**ANGLO-CHINESE JUNIOR COLLEGE**

**2024 JC2 PRELIMINARY EXAMINATIONS**

**ECONOMICS** **9570/01**

**Higher 2** 19 August 2024

Paper 1 2 hours 30 minutes

Additional materials: Writing papers
2 cover sheets

**READ THESE INSTRUCTIONS FIRST**

Write your exam index number and name on all the answers you hand in.
Write in dark blue or black ink pen on both sides of the paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid / tape in your answers.

Answer **all** questions.

Begin Question 2 on a **fresh** sheet of writing paper.

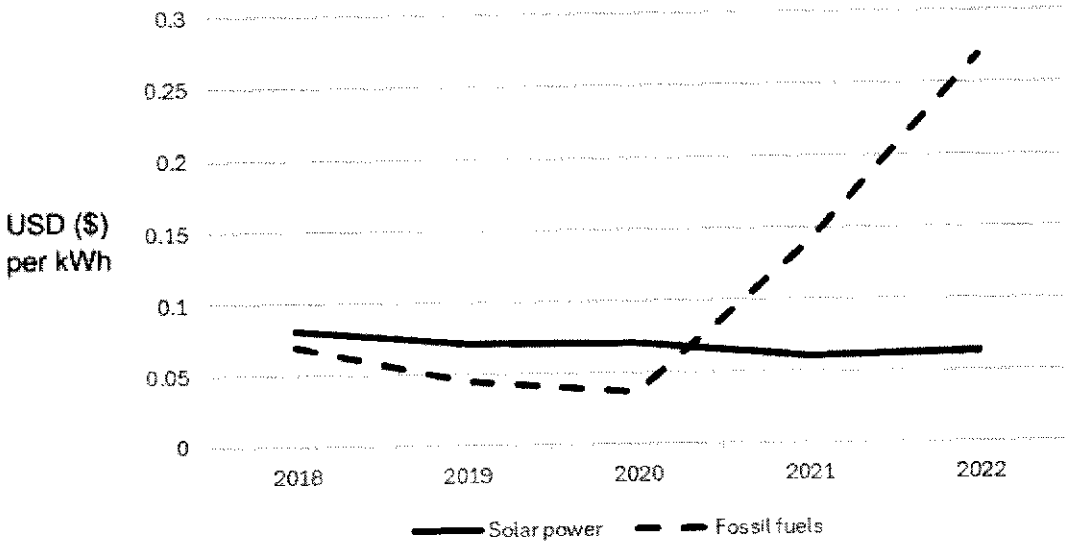
At the end of the examination, arrange your answers in order.
Fasten your answers for Question 1 and Question 2 **separately** using the cover sheets provided.

The number of marks is given in brackets [ ] at the end of each question or part question.

Answer **all** questions

**Question 1: Sustainable Development in Singapore**

**Figure 1: Cost of energy generated from solar power vs fossil fuels:**




Source: International Renewable Energy Agency

**Extract 1: Renewables increasingly beat even the cheapest coal competitors on cost.**

Renewable power, or collectively known as renewables, is increasingly cheaper than fossil fuels, a new report by the International Renewable Energy Agency (IRENA) published today finds. The report highlights that new renewable power generation projects now increasingly undercut existing coal-fired plants. On average, solar power and wind power cost less than keeping many existing coal plants in operation.

Renewable electricity costs have fallen sharply over the past decade, driven by improving technologies, economies of scale, increasingly competitive supply chains and growing developer experience. Since 2010, solar power has shown the sharpest cost decline at 82%, followed by wind at 39%.

Renewables offer a way to align short-term policy action with medium- and long-term energy and climate goals. Renewables must be the backbone of national efforts to restart economies in the wake of the COVID-19 outbreak. With the right policies in place, falling renewable power costs can shift markets and contribute greatly towards a green recovery.

Source: International Renewable Energy Agency, 2 June 2020

**Extract 2: 'Long Island' along East Coast being studied as part of URA's plans for coastal protection, housing needs.**

A reclaimed 'Long Island' along the south-eastern coast of mainland Singapore may one day not only offer protection against floods and rising sea levels, but also a new spot for leisure and recreation, much like the Marina Barrage. Living on the "island", which is envisioned to stretch around 15km from Marina East to Changi, may also be a possibility.

The Long Island concept was one of the possible options laid out as part of Singapore's S$100 billion plan to protect itself from rising sea levels. The Urban Redevelopment Authority (URA) said that it is studying ways to integrate coastal protection measures such as Long Island with future reclamation that are in the works.

"This could include creating a new reservoir to enhance our flood and water resilience. The 'Long Island' can be developed for new homes and integrated with coastal parks and recreational spaces," it added.

Source: Today Online, 7 June 2022

**Extract 3: Can a higher carbon tax lead Singapore to the promised green land?**

Back in 2019, when Singapore became the first South-east Asian country to implement a carbon tax — touted as a cost-effective way to combat global warming — many viewed the current rate of S$5 per tonne of carbon emissions as too low.

However, the impending hike in carbon tax, which will be raised to a more "respectable level" of S$25 per tonne in 2024, will give Singapore a seat alongside serious carbon tax users. The tax will be further increased progressively to S$45 per tonne in 2026, with a view to reach S$50 to S$80 per tonne by 2030.

The hike is meant to send a signal to companies that carbon emissions have an explicit cost on the environment. They will now find it worthwhile to adopt sustainable measures to reduce their carbon tax.

While many view the impending hike in carbon tax as unavoidable, given the intensified concerns over climate change in recent years, some observers pointed out that consumers and businesses may feel the pinch in the form of higher prices and costs.

The effectiveness of carbon tax is contingent on its rate, which must be high enough to incentivise companies; the time period given for industries to adapt to the tax; and the availability of green technology for industries to tap, said experts.

Professor Euston Quah, who specialises in environmental economics at NTU, however, argued for adjustments to the carbon tax to be spread out over a longer time period, beyond 2030. He pointed to the constraints facing Singapore in switching to renewable energy. The use of solar energy, for instance, is hampered by limited space, while tapping energy sources through an international grid or pipeline would present energy security issues.

Source: Today Online, 5 March 2022

**Extract 4: What firms are doing in response to the rise in carbon tax.**

Big emitters which are subject to the carbon tax said that they have already implemented various decarbonisation measures to reduce their emissions over the last decade.

Petroleum company ExxonMobil Asia Pacific said that the firm has introduced a series of innovations since 2002, which have led to energy efficiency gains of more than 25 per cent and reduced the carbon emissions of its Singapore facility.

These initiatives include the operation of three cogeneration facilities that produce both electricity and steam concurrently. Cogeneration recovers heat energy after electricity is generated to produce steam. The steam is then used for ExxonMobil's plant operations in Singapore. This process requires less fuel and emits less carbon than if the steam and electricity were produced separately.

However, given Singapore's open economy, it is important that the carbon tax framework safeguards the competitiveness of trade-exposed industries. They are competing with other industrial facilities globally that have either no, or a lower price on carbon domestically or on their exports.

Source: Channel News Asia, 7 March 2022

**Extract 5: Large emitters can buy carbon credits to offset carbon tax bill from 2024**

Large emitters in Singapore will from 2024 be able to buy international carbon credits[1] to reduce the carbon tax they have to pay.

