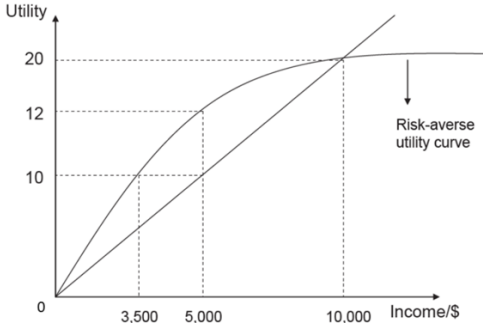
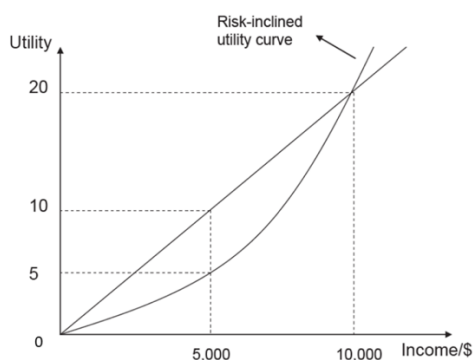


2025 ASRJC H3 prelim paper

Suggested answers

Question 1

(a)	With reference to Extract 1, explain how different risk attitudes influence individuals' decisions towards cryptocurrency investments. Assume the following payoffs: 1. An individual gets a guaranteed investment income of \$5,000 from a fixed deposit commitment. 2. There is a 50 per cent chance he gets absolutely nothing, and a 50 percent chance that he gets \$10,000 from cryptocurrency investment. In the second scenario, his expected investment income is thus $0.5 \times \\$0 + 0.5 \times \\$10,000 = \\$5,000$. There are three types of individuals: (i) risk-averse, (ii) risk-neutral, and (iii) risk-loving. Note: risk-neutral not discussed here. Risk-averse individuals prefer outcomes with lower uncertainty and tend to avoid high levels of risk, even if the potential rewards are significant. Risk-averse individuals have a concave utility function.  The individual has a higher level of utility from an investment income of \$5000 (utility at 12) with certainty from fixed deposit than if he had to take a chance with cryptocurrency investment (utility at 10). His risk premium is \$1500. Decisions towards cryptocurrency investments: These individuals tend to avoid investing in cryptocurrencies due to their high volatility and uncertain returns. They are more likely to prefer traditional, lower-risk investments like government bonds or savings accounts. The utility derived from potential high returns does not outweigh the disutility caused by the perceived high risk and potential for losses. This aligns with the diminishing marginal utility of (investment) income — the additional satisfaction from gains in income decreases as income increases, making losses more impactful. Extract 1 suggested that lower income individuals tend to be more risk-averse. Risk-loving individuals prefer investments with higher risk as they derive utility from taking risks. Moreover, these investors are drawn by the lure of potentially higher returns in a “lottery-style payoff” than investors expect with traditional investments. Risk-seeking individuals have a convex utility function.	[6]
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The risk-loving individual has an increasing marginal utility of (investment) income. This means that the additional utility per dollar (investment) income gained gets higher and higher. The risk-loving individual thus always prefers the uncertain outcome (utility of 10) from crypto investments than the certain outcome (utility of 5) from fixed deposit.

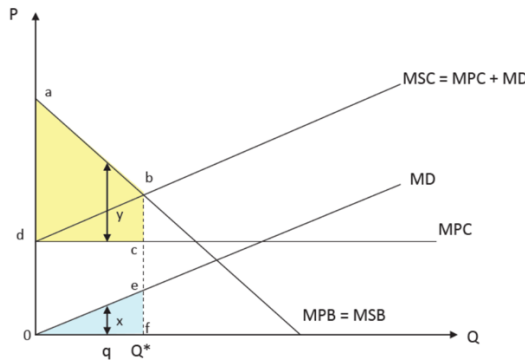
Decisions towards cryptocurrency investments:

These individuals are attracted to the speculative nature of cryptocurrency markets, including high-risk, high-reward investments, or investments in unproven cryptocurrencies.

Mark scheme

Level	Knowledge, Application, Understanding and Analysis	Mark
L3	For a well-developed answer that has: • good scope – explain how different risk attitudes (high risk and low risk) influence individuals' decisions towards cryptocurrency investments; and • good rigour – uses economic concepts like utility functions (and/or numerical examples) to explain individuals' decisions towards cryptocurrency investments; and • good application – explains with reference to extract, referring to risk-loving and risk-averse individuals.	5-6
L2	For an under-developed answer that: • lacks scope – explains only one type of risk attitude towards cryptocurrency investments; and/or • lacks rigour – provides a descriptive explanation on how different risk attitudes influence individuals' decisions towards cryptocurrency investments.; and/or • lacks application – explains with little or no reference from extract.	3-4
L1	An answer that does little more than identify the two possible reasons, with no application of economic analysis.	1-2

(b)	With reference to the extracts, explain two different types of market failure associated with Bitcoin. Requirement 1: Negative externalities associated with the production (mining) of Bitcoin. These include high energy consumption, often powered by fossil fuels leading to carbon emissions, noise pollution from mining rigs and cooling systems, strain on local power grids, affecting other users or e-waste due to rapid hardware obsolescence. To have the usual explanation of 3rd party effects with application to extract information + CBA diagram and explanation of deadweight loss. Requirement 2: Information asymmetry associated with the trading (buy and sell) of Bitcoin. Information asymmetry emerges when traders are segmented into two categories: more informed traders who actively engage with social media, and less informed traders who do so infrequently (or not at all). Traders in this case refer to both buyers and sellers in the financial (Bitcoin) market. Information asymmetry occurs between the buyer and the seller. The more informed trader can be a buyer or a seller, depending on the circumstances. In a particular scenario, a trader may receive certain insider information that prompts him to sell, and in this case another trader who is willing to buy the Bitcoin must be someone who does not share the same insider information; thus adverse selection occurs where the seller has more information than the seller. Conversely, a trader who sold and finds out later the Bitcoin has made large gains could mean the buyer had insider information on the prospective gains. This again is a display of adverse selection. Such dynamics lead to transactions occurring in the Bitcoin market to be based on guesswork and expected returns of traders, and transaction prices do not reflect the true value of Bitcoin. These inefficient transactions diminish overall market welfare, where buyers will be wary of the sellers (thinking that they could be letting go of the crypto due to insider info.) and vice versa. The outcome will be less transactions that could have occurred, and less liquidity from these assets. <i>(This asymmetry is compounded by bounded rationality, where decision-making is constrained by cognitive limitations and bounded willpower, a focus on short-term outcomes rather than long-term utility maximisation. In addition, traders may be influenced by behavioral biases such as loss aversion and salience bias, which further distort rational judgment. In the context of Bitcoin's speculative nature, some traders are drawn by the "lottery effect," wherein the prospect of unusually high returns motivates participation despite high volatility.)</i> <table border="1" data-bbox="268 1771 1299 2011"> <tr> <th data-bbox="272 1771 376 1809">Level</th><th data-bbox="376 1771 1201 1809">Knowledge, Application, Understanding and Analysis</th><th data-bbox="1201 1771 1294 1809">Mark</th></tr> <tr> <td data-bbox="272 1809 376 2011">L3</td><td data-bbox="376 1809 1201 2011"> For a well-developed answer that has: • good scope – explain two different types of market failure associated with Bitcoin; and • good rigour – applies economic models such as cost-benefit analysis where appropriate, and incorporates relevant economic terminology and explanations of </td><td data-bbox="1201 1809 1294 2011">5-6</td></tr> </table>	Level	Knowledge, Application, Understanding and Analysis	Mark	L3	For a well-developed answer that has: • good scope – explain two different types of market failure associated with Bitcoin; and • good rigour – applies economic models such as cost-benefit analysis where appropriate, and incorporates relevant economic terminology and explanations of	5-6	[6]
Level	Knowledge, Application, Understanding and Analysis	Mark						
L3	For a well-developed answer that has: • good scope – explain two different types of market failure associated with Bitcoin; and • good rigour – applies economic models such as cost-benefit analysis where appropriate, and incorporates relevant economic terminology and explanations of	5-6						

