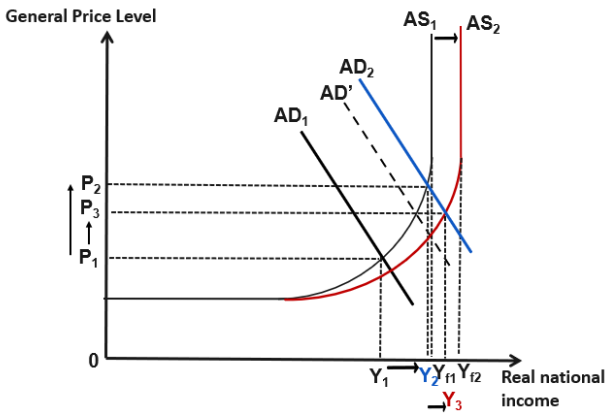
Suggested Answers for 2022 A-Level H2 P1 Qn 2

(a)	Distinguish between a rise in total output and a rise in productivity.	[2]
	A rise in total output refers to an increase in the amount of goods and services produced but a rise in productivity refers to an increase in goods and services produced per unit of resource in a given time period.	
(b)	Explain one reason why a firm with significant market power and long-run excess profