, leads to higher donation rates because of people's tendency to stick with the default option – not because they actively choose it, but because they avoid the friction of changing it • Designing the environment to promote healthy eating**:** Placing healthy food options at eye level in a cafeteria can encourage people to choose them • Leveraging on social norms and comparisons to reduce energy consumption**:** Providing homeowners with reports comparing their energy usage to their neighbors can motivate them to conserve energy	
Behavioural tools such as nudges are cost-effective and potentially more acceptable by the masses as freedom of choice is preserved. In particular, they are effective when addressing individual-level behaviour influenced by cognitive biases or self-control problems, such as eating habits, health screening and saving for retirement. Nevertheless, traditional policies based on costs and benefits are still relevant and sometimes the preferred policy options in view of context, severity of situation and government's objectives. For example during the COVID-19 pandemic, direct intervention to control behaviour such as mandatory mask-wearing and safe distancing is necessary to control and contain the spread of the virus and cannot rely solely on nudge. In the case of achieving government's objective of improving equity, governments in many countries provide heavily subsidised or free primary education to ensure universal access. In the case of goods which generate severe negative externalities, such as drug consumption, it would be safer to outrightly ban it as the costs to the individual and society are too high. Thus, nudges are insufficient to address deeper structural issues and stronger regulation and intervention is needed.	**E3: Evaluation of whether behavioural economics has improved the understanding of policy decision-making by governments**
Neoclassical economics assumes that rational economic agents make decisions through cost-benefit analysis. Implicit in this formulation of costs and benefits are another two assumptions: 1. Economic agents have perfect information on all types of costs and benefits. 2. Economic agents are able to predict with certainty, costs and benefits that accrue in the future. However, real-world evidence has shown that these assumptions do not hold, and thus neoclassical economics have inherent limitations in explaining how economic agents make decisions.	**Summative conclusion**

On the other hand, behavioural economics has significantly enriched our understanding of economic decision-making by incorporating the complexities of human psychology. It provides more accurate and insightful explanations for consumer biases, firms' behaviour, and policy outcomes than the simplified assumptions of neoclassical economics. However, it does not fully replace neoclassical economics which remains useful for its greater certainty and predictive clarity. Therefore, on balance, while behavioural economics may not replace neoclassical economics, it has improved the understanding of decision-making by economic agents **to a large extent** as it has provided a more realistic and refined framework that deepens our understanding of how consumers and firms behave in real-world settings.	

2025 H3 Economics Essay 3

Discuss the extent to which competitive rivalry, bargaining power of customers and threats of new entrants affect how firms make decisions, and assess various strategies that firms could adopt to achieve their objectives when faced with these problems. [35]

Suggested Answer:

Introduction:

- According to Porter's Five Forces framework, three critical factors—competitive rivalry, bargaining power of customers, and threat of new entrants can affect the extent of competitive advantage a firm has and achieving their objectives such as profit maximisation, growth, and market share.
- Firms implement various strategies to achieve their objectives upon identification of the critical strengths and weaknesses relating to these forces.

Requirement 1: The impact of the competitive rivalry on how firms make decision and strategy to overcome it.

- Competitive rivalry among existing firms significantly influences firms' pricing, output, and innovation decisions, especially in oligopolistic markets where strategic interdependence is prevalent.
- Consider two firms in the telecommunications industry: Firm S and Firm M. Firm S previously enjoyed a monopoly over the industry but had to compete with Firm M (a new entrant) when the telecom market was liberalised.
- Both have the option to either maintain or lower prices, and neither knows what the other is doing. If one lowers price while the other maintains it, the one who lowers their price can garner a large market share and earn higher profits. Meanwhile, the one who maintains their price will lose profits. If both cut prices, both lose profits. Finally, joint profits are highest if both maintain their prices.
- The game can be represented by the payoff matrix below.

		M	
		Lower	**Maintain**
S	**Lower**	$2m, $2m	$5m, $1m
	Maintain	$1m, $5m	$4m, $4m

- The Nash equilibrium we get is the one in the top left cell where both firms each earn $2 million in profits. The dominant strategy of both firms, regardless of what the other does, is to lower prices.
- Both firms are collectively better off if they choose to maintain prices ($4 million in profits for each). However, they do not do so; if they choose to maintain price, there is no guarantee that the other firm will maintain its prices.
- In fact, it would have an incentive to undercut the other party by choosing to lower prices as doing so would give it $5 million in profits as opposed to $4 million if it were to cooperate.

- This is a classic prisoner's dilemma situation as both firms are actually worse off due to an inability to coordinate their actions.

Intermediate Evaluation 1:

- However, the above analysis assumes that the two firms are rational in making decisions. There could be presence of imperfect information that distorts the firms' rationality. Firm X could have been spending much on aggressive advertisements and thought it is facing a price inelastic demand curve. This means that Firm X may choose to charge at $2.00. This will cause Firm X's profits to fall to only $0.5 million.
- It is also possible for the large firms in oligopolistic markets to deviate from the Nash equilibrium of (lower price, lower price) by practicing tacit collusion and charge high prices. Hence this leads to the firms landing at the equilibrium of (higher price, higher price) instead. Although tacit collusion can stabilise prices, but it is very much monitored and constrained by competition law (e.g. Singapore's Competition Act.

Requirement 2: The impact of bargaining power of customers on how firms make decision and strategy to overcome it.

- Customer bargaining power is high when buyers are price sensitive, well-informed, or when switching costs are low. In monopolistically competitive markets, customer power can erode firm pricing power and force allocative efficiency (P=MC).
- An example of such markets in Singapore is Singapore private tuition market where students have many choices and access to information on various tuition centres/tutors. As a result, the providers face pressure to lower their fees and offer good quality services to remain competitive.
- The bargaining power of customers affects firm decisions by limiting pricing power and forcing firms to improve the quality and variety of goods and services
- A firm in monopolistic competitive market structure earns only normal profit in the long run due to low market power. It faces a relatively price elastic AR and MR curves. This means that the firms will not have the ability to engage in capital intensive product innovation and will choose to engage in low budget marketing campaigns in the form of advertisements instead.
- Advertising can be persuasive in nature where a firm aims to subjectively influence consumers about the quality or desirability of its product. It can also be informative in nature, where a firm aims to inform consumers about the prices of its products, the tangible characteristics of its products, or the locations and conditions of sale, e.g., Apple advertising the capabilities of the camera on their latest iPhone. Marketing will enhance the desirability of the goods or services of a firm and increase the demand for the goods or services.
- Marketing can also enhance the perceived uniqueness of the product cause the demand for goods or services provided to become even more price inelastic,

giving the firm more market power to further reduce output and increase price to raise revenue.