	market failure, particularly when diagrams are not feasible; and • good application – explains with reference to extract.		
	L2 For an under-developed answer that: • lacks scope – explains only one type of market failure associated with Bitcoin; and/or • lacks rigour – provides a descriptive explanation of market failure associated with Bitcoin; and/or • lacks application – explains with little or no reference from extract. 3-4		
	L1 An answer that does little more than identify the two possible types of market failure, with no application of economic analysis. 1-2		
(c)	Discuss the extent to which issues arising from Bitcoin mining in Kazakhstan can be resolved by allocating property rights to the parties involved. Command word: Discuss the extent (balanced view)... can be resolved (remove the welfare loss associated with Bitcoin mining) Content: Application of the Coase Theorem Context: Bitcoin mining (Kazakhstan) Coase Theorem: if property rights are clearly defined and transaction costs are low, private parties can negotiate to resolve externalities and reach an efficient outcome regardless of who holds the initial rights. Requirement 1: The allocation of property rights to the parties involved can resolve the issues arising from Bitcoin mining in Kazakhstan Conditions of Coase Theorem to be applied • Well-established property rights. • Low costs of negotiation. • The externality must be well-defined.  Consider the case where the local community has the property rights. The Bitcoin miners now require the permission of the local community to produce any Bitcoin that will pollute the environment. Production is initially zero and slowly increases till output level Q^*. As long as the marginal net benefit is greater than the amount of compensation Bitcoin miners have to pay to the local community, the miners will pay the compensation to produce that extra unit of	[8]	

output. At output level q between 0 and Q^* , the marginal net benefit $\$y$ is greater than the marginal damage $\$x$ (which is the amount the miners have to compensate the local community for). The miners would thus be willing to produce an extra unit of output. This continues until an output level of Q^* where marginal net benefit is exactly equal to marginal damage. At quantities more than Q^* , marginal net benefit is less than marginal damage and the miners would not produce an additional unit of output.

The cost to the local community is given by area $ef0$. The benefit that the miners get is given by the area $abcd$. The benefit to the miners is larger than the cost to the local community as area $abcd$ is larger than area $ef0$. There is thus a net benefit to society.

The socially optimal level Q^* is reached through private bargaining based on the local community owning the right to allow or disallow Bitcoin mining.

The Coase Theorem thus implies that once the government manages to establish a strong legal system, which guarantees property rights, there is no need for government intervention to correct externalities.

Requirement 2: There are limitations in the allocation of property rights to the parties involved to resolve the issues arising from Bitcoin mining in Kazakhstan

The Coase Theorem only works when the three necessary conditions hold: the existence of well-established property rights; low cost of negotiation; and a well-defined source of externality. In many cases, these conditions are not fulfilled.

In reality, negotiating agreements between many affected parties is complex and costly. Costs include legal fees, monitoring, enforcement, and coordination. This is especially problematic when a large number of people are affected (in this case, the local community in Kazakhstan could be in thousands). The difficulty of establishing property rights for clean air also arises.

It can be difficult to identify the external costs with accuracy. The local community might not know how much harm is being caused or how much to demand in compensation. This is especially in the case where negative effects do not show up until much later (some health detriments only surface after some time). The Bitcoin miners might hide or understate the extent of the harm. The monetised value of external cost is inaccurate due to attempts at valuing the intangibles (shadow pricing in extract) and information asymmetry.

Evaluation:

[Stand] Large or small extent in solving the issue.

[Substantiation] Justify with one well explained perspective why large/small extent in which the issue can be resolved.

In cases involving many affected individuals in a local community, some may refuse to settle unless they receive a larger share, creating a holdout problem. This can stall or derail negotiations. Large firms (like Bitcoin miners) may exploit their financial or legal advantages while the poorer or less united communities may lack resources to negotiate or defend their rights.

In Kazakhstan, local communities suffer from power outages, rising electricity prices, and environmental degradation due to energy-intensive crypto mining operations. These communities often lack the resources, legal support, and

bargaining power to negotiate on equal terms. In contrast, many large, often foreign-owned mining firms hold significant financial and legal advantages, creating a clear power imbalance. Even if property rights were well-defined, the market failure may persist due to transboundary issues, as foreign entities exploit Kazakhstan's low energy costs and weak regulatory environment, complicating enforcement and limiting the effectiveness of private negotiations.

The Coase Theorem works best in small-scale, localised situations. It is not very practical when it comes to broad climate change issues or when the parties involved come from different jurisdictions. Coordinated government action is needed. However, the extent of government coordination depends on the will of the government, and also on political ties between countries.

Level	Knowledge, Application, Understanding and Analysis	Mark
L3	For a well-developed answer that has: • good economic rigour – explains how production negative externalities in Bitcoin mining in Kazakhstan can be resolved by allocating property rights to the parties since owners of the affected resources can seek compensation from the party who is causing the external cost, i.e. Coase Theorem must be considered; and • good scope and balance – considers how property rights work to resolve the issue and consider the limitations of the proposed solution based on the assumptions of Coase Theorem; and • good application – explains with reference to extract.	5-6
L2	For an under-developed answer that: • lacks rigour – insufficient use of economics concepts (Coase Theorem) to explain how allocating property rights will resolve issues related to production negative externalities in Kazakhstan; and/or • lacks scope and balance – one-sided analysis that did not consider the limitations related to allocation of property rights; and/or • lacks application – little use of the extracts.	3-4
L1	An undeveloped answer that merely lists material from the case with little or no application of economic analysis.	1-2
	Evaluation	Mark
E	For a well-reasoned evaluative conclusion that considers whether allocation of property rights can resolve issues arising from Bitcoin mining given the context – the issue is occurring in Kazakhstan. Other conditions influencing the effectiveness of allocation of property rights to resolve the issues can be considered.	1-2

(d)	Discuss the impact of crypto mining on a country's sustainable development using the capital approach. Define sustainable development: United Nations (UN) defines development as an increase in well-being across the members of a society between two points in time and well-being is enhanced by the increased consumption of goods and services. Well-being is not restricted to the utility obtained from the consumption of goods and services, but also includes goods and services provided freely by nature, enjoyment of the benefits of human rights and mental wellness. The increase in consumption must be over a long period of time. One way to measure sustainable development is the capital approach. By measuring the capital stock amount over time, the sustainable development level, or how much the economy has developed sustainably, can be determined. In this case, the influx of crypto mining to countries (such as Kazakhstan): <i>Requirement 1: Positive impact on sustainable development based on capital approach</i> Produced Capital Produced capital refers to machinery, buildings, telecommunications and other types of infrastructures. On the positive side, crypto mining contributes to the accumulation of produced capital. Investments in data centres, cooling systems, and grid infrastructure may have long-term benefits if repurposed. It can boost ICT development and attract foreign investment. The grid can also serve the local community through providing a stable source of electricity. Financial capital Financial capital refers to assets such as stocks, bonds, and currency deposits within a country. These instruments play a vital role in enabling individuals to make savings decisions, hedge against inflation, preserve wealth, and manage consumption over time. As a country's income grows, its citizens are typically able to save a larger share of their earnings, making the efficient use of financial capital increasingly important for improving the overall standard of living. Moreover, greater exposure to and trading of financial instruments contribute to the development and sophistication of the country's financial markets. The growth of crypto mining in a country like Kazakhstan can serve as a catalyst for the development of cryptocurrency-related financial markets, potentially contributing to broader economic development. <i>Requirement 2: Negative impact on sustainable development based on capital approach</i> Natural Capital Natural capital refers to natural resources, land and ecosystems providing services like waste absorption. Crypto mining is energy-intensive, and in Kazakhstan, the energy used often comes from coal-fired power plants, a key source of greenhouse gas emissions and local air pollution. This results in depletion of non-renewable resources (coal), environmental degradation, including increased carbon emissions, reduced air quality and adverse impacts on ecosystems and public health. Human Capital	[10]
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	Human capital refers to healthy and educated workforce. Crypto mining provides limited direct employment opportunities due to its capital-intensive nature, often requiring technical expertise and minimal labour. Moreover, the health effects from pollution due to higher energy use can negatively affect human capital. Investments in digital infrastructure and technology may enhance technical skills and digital literacy in the long term, though these benefits are not guaranteed or widely distributed. Social capital Social capital refers to functioning social networks and institutions. includes trust, institutions, and networks that support cohesive and productive societies. The extract highlights public discontent over energy shortages caused by mining, which has sparked mass protests and heightened tensions around corruption. These issues risk undermining trust in institutions and pose a serious threat to social cohesion and productivity, both vital to a country's sustained economic development. Additionally, unequal distribution of benefits (e.g., profits concentrated among foreign investors or elites) may fuel social tensions. Evaluation: [Stand] Overall net positive or negative impact on sustainable development. [Substantiation] Crypto seem to contribute to short term growth without significant benefit in the long run. Crypto miners deliberately choose to situate their mining activities in countries with lax environment rules knowing well that they may be subjected to restrictions in countries who are more aware of the hazards and have sound institutions. Extract 4: "Given the knock-on effects of national regulations, there must also be some form of global governance to prevent crypto miners from simply seeking out new regions with accessible energy resources and poor regulation." For the case of Kazakhstan, there seems to be limited in the increase in produced capital and financial capital (based on extract information). It is likely the deterioration of natural and human capital (due to pollution and limited employment opportunities) outweighs the little to no increase in produced and financial capital. The overall capital stock in Kazakhstan is likely to fall in the long run and possibly even in the near future. However, Crypto miners are also motivated to turn "to renewable energy sources to overcome tensions with electrical grids." There are efforts to reduce the environmental hazards that come with crypto mining. Inclusive institutions that formulate redistributive and transparent policies are essential to ensure that the benefits of development and progress are broadly shared across the population, rather than being concentrated in the hands of a select few or politically connected elites. At the same time, institutions can come up with well-designed and consistently enforced regulations coupled with market based solutions (such as tax) to reduce negative externalities and optimise the level of crypto mining. In the long run, if the negative impact can be minimised through combined efforts from both the government and firms, crypto mining may be able to contribute to sustainable development in the countries who host these activities.	
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Level	Knowledge, Application/Understanding and Analysis	Marks
L3	For a well-developed answer that has: • good rigour: Answer makes use of the capital approach and relevant economic concepts related to sustainable development. • good scope and balance: Answer considers both the benefits and harms of crypto mining on sustainable development. • good application to context: Answer makes good reference to extracts provided where possible.	5 – 6
L2	For an underdeveloped answer that: • lacks rigour: Answer tends to be descriptive and does not use the relevant H3 concepts, especially the capital approach. • lacks scope and balance: Answer considers only benefits or costs of crypto mining on sustainable development. • lacks application to context: Answer draws little reference from the extracts provided.	3 – 4
L1	An undeveloped answer that either • lacks understanding on the capital approach and its relevance to assessing sustainable development and/or • merely lists material from the case with little or no application of economic analysis.	1 – 2
Evaluation		
E2	For a well-reasoned evaluative conclusion that assesses the net impact of crypto mining on sustainable development, supported by a capital approach analysis. Consideration is given to how the net impact may differ across contexts, with a particular focus on Kazakhstan in comparison to other countries.	3 – 4
E1	The conclusion provides a succinct and relevant evaluation of crypto mining's impact on sustainable development, but with minimal contextual application.	1 – 2
[Total: 30]		

Question 2

Discuss whether the presence of decision-making biases undermines the assumption of rationality in consumer behaviour and evaluate the relative usefulness of traditional and behavioural economics in guiding policy decisions. [35]

Suggested Answer

R1: Explain rational decision-making by consumers in traditional economics

Using the equi-marginal principle, explain rational decision making as the maximizing of net benefits and apply to consumers: $MU_a/P_a = MU_b/P_b$

- The rule of the Equi-marginal Principle states that consumers allocate their money incomes such that the last dollar spent on each product purchased yields the same amount of extra marginal utility (MU) i.e. $MU_a / P_a = MU_b / P_b$. If the MU of the next dollar is better spent on good A, then the consumer would buy more of good A. As more units of A are consumed, then $MU_a / P_a < MU_b / P_b$. The consumer would then switch B instead. In this manner, consumers would get the most utility from their limited budget, by spreading out their limited budgets across a variety of goods according to MU/P

[May be considered for R1 as well] Students can also explain discounting for decisions spanning a time horizon:

- For decisions that span a time horizon, economic agents can apply time discounting for rational decision making.
- The discount rate expresses the time value of money. By placing a discount rate $[1/(1+R)]$ on benefits and costs in the next time period, households can estimate the net present value (NPV) when they sum up the discounted future benefits and costs of that decision.
- The discount rate decreases the value of future utility because satisfaction derived today valued more than satisfaction derived tomorrow. It also accounts for opportunity cost, as funds allocated for satisfaction today could yield interest that could be spent on more goods and services tomorrow.

Evaluation:

Are these assumptions realistic in all decision contexts? Assumptions do not hold in reality

Why do economists use them despite simplifications?

Are there contexts (e.g., high-stakes decisions, experienced agents) where rationality still holds?

- However, in reality, the assumptions do not hold – traditional economic theory assumes that all agents are rational and have perfect knowledge of all prices and their preferences and can calculate their marginal utility. Most consumers rely on heuristics or past consumption patterns. Can also consider the assumption that preferences are consistent, transitivity of preferences.
- When consumers purchase goods, they may have a rough idea of how much utility the good will give, but often they don't – especially for new goods. Consumers can also

show ordinal utility (they know the rank order of their preferences) but not cardinal utility (they cannot give a numerical value to utility)

- There may also be consumer ignorance due to myopia or lack of information. For example, in demerit goods like sugar beverages or cigarettes where consumers are unaware of or heavily discount future consequences. They could also be overly swayed by persuasive advertising (Marlboro Man, endorsements at sports events).
- This can also be due to high search costs. If it is very costly to keep searching (time, money, or effort), decision-makers are more motivated to carefully weigh options early and settle on the optimal one rather than “satisfice.” Thus, their choices deviate from the strict definition of rationality, even if they appear “reasonable” given constraints.

R2: Explain how decision-making biases challenge these assumptions in explaining consumer behaviour.

- Using examples, explain how biases such as loss aversion, status quo bias or sunk cost fallacy (minimum 2 – to meet Q requirement of ‘biases’)
- For instance, explain how sunk cost fallacy and status quo biases hinder ability to make rational decisions
- Sunk cost fallacy is when one continues to do an action due to their past commitment, such as time, money and effort spent, when the rational decision is to instead do the action that will maximise social welfare Example: payment for the COE is a sunk cost, because it is irreversible (even if one were to sell his/her car, only part of the COE can be recovered). Despite it being irrelevant to one’s decision on car usage, since it does not impact on cost or benefit of making one additional car journey, car owners have an irrational tendency to take it into consideration when making decisions on whether to drive, e.g. since the ‘cost’ is so high, there is need to drive more frequently so as to benefit from the car sufficiently in order to justify the cost of the car. This is an irrational decision if the $MC > MU$ of the specific car journey.
- Consumers may show a preference for things to stay the same (status quo bias), even though there may be new possible combinations of goods and services e.g., arising from new product launches that could improve their utility. One reason for sticking to the status quo rather than switch to the alternative could be because consumers treat the status quo as a reference point (students can refer to prospect theory here). When considering the alternative option, more weight is assigned to potential losses it could result in (stemming from losing the status quo) than its potential gains (loss aversion), such that the decision is in favour of the status quo. E.g. Telcos often take advantage of consumers’ tendency to remain with their current provider, even when cheaper SIM-only plans are available. Although these new plans may offer more data at a lower cost, many consumers still prefer the familiarity of their existing arrangements. This is because the potential losses from switching — such as the risk of poorer network reliability, complications with number portability, or the inconvenience of unfamiliar customer service — are perceived to outweigh the potential gains in cost savings. As a result, consumers display status quo bias, consistent with prospect theory’s emphasis on loss aversion, which helps explain why rational utility-maximising behaviour may not hold.