Finance Minister Lawrence Wong said that businesses will be able to use "high-quality, international carbon credits" to offset up to 5 per cent of taxable emissions, in lieu of paying the carbon tax.

"This will moderate the impact for companies," he said. "It will also help to create local demand for high-quality carbon credits and catalyse the development of well-functioning and regulated carbon markets."

Partially offsetting tax liabilities with international carbon credits would mean that firms can shrink their tax bill if they buy credits generated by, say, a forest conservation project in Indonesia. Essentially, it means that a company here would have the option to pay another entity to reduce emissions in another country where it may be cheaper to do so.

Source: The Straits Times, 27 February 2022

[1] Carbon credits are tradeable permits that allow the owner to emit a certain amount of carbon dioxide or other greenhouse gases (GHGs).

**Questions:**

**(a)** Compare the change in the cost of energy from fossil fuels with the change in cost of energy from solar power between 2018 to 2022. [2]

**(b)** With the aid of diagrams, explain how the developments in renewable energy may affect the markets for renewable energy and energy from fossil fuels. [4]

**(c)** **(i)** Explain how the development of 'Long Island' will reduce the opportunity cost of building new homes. [2]

**(ii)** Explain why coastal protection measures such as 'Long Island' must be provided by the government. [4]

**(d)** Discuss whether the benefits of a carbon tax outweigh the costs to society. [8]

**(e)** Discuss whether firms should use innovation or purchase carbon credits when faced with an increase in carbon tax. [10]

**[Total: 30]**

Answer **all** questions

**Question 2: The challenges in a post-pandemic world**

**Table 1: Selected Key Economic Indicators for United States, 2019 - 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Real Effective Exchange Rate Index (USD) | 116.4 | 118 | 115.6 | 126.6 | 127.3 |
| Net current account (in USD billions) | - 441.7 | - 597.1 | - 831.4 | - 971.6 | - 818.8 |
| Unemployment Rate (in %) | 3.7 | 8.1 | 5.3 | 3.6 | 3.6 |
| Government Debt (as a % of GDP) | 100.1 | 124.7 | 118.9 | 114.7 | No data available |

*Source: data.worldbank.org, accessed on 23 July 2024*

**Table 2: Selected Key Economic Indicators for Singapore, 2019 - 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Current account as a % of GDP | 16.0 | 16.6 | 19.8 | 18.0 | 19.8 |
| Consumer Price Index (base year 2019) | 100 | 99.8 | 102.1 | 108.4 | 113.6 |
| Unemployment rate (in %) | 2.3 | 2.9 | 2.7 | 2.1 | 1.9 |
| Gini coefficient value (before accounting for tax and transfers) | 0.452 | 0.452 | 0.444 | 0.415 | 0.412 |

*Source: Singstat.gov.sg*

**Extract 6: America's CHIPS Act**

Signed into America's law in August 2022, the **C**reating **H**elpful **I**ncentives to **P**roduce **S**emiconductors (CHIPS) Act is intended to lure microchip manufacturing back to the United States (US) after decades of companies offshoring this technology to cheaper countries such as China. Although the US produced close to 40 percent of the world's semiconductor supply in the 1990s, this has now since fallen to just 12 percent, with Taiwan on the other hand, producing more than 60 percent of the world's supply of semiconductor chips now.

The CHIPS Act allocated $53 billion in fiscal incentives for domestic semiconductor manufacturing and research and development, to build new and expand existing semiconductor facilities. Companies are also eligible for a 25 percent tax credit. The legislation is sparking a great deal of investment activity in the US semiconductor sector. Hundreds of companies have requested more than $70 billion in subsidies—nearly double the amount available. Private companies have meanwhile announced more than $200 billion in investment spending since the law passed.

There's a newfound realisation about the growing importance of chips and semiconductors because chips are one of the critical factor inputs to produce electric vehicles. With an increased global emphasis on reducing carbon footprint, this has made some supporters see this policy as a much-needed boost to America's trade and its investment in critical technologies.

However, some critics are sceptical about the effectiveness of this policy change. There are limits to how much semiconductor can be shifted to the United States from East Asia due to the cost of labour, construction cost and the lack of trained workforce in the US. Building a new chip manufacturing facility in US is estimated to be 'four or five times greater' than in Taiwan, which begs the question on the sustainability of the CHIPS act especially with a rising federal debt. Economists are worried that the CHIPS Act explicitly pulls investment away from East Asia and risks hollowing out[2] major tech industries in East and Southeast Asia region. This may have spillover effects on smaller Asia countries which rely on major East Asia economies for export growth. In the long term, such industrial subsidies invite retaliation from others, leading to an overall more inward-looking world.

*Source: Adapted from Council on Foreign Relations, accessed on 14 July 2024 & East Asia Forum, 26 Nov 2023*

**Extract 7: The challenge of food security**

With world food costs surging to all-time highs, several governments are taking steps to secure their own food supplies.

Indonesia's palm oil export ban kicked off in one of the most drastic cases of food protectionism since the war erupted in Ukraine. The global top exporter of palm oil imposed a sweeping ban on cooking oil exports, covering palm oil products across the value chain. This tropical oil is found everywhere today - in food, soap, lipstick and even printing ink - which makes Indonesia's move even more significant to the already disrupted global edible oil market.

Such export bans hurt small and resource-scarce countries like Singapore. Singapore, being a highly-import reliant country and a net importer of resources, will continue to face such global supply uncertainties and disruptions from time to time. While the government will do what it can to minimise the impact such as through stockpiling and import diversification, Singapore will not be able to completely remove the disruptions to our food supply.

*Source: Adapted from Arvind Jayaram, The Straits Times, 10 September 2023*

[2] Hollowing out refers to a deterioration of a sector when firms opt for lower-cost facilities overseas

**Extract 8: Demographics changes in Singapore**

With an ageing workforce and the fertility rate falling far below replacement rate, it will not be long before Singapore's workforce size plateaus. Ageing will also create additional manpower needs in the healthcare and aged care services. This could lead to manpower shortfalls in key sectors as workers retire and healthcare needs rise. As a fully globalised country, Singapore has been plugging the labour shortfalls by increasing the inflow of foreign workers, for example, earlier in 2023, Singapore announced that it would be stepping up recruitment of foreign nurses.

However, reliance on foreigners should not be the main or only strategy. The Covid-19 pandemic has underscored the risks of high foreign-worker dependence when borders close or travel is disrupted. Besides, it cannot be assumed that there will always be a ready supply of foreign manpower as job opportunities in other countries expand and these countries themselves undergo demographic transitions. In Singapore, there are limits to overall immigration, given our land and population constraints and the need for a core of local workers in essential jobs and sectors. Besides, bringing in too many foreign workers may create a depressing effect on wages, which puts off local workers from joining certain industries.

While the emergence of new technology such as generative artificial intelligence (AI) could help Singapore produce more with fewer people, it is also expected to put many existing job roles at risk. Even if AI can help boost productivity, it is unlikely to significantly reduce manpower needs in service industries like healthcare and hospitality. In fact, it is necessary to equip workers with the skills and adaptability to take up good jobs and thrive in their careers. As skill demands continually evolve, more than ever, education should be aimed at cultivating a love for learning, curiosity, teamwork, resilience and a tolerance for ambiguity.