Intermediate Evaluation 2:

- The extent of the marketing campaigns must be carefully determined through market research. This is because marketing efforts will cause both revenue and costs to rise. Hence firms will only carry out such strategies if they expect the rise in revenue to exceed the rise in costs.
- For example, a firm spending on advertisements must also considered whether other firms will follow suit. If they do, the effects might be limited.

Requirement 3: The impact of threats of new entrants on how firms make decision and strategy to overcome it.

- The possibility of new competitors entering the market can pressure firms to maintain high performance, invest in brand loyalty and erect barriers to entry.
- Barriers to entry refers to obstacles that prevent new firms from competing on an equal basis with established firms in an industry.
- Strategic barriers to entry such as product differentiation through advertising and branding are designed to raise barriers to entry and enhance sustainable competitive advantage. Advertising and branding by established firms enhance customer loyalty and positive relationship with consumers. Huge advertising costs increases the start-up costs for new firms. In addition, these new firms may not be able to enjoy economics of scale in advertising due to their small output levels.
- An example would be cereal companies such as Kellogg's and Nestle. It is relatively easy to produce cereals efficiently. However, to compete with these established firms, a new firm would need a huge amount of funds to market its new products. This increase the risk of investment as returns is uncertain and hence this is likely to be effective in deterring new firms from joining the cereal market.

Intermediate Evaluation 3: Strategy may not overcome the threat of new entrants

- Advertising and branding strategies are likely to be more effective when there are already existing substantial existing barriers to entry. The new strategies serve as a reinforcement to very strong brands. For example, in recent years the established cereal companies that have already gained much reputation with families target children as their main consumer group. They invest heavily to feature popular cartoon characters on cereal boxes and in television commercials. This strategy uses salience bias to create a sense of trust and familiarity with children. This further increase the start-up costs necessary for new firms to compete.

- In today's globalised world, the consumers are faced with unprecedented varieties in many markets. The demand for most goods is unlikely to be price inelastic even with massive advertisements and successful branding proliferation.
- Consumers in today's world are more likely to experiment with new products and social media increases the ease of advertising/reduces the costs of advertising for small firms. Hence, small players could still exist in the markets if they have innovative and niche products they can offer to the consumers.

Overall Evaluation Conclusion:

- The extent to which competitive rivalry, customers power and new entrants affecting firms varies according to the market these firms are in, the level of contestability, the prevailing market conditions and government regulation.
- While no single strategy can guarantee success, the most successful firms which most likely are able to sustain profitability and long term growth are those that continuously navigate around the external forces and formulate holistic approach using multiple strategies.

Marking Scheme:

Knowledge, Understanding, Application, Analysis		
L3	For an answer that covers most of the pertinent points in a clear, succinct and logical manner. The answer should display an awareness of the relevant literature and demonstrate a good understanding of the basic issues, together with some awareness of related issues e.g. those relating to oligopoly.	Mark 18-25
L2	Foran answer that covers many of the relevant points, but where the exposition is not succinct. Although there may be structure to the essay, expect the points to be generally raised in an isolated manner, with little attempt to show how they are inter-related.	Mark 10-17
L1	For an answer that identifies a few relevant points, but where the exposition and the presentation of the arguments are generally poor and the answer lacks coherent structure	Mark 1-9

Evaluation Marks

Level		Marks
E2	Judgement based on analysis	6-10
E1	Mainly unexplained judgement	1-5

A levels Examiners Report

Candidates responded to this question using Porter's 'five forces' model. Most responses gave a good explanation of how competitive rivalry and the threat of new entrants affect decision-making of firms. Stronger responses gave an in-depth explanation of the impact of the competitive rivalry, bargaining power of customers and the threat of new entrants on the decision-making of firms. Candidates offered various explanations of strategies that could be adopted by firms faced with these identified problems. Stronger responses gave a range of strategies that were well focused in overcoming each of the three identified problems. They also made good evaluative judgements about both the likelihood of these problems occurring and the strategies that might be used to overcome them. The stronger responses included an in-depth summative conclusion.

2025 H3 Economics Essay 4

It has been argued that there are few examples of pure public goods in the real world and the extent of externalities has been exaggerated. Quasi-public goods and information failure are more prevalent.

Discuss, with examples, whether quasi-public goods and asymmetric information are the main reasons for market failure, rather than externalities and pure public goods. [35]

Suggested Answer:

Introduction

Market failure refers to the inefficient allocation of resources when the free market does not produce at the socially optimal level of output, resulting in deadweight loss. Traditional sources such as externalities and pure public goods are foundational in microeconomic theory. However, in practice, many goods do not fit neatly into these categories. Instead, quasi-public goods—including club goods and common resources—and asymmetric information (due to principle-agent problem, moral hazard and asymmetric information) are increasingly recognised as more relevant causes of market failure. This essay will assess the extent to which these latter sources contribute more significantly to real-world inefficiencies than externalities and pure public goods, supported by examples and evaluation.

Suggested Answer:

<u>Requirement 1: Externalities and Pure Public Goods as Primary Sources of Market Failure</u>

Externalities are sources of market failure as they lead to allocative inefficient output level. Externalities occur when third-party effects are not reflected in market prices. Negative externalities (e.g., pollution) cause overproduction as private marginal cost (MPC) is lower than social marginal cost (MSC), while positive externalities (e.g., vaccination) result in underproduction due to underestimation of marginal social benefit (MSB). In Singapore, externalities are evident in cases such as carbon emissions from private vehicle use, which impose costs on society through pollution and congestion.

Pure public goods are sources of market failure as they are not provided by the market even though their provision could significantly increase the society's welfare. Pure public goods are both non-excludable and non-rivalrous, such as national defence or flood warning systems, and suffer from the free rider problem, resulting in underprovision. Civil defence services exemplify pure public goods, as consumption by one citizen does not reduce availability for others (non-rivalrous in

consumption). The marginal cost of prodiving civil defence service to an additional user is zero. The allocative efficient price charged should be zero but no profit-drive firm would produce the good if the price is zero. Hence there is no supply. Moreover, individuals cannot be excluded from their protection as civil defence, such as police patrolling, would respond to and serve the entire country, which protect all individual within the geographical boundary of the nation (non-excludable). This leads to the free rider problem where non-payers can enjoy the good/service. AS a consequence, the demand will be concealed. Since there is no demand and no supply, it is a case of complete market failure with zero production.

Intermediate Evaluation 1: Limited Relevance of Pure Public Goods and Externalities in Practice

However, the strict categorisation of goods, like public goods, has been challenged as goods often lie on a spectrum of excludability and rivalry. For instance, roads are non-rivalroud during off-peak hours as the roads are largely empty. Having one additional driver would not contribute to congestion or lengthening the travelling time for the next user. But roads become rivalrous during peak periods due to congestion. Having one additional user can further worsen congestion and increase the travelling time for the next user. In this case, roads may not longer be considered as a public good.

Likewise, ERP (Electronic Road Pricing) allows the government to impose excludability on certain highways/expressways, transforming the uncongested road from a pure public good into a quasi-public good such as a club good, which is non-rivalrous but excludable. This shows that even public goods are context-dependent and may not consistently exhibit public good characteristics.

In the case of externalities, the Coase Theorem suggests that under certain conditions—clearly defined property rights, low transaction costs, and well-defined externalities—**market participants can internalise externalities through bargaining and hence externalities is not a main reason for market failure.**

In theory, this could apply to emissions from a incineration firm that contributes to air pollution in a neighbourhood. Suppose a group of residents (or a community organisation) legally owns the right to clean air, and the firm wishes to emit gases that reduces air quality. If transaction costs are low and the impact of emissions is well-defined, the firm and residents could negotiate a compensation scheme. For instance, the residents could accept a certain level of emissions in exchange for payment.

In the figure below, the marginal private cost (MPC) and marginal private benefit (MPB) belong to the factory, and MD stands for the marginal damage that is done to the air with more incineration activity. If left on his own, the firm will choose to produce at output Q, as this is where MPC = MPB. However, the socially efficient output is at Q* where the marginal damage is taken into account and where marginal social cost (MSC) = marginal social benefit (MSB).

If the three conditions for Coase Theorem hold, then the residents and the firm will be able to strike an agreement to reduce output to Q*. Note that this is independent of the party receiving the property rights.

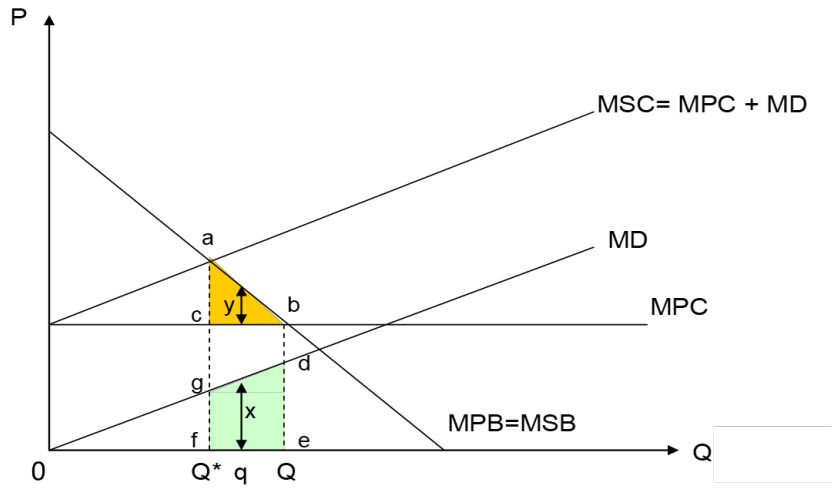


Figure 2–8: FIrm With Property Rights

We first consider the case where the firm has the property rights. In the absence of any negotiation, the firm will produce at MPB = MPC at an output level of Q. How does negotiation reduce output to Q*? The residents can offer to pay the firm to reduce their output. The maximum amount the resident is willing to pay at each output level is equal to the marginal damage at that point.

The firm will reduce his output if the payment he receives from the residents exceeds the net benefit he derives from producing an extra unit of output. At an output level q between Q and Q*, the resident is willing to pay a maximum of $x. The marginal net benefit for the firm by producing that unit of output is $y. Since the loss in net benefit of reducing that unit of output is less than the compensation he receives, the firm would agree to reduce output.

As we move left from the private equilibrium quantity Q towards the social equilibrium quantity Q*, compensation to the firm is always larger than the marginal net benefit forgone. This induces the firm to reduce output. However, at the socially optimal quantity of Q*, the firm has no more incentive to reduce incineration activity as the marginal net benefit (distance ac) is exactly equal to the maximum the residents are willing to pay him (distance gf). At quantities less than Q*, the marginal net benefit is always greater than marginal damage (which is the maximum amount the residents are willing to pay), and the firm has no incentive to further reduce output.

Through the assignment of property rights to the firm, we have arrived at the socially optimal level of output Q* by allowing the parties involved to negotiate with each other. Government intervention is minimal and solely confined to the protection of property rights to solve the problem of externalities.

Requirement 2: Quasi-Public Goods as Prevalent Sources of Market Failure

Quasi-public goods are goods that are either non-rivalrous or non-excludable, but not both. These include:

- Club goods (excludable, non-rivalrous): e.g., toll roads, museums, internet access, MRT stations during off-peak hours
- Common pool resources (non-excludable, rivalrous): e.g., urban public parks, fish in open seas

Existence of club goods can lead to market failure due to under-utilisation. Club goods are goods that are excludable but non-rivalrous in consumption. This means that while providers can charge for access (e.g. membership fees), consumption by one individual does not reduce the availability of the good for others during off peak periods.

Golf club facilities, such as driving ranges or golf courses, are non-rival during off-peak hours—there is ample capacity, and an additional player does not reduce the enjoyment or access of others. However, when high membership fees or peak-hour pricing structures are rigidly applied throughout the day, potential users may choose not to play or seek alternative recreational activities, even though their usage would not crowd the facility. Since the marginal cost of an additional player during off-peak hours is close to zero, while the marginal benefit to the user—such as improved well-being or leisure satisfaction—is positive, fixed high pricing can result in under-utilisation and a deadweight loss.

Common pool resources can lead to market failure due to over-consumption. Marine resources are common pool resources as they are rivalrous but non-excludable. They are rivalrous because they are biologically limited. If one fisherman catches a fish, that fish is no longer available to others. If coral reefs are damaged by excessive tourism, anchoring, or fishing activities, their ecological function and biodiversity are diminished for future users. This depletes the stock available to others, leading to competition and potential overuse.

Marine resources are non-excludable due to the vast, open nature of oceans makes it hard to patrol illegal fishing even if attempts are made to make the marine resources excludable to payers. Moreover, migratory fish species cross national boundaries, further complicating exclusion. Thus, it is not economically feasible to prevent non-payers from using the marine resources. So far, it remains open-access to multiple users, especially in large coastal areas. The tragedy of the commons demonstrates how individual incentives to overconsume a common resource led to collective depletion. Without property rights, each consumer ignores the social cost of their actions. For example, in Singapore, unregulated overuse of marine habitats could lead to extinction or endangerment of species unless access is restricted or regulated.

Policy tools such as tradeable permits, user fees, and property rights assignment have been used to limit overconsumption of common resources. However, the success of these interventions depends on the good's characteristics and the effectiveness of enforcement mechanisms.

Intermediate Evaluation 2: The utilization of quasi-public goods can be improved with technology so it is not a major reason for market failure.

Typical club goods like golf facilities can also be managed more efficiently through digital booking systems and dynamic pricing. For instance, during weekdays when demand from members is low, golf courses can lower their fees and open uo the booking of the facilities to non-member. This encourages a more optimal use of the facilities, spreading out demand more evenly and reducing idle capacity. **In doing so, technology helps correct underconsumption of club goods, improving allocative efficiency while maintaining excludability and reducing deadweight loss.**

Furthermore, technological advancement has lowered the cost of exclusion, making common resources excludable and preventing over-utilization. For example, satellite monitoring and geofencing technologies have made it possible to track and regulate fishing activities in open-access oceans. By using GPS tracking systems on fishing vessels and real-time monitoring of maritime boundaries, authorities can enforce fishing quotas and restrict access to overfished areas. This effectively turns a common pool resource like marine fisheries—which are traditionally rivalrous and non-excludable—into a more excludable resource, similar to a private good. As a result, overutilisation is curbed, helping to prevent the "tragedy of the commons".

Requirement 3: Asymmetric Information as a Widespread Cause of Market Failure

Asymmetric information refers to situations where one party in a transaction has more or better information than the other, leading to hidden characteristics or actions. This manifests in: adverse selection, moral hazard and principal-agent problem.

In the health insurance market, adverse selection occurs when individuals have more information about their own health status than insurers do. Suppose insurance companies offer a single health insurance policy at an average premium, because they cannot distinguish between high-risk (unhealthy) and low-risk (healthy) individuals.

Healthy individuals, who expect lower medical expenses, may find the premium too high relative to their expected benefit and opt out of purchasing insurance. On the other hand, individuals who expect higher medical costs are more likely to buy insurance. As more high-risk individuals join the insurance pool, insurers face rising costs and may raise premiums further.

This leads to a vicious cycle: as premiums rise, even more healthy individuals withdraw, worsening the risk pool. Eventually, the market may collapse or shrink significantly, with only high-risk individuals left insured. **This is a case of market failure—where mutually beneficial exchanges (insuring healthy individuals) do not occur due to asymmetric information, leading to allocative inefficiency and loss of welfare.**

In the healthcare market, moral hazard occurs when individuals with health insurance change their behaviour because they do not bear the full cost of medical services. Once insured, patients may consume more healthcare than necessary—e.g., visiting specialists for minor issues or opting for expensive diagnostic tests—because the cost is largely borne by the insurer.

For instance, someone with full coverage may go for frequent, unnecessary check-ups or brand-name medications instead of generic ones, since they are not paying directly. This increases cost and leads to wastage of resources. **Moral hazard leads to overconsumption and market failure.**

The principal-agent problem is a type of market failure that arises when one party (the principal) delegates decision-making authority to another party (the agent) to act on their behalf, but their interests are not perfectly aligned, and the principal cannot fully monitor the agent's actions. In healthcare, the principal-agent problem arises when a patient (the principal) relies on a doctor (the agent) to make decisions in their best interest, but the doctor may have different incentives or more information.

For example, in a fee-for-service healthcare system, doctors are paid for each treatment or procedure they perform. This can create an incentive for them to recommend more treatments than necessary (supplier-induced demand), even if those treatments offer little to no added benefit to the patient. The patient, lacking medical knowledge, is unable to verify whether the treatment is necessary and trusts the doctor's judgment.

Hence such principal-agent problem can lead to misalignment of incentives, over-utilisation of healthcare services and market failure, where healthcare services are not provided at the socially optimal level.

Intermediate Evaluation 3: Technology could reduce the extent of information asymmetry so information asymmetry is no longer a major reason for market failure.

For instance, insurers now use wearable health devices (like fitness trackers, smartwatches, or health apps) to collect real-time data on physical activity, heart rate,

sleep quality, and other health indicators. With the individual's consent, this data allows insurers to better assess individual health profiles and more accurately price premiums based on actual behaviour and risk levels. So mutually beneficial transactions such as lower premium health insurance packages can be provided to lower risk individuals. In terms of health insurance for low-risk individuals, there is no longer a missing market. **With technology enhancing information symmetry, information asymmetry is no longer a major reason for market failure.**

Overall Evaluation Conclusion

Pure public goods are rare, as most goods exist along a spectrum of excludability and rivalry. Many goods previously considered public, such as roads or digital services, often function as quasi-public goods under certain conditions.

Quasi-public goods and **asymmetric information** represent more **widespread and persistent sources of market failure** in modern economies. Under- or over-utilisation of club goods and common resources, as well as hidden information problems in insurance and healthcare markets, frequently distort resource allocation and result in deadweight loss.

However, the extent of market failure arising from these sources is increasingly moderated by technological advancement. Technology lowers the cost of exclusion, enables dynamic pricing, and improves the monitoring and usage of common resources. It also enhances transparency and data availability, helping to reduce information gaps between buyers and sellers. Therefore, while quasi-public goods and asymmetric information are arguably more prevalent causes of market failure than pure public goods or externalities, **their impact is increasingly mitigated through technology, making the overall severity of such failures highly dependent on the degree of technological integration in the market.**

Externalities remain a common and significant source of market failure, particularly in sectors such as transport, pollution, and education, because of the inherent difficulty in assigning and enforcing property rights. In many real-world scenarios, it is challenging to clearly define who owns the resource affected by the externality, or to trace the source of the harm or benefit. For example, in the case of air pollution from vehicle emissions, no single individual owns the atmosphere, making it difficult to hold drivers accountable for the negative external effects their actions impose on society.

Marking Scheme:

Knowledge, Understanding, Application, Analysis		
L3	For an answer that explains how market failure arises for goods with externalities, pure public goods, quasi-public goods (including common pool resources and club goods) and goods with asymmetric information (adverse selection, moral hazard, principal-agent problem) with consistent real-world application. The answer should display a clear understanding of how to classify the various types of goods.	Mark 18-25
L2	For an answer that covers many of the relevant points, but where the exposition is not succinct. Although there may be structure to the essay, expect the points to be generally raised in an isolated manner, with little attempt to classify the goods or explain how the underlying nature of the goods causes market failure.	Mark 10-17
L1	For an answer that identifies a few relevant points, but where the exposition and the presentation of the arguments are generally poor and the answer lacks coherent structure	Mark 1-9

Evaluation Marks

Level		Marks
E2	Judgement based on analysis	6-10
E1	Mainly unexplained judgement	1-5

A levels Examiners Report

This was a popular question. Stronger responses gave a clear analytical explanation of quasi-public goods and asymmetric information with good application to real-world examples. They linked the key characteristics of a quasi-public good to common pool resources and club goods, as well as explained how adverse selection, moral hazard and principal agent problem can be considered as reasons for market failure. Their responses were characterised by the extent and quality of their explanation of the potential reasons for market failure.

Stronger responses provided real-world examples of goods that showed a clear analytical understanding of the development of ways in classifying goods. As an example, one strong response explained that a pure public goods classification was not always appropriate even for the same good. Some goods such as a road might be considered non-rival at some times of the day or on certain routes, but rival at peak times of the day.

In many weaker responses, a limited range of real-world examples were identified and the explanation of the reasons for market failure were stated, rather than clearly

explained. Their explanation of why markets might fail in these cases often lacked depth and breadth. Most candidates made at least one appropriate evaluative judgement about the identified reasons for market failure. Stronger responses came to a summative conclusion about whether quasi-public goods and asymmetric information were the main reasons for market failure.

Question 5:

'It is imperative to find solutions that foster economic growth in a more inclusive manner, where the gaps between the rich and the poor- not only in terms of income, but also in other dimensions that matter for people - are less pronounced and opportunities are shared more equally.'

Source: OECD, Inclusive growth, 30 April 2022

Explain how sustainable development might be measured and discuss whether strategies to gain dynamic comparative advantage are the most appropriate approaches to achieving inclusive growth.

In the face of rising inequality, environmental degradation, and uneven access to opportunities, achieving inclusive growth has become a global imperative. Inclusive growth involves achieving sustained economic growth in a manner where disparities in income and other well-being dimensions are minimized and opportunities are more equitably distributed. This essay examines how sustainable development might be measured, particularly through the **United Nations Capital Approach** (2008) and the **Sustainable Development Goals (SDGs)**, before assessing whether strategies aimed at achieving **dynamic comparative advantage** are the most appropriate means to achieve inclusive growth.

R1a: Measuring Sustainable Development using Capital Approach

United Nations (UN) defines sustainable development as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." For sustainable development (SD) to be achieved, it is crucial to harmonize three core elements of economic growth, social inclusion and environmental protection. Traditional measures such as GDP offer a narrow lens, capturing only the volume of output without addressing the quality of growth or its distributional and environmental consequences. More comprehensive tools are thus necessary.

One way of measuring SD is the **United Nations Capital Approach**, detailed in the *2008 Measuring Sustainable Development* report. This framework evaluates sustainability through the preservation and accumulation of four key types of capital: produced capital (e.g., infrastructure and machinery), natural capital (e.g., ecosystems and resources), human capital (e.g., health and education), and social capital (e.g., institutions, trust, and social cohesion). The central premise is that sustainable development requires that the total capital stock be maintained or enhanced over time. By measuring the economy's capital stock amount either at a point in time or over a period of time, the sustainable development level or how much the economy has

developed sustainably, can be determined. Depletion of natural or social capital for increased production, for example, may yield short-term economic growth but undermine long-term well-being.

R1b: Measuring Sustainable Development using SDGs

The capital approach, however, focuses on the accumulation of resources/capital but does not capture how the use of these resources can lead to more inclusive growth. E.g. it does not measure the changes in inequality, be it gender or income inequality or whether the economy is generating more job opportunities for the broader population, or if the capital gains are used to reduce poverty effectively. These are all crucial aspects of inclusive growth as established earlier. Thus, UN went on to develop the **United Nations Sustainable Development Goals (SDGs)**, introduced in 2015. The 17 SDGs provide a roadmap for achieving inclusive and sustainable development, encompassing goals such as ending poverty (SDG 1), promoting quality education (SDG 4), reducing inequality (SDG 10), and taking climate action (SDG 13). These goals are supported by measurable targets and indicators that enable governments and institutions to monitor progress beyond conventional economic output and stock of capital. For instance, indicators on school completion rates, income distribution, proportion of people living below poverty line and CO_2 emissions allow for a nuanced understanding of development outcomes.

R2: Strategies to gain Dynamic Comparative Advantage in achieving Inclusive Growth

The pursuit of **dynamic comparative advantage** offers a potentially effective strategy for achieving inclusive growth. Unlike static comparative advantage, which is based on natural factor endowments such as natural resources or abundance of low-skilled labor, dynamic comparative advantage can be cultivated over time. It focuses on developing lower opportunity cost in the production in higher value-added sectors through increased productivity via investments in education, technology, and innovation. This strategy enables economies to move up global value chains and reduce dependence on low-productivity sectors.

Dynamic comparative advantage thus aligns well with the goals of inclusive growth. Strategies usually involve substantial investment in **human capital** (SDG 4), ensuring that more individuals acquire the skills needed to participate in and benefit from economic transformation. For instance, Singapore's long-term strategy to develop its workforce through the upskilling of workers in the targeted areas of dynamic CA, from capital-intensive sectors such as semi-conductor and petrochemical (1980s) to knowledge-based, high value-add, high growth areas such as biotechnology, pharmaceuticals and digital commerce, has supported both economic competitiveness and sustained growth. Shifting into high-productivity sectors can

generate **decent work opportunities** (SDG 8), lifting wages and improving working conditions. In South Korea, industrial upgrading from the 1960s, developing new areas of CA from steel to electronics and cars to smart phone technology helped reduce poverty and raised living standards through better paying jobs in manufacturing and technology.

Another strategy used concurrently with the investment in human capital is the investment in R&D, such as government funding or tax rebates for businesses in targeted sectors and the development of the necessary infrastructure to support the new industries. E.g. the Singapore government's development of the Jurong Island petrochemical hub with road, fire stations, access to port; and the provision of a clean environment with easy access to clean air and clean water for the development of semiconductor industry. Countries such as Denmark and the Netherlands have invested in green technologies, direct funding and tax rebates, combining economic growth with reduced environmental footprints. These strategies can therefore also foster **innovation** that supports environmental sustainability (SDGs 12 and 13). Moreover, expanding access to technology and education, this approach can build **social capital**, a key element of the UN Capital Approach.

The various strategies in the development of new areas of CA utimately allows for an increase in exports, increasing AD and a multiplied increase in NY. The investments in education, technology and innovation will increase the productive capacity, increasing PPC and LRAS, promoting long term growth. That also aligns with Romer's growth model where knowledge creation, given the increasing returns to knowledge capital (ideas, technology) is the key driver of sustained growth. Ideas are non-rivalrous and the creation of new knowledge and ideas via the strategies adopted to create dynamic CA supports sustained growth, especially for developed economies which are likely facing slower growth due to diminishing returns to capital (as explained by Solow's growth model). Often the creation of dynamic CA involves the use of not one, but many different strategies that allows for the accumulation of knowledge and human capital that is crucial for long term growth as prescribed in the Romer's model.

Intermediate Evaluation 1:

However, it is not without its limitations. Given the need to divert resources to target high value-added sectors up the dynamic CA ladder, the benefits of skills upgrading and technology remains unequal, the benefits of innovation-driven growth may accrue only to a privileged few, thereby **widening inequality** (SDG 10). Unequal opportunities due to urban-rural divides, economic-social background, and digital exclusion can prevent vulnerable populations from participating in new economic opportunities. Furthermore, rapid industrial transformation can cause job displacement and social dislocation

unless accompanied by social safety nets and retraining programs. There is also a risk that the pursuit of competitiveness may overshadow environmental concerns unless sustainability is embedded in the growth strategy.

R3: Other strategies to attain inclusive growth

Thus, there is a need for the government to incorporate strategies for broad based investment in human capital, ensuring equitable access to quality education and healthcare. This can be achieved with universal education and healthcare program, as practiced by the UK and Nordic countries, where Gini coefficient remains low. Deliberate redistributive policies with the use of progressive taxes and transfer payments for vulnerable groups have been observed to be effective to reduce inequity in many advanced countries, promote social and economic stability, providing a conducive environment for investment and growth. Growth strategies should also target small businesses and technological spillover through sharing of ideas and investment in new technology in these sectors e.g. Singapore government's investment to help cleaning companies tap into more advanced machineries to increase productivity.

Intermediate Evaluation 2:

It is important to note that a key enabler of the strategies achieving inclusive growth is the development of strong inclusive institutions (Acemoglu and Robinson) where power is broad based and the power of rules and laws are fair across all groups and effectively enforced. In comparing countries whereby institutions are effective, such as many of the developed countries (such as Germany, Denmark, Uk and Japan), as opposed to the countries with extractive institutions (such as North Korea, Zimbabwe and Venezuela), economic development has been lagging in the latter, with stagnating or sometimes deteriorating living standards over the years. Strategies to increase transparency and accountability of the government via development and enforcement of constitutions that prevents the monopolisation and abusing of power, development of effective legal, tax and banking systems are therefore important to provide the cornerstone that supports enterprise and development of innovation and ideas, as well as a fair broadbased distribution of benefits to the population.

Conclusion

Measuring sustainable development through frameworks like the SDGs and the United Nations Capital Approach enables a deeper understanding of the inclusiveness and long-term viability of growth. While strategies to gain **dynamic comparative advantage** hold significant potential to drive inclusive growth, they are not inherently inclusive. Their success depends on **complementary policies** that ensure broad access to

education, technology, and finance, and that safeguard environmental and social capital. In this way, countries can achieve not only faster and smarter growth, but also growth that is fair, inclusive, and sustainable for future generations.

Question 6:

'Worldwide consumption and production - driving forces of the global economy - require the use of the natural environment and resources that may have destructive impacts on the planet. Economic and social progress over the last century have been accompanied by environmental degradation that is endangering the systems on which our future development and survival depend.'

Source: Adapted from UN, Responsible Consumption and Production, 30 April 2022

Assess alternative measures that might be adopted by economic agents with the aim of developing sustainable consumption and production patterns for long-term protection of the global environment. [35]

Suggested Answer:

Intro

The global model of consumption and production has driven economic growth but at significant environmental cost. Achieving sustainability requires a shift to patterns that meet present needs without compromising future generations. Central to this shift is the circular economy — a framework that promotes sustainable consumption and production by minimising waste, maximising resource efficiency, and closing material loops. This essay evaluates how economic agents can adopt such strategies to support the long-term protection of the global environment.