Evaluation:

Are they significant enough to invalidate the rational model entirely, or just in some contexts?

Does bounded rationality e.g. offer a better framework?

- These behavioural biases are more likely to happen when consumers have to make decisions under time constraints because when a decision have to be made more quickly, people tend to fall back on heuristics, giving rise to a higher likelihood of salience bias as they tend to focus more on what is prominent in decision making.
- Consumers also tend to make many more 'small' decisions, so the impact of loss aversion may be negligible in such cases. E.g. Trying out a free or low-cost app (e.g., \$1–\$2) involves very little risk. If the app turns out to be unhelpful, the loss is trivial, so consumers are less anchored to the status quo and more open to switching or experimenting.

R3: Explain how traditional and behavioural economics can help governments design and carry out effective economic policies.

Use of traditional economic theory	Use of behavioural economics
E.g. taxes and subsidies to change consumption through price signals Q* where MSB = MSC	E.g. Default opt-in options for organ donation (to tap on status quo bias), OR Nutri grade and healthy labels for sugary drinks (to tap on salience bias)

Traditional economic theory suggests that governments can correct market failures through Pigouvian taxes and subsidies, using price signals to influence consumption decisions. For example, a tax on sugary drinks raises their market price, discouraging excessive consumption, while subsidies on healthier alternatives lower relative prices, encouraging substitution. In theory, such policies shift consumption towards the socially optimal level Q*, where marginal social benefit (MSB) equals marginal social cost (MSC). This approach relies on the assumption of rational decision-making, where consumers respond predictably to price changes in maximising their utility.

Governments increasingly employ behavioural-informed “nudges” that account for cognitive biases in decision-making. For instance, adopting a default opt-in system for organ donation leverages status quo bias — many individuals prefer to avoid the effort of switching or perceive the default as the “recommended” choice, thereby significantly increasing donation rates without coercion. Similarly, the introduction of Nutri-Grade labels for sugary drinks in Singapore taps on salience bias. By making the health consequences of consumption more visible at the point of purchase, consumers are nudged to reconsider their choices, even if prices remain unchanged. These policies acknowledge that consumers often deviate from rational utility maximisation.

Evaluation:

Which approach leads to better results in solving economic problems?

Applicability to different policy contexts/countries

- Traditional Economics might be more useful for market-wide problems as traditional models are very good at predicting aggregate outcomes (e.g. addressing externalities,

price distortions). Traditional economics is also excellent at solving problems where price signals are the dominant force of change.

- On the other hand, behavioural economics might be more useful for individual-level behaviours (e.g. individual decisions on their health, savings, energy consumption, etc) as compared to traditional economics which may not reflect actual human behaviour since it assumes rational agents.
- Behavioural economics explains real-world choices better but may be less generalisable across all settings. While behavioural insights capture these realistic patterns, they may be less generalisable across all settings. For instance, different groups of people may respond differently to the same “nudge.” For instance, a Nutri-Grade label may strongly affect health-conscious consumers but have little impact on youths who prioritise taste over health. Likewise, organ donation defaults that work in one country may fail in another due to cultural or ethical norms. In contrast, traditional economic tools like taxes and subsidies tend to apply more broadly, since they work through universal price signals.

Applicability to different types of market failure (consumer ignorance vs externalities)

- Nudges are most effective when the primary problem is imperfect information or cognitive biases that prevent people from making decisions aligned with their own best interests. Classic examples include automatic enrollment in pension schemes (addressing procrastination and inertia) or calorie labelling on menus (providing missing information). These work because they help people make better choices for themselves without restricting their options – i.e. nudges do not change people's underlying preferences or restrict their choices, but they simply remove friction, provide missing information, or make existing preferences easier to act upon, resulting in behavioural changes.
- For externalities, nudges are generally less applicable because the fundamental problem isn't that people lack information or make poor personal decisions - it's that their privately optimal choices impose costs on others. E.g. consider a consumer choosing whether to drive or take public transport. Even with perfect information about congestion and pollution, they might drive because it's more convenient, faster, or comfortable for them personally. The congestion they add affects other drivers, and their emissions affect air quality for everyone, but these costs don't factor into their private decision-making. In this case, the consumer is making a privately optimal choice that happens to impose external costs. No amount of nudging will align their private incentives with social welfare when the market failure stems from divergent private and social costs.

Conclusion

[Stand] Overall, the presence of decision-making biases undermines the assumption of rationality in consumer behaviour. Additionally, traditional and behavioural economics are both equally useful in guiding policy decisions since deploying a combination of incentives and nudges would allow policymakers to design more robust and effective solutions to a wider range of economic problems.

[Substantiation]

A key factor in justifying that the presence of decision-making biases undermines the assumption of rationality in consumer behaviour lies in the type of decision and the time period under consideration. For low-stakes, routine choices made frequently, such as food or transport decisions, biases like loss aversion may have negligible impact, and consumer behaviour may still approximate rationality. However, in high-stakes or infrequent decisions — for example, financial planning, healthcare, or organ donation — behavioural biases such as status quo bias play a more significant role, clearly against the rationality assumption.

The usefulness of policies in addressing such deviations depends on several factors, including the policy goal, the type of decisions being influenced, the target group of consumers, and the broader economic context. For instance, if the policy goal is to reduce unhealthy consumption among youths, behavioural nudges such as salience-based labelling may be more effective, whereas reducing carbon emissions on a national scale might require traditional tools like carbon taxes.

In practice, the most effective policies often combine traditional and behavioural economics. Traditional economics provides the foundation for identifying and defining economic problems such as market failure or resource misallocation — through the use of concepts like externalities for example. Behavioural economics then complements this by diagnosing the underlying psychological reasons behind the problem, such as inertia, bounded rationality, or salience bias. Taken together, this integrated approach allows policymakers to design interventions that not only correct price signals but also reshape the decision-making environment, thereby achieving more sustainable and welfare-enhancing outcomes.

Mark Scheme

Level	Knowledge, Application/Understanding and Analysis	Marks
L3	For a clear analytical explanation of: • Rational decision making by consumers • How at least two biases undermine the assumption of rationality in consumer behaviour. • How traditional and behavioural economics can help governments design and carry out effective economic policies Analysis shows good application to the real world and explanation is illustrated with relevant examples.	18-25
L2	For an answer that shows some explanation of: • Rational decision making by consumers • How at least two biases undermine the assumption of rationality in consumer behaviour. • How traditional and behavioural economics can help governments design and carry out effective economic policies There are some applications to the real world and explanation is illustrated with examples.	10-17
L1	For a basic or limited explanation of how a consumer makes decisions rationally and/or are hindered in rational decision making by behavioural biases.	1-9
Evaluation		
E3	A detailed evaluation of whether decision making by consumers is hindered by behavioural biases and the relative usefulness of traditional and behavioral economics in guiding policy decisions. Conclusion made is well-reasoned and synthesises previous judgements made.	7-10
E2	For an answer that makes some attempt at evaluation or a conclusion about whether decision making by consumers are hindered by behavioural biases and the relative usefulness of traditional and behavioral economics in guiding policy decisions.	4-6
E1	Limited conclusions that are not supported by reasoned argument and that are not well directed at the question.	1-3

Question 3

Geopolitical tensions between the US and China since 2018 have created uncertainty in global markets, disrupting supply chains and trade flows. For large firms, particularly multinational corporations (MNCs), maintaining a competitive advantage is crucial.