*Source: Adapted from Terence Ho, The Straits Times, 30 August 2023*

**Questions:**

**(a)** Describe the trend in the USA's net current account balance between 2019 to 2023. [2]

**(b)** With reference to Extract 6, explain the factors affecting the US government decision to implement the CHIPS Act. [6]

**(c)** According to Extract 7, Indonesia imposes an export ban on edible oil. Using a diagram, explain what determines the size of the increase in global price of edible oil following the export ban. [4]

**(d)** Discuss whether domestic or external challenges are more damaging to the Singapore economy. [8]

**(e)** With reference to the extracts and/or your own knowledge, discuss whether the Singapore government should increase the immigration of foreign labour or rely more on artificial intelligence to improve the standard of living. [10]

**[Total: 30]**

## 2024 H2 Paper 1 Question 1: Suggested Mark Scheme

**(a)** Compare the change in the cost of energy from fossil fuels with the change in cost of energy from solar power between 2018 to 2022. [2]

**General trend:** The cost of fossil fuels was increasing while the cost of solar power was decreasing. [1]

**Refinement:** The cost of fossil fuels changed by a larger extent of about 300% increase compared to the change in cost of solar power. [1]

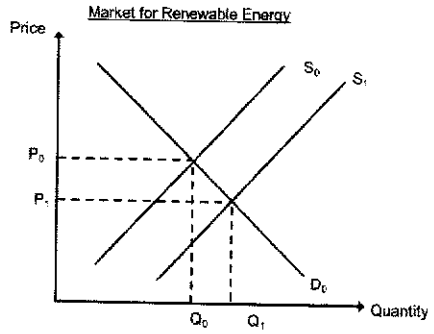
*Not accepted:*

- *Both decreased from 2018 to 2020 – this does not cover the entire time period of 2018 to 2022.*
- *0 marks if no explicit comparison made and student describe each change separately.*

**(b)** With the aid of diagrams, explain how the developments in renewable energy may affect the markets for renewable energy and energy from fossil fuels. [4]

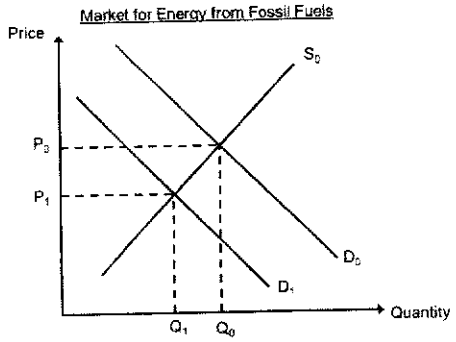
**Explain the changes in the renewable energy market: [2]**

- With an increase in technology and economies of scale, cost of production is falling. Firms are more willing and able to produce, resulting in an increase in supply of renewable energy.
- The increase in supply results in a surplus and downward pressure on price, decreasing the price of renewable energy.
- At the new market equilibrium, price has decreased, and quantity has increased.




**Explain the changes in the fossil fuels energy market: [2]**

- Renewable energy is a substitute for energy from fossil fuels. As the renewable energy becomes relatively cheaper, consumers switch away from consuming energy from fossil fuels, resulting in a decrease in demand for energy from fossil fuels.
- As demand decreases, there is a surplus and downward pressure on price.
- At the new market equilibrium, price has increased, and quantity has decreased.




*Markers' notes: Award only 1 mark for each market if there are any key words (underlined) missing or if there are any errors in the diagram.*

**(c) (i)** Explain how the development of 'Long Island' will reduce the opportunity cost of building new homes. [2]

Opportunity cost is the value of the next best alternative forgone when a choice is made. [1]

With the reclamation of land for Long Island, there is more land available for uses such as building new homes and recreation. With more land available, there is a lesser need to forgo alternative uses when the land is used to build new homes, resulting in a lower opportunity cost incurred. [1]

*Markers' notes: Award one mark for the explanation of opportunity cost. Exact definition is not required as long as the meaning comes across. Award the second mark if student show's the understanding that more available land reduces opportunity cost.*

**(ii)** Explain why coastal protection measures such as 'Long Island' must be provided by the government. [4]

Coastal protection measures are non-rival: [2]

- Coastal protection measures are non-rival because the use of the protection measure by one individual does not diminish the quality or quantity of protection enjoyed by another individual at the same time. Many households living within the proximity of Long Island can enjoy the benefits of coastal protection at the same time.
- As such, the marginal cost (MC) of providing coastal protection measures to an additional household is zero. Thus, the condition for allocative efficiency is P = MC = 0.
- Profit maximising firms will choose to price at P > MC, therefore resulting in welfare loss to society.

Coastal protection measures are non-excludable: [2]

- Coastal protection measures are non-excludable as once it is provided, it is not economically feasible to exclude a non-payer from enjoying the benefits of coastal protection.
- This results in a problem of free ridership where consumers would wait for someone else to pay for the good and enjoy the benefits for free. Thus, there would be no demand for the coastal protection measures.

- Without demand, there are no price signals, and it would not be profitable for firms to produce the good and there would be a missing market.

Since coastal protection measures are a public good, they must be provided for by the government.

*Marker's notes: Minus 1m for each characteristic if any key words are missing.*

**(d)** Discuss whether the benefits of a carbon tax outweigh the costs to society. [8]

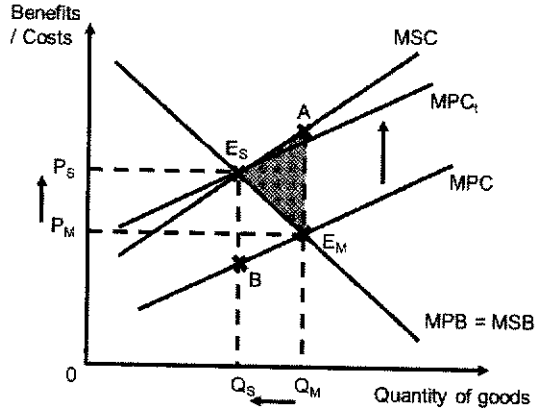
**Introduction:**

- Brief explanation of negative externalities from carbon emissions
- State policy objective: a carbon tax is used to reduce carbon emissions and maximise social welfare.

**Requirement 1: Carbon tax is beneficial to society**

Correction of market failure:

- Carbon tax helps to address negative externalities from carbon emissions.
- A carbon tax will increase the MPC for firms that emit carbon in their production of goods and services.
- The government should impose a per unit tax equivalent to the MEC at the socially optimal quantity.
- Such a tax would shift the MPC upwards to $MPC_t$

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- With the shift in MPC, the external cost is internalised by firms. Profit maximising firms will now produce at $MPC_t$ = MPB with quantity $Q_s$
- Thus the socially optimal quantity is achieved. Since MSC = MSB at this quantity, the welfare loss is eliminated, and social welfare is maximised. Society benefits from the imposing of a carbon tax.

Evaluation of R1:

- The extent of this benefit to society depends on the government's ability to impose the correct amount of tax. The external cost from carbon emissions is difficult to accurately estimate. This is due to its widespread impact on society that is difficult to track.
- If the government underestimates the amount to tax, there would still be overproduction and there would still be a welfare loss incurred. If the government

overestimates the amount to tax, this would result in underproduction and there would also be a welfare loss to society.