R1: Explaining the circular economy as a framework for environmental protection

The linear economy refers to a traditional model where natural resources are extracted, used to produce goods and services, and eventually discarded as waste. This contributes significantly to environmental degradation through resource depletion, pollution, and rising greenhouse gas emissions. In contrast, the circular economy seeks to close the loop by keeping products and materials in use for as long as possible, transforming waste into productive inputs and reducing reliance on virgin resources. This reduces the ecological footprint of economic activity and promotes long-term environmental protection.

Making the circular economy work requires systemic changes across the entire lifecycle of a product — from design and production to consumption and disposal. At the production stage, firms need to adopt eco-design principles that reduce material use and allow products to be easily repaired, reused, or recycled. During

consumption, individuals can be encouraged to choose durable goods, reduce unnecessary purchases, and adopt sharing or reuse practices. At the end-of-life stage, effective recycling and waste management systems are needed to reintegrate materials back into the production cycle, rather than sending them to landfills or incineration.

These coordinated actions reduce the extraction of virgin resources, lower greenhouse gas emissions, and limit environmental pollution. In this way, the circular economy puts the ideas of sustainable production and consumption into action, helping to reduce the environmental impact of economic activities.

R2: Explain the measures to promote sustainable consumption

To promote sustainable consumption, economic agents must steer individuals toward environmentally responsible behaviour that reduces resource use and emissions without compromising welfare. This involves modifying both incentives and decision-making environments.

a. Behavioural Interventions and Nudges

Consumers often fail to make environmentally optimal choices due to bounded rationality, where they lack the information or cognitive ability to evaluate the long-term environmental impact of their decisions. In addition, bounded willpower may prevent them from acting on their intentions, especially when greener options are less convenient or more costly. Cognitive biases such as status quo bias and salience effects further entrench unsustainable behaviour — for instance, individuals may default to single-use plastics simply because they are more familiar or immediately accessible.

To address these behavioural failures, policymakers can implement nudges — small, low-cost changes in choice architecture that guide individuals toward more sustainable behaviour without restricting freedom of choice. Examples include placing eco-friendly products in prominent store locations, setting green energy plans or digital receipts as the default, or providing real-time feedback on energy consumption. These interventions increase the salience of sustainable options and leverage default effects to shift behaviour at scale.

Intermediate EV2a:

Nudges are low-cost and easy for governments to introduce, but they usually lead to only small or short-term changes in behaviour. For example, placing eco-friendly products in visible spots may increase their sales for a while, but people may go back to old habits if the green choices are still more expensive or less convenient. This is known as “nudge fatigue,” where the effect wears off over time.

Nudges also work best when it’s easy to switch to the better option. But if the sustainable choice costs more or takes more effort — like using reusable containers

instead of single-use plastics — then a simple nudge may not be enough. This is especially true in lower-income settings, where many people focus more on price than the environment.

So while nudges are useful, they are not enough on their own. They work best when used together with other policies like education, financial help for greener options, or rules that encourage sustainable behaviour across society.

b. Internalising External Costs through Market-Based Measures

Governments can address the market failure of negative externalities by implementing taxes — corrective taxes designed to internalise the external costs of production or consumption. When consumers purchase high-carbon or non-recyclable products, they often do not bear the full social cost of their actions, which includes environmental damage such as pollution or carbon emissions. This leads to overconsumption from a societal perspective.

By imposing a tax equal to the marginal external cost, the government raises the marginal private cost (MPC) to match the marginal social cost (MSC). As a result, the quantity consumed falls from the market equilibrium to the socially optimal level, where MSC = MSB (marginal social benefit), reducing the extent of environmental harm.

Intermediate EV2b

The effectiveness of such taxes depends on the **price elasticity of demand (PED)** — that is, how sensitive consumers are to price changes. If the good is **price elastic** (e.g., bottled water or plastic bags), even a small tax can lead to a big drop in demand, making the policy effective. But if the good is **price inelastic** (e.g., petrol or electricity), demand may not fall much even with a high tax. In this case, the tax mostly raises costs for consumers without much environmental benefit.

Also, these taxes can be **regressive**, affecting low-income households more. To reduce this burden and improve effectiveness, governments can use the tax revenue to support green alternatives — such as subsidising public transport or providing rebates — making it easier and fairer for people to adopt sustainable habits.

c. Information Campaigns and Education

Over time, public education and information campaigns help address a key problem — many consumers are not fully aware of how their choices harm the environment. For example, they may not realise the environmental impact of fast fashion or throwing away food. This lack of awareness stops them from making more sustainable decisions.

Governments can run campaigns and include environmental topics in schools to help people understand these impacts. As people learn more, they may choose to act more responsibly. For instance, public awareness of plastic waste has led many people to switch to reusable bags and bottles.

These campaigns can also have a wider influence. *As awareness spreads,* when some people change their behaviour, others often follow — spreading sustainable habits across society.

Intermediate EV2c

While education and awareness campaigns are important for building long-term habits and values, they often do not lead to quick or large changes in behaviour. Whether people act on the information depends on how clear and believable the message is, and whether they have easy and affordable alternatives. For example, someone may know that using plastic bags harms the environment, but if reusable bags are expensive or hard to find, they may still choose plastic.

Also, the effect of education is usually slow and may vary across groups. Factors like culture, income, and how much people already know about the environment all play a role. In places where people have less education or exposure to these issues, the changes may take longer.

So, while education is an important part of encouraging sustainable choices, it usually works best when paired with other tools — like financial help, better infrastructure, or nudges — that make it easier for people to act on what they've learned.

R2: Explain the measures to promote sustainable production

Sustainable production seeks to reduce the ecological damage caused by goods and services throughout their lifecycle — from resource extraction and processing to distribution and disposal. Producers play a central role in reducing emissions, waste, and resource use.

a. Investment in Green Innovation and Clean Technology

Firms play a critical role in sustainable production by adopting green technologies — such as renewable energy, energy-efficient machinery, or closed-loop manufacturing that minimises waste and recycles inputs. These innovations help reduce emissions, resource use, and environmental damage across the entire production lifecycle.

From an economic perspective, the **endogenous growth model** highlights how investments in innovation can lead to sustained productivity growth. Green innovation aligns with this model by enabling firms to produce more output with fewer

natural inputs, thereby preserving environmental capital for future use. Over time, this supports both economic and ecological sustainability.

Intermediate EV3a

While green technologies offer long-term benefits, many firms are hesitant to invest due to high upfront costs, long payback periods, and uncertain profitability. For example, installing solar panels or switching to cleaner production processes often requires large capital investments that may not yield immediate returns. Smaller firms, in particular, may lack the financial resources or technical expertise to adopt such innovations.

To overcome these barriers, governments can offer support in the form of subsidies, tax incentives, or co-funding through public-private partnerships. These policies can lower the effective cost of investment and encourage early adoption. However, such support carries risks — if not well-targeted, subsidies may go to firms that would have invested anyway, resulting in wastage of resources. There is also the possibility of inefficient allocation of public funds if governments fail to identify the most impactful technologies.

Therefore, while public intervention can play a key enabling role, it must be carefully designed and regularly reviewed to ensure resources are used effectively and to avoid unintended consequences.

b. Carbon Pricing and Tradeable Permits

These policies make producers pay for the greenhouse gases they emit, encouraging them to cut emissions and switch to cleaner methods.

A **carbon tax** sets a fixed price for every unit of carbon emitted. This gives firms a clear reason to reduce emissions to save costs. A **cap-and-trade system**, on the other hand, puts a limit on total emissions and allows firms to buy and sell emission permits. Firms that can cut emissions easily can sell their unused permits, while others must pay more if they pollute more — creating incentives for efficiency.

Both methods help fix the problem of **negative externalities**, where polluters do not bear the full cost of the damage they cause. By including these costs in their decisions, firms are more likely to produce at a level that protects the environment.

Intermediate EV3b

While carbon pricing and emissions trading are effective in theory, their success depends heavily on how they are designed and enforced. If the carbon tax is set too low, it may not significantly change firm behaviour, as the added cost becomes negligible. Similarly, if the cap in a cap-and-trade scheme is too generous, the price of permits may fall, weakening the incentive to cut emissions.

Enforcement is also crucial. In countries with weak monitoring or regulatory capacity, firms may underreport emissions or ignore rules altogether. Moreover, the additional production costs may be passed on to consumers, especially in energy-intensive sectors, potentially raising living costs. This can create affordability concerns, particularly for low-income households.

To address these issues, governments may need to pair carbon pricing with compensatory measures — such as subsidies for clean alternatives, rebates for vulnerable groups, or investment in green infrastructure — to maintain public support while ensuring environmental effectiveness.

c. Voluntary Initiatives and ESG Pressures

Firms are increasingly responding to pressures from investors, consumers, and international partners to adopt more sustainable production practices. These include voluntary commitments under ESG (Environmental, Social, and Governance) frameworks, such as setting science-based emissions targets, obtaining green certifications (e.g., ISO 14001), or disclosing environmental performance in annual reports. These efforts can influence firm behaviour when aligned with access to capital, investor confidence, and brand competitiveness. In particular, ESG ratings are now factored into investment decisions by institutional investors, and firms that score poorly may face higher capital costs or divestment.

Voluntary initiatives can also foster innovation and set industry benchmarks. When market leaders adopt high sustainability standards, they may induce positive spillover effects along the supply chain or trigger emulation by competitors seeking to maintain legitimacy and market share.

Intermediate EV3c However, the effectiveness of voluntary measures depends on the strength of market discipline and the credibility of disclosure. Without independent verification or legally binding requirements, some firms may resort to **greenwashing** — overstating or misrepresenting the environmental impact of their operations to gain reputational or financial advantage. For example, vague claims like “eco-friendly” or “sustainably sourced” may lack clear metrics or third-party validation, reducing transparency for stakeholders.

Moreover, voluntary ESG adoption tends to be concentrated in larger firms operating in advanced economies with strong consumer activism and investor scrutiny. In contrast, smaller firms and those in developing countries may lack the incentives, capabilities, or external pressure to pursue such commitments.

Therefore, while voluntary initiatives can complement regulatory and market-based approaches, they are unlikely to drive systemic change on their own. For broader impact, governments should establish reporting standards, mandate third-party audits, and integrate ESG compliance into procurement or investment frameworks.

This creates a more credible and level playing field, ensuring that voluntary efforts translate into real environmental outcomes.

Summative Evaluation

Achieving sustainable consumption and production requires a mix of strategies — including education, market-based tools like taxes and subsidies, and support for green innovation. While each approach has its strengths, none can work well on its own. These measures are most effective when used together, under the broader idea of the circular economy.

However, how well these strategies work depends a lot on the country's situation. Developed countries usually have stronger governments, more money, and better technology. This makes it easier for them to use tools like carbon taxes, emissions trading, and funding for green research. On the other hand, developing countries may not have the same resources or institutions. They may focus more on giving targeted help to firms and households, using international aid, or building basic systems to support sustainability.

Because of these differences, countries need to take different paths, but also work together. Global cooperation — such as sharing knowledge, providing financial support, and agreeing on common goals — is key to making progress. The circular economy gives a useful long-term vision, but reaching it will require practical and inclusive efforts that fit each country's needs.

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Markers' Report:

This was not a popular question. There was also wide variation in the depth and quality of explanation to this question. Stronger responses gave a good explanation of the 'circular economy' and a wide range of measures that might be adopted by economic agents to deliver 'sustainable production' and 'sustainable consumption'. These measures were derived from a range of analytical approaches, such as those suggested by behavioural economics, Coasian economics and economic growth models adapted for sustainability. Protection of the global environment was less well explained by most candidates. Stronger evaluative judgements about the success of policy measures were set in the context of the global economy, with comparisons being made between countries at different levels of economic development. Weaker responses were briefer and moresuperficial. These types of response made unsupported statements about a limited number of measures that consumers or producers might adopt to protect the environment, such as reduced use of plastics or use of green technology. In consequence, they lacked underlying economic analysis to justify the measure presented. Weaker evaluative judgements tended to be superficial statements, such as these measures might lead to increased prices.