In view of geopolitical tensions between the US and China, evaluate the strategies that might be adopted by a MNC to maintain competitive advantage in the market. [35]

Suggested Answer:

Introduction:

- Since 2018, US-China geopolitical tensions have created uncertainty in global markets due to trade tariffs, technology restrictions and national security concerns. Porter's Five Forces is useful for firms to determine the degree of competitive advantage in view of the challenges encountered by a MNC during a period of geopolitical tensions. For MNCs, strategies such as cost minimisation, product differentiation, non-price competition, and risk management under imperfect information can be adopted to gain competitive edge in the market.

Requirement 1: Disrupting supply chains – Bargaining power of suppliers – Cost-based strategy (Backward vertical integration or reshore production back to home country) OR Diversification or de-risk supply chain (e.g. China +1 strategy)

- When supply chains are disrupted, many smaller firms may be forced to exit the market. This leads to greater supplier concentration, which increases the market power of the remaining suppliers. Suppliers will have more bargaining power to drive up the input costs for a MNC and reduce their profitability when there are few suppliers in the industry. This reflects a shift from perfect or monopolistic competition toward a more oligopolistic or monopolistic supply structure. Fewer suppliers can now set higher prices, knowing that buyers (e.g. MNCs) have limited alternatives. An example in the semi conductor industry where smaller fabrication firms close down due to US-China export restrictions and hence Samsung and TSMC increased in market power.
- MNCs must respond strategically, through diversification, localisation, or vertical integration, to mitigate their increased vulnerability. MNCs may adopt a "China+1" strategy to shift production to other low-cost countries such as Vietnam, India, or Mexico, thereby reducing over-reliance on a single geopolitical zone. This enables firms to manage operational risk and maintain productive efficiency (lower average costs in the long run). For example, Apple moved some iPhone production to India; Nike increasing sourcing from Vietnam.

Intermediate Evaluation 1:

- While this improves resilience, short-term costs may rise due to loss of economies of scale, retraining labour, and capital reallocation.
- For industries with high fixed costs like electronics, this may significantly impact average total cost (ATC). It may also result in longer lead times for production realignment.

Requirement 2: Disrupting trade flows – Bargaining power of customers – Product differentiation (localise products to fit home market preferences)

- Trade disruptions such as tariffs, customs delays, or container shortages raise the marginal cost (MC) and average cost (AC) of production and delivery. In a firm's cost curve, an upward shift in MC and AC due to disruption reduces profit-maximising output (where $MC = MR$) and compresses profit margins. If a MNC exports to price-sensitive (elastic) markets, increased export prices due to trade disruptions can lead to a large fall in quantity demanded, reducing total revenue. A MNC may hence face loss of access to major markets due to political sanctions or retaliatory measures, leading to market exclusion and demand diversion to rivals. In the long run, trade disruptions can stimulate domestic entrepreneurship, leading to the emergence of new substitute goods, which increase consumer choice and bargaining leverage.
- MNCs may form strategic alliances or joint ventures with domestic firms. Partnering with a domestic firm allows the MNC to comply with local regulations and secure licences more easily. In China, foreign automakers like Volkswagen entered via joint ventures with Shanghai Automotive Industry Corporation to meet the 50% ownership cap on foreign firms. MNCs avoid bearing full investment risk in volatile markets, it enables co-branding and trust-building with domestic consumers and local partner can source labour, inputs, and permits more efficiently.

Intermediate Evaluation 2:

- Principal-agent problems may arise if objectives between the MNC and domestic partner diverge. Decision-making may be slow or conflict-ridden, especially in cases with equal ownership. In economies with weak IP enforcement, MNCs risk technology leakage or reverse engineering by local partners.

Requirement 3: uncertainty in global markets – competitive rivalry within industry – Pricing and non-pricing strategies to defend market share (game theory and the economics of cooperation)

- Uncertainty in global markets can lead to increased competitive rivalry within industries. This occurs because firms face higher risks, weaker demand, and shifting cost structures, prompting more aggressive strategies to maintain market share, profitability, and survival. Global uncertainty often leads to lower consumer and business confidence, resulting in reduced aggregate demand, particularly for non-essential or export-oriented goods. In oligopolistic or monopolistically competitive markets, where firms are interdependent, a fall in market demand forces firms to compete more aggressively on price to defend or grow market share. This can lead to price wars, eroding profit margins and increasing rivalry.
- Under uncertainty, firms are unsure about competitor reactions, leading to pre-emptive or retaliatory behaviour. In game theory, firms may adopt dominant strategies (e.g. price-cutting or capacity expansion) to defend their market position even at the risk of mutual losses. In tech industries, trade tensions led firms like Huawei and Apple to rapidly expand product lines and R&D in anticipation of rival gains or restrictions. Explain using game theory matrix.

Intermediate Evaluation 3:

- Whether through price cuts, market re-entry, or non-price competition, firms act more defensively and pre-emptively, often at the expense of profitability and industry stability. The extent of rivalry depends on the market structure, cost asymmetries, and how effectively firms can differentiate, innovate, or diversify in response to uncertainty.

Overall Evaluation:

- The type of MNC ultimately determines its strategies and the level of vulnerability in uncertain global environments. Global MNCs focus on producing standardised goods such as medicinal drugs through global economies of scale and hence its strategies focused more on supply chain diversification during times of uncertainty while international MNCs focus is on exporting goods from their home country are often most exposed due to export dependency and will adopt strategies such as joint ventures with foreign brands.

Marking Scheme:

Knowledge, Understanding, Application, Analysis		
L3	For an answer which demonstrates a clear and analytical consideration of the Porter's five forces framework and the appropriate strategies a MNC may employ to maintain a competitive advantage in the market. The analysis should include sufficient real life examples of MNCs. There should be a good range of strategies and the effects of such strategies on competitive advantage.	Mark 18-25
L2	For an answer which demonstrates a general understanding of the Porter's five forces framework and at least two strategies a firm may employ to maintain a competitive advantage in the market. The analysis may or may not include real life examples of MNCs.	Mark 10-17
L1	For an answer that did not grasp the requirements of the question and only 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
E3	A detailed evaluation of the limitations of the strategies based on the market the MNC is in and/or the MNC itself. A well-reasoned overall conclusion that justifies the judgements made previously.	7-10
E2	An attempt to provide general limitations of the strategies. A broad overall conclusion that is not well-focused.	4-6
E1	Mainly unexplained judgement	1-5

Question 4

Green spaces, such as neighbourhood parks, park connectors and mall rooftop gardens, contribute to urban liveability and help cities adapt to climate risks. Some green spaces are provided for by the government, while others are treated as club goods and produced by the private sector. Even for such club goods, there is room for government intervention to incentivise private actors to maximise the benefits of such green spaces while minimising their negative effects, such as externalities and social injustice.

Discuss why some green spaces are provided for by the government while others are left to the free market, and assess the potential impacts of government intervention to maximise the benefits or minimise the costs of green spaces on its economic aims. [35]

Suggested Approach

Candidates are expected to explain firstly why some green spaces are provided for by the government (e.g. positive externalities, public good attributes), and secondly why such provisions are left to the private sector i.e. explain the club good characteristics of some green spaces. Thereafter, candidates will need to explain how method(s) of government intervention work – to increase the benefits of green spaces and minimise their negative effects – and the potential impacts of such government intervention on its microeconomic and macroeconomic aims.