**Requirement 2: Carbon tax results in a cost to society**

Impact on consumers and businesses:

- As mentioned in extract 3, consumers and businesses may feel the pinch of a carbon tax in the form of higher prices and costs.
- For firms, a carbon tax would increase the cost of production, especially for firms that have higher levels of carbon emissions. This higher cost would erode their profits and reduce producer surplus.
- As firms experience an increase in cost of production, firms are less willing and able to produce, resulting in a fall in supply of goods. A fall in supply results in a shortage and upward pressure on prices. Consumers would thus experience higher prices of goods and services such as electricity.
- If the increase in price is for necessities such as electricity, low-income households would feel a greater impact since necessities take up a larger proportion of their income. If necessities become unaffordable for some households this results in inequity in society.

Impact on the economy:

- Extract 4 also states that a carbon tax could have a negative impact on the competitiveness of trade-exposed industries.
- As mentioned above, taxes result in higher cost of production and prices of goods and services. Since firms in other countries face either no tax or a lower carbon tax rate, they would also have a lower cost of production and be able to price their goods lower.
- Thus, if countries like Singapore impose a carbon tax, exports may become less price competitive, leading to a loss of export revenue which could harm the aggregate demand and lower the economic growth in the economy. (Note: students do not need an excessively detailed AD/AS analysis for this question.)

Evaluation:

- Criteria 1: Short vs Long Term
    - o A carbon tax is more costly in the short run, but leads to more benefits to society in the long run. Without the carbon tax, the problem of negative externalities may become severe in the long run, leading to high costs incurred by society if the situation is not addressed.
    - o However, in the short run, it may be difficult for firms to adapt to the additional costs incurred, leading to higher cost of living and negative impacts on the economy.
- Criteria 2: Government's use of complementary policies
    - o The government may use other policies to mitigate the costs in the short run. For example, they could provide subsidies to households to cope with the higher costs, or grants to firms to invest into the use of cleaner energy and green technology.
    - o If these policies are implemented in the short run, the overall benefits of imposing a carbon tax are likely to outweigh the costs to society.

| Level | Descriptors | Marks |
|---|---|---|
| L2 | - Answer explains both costs and benefits well<br>- Explanation contains economic analysis and application to the context.<br>- Economic analysis used mostly relevant and accurate. | 4 – 6 |
| L1 | - Answer may only address either the costs or benefits of a carbon tax to society.<br>- Answer may be lacking in economic analysis and be more descriptive in nature, with excessive lifting from the extract.<br>- Economic analysis used may be irrelevant or contain many inaccuracies. | 1 – 3 |
| E | - A summative conclusion is provided with clear criteria and reasoning for the overall stand. | 1 – 2 |

| Annotation | Level | Mark out of 8 |
|---|---|---|
| A+C or A+A | L2 | 6 |
| C+C or A | L2 | 5 |
| C | L2 | 4 |

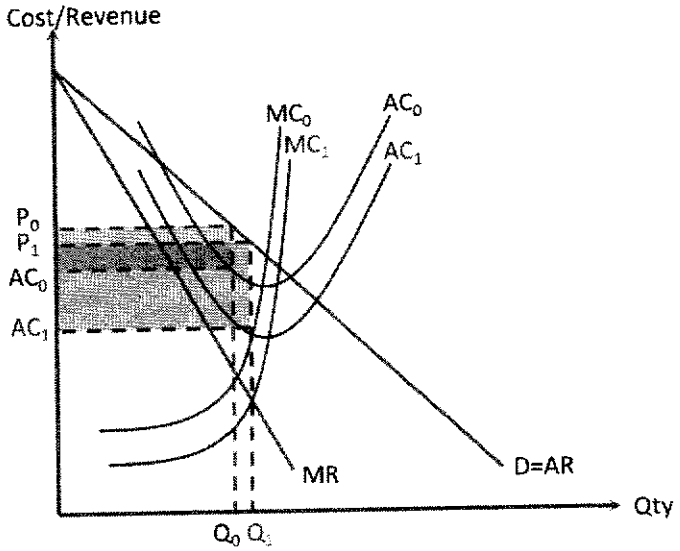
**(e)** Discuss whether firms should use innovation or purchase carbon credits when faced with an increase in carbon tax. [10]

**Introduction:**

- Firms are assumed to be profit maximising and produce at the output level where MC = MR to maximise profits.
- An increase in carbon tax increases the marginal and average cost for firms that emit carbon in production.
- This results in a lower profit margin for firms.
- Thus, a firm can adopt various strategies such as innovation or purchase of carbon credits to try to maintain their profits in light of the increase in carbon tax.

**Requirement 1: Firms should use innovation when faced with an increase in carbon tax.**

- Evidence: Firms like ExxonMobil has invested in innovation to reduce their emissions of carbon. (Extract 4). These include a new process of producing energy that leads to less carbon emitted.
- With such process innovation, firms will have less carbon emissions and therefore pay less carbon tax per unit of good produced.
- Since carbon tax is a cost that varies with output (variable cost), the process innovation would lead to a decrease in marginal cost and average cost of the firm, compared to without the innovation.
- In addition, process innovation could also improve the firm's efficiency such that fewer resources (e.g. fuel) are needed to produce each unit of output. This would lead to a further decrease in MC and AC.




- With the decrease in MC and AC, the profit maximising output will increase, price will fall, and profits will increase.
- Thus, innovation is an effective way for firms to respond to an increase in carbon tax.
- *Note: Student can also explain how product innovation may increase AR and MR. However, they should avoid purely theoretical answers. A possible contextualised answer would be that consumer are increasingly aware of environmental issues and have a growing taste and preference for goods that are made in sustainable ways. Thus firms that innovate to reduce their carbon footprint may experience a rise in demand for their goods and services.*

Evaluation of Requirement 1:

- However, innovation is also very costly to undertake. It could result in an increase in fixed cost. For large firms, the fixed cost can be spread over a larger output, leading to a smaller increase in AC. However, this strategy would not be feasible for smaller firms that do not have significant economies of scale. For smaller firms, the fixed cost increase would be large compared to their overall cost, and may outweigh the long term gains from lower AC and MC.

**Requirement 2: Firms should purchase carbon credits when faced with an increase in carbon tax.**

- Evidence: Firms can choose to buy carbon credits to reduce the carbon tax they have to pay. (Extract 5)
- Carbon credits are tradable permits, and their price is determined by demand and supply forces.
- In Singapore, firms can offset up to 5% of their taxable emissions by purchasing international carbon credits.
- **EITHER**: Doing so would reduce the amount of carbon tax the firm needs to pay by 5%. Assuming the cost of the carbon credits is lower than the cost of the tax, there will be a decrease in cost of producing each additional unit of good, decreasing AC and MC incurred by the firm, shown by a downward shift of the AC and MC curve.
- **OR**: A firm can make a one-time payment to offset up to 5% of their taxable emissions, resulting in a decrease in the AC incurred.

- The firm's profits would be increased compared to a situation of paying the full amount of carbon tax.
- Thus, buying carbon credits can be an effective way for the firms to respond to an increase in carbon tax.
- *Note: Students can also explain that the purchase of carbon credits would offset part of the carbon tax, resulting in a smaller increase in AC/MC overall, and therefore a smaller decrease in profits when the carbon tax is increased.*

Evaluation of Requirement 2:

- However, the decrease in cost might be small. Since only 5% of emission can be offset and the firm still has to incur the cost of buying the carbon credits, it would likely be a small decrease in average and marginal cost.
- Overall, firm's profits might still decrease significantly with a greater increase in the carbon tax.
- In addition, since the cost of carbon credits is determined by demand and supply forces, if many firms adopt this strategy, the cost of carbon credits might rise and end up being higher than simply paying the carbon tax.

**Overall evaluation:**

Criteria 1: Short vs long run

- Innovation may take a long time to take effect and will not significantly reduce carbon emissions immediately. Thus in order to avoid paying a high amount of carbon tax, firms should consider buying carbon credits to at least off set a part of the cost.
- However, in the long run, innovation has a greater potential to reduce the cost of carbon tax. This is especially since the carbon tax is likely to increase more in the long run as the government wants to address global warming effectively.

Criteria 2: Size of firm

- Smaller firms may not be able to afford the cost of innovation. R&D to come up with new processes and converting existing infrastructure to adopt new technology would be extremely costly for these firms. Thus, buying carbon credits might be a more feasible option for these firms.

| Level | Descriptors | Marks |
|---|---|---|
| L2 | - Answer explains both strategies well<br>- Explanation contains economic analysis and application to the context.<br>- Economic analysis used mostly relevant and accurate. | 4 – 7 |
| L1 | - Answer may only address one of the strategies given or bring in irrelevant strategies.<br>- Answer may be lacking in economic analysis and be more descriptive in nature, with excessive lifting from the extract.<br>- Economic analysis used may be irrelevant or contain many inaccuracies. | 1 – 3 |
| E | - Answer considers the limitations of both policies | 1 – 3 |

| | | |
|---|---|---|
| | - A summative conclusion is provided with clear reasoning for the strategy chosen. | |

| Annotation | Level | Mark out of 8 |
|---|---|---|
| A+A | L2 | 7 |
| A + C | L2 | 6 |
| C+C or A | L2 | 5 |
| C | L2 | 4 |

**Question 2: The challenges in a post-pandemic world**

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*Source: Singstat.gov.sg*

**Extract 6: America's CHIPS Act**

Signed into America's law in August 2022, the **C**reating **H**elpful **I**ncentives to produce **S**emiconductors (CHIPS) Act is intended to lure microchip manufacturing back to the United States (US) after decades of companies offshoring this technology to cheaper countries such as China. Although the US produced close to 40 percent of the world's semiconductor supply in the

1990s, this has now since fallen to just 12 percent, with Taiwan on the other hand, producing more than 60 percent of the world's supply of semiconductor chips now.

The CHIPS Act allocated $53 billion in fiscal incentives for domestic semiconductor manufacturing and research and development, to build new and expand existing semiconductor facilities. Companies are also eligible for a 25 percent tax credit. The legislation is sparking a great deal of investment activity in the US semiconductor sector. Hundreds of companies have requested more than $70 billion in subsidies—nearly double the amount available. Private companies have meanwhile announced more than $200 billion in investment spending since the law passed.

There's a newfound realisation about the growing importance of chips and semiconductors because chips are one of the critical factor inputs to produce electric vehicles. With an increased global emphasis on reducing carbon footprint, this has made some supporters see this policy as a much-needed boost to America's trade and its investment in critical technologies.

However, some critics are sceptical about the effectiveness of this policy change. There are limits to how much semiconductor can be shifted to the United States from East Asia due to the cost of labour, construction cost and the lack of trained workforce in the USA. Building a new chip manufacturing facility in USA is estimated to be 'four or five times greater' than in Taiwan, which begs the question on the sustainability of the CHIPS act especially with a rising federal debt. Economists are worried that the CHIPS Act explicitly pulls investment away from East Asia and risks hollowing out[1] major tech industries in East and Southeast Asia region. This may have spillover effects on smaller Asia countries which rely on major East Asia economies for export growth. In the long term, such industrial subsidies invite retaliation from others, leading to an overall more inward-looking world.

*Source: Adapted from Council on Foreign Relations, accessed on 14 July 2024 & East Asia Forum, 26 Nov 2023*

**Extract 7: The challenge of food security**

With world food costs surging to all-time highs, several governments are taking steps to secure their own food supplies.

Indonesia's palm oil export ban kicked off in one of the most drastic cases of food protectionism since the war erupted in Ukraine. The global top exporter of palm oil imposed a sweeping ban on cooking oil exports, covering palm oil products across the value chain. This tropical oil is found everywhere today - in food, soap, lipstick and even printing ink - which makes Indonesia's move even more significant to the already disarray global edible oil market.

Such export bans hurt small and resource-scarce countries like Singapore. Singapore, being a highly-import reliant country and a net importer of resources, will continue to face such global supply uncertainties and disruptions from time to time. While the government will do what it can

[1] *Hollowing out refers to a deterioration of a sector when firms opt for lower-cost facilities overseas*

to minimise the impact such as through stockpiling and import diversification, Singapore will not be able to completely remove the disruptions to our food supply.

*Source: Adapted from Arvind Jayaram, The Straits Times, 10 September 2023*

**Extract 8: Demographics changes in Singapore**

With an ageing workforce and the fertility rate falls far below replacement rate, it will not be long before Singapore workforce size plateaus. Ageing will also create additional manpower needs in healthcare and aged care services. This could lead to manpower shortfalls in key sectors as workers retire and healthcare needs rise. As a fully globalised country, Singapore has been plugging the labour shortfalls by increasing the inflow of foreign workers, for example, earlier in 2023, Singapore announced that it would be stepping up recruitment of foreign nurses.

However, reliance on foreigners should not be the main or only strategy. The Covid-19 pandemic has underscored the risks of high foreign-worker dependence when borders close or travel is disrupted. Besides, it cannot be assumed that there will always be a ready supply of foreign manpower as job opportunities in other countries expand and these countries themselves undergo demographic transitions. In Singapore, there are limits to overall immigration, given our land and population constraints and the need for a core of local workers in essential jobs and sectors. Besides, bringing in too many foreign workers may create a depressing effect on wages, which puts off local workers from joining certain industries.

While the emergence of new technology such as generative artificial intelligence (AI) could help Singapore produce more with fewer people, it is also expected to put many existing job roles at risk. Even if AI can help boost productivity, it is unlikely to be able to significantly reduce manpower needs in service industries like healthcare and hospitality. In fact, it is necessary to equip workers with the skills and adaptability to take up good jobs and thrive in their careers. As skill demands continually evolve, more than ever, education should be aimed at cultivating a love for learning, curiosity, teamwork, resilience and a tolerance for ambiguity.

*Source: Adapted from Terence Ho, The Straits Times, 30 August 2023*

**Questions:**

**(a)** Describe the trend in the USA's net current account balance between 2019 to 2023. [2]

**(b)** With reference to Extract 6, explain the factors affecting the US government decision to implement the CHIPS Act. [6]

**(c)** According to Extract 7, Indonesia imposes an export ban on edible oil. Using a diagram, explain what determines the size of the increase in global price of edible oil following the export ban. [4]

**(d)** Discuss whether domestic or external challenges are more damaging to the Singapore economy. [8]

(e) With reference to the extracts and/or your own knowledge, discuss whether the Singapore government should increase the immigration of foreign labour or rely more on artificial intelligence to improve the standard of living. [10]

**[Total: 30 marks]**

Suggested Answers:

**Questions:**

(a) **Describe the trend in the USA's net current account balance between 2019 to 2023.** **[2]**

1m: Overall net current account balance is negative & increasing □ widening deficit

1m: Anomaly: except for the 2022 to 2023, where the deficit improves (negative decreases)

(b) **With reference to Extract 4, explain the factors affecting the America's government decision to implement the CHIPS Act.** **[6]**

**Factor 1: Benefits (How the Act can help achieve macroeconomic objectives for USA)**

Students only need to explain either one of the following benefits – focus is on **how** the Act can help to achieve either of the macro goals.