Evaluative comments should attempt to cast a critical lens on each of the requirements. A possible big question for the evaluation for each requirement could be:

- R1: The extent to which green spaces should be provided for by the government (i.e. whether government intervention in the provision of green spaces is **always** needed, or if there are scenarios in which the government does not need to be involved)
- R2: The extent to which the provision of green spaces can be left to the private sector
- R3: Weighing of the overall impact of government intervention on its economic aims – whether such intervention is likely to be beneficial or harmful overall, to society

Big concepts tested:

- Club goods
- Positive externalities
- Competitive advantage (as a possible Ev point)
- Sustainable development (inclusive and sustainable growth; inequitable growth)

Suggested Answer

Introduction

- Context-setting: preview to essay's three requirements + overall stand

R1: Discuss why some green spaces are provided for by the government

Possible reasons for intervention:

- **Positive consumption externalities**
 - Green spaces generate positive externalities that private providers may undervalue (improved air quality, biodiversity, increased property values in surrounding areas, urban cooling and reduced energy usage)
 - Note: But may also generate negative externalities (noise, congestion) if no controls
- **Public good**
 - Some green spaces can be considered public goods – non-rival and non-excludable e.g. public parks and park connectors, given their large size and multiple access points → explain how this leads to total market failure
- Alternatively, green spaces can be argued to be **non-rival (up to congestion point) but excludable** [hint at club good characteristics]
 - Non-rivalry means that once the good is produced, MC for providing to the additional user = 0 (at least up to the point of congestion). So, for green spaces to be priced efficiently, the producer should be charging zero price (i.e. lowering price to zero would have led to pareto improvement in welfare)
 - In the free market, $P = MC = 0$ is the allocative efficient price (since the MC of providing for one more user = ~ 0), which corresponds to the allocative efficient / socially desirable output level. Any $P > 0$ will deter some potential users with $MB < P$ set from consuming the good → underconsumption of green spaces
- **Equity**
 - Government provision of green spaces creates access to these spaces and ensures inclusive growth, reduces inequality in access to nature

[Ev] Possible in-body evaluation points:

- **Whether a certain green space should be left to government provision depends on the nature / size of the green space, as well as the government's priorities**
 - Larger and more difficult to exclude – public good → necessary for government to step in to provide, as there would otherwise be total market failure in the free market
 - However, there is room for private provision (i.e. don't need government intervention) for smaller green spaces e.g. shopping mall rooftop gardens, or those that are naturally excludable in nature and hence don't fall under the definition of a public good (e.g. gardens in condominium buildings)
 - Also depends on governments' priorities i.e. whether there are any other (potentially more) pressing issues e.g. high inflation, ageing population
- **Intervention is most necessary when spillovers (MEB) are high:** If MEB is large → more likely that the extent of underconsumption is greater → greater need for government to intervene

R2: Discuss why the provision of some green spaces is left to the private sector

- **Government intervention may not be necessary if private incentives (in the free market) are aligned with the wider social objectives**
- Also, private sector provision of green spaces (i.e. no government intervention needed) may be a strategy that can help a firm develop some degree of competitive advantage (via differentiation leadership) → may help to promote business, in terms of increasing popularity of the e.g. shopping mall → increase in demand / footfall → higher TR and hence profits, c.p.
 - Could also increase customer loyalty, thereby making demand more price inelastic over time → increase in price will lead to less than proportionate fall in Qd, c.p. → firm will have greater ability to raise price in order to increase TR and hence profits
 - Such effects could be sustained into the LR (customer retention)

[Ev] Possible in-body evaluation points:

- **Whether it is possible to leave the provision of green spaces to the free market depends on nature of the club good and how**
- In situations where it is difficult to exclude non-payers (e.g. neighbourhood park connectors that anyone can enter, or shopping mall rooftop gardens that cannot stop non-patrons from enjoying the rooftop garden) → undermines ability to charge fees → the club is less likely to form sustainably on its own as it is not profitable → under-provision of green spaces → may need government to intervene
- While club goods allow for exclusion, this can limit access and cause inequity – provision of green spaces is usually uneven, as not all firms (e.g. mall developers) will have the incentive or ability to do so – only firms that can afford it or that expect to benefit will invest in such green spaces. This could inadvertently result in green spaces being concentrated in more affluent or commercial areas, and neglected in areas that are deemed less profitable (e.g. lower-income zones) → negative impact on equity
- Profit-driven private actors may neglect socially beneficial but less profitable green spaces if they do not expect its provision to bolster its profits

R3: Discuss (at least one) method of government intervention and their impacts on a government's economic aims

[Ideally, explain 2 for scope. But 1 well-explained policy discussion can be suitably credited.]

Possible policies that can be implemented:

- Subsidies for firms to lower their COP of building green spaces
- Incentives to firms e.g. to achieve eco-certifications (e.g. Singapore's BCA Green Mark)
- Regulation e.g. urban planning policies to integrate green spaces into infrastructure, or to require a minimum percentage of green spaces in each town
- Public-private partnerships e.g. community gardens, shared-use rooftop gardens, joint development of park connectors through adjacent malls
 - **CapitaSpring (Raffles Place):** mall/office tower includes sky gardens and urban farm accessible to tenants and curated public visits, but required by URA's landscaping incentives

- **High Line Park (NYC):** Originally funded by public-private partnership, with private donors and businesses sustaining much of its maintenance
- Note: Students should ideally not explain public provision, as public provision was already explained in R1 and so the flow of the essay will not be sound
 - Direct funding and maintaining of green spaces e.g. public parks and park connectors, where exclusion is difficult and equity is an important consideration

Microeconomic aims

- Efficiency –
 - Internalisation of externalities → increased provision of and hence access to green spaces → improvement in society's welfare
 - **However**, risk of government failure if poorly designed and executed
- Equity –
 - Intervention can broaden access, thus reducing social exclusion and promoting environmental justice
 - Funding mechanisms (taxes, fees) must be equitable to avoid burdening low-income groups disproportionately

Macroeconomic aims

- Actual and potential growth –
 - Enhanced green spaces improve urban liveability, attracting skilled labour and investment, stimulating economic expansion
 - E.g. In Singapore, initiatives like the ABC Waters Programme aim to integrate greenery into all residential areas, not just private estates
 - Public-private models can leverage private capital, easing fiscal pressure
 - Overly stringent regulation may deter investment or development
- Inclusive growth –
 - [Access and equity] Ensures that low-income or marginalised communities also benefit from high-quality green spaces, not just those in affluent areas → contributes to social cohesion
 - [Health and productivity benefits] Equitable access to green spaces improves physical and mental health, reducing healthcare costs and improving labour productivity, especially among low-income workers who might otherwise lack access to recreational amenities
 - [Employment opportunities] Creation of green spaces often creates local jobs in landscaping, maintenance, and environmental education, especially when governments design policies to favour inclusive hiring (e.g. targeting older workers, people with disabilities, or the long-term unemployed)
- Sustainable growth –
 - Provision of green spaces helps support public health and improve nmSOL
 - Green space investment supports environmental resilience (e.g. flood mitigation, heat island reduction) and can foster new sectors such as urban farming, green architecture, and landscape design
 - Provision of green spaces may enhance long-term urban attractiveness, aiding in economic competitiveness → potential growth

[Ev] Possible in-body evaluation points:

- Depends on effectiveness / ability of government
 - Possibility of bringing in community partners to co-create or co-implement policies – ground-up participation strengthens inclusivity and buy-in
- Depends on government priorities

Synoptic Conclusion

- Overall, government intervention in the provision of green spaces would be necessary where there is market failure or for equity reasons
- Private sector, although increasingly involved (e.g. rooftop gardens in malls), can provide some green spaces (as they can be considered club goods), but cannot on its own ensure socially optimal quantity, accessibility or equitable geographic distribution of green spaces → therefore the relevance of the government
- But effectiveness of government intervention really depends on policy design; want to avoid cases of government failure or interventions that do not move the needle
- Ultimately, benefits of government intervention in the provision of green spaces have to be weighed against opportunity costs and the abovementioned risks of government failure
 - Policies implemented must balance the various government aims and priorities – efficiency, equity, sustainability and fiscal responsibility
 - Also, need to consider competing government priorities – provision of green spaces may not be a priority for the government, and there are potentially other types of government spending that could fulfil the same / similar benefits as that of green spaces
- At steady state, would probably look like the government playing a facilitating role alongside the private sector (not necessarily the sole provider of green spaces), but extent would differ depending on country's context

Mark Scheme

Level	Knowledge, Application / Understanding and Analysis	Marks
L3	For a balanced and clear analytic explanation of why some green spaces are provided for by the government and why others are left to the private sector, as well as how government intervention to maximise the benefits and minimise the costs of green spaces can affect its economic aims. Analysis shows application to the real world and is illustrated with relevant examples.	18-25
L2	For an answer that shows a basic but descriptive and/or one-sided explanation of why some green spaces are provided for by the government and why others are left to the private sector, as well as how government intervention to maximise the benefits and minimise the costs of green spaces can affect its economic aims.	10-17
L1	For a basic or limited explanation of why some green spaces are provided for by the government and why others are left to the private sector, as well as how government intervention to maximise the benefits and minimise the costs of green spaces can affect its economic aims.	1-9
Evaluation		

E3	A detailed evaluation of the extent to which government provision of green spaces is relevant and/or necessary, as well as an overall assessment of the impacts of government intervention on its economic aims. The conclusion made is well-reasoned and synthesises previous judgments made.	7-10
E2	For an answer that makes some attempt at evaluation or a conclusion about the relevance of / need for government provision of green spaces as well as assess the overall impacts of government intervention on its economic aims, but one that lacks focus or is lacking in analytic depth.	4-6
E1	Limited conclusions that are not supported by reasoned argument and that are not well directed at the question.	1-3

Question 5

Policies targeting the poor may result in economic inefficiencies and distortions that retard growth.

Explain how the pursuit of inclusivity might limit the ability for the economy to grow and discuss the best way to achieve inclusive growth in light of this problem. [35]

Suggested Answer:

Introduction

Define key terms and/or provide direction of essay:

Inclusive growth can be defined as a situation where everyone can participate in the growth process and the benefits of growth are shared equitably. Attaining inclusive growth thus requires deliberate pursuit of inclusivity by the government. While inclusivity is a critical policy goal for social stability and fairness, efforts to reduce income inequality can, if poorly designed, undermine the incentives that drive economic growth. This essay will examine how the pursuit of inclusivity might limit growth and will evaluate strategies that reconcile equity with efficiency.

R1. How Inclusivity Can Limit Economic Growth

Many governments pursue inclusivity through redistributive policies such as progressive taxation, subsidies, welfare transfers, and wage controls. However, these measures may create **economic inefficiencies and distortions**:

- **Disincentives to work and invest:** High marginal tax rates on high-income earners reduces the returns to effort, entrepreneurship and R&D, and may discourage entrepreneurship and reduce innovation. For instance, Sweden's high taxes in the 1970s led to capital flight and "brain drain," prompting later reforms. Referring to Romer's model, disincentivizing new business and innovation → reduction in creation of new knowledge and ideas which is crucial in driving long-term growth (more will be explained later).
- **Labor market rigidity:** Minimum wage laws and excessive job protections, while intended to protect the poor, can increase unemployment if wages exceed productivity levels → increases labour immobility and inefficiency in resource usage and allocation → reduces cost competitiveness of domestic firms → reduces (X-M) and compromises short term growth. The increased labour market rigidity could also affect firm's confidence in future returns to investment → reduce I and long term growth

EV1: Despite these risks, redistribution policies are still an important tool to attain inclusive growth. It helps to narrow the gap between the rich and poor with little time lag, reduces social and political tensions or the increase in populist regimes that could have reduced growth in the long run.

In light of the possible trade-offs with growth, policies for inclusivity can be better designed to achieve both lower inequality and sustained growth, key components in inclusive growth.

The key lies in pursuing **"equity-enhancing efficiency"**—policies that reduce inequality by empowering the poor to contribute productively to the economy.

R2. Strategies for Achieving Inclusive Growth

(a) Redistribution via Conditional Cash Transfers

- Conditional cash transfers □ used by >60 developing countries
- Cash given to poor households on certain conditions that they meet certain requirements usually linked with children's education or healthcare
- Have become an important poverty reduction tool as it targets the extremely important objective of building human capital
- E.g. Brazil's **Bolsa Família** program provides income support to the poor conditional on school attendance and healthcare checkups.
- This not only reduces poverty but also promotes human capital accumulation, making it a **relatively growth-enabling form of redistribution**.

(b) Investing in Human Capital

- In many of the less developed countries, the poor are unable to invest in human capital, resulting in them stuck in the poverty trap
- 2 of the most important merit goods, education and healthcare, are underconsumed
- An important policy to attain inclusive growth therefore requires the Government to spend to provide merit goods
- Govt needs to ensure affordability and access to quality education and healthcare for the very low income → these goods should be free (or nearly free) to the low income + subsidies to producers to increase production in rural areas where the proportion of poor is higher
- This investment helps to increase human capital, raise productivity thereby **increasing the capacity of the economy to growth while ensuring the benefits filter down to the low income group**.
- E.g. The Asian tigers (Singapore, South Korea, Taiwan and Hong Kong) have invested heavily in universal basic education and basic healthcare, helping them **achieve sustained growth with slower increase in Gini coefficient** compared to countries that did not focus on human capital investment.

EV2:

- Conditional cash transfers have been shown to motivate families to send their children to school, improve their nutrition, and monitor their health. (IMF report, 2018)
- But facilities to meet this additional demand must be made available and must be financed, thus the need to complement it with government's direct investment in human capital.
- Expanding those programs also requires more funding and resources, for campaigning, executing and monitoring, compared to direct cash handouts, reducing government's funding for other growth driving programs e.g. investment in infrastructure.
- However, research has shown that countries with greater development of human capital experience greater growth than countries that did not. Conditional cash transfers reduces inequality and poverty in the short term and helps these households generate more income over the medium and long term, enabling them to break out of poverty and do their own private investment in human capital, reducing

the need for cash transfers in the LR, **yet a sustained impact on increasing EG with income inequality reduction.**

R3: Policies to generate sustained growth

To attain inclusive growth, policies to grow the economic pie is equally important.

Using the Romer Growth model, knowledge creation is a key driver of sustained growth.

- Romer allows for constant or increasing returns to capital, especially knowledge capital (ideas, technology), which is non-rivalrous.
- One firm's or industry's productivity gains has a positive externality and leads to spillover productivity gains in other firms or industries.
- Therefore, when firms invest in capital, the economy's growth rate can be non-zero in the long run as firms are constantly "learning by investing".
- Romer's model therefore endogenises the reason for growth to capital investment leading to technological progress rather than attributing growth to an exogenous unexplained technological variable (as in the Solow-Swan model).
- According to Romer, both market incentives and government policies have an effect on the discovery and diffusion of technological advances.
- Policies to promote technological advances and sustained growth could include market-based policies to improve market incentives for R&D such as refining the scope of protection for intellectual property rights and providing greater links between private firms and universities or interventionist policies such as tax subsidies for private research and explicit government-led technology policy.

EV3:

- However, policies to achieve knowledge creation might be less effective without support from strong institutions.
- 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), growth 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 well-functioning judicial system, effective tax and banking systems are therefore important to provide the cornerstone that supports government's efforts in breeding enterprise, innovation and ideas, as well as a fair broadbased distribution of benefits to the population.

Conclusion

While the pursuit of inclusivity can, under certain conditions, limit economic growth through inefficiencies and distortions, this is not inevitable. The challenge is to design policies that empower the poor without undermining the incentive structures that drive innovation,

investment, and productivity. Romer's growth model reinforces the importance of knowledge creation. Therefore, the most effective strategy for achieving inclusive growth is to focus on **equalizing opportunity**—not by simply redistributing income, but by **building the capabilities of all individuals** to participate in and benefit from economic progress.