**Actual EG:**

- The CHIPS Act encourage greater investment spending (I) by chips companies due to the government subsidies and tax credits
- **Higher I ⇒ higher AD □ achieve higher actual economic growth via the multiplier process and jobs creation (reduce unN)**
- Assuming the economy is below full-capacity, when firms see a fall in the inventories, they are more willing and able to produce more, which means it will lead to an increase in derived demand for workers → Higher wages for workers, better material SOL for the workers.

**Potential EG:**

- The higher investment spending on machines, technology and capital resources □ increase the **quantity and quality of resources □ increase the country's LRAS and hence, potential growth.**
- With higher productive capacity, the economy is not only able to have more resources to produce more output & increase in potential output, it can also **keep prices low and stable, since there is less competition for the resources.**

**Improved BOT:**

- From Extract 2, it was explained that global demand for semiconductor chips are likely to rise since it is a input used to produce electric vehicles → since there is a rising global demand for EV = rising demand for semiconductor chips. If the manufacturing companies are lured back into USA and **coupled with the subsidies given by the US government to produce the USA microchips □ US microchips more price competitive, hence higher demand for the**

**microchips □ USA can export more microchips □ higher demand for USA's X and hence, improve USA's BOT.** *Students may also link this to greater profits for the USA's manufacturing companies.*

**Costs:**

- Government budget, opportunity costs incurred, as the subsidies provided is not able to use for other areas such as healthcare, education.
- May increase the USA's federal debt, cause the government to have to raise taxes, reduce disposable income for households and after-tax profits for firms.
- Other countries retaliating → cannibalise the demand for America's chips reduce their demand for America's exports → possibly to reduce X-revenue, BOT, and hence, AD and economic growth

**Constraints:**

- How much subsidies the government is able to provide, given the tight govt budget.
- Lack of skilled labour, even if the microchip companies pull their investment out from elsewhere into USA, they may not be able to produce as efficiently since they are unable to get the necessary workers □ limit to how much profits these firms can earn.

**Mark scheme:**

2 marks for benefits explanation
2 marks for costs explanation
2 marks for constraints explanation

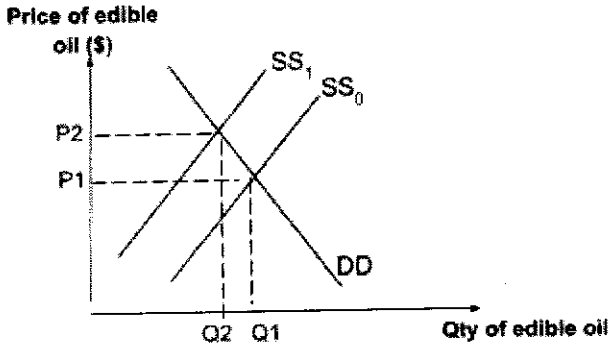
(c) **According to Extract 7, Indonesia imposes an export ban on edible oil.**

**Using a diagram, explain what determines the size of the increase in global price of edible oil following the export ban.** **[4]**

Export bans ⇒ **reduce global supply** since Indonesia is a major exporter of edible oil, hence, it creates a shortage in the market. To correct the shortage, the global price of edible oil increases to reduce the Quantity demanded and increase quantity supplied to the new equilibrium quantity.

**(2 marks to identify and justify the PED value for edible oil)**
**Price Elasticity of Demand** will determine the size of increase in the global price. As edible oil is **price inelastic in demand**, since edible oil is a key ingredient in many products and hence, **lacks close substitutes** (and that Indonesia is the major exporter of this good).

When the price increases, the quantity demanded only falls by less than proportionately, so the **extent of price increase is larger** as it takes a **larger price increase to clear the shortage.**




**Mark scheme:**
1 mark: diagram showing a leftward shift in the supply curve and an inelastic demand

1 mark: supply shock □ explain why global supply drops (Indonesia is a key global exporter of edible oil)

1 mark: state and justify why the PED for edible oil is < 1

1 mark: explain that the price increase is large / more than proportionate

*Note to markers:*
*Can also accept the extent of supply shock is very large – since Indonesia is a global top exporter of palm oil, with appropriate diagram (to show) □ replace 3rd mark*

**(d) Discuss whether domestic or external challenges are more damaging to the Singapore economy. [8]**

Singapore economy is a small and open economy, due to its lack of natural resources and small geographical size. Singapore is heavily reliant on imported resources and export markets for growth.

**R1: Domestic challenges can be a concern to the Singapore government**

Shrinking workforce, ageing population:

- Shrink in total quantity of labour □ **drop in LRAS** □ **worsens potential economic growth.**

- The **unit cost of production may also rise** due to fewer workers available (shortage of manpower), leading to the firms to pass on the higher unit COP to the consumers in terms of **higher prices (higher GPL from P0 to P1).**

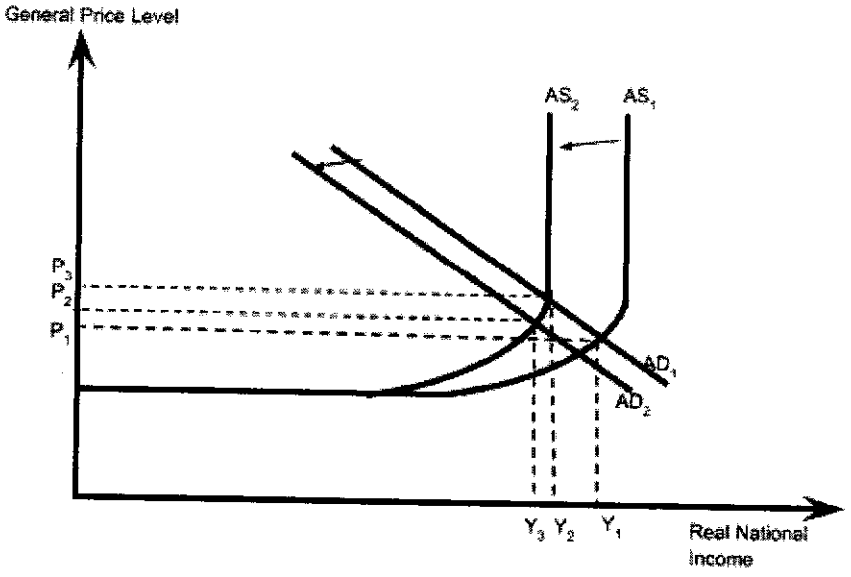
- Smaller workforce may result in **less consumption spending** and the more expensive COP may make investing in Singapore less attractive to foreign companies, **reducing the inflow of FDI (investment spending)  lower AD from AD1 to AD2.**

- Overall there is an ever larger **fall in RNY from Y1 to Y3, since the firms have fewer resources to produce and fewer demand for their goods and services  worsens both actual and potential economic growth.**

- With a fall in RNY, there is also a corresponding **fall in household incomes** leads to **a worsening of SOL for the residents, as they are less able to access goods and services.**

- The higher GPL may also lead to less competitive exports, foreign consumers may switch away from consuming Singapore's exports and consume other countries' exports instead  leading to a **fall in X-revenue and hence, worsening the Singapore's BOT.**

- With a shrinking workforce and an ageing population, government may have to pay out more transfer payments and at the same time, collect less tax revenue since working population is now smaller. **Worsens government budget** which may lead to **possible trade-off for future standard of living in terms of literacy rate, life expectancy, government is less able to spend on infrastructures such as schools, roads and hospitals.**




**Evaluation: extent of severity from the domestic challenges**

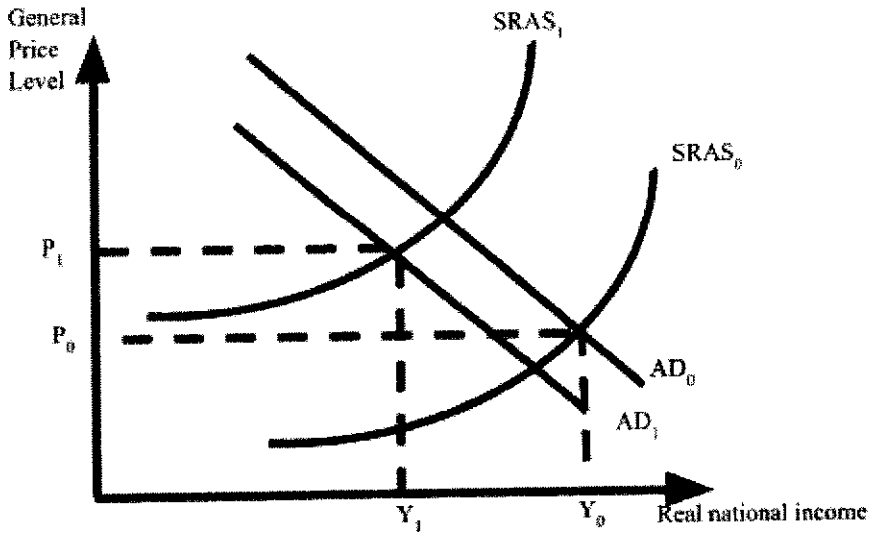
- **Extent of impact can be mitigated by the implementation of supply-side policies** such as education and increase in immigration of foreign labour
- Helps to temporarily alleviate the shortages of manpower and hence, reduce the pressure of cost-push inflation.
- Hence, short-term impact may be more severe, but once the effectiveness of the policies kick in, the **challenges may be mitigated in the long-term**

**R2: External challenges are also a concern to the Singapore government**

- Food security → **edible oil export ban** → **higher imported inflation** since Singapore is a import-reliant country

- **SRAS falls from SRAS0 to SRAS1, since the FOPs are more expensive,** firms are less willing to produce, results in a **fall in RNY, fall in economic growth**.
- Firms pass on the rising COP to consumers, **raise GPL (cost-push inflation),** and consumers may tend to save more rather than consume, leading to a **fall in consumption expenditure as seen by the movement along the AD curve.**

- 'Hollowing out' □ due to the America's CHIPS Act, other Asia countries may experience hollowing out of investment □ **reduce the AD of other Asian's countries and hence, Asia's economies experience slower economic growth** □ **fall in the foreigners' purchasing power** and hence, lead to **less demand for Singapore's X**, reduce Singapore's AD from AD0 to AD1 □ **worsens Singapore's BOT and hence, our actual economic growth.**




Assuming that the fall in AD is smaller than the fall in SRAS:
The GPL is likely to increase from P0 to P1 and a fall in RNY from Y0 to Y1

- Worsens purchasing power for households
- Less able to purchase goods and services, worsens material SOL
- Less able to purchase quality healthcare and education, worsens the literacy rate and life expectancy rate, worsens non-material SOL.

**Evaluation: extent of severity from the external challenges**

- Singapore is a **small & open economy**, very **vulnerable** to external shocks from other countries
- Since Singapore's major **trading partners also include Asia's countries**, likely to impact greatly.
- However, it also depends on the **success of the CHIPS Act in USA**. If the Act is effective, **USA's economic growth may improve and hence, in turn, improving Singapore's economic growth via higher X-revenue** since the USA is one of the major buyers for Singapore's exports.

- Singapore also practices **import diversification and stock-piling**, helps to reduce the negative impact of cost-push inflation slightly. Singapore can avoid over-reliance on one country solely, therefore mitigate our contagion effects.

**Evaluation and Conclusion – which is a more serious concern to the government?**

Both challenges are of concern to Singapore. However, the severity of the concern is depending on **whether the government is able to address some of the challenges that it brings. External challenges may be of a greater concern to the Singapore government since it is harder to resolve.** It is mentioned in the extract that, while the government will do what it can to minimise the impact such as through stockpiling and import diversification, Singapore will not be able to completely remove the disruptions to our food supply. It is also largely depending on what the other countries do which Singapore has no control over.

Whereas on the other hand, **Singapore government may have more control over the negative impact that the domestic challenges bring**. Singapore government has a relatively good relationship with its population, is able to garner support to implement the policies needed to overcome the domestic challenges. **As seen from the data, Singapore's unN rate is relatively low and stable, with a improvement in gini coefficient too.** This goes to show that the policies the government puts in place is rather effective to prevent a rise in income inequality and unemployment.

**Mark scheme:**

| Level | Descriptor | Marks |
|---|---|---|
| L2 | • Well-balanced answers explaining both types of challenges and how it impacts Singapore in terms of macroeconomic issues and/or economic agents.<br>• Economic analysis tools such as diagrams are drawn and explained. | 4-6 |

| | | |
|---|---|---|
| | **A + C or A + A = 6**<br>**A + 0/K or C + C = 5**<br>**C + 0 = 4** | |
| L1 | • One-sided answers that only considers one type of challenge<br>• Economic analysis is lacking, with several missing gaps and lacking accuracy<br><br>**C + K = 3**<br>**K + K = 2**<br>**K + 0 = 1** | 1-3 |
| E2 | • Extent of the challenges are explained with sound reasoning and a brief attempt to provide a conclusion (2m)<br>• An overall conclusion is provided with appropriate criteria used. (3m) | 2 |
| E1 | • Extent of the impact is stated but not explained<br>• No attempt to provide an overall conclusion. | 1 |

(e) **With reference to the extracts and/or your own knowledge, discuss whether the Singapore government should increase the immigration of foreign labour or rely more on artificial intelligence to improve the standard of living.** **[10]**

*Note to students: to deepen the analysis, you are expected to bring in the impact on AD and AS (either SR or LRAS) as well as the impact on both material and non-material SOL.*

Standard of living measures both the material and non-material aspects. Material SOL is measured by the **real GDP per capita which measures the the accessibility to goods and services and purchasing power of the households**, whereas non-material SOL is about the intangible quality aspects of life **such as literacy rate and life expectancy.**

**R1: Increasing immigration can improve the standard of living**

**Impact on material SOL:**

1. **Increase in AD:**

Greater pool of workforce / population □ **increase consumption expenditure** □ **increase in AD**

- **Assuming there is spare capacity in the economy** □ RNY can increase as firms react to the fall in inventories by producing more □ hire more FOPs, pay more as wages. Higher induced consumption □ AD increases again, therefore **RNY increases by a multiplied amount.**