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 of how trade-offs might arise from policies that target inclusivity and thus how best to design policies to achieve inclusive growth, minimizing the trade-offs. Answer should also make use of economic tools such as the Solow or/ & Romer's growth models Or Excellent use of the H2 tools of analysis such as AD/AS.	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 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
E3	A detailed evaluation of the limitations of the strategies given the problem of how some inclusivity policies might put a drag on growth. A well-reasoned overall conclusion that justifies the judgements made previously.	7-10
E2	An attempt to provide general limitations of the strategies. A broad overall conclusion that is not well-focused or based on analysis.	4-6
E1	Mainly unexplained judgement	1-3

Question 6

The circular economy aims to decouple economic activity and growth from the consumption of finite resources by keeping products in use for as long as possible and transforming these back into inputs. The ideal state is for production and consumption process to go in a continuous loop, resulting in net-zero waste outcome.

Discuss if the circular economy approach would effectively reduce resource depletion and environmental degradation. [35]

Suggested Answer:

The **circular economy** is a systemic economic model that aims to reduce waste and maximise resource use by extending product lifecycles. It contrasts with the traditional linear economic model where resources are extracted from the environment to produce goods and services, which are then consumed and eventually discarded back into the environment. The circular economy embeds sustainability throughout the value chain by keeping products in use for as long as possible and transforming waste back into inputs so that the production and consumption process goes in a continuous loop, resulting in a net-zero waste outcome. This essay evaluates the extent to which the circular economy addresses resource depletion and environmental degradation by examining its three pillars: **sustainable production**, **sustainable consumption**, and **sustainable waste management**, and explores its limitations as well as possible policy reinforcements.

R1: Sustainable production can help to reduce resource depletion and environmental degradation.

- Sustainable production can be promoted through sustainable design, improving resource efficiency, and the adoption of industrial symbiosis.
- Sustainable design involves designing goods for durability, repairability, and recyclability, reducing the use of virgin resources and emissions in manufacturing while extending the lifespan of these goods thus delaying their entry into the waste stream. For instance, Fairphone in the Netherlands produces modular smartphones designed for easy repair and upgrades in contrast to traditional smartphone manufacturers which require specialized equipment for dismantling and repairing the phone.
- Improving resource efficiency involves the provision of frameworks, technological assistance, and energy and waste audits to support firms in their efforts to reduce their energy usage and waste generation. Frameworks can help firms think about areas where energy and waste reduction can be achieved and how such outcomes can be measured. For example, Singapore's Extended Producer Responsibility (EPR) scheme for electronic waste mandates that producers take back used goods, conserving finite resources like rare earth metals.
- Industrial symbiosis refers to collaborations that enable the waste generated by one firm to be transformed into raw material to be used by another firm. By locating these firms near each other and developing relevant infrastructure (such as pipelines), the cost and time taken to transport such waste can be greatly reduced, thus enhancing the economic viability of such by-product reutilization.
- Overall, sustainable production would help to reduce environmental degradation and resource depletion by improving resource efficiency and adopting symbiosis where resources can be reused.

Limitations of Sustainable Production

- Firms are profit motivated and sustainable production would have to be cost-effective for firms to consider adopting these methods. Unfortunately, many firms still adopt a **linear economic model** for profitability reasons and there are incentives for firms to design products with a shorter lifespan or durability as this promotes more frequent purchases of new products, which increases their profitability.
- As for improving resource efficiency, firms must themselves be convinced of the need to go green or the energy savings need to be substantial so that they are willing to undertake any form of greening efforts.

R2: Sustainable Consumption can help to reduce environmental degradation and resource depletion.

Sustainable Consumption:

- Sustainable consumption reduces material intensity through changes in consumer behaviour, such as leasing instead of owning; repairing instead of discarding and purchasing greener products instead of products made from pollutive or extractive industries. These could be done via community or grounds-up initiatives such as Singapore's Repair Kopitiam which encourages community repair of simple household electronic products such as fans and televisions rather than disposing of these items.
- Consumers should be encouraged to opt for reusable items rather than single-use disposables. For example, reusable bottles, bags and containers can be used to store purchased food and groceries rather than disposable ones. Many countries, including Singapore, have started imposing charges for the use of disposable carrier bags for groceries in a bid to encourage consumers to use their own shopping bags.
- Overall, sustainable consumption with the use of reusable items and repairing of household electrical appliances which would help to reduce the need for drawing down on more resources and reducing pollution and environmental damage.

Limitations of Sustainable Consumption:

- Similar to producers, consumers are self-interested - while some consumers may adopt sustainable consumption for altruistic reasons, the majority of consumers will only adopt sustainable consumption if it increases their own utility. For such consumers, the convenience of being environmentally unfriendly far outweighs any potential social and emotional costs of such behaviour. For example, even with many countries imposing charges for disposable carrier bags, the world is producing a record amount of single-use plastic waste. It is estimated that the world generated 139 million tonnes of single-use plastic waste in 2021, according to the Plastic Waste Makers Index, an increase of 6 million tonnes from 2019.
- While charging for plastic bags is an effective short-term strategy to reduce consumption, the long-term effectiveness is uncertain. People may become accustomed to these charges, and what initially may seem like an inconvenience or a financial burden may become the new normal, reducing the behavioural impact of the charge.

R3: Sustainable Waste Management is the final piece to reduce environmental damage and resource depletion where there is still waste or resources.

- Even with the best efforts to engage in sustainable production and consumption, some waste will still be generated. The final step in the circular economy is to recycle as much of such waste as possible by transforming them into resources which can be

used for production and consumption. This involves identifying the types of waste where such recycling is possible before building the necessary infrastructure and ecosystems that can enable such recycling to take place.

- Besides industrial and commercial waste, household waste should also be recycled. For such recycling to materialise, households need to separate their waste into those which are recyclable and those which are not. Infrastructure and processes then need to be developed to make it sufficiently convenient for households to drop-off such waste and for recycling firms to collect them.

Limitations of Sustainable Waste Management

- There are various limitations to sustainable waste management. First, some types of waste like fabric and leather are largely non-recyclable. Second, although items like toys, clothes and shoes may contain recyclable materials like metals, wood and plastics, it is usually not cost effective to separate these materials from the items, hence making such products largely unrecyclable. Third, automated extraction of recyclable materials like metals from raw and incinerated waste is highly capital intensive and may not be affordable for poorer developing countries nor cost effective for smaller towns and cities.

Given its limitations, circular economy alone will be insufficient to effectively reduce resource depletion and environmental degradation. Other approaches need to be considered to achieve the desired end state:

- a) Government policies – e.g. pigovian taxes, rules & regulations
- b) Market-orientated policies – e.g., tradeable permits
- c) Nudges to promote sustainable consumption – e.g., taking advantage of herding bias etc.

Conclusion

The circular economy offers a promising, market-compatible solution to address the twin challenges of resource depletion and environmental degradation, by altering how goods are produced, consumed, and disposed of. However, its effectiveness depends on overcoming behavioural, economic, and institutional barriers. For example, with sustainable consumption, one institutional barrier to overcome would be how people who live in HDB flats still need to use single-use plastic carriers to dispose garbage in the central chutes. Thus, even though large supermarket operators have observed around a 50 per cent to 80 per cent drop in the number of disposable carrier bags used by consumers since the minimum 5-cent charge came into force, supermarkets have started to sell their own house-brand disposable carrier bags which may actually increase the use of plastics. With robust and coordinated policies, the circular economy can evolve from a niche strategy to a mainstream driver of sustainable development and inclusive growth.

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 how the circular economy approach would reduce environmental degradation and resource depletion. The answer should also have relevant examples to support the arguments.	Mark 18-25
L2	For an answer that covers many of the relevant points, but where the exposition is not succinct or where there are underdeveloped arguments. For this level of response, while there will be some structure to the essay, the points would generally be 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
E3	A detailed evaluation of the limitations of sustainable consumption, production and waste management considering various factors including behavioural, structural, institutional and other factors which may limit the effectiveness of the three pillars of the circular approach to address environmental degradation & resource depletion. A well-reasoned overall conclusion that justifies the judgements made previously.	7-10
E2	An attempt to provide general limitations of the strategies. A broad overall conclusion that is not well-focused.	4-6
E1	Mainly unexplained judgement	1-5