- As the economy has spare capacity, **the increase in incomes is greater than the increase in GPL □ enjoy higher purchasing power □ greater accessibility to goods and services, improve material SOL.**

2. **Increase in LRAS:**

Higher supply of labour □ **increase in quantity of resources** □ increase in LRAS, **greater potential economic growth.**

- **Assuming that the economy is now producing near or at full employment,** the increase in LRAS can allow the country to **lower demand-pull inflation and produce more output.**
- Since there are now more resources available, firms **do not need to compete for the scarce resources as much, bidding down prices of FOPs,** hence, **lowering GPL** via the lower unit COP.
- At the same time, the **greater available resources allow the firms to produce more output, increasing the RNY.**
- **With the higher RNY and a fall in GPL □ households enjoy higher purchasing power, greater accessibility to goods and services, improve material SOL.**

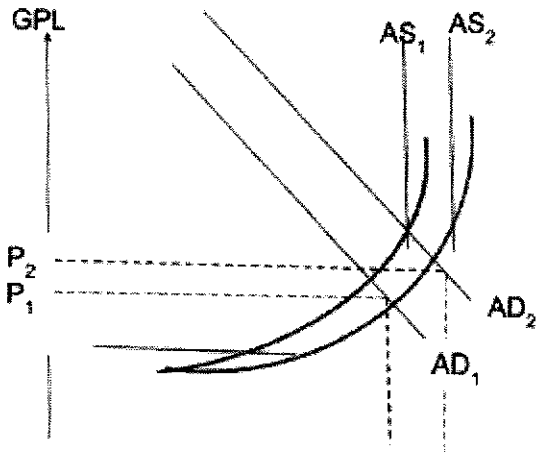
**OR**

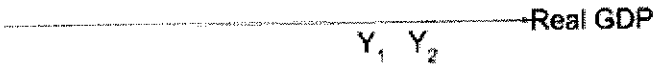
3. **Increase in SRAS:**

Greater supply of labour helps to **reduce wages, reduce unit COP.** Firms are **more willing and able to produce more, increasing production of goods and services.**

- Firms **pass on fall in unit COP in terms of lowering of GPL □ reduce cost-push inflation.**

- **Assuming that the fall in wages is smaller than the reduction in GPL, there can be an increase in purchasing power for the households.** This can enable the households to **enjoy greater and more variety of goods and services, improving material standard of living.**






**Impact on non-material SOL:**

The higher purchasing power also enable consumers to **consume better healthcare and education, improving life expectancy and literacy rates, therefore improving the non-material aspect of their SOL.**
As mentioned in Extract 8, the intake of foreign nurses can help to improve our healthcare capacity □ **cheaper healthcare costs, more consumers are able to afford the healthcare services, helps to lower infant mortality rate and improve life expectancy □ overall improve in non-material SOL**

**Evaluation □ To what extent can the increase in foreign labour help to improve SOL?**

- While there may be an increase in RNY due to greater production of output, there is also the **increase in population size due to the inflow of foreign labour** □ therefore, the **real GDP per capita may fall** if the population growth outweigh the increase in income.
- This is especially so when the **inflow of foreign labour can cause a depressing effects on wages for local workers in some sectors, especially the labour intensive sectors such as hospitality and healthcare sectors.**
- In this case, the material SOL may worsen instead.

- **Limited land space + competition for jobs** □ may raise unN among the Singapore residents and increase unhappiness amongst the residents, **worsen both the material and non-material SOL for the households.**
- No ready pool of supply of workers, cannot expect to be sufficient = not sustainable to rely on increase immigration in the long term.

**R2: Relying on automation / AI can improve SOL for Singapore**

**Impact on material SOL:**

1. **Impact on AD:**

- **Attract FDI and boost investors' confidence** due to the greater **efficiency** and higher productivity of labour
- Increase in I = increase in AD
- The **use of AI** can also **improve quality of our goods and services** □ improve **X-competitiveness, attract more buyers** □ **increase X-revenue** and hence, AD
- **Assuming there is spare capacity in the economy** □ RNY can increase as firms react to the fall in inventories by producing more □ hire more FOPs, pay

more as wages. Higher induced consumption □ AD increases again, therefore **RNY increases by a multiplied amount.**

- As the economy has spare capacity, **the increase in incomes is greater than the increase in GPL □ enjoy higher purchasing power □ greater accessibility to goods and services, improve material SOL.**

2. **Impact on AS:**

- Higher productivity = country can produce higher output with fewer people □ **average cost falls □ SRAS increases**
- **Better quality of workforce = better quality of resources higher LRAS**
- AS increases □ country can produce more output and reduce inflationary pressures at the same time.
- Since the workers are **more productive**, they are able to **earn higher wages**. Coupled with a lower GPL, the workers can enjoy **higher purchasing power □ enjoy more and better quality of goods and services □ improve material SOL.**

**Impact on non-material SOL:**

- With higher and better paying jobs □ fewer workers turn to crime, improve non-material SOL as well.

- The workers with higher productivity may also suffer from **less stress and less anxiety, leading to better non-material SOL as well.**

**<u>Evaluation □ To what extent can the reliance on AI help to improve SOL?</u>**

- Reliance on AI can cause **structural unN** since it may replace some of the jobs □ these workers lose jobs and lack skills needed for the new jobs, hence for a group of structurally unemployed workers, they may not enjoy better SOL.
- At the same time, their income level falls while the income level for the skilled / trained workers increase, **worsens income gap and income inequality = non-material SOL is worsened.**
- This approach may also be **more costly** to the government, than increasing the foreign workers □ strain on government budget, **incurs opportunity costs** and hence, government may not be able to spend on other areas such as healthcare, education and transport.

**<u>Overall conclusion:</u>**

Whether which policy is better able to improve SOL for the households depends on:

- **<u>Sector</u>**: Critical services and healthcare will need the labour manpower to supply the services & AI cannot help much to ease their labour shortages. So increase immigration may be more appropriate, but other sectors like manufacturing sector, AI may be more helpful

- **Time needed**: urgency of problem in terms of labour shortage, immigration is a short-term measure, whereas reliance on AI is a long term solution. The more severe and urgent the labour shortages is, the more appropriate solution would be to increase immigration first.

**Mark scheme:**

| Level | Descriptor | Marks |
|---|---|---|
| L2 | • Well-balanced answers considering both policies and how it works to help Singapore improve SOL **via links to AD and AS (either SR or LR), hence linking to changes in RNY and GPL □ purchasing power, links to literacy rate, infant mortality rate etc.**<br>• **Explicit explanation to link to both material and non-material SOL improvements**<br>• Economic analysis tools such as diagrams are drawn and explained.<br><br>Note to markers:<br>- To qualify for a "A" answers, students must have explain the changes in AD and AS, material and non-material.<br><br>**A + A = 7**<br>**A + C = 6**<br>**A + 0/K or C + C = 5** | 5-7 |
| L1 | • One-sided answers that only considers one policy and its possible improvement to SOL<br>• Economic analysis is lacking, with missing gaps and lacking accuracy<br><br>**C + K = 4**<br>**C + 0 = 3**<br>**K + K = 2**<br>**K + 0 = 1** | 1-4 |
| E2 | • Limitations of the measures were explained with good context provided.<br>• Overall conclusion is provided as to which is better able to improve SOL for the country. | 2-3 |
| E1 | • Limitations of the measures were stated, rather than explained<br>• No overall conclusion provided. | 1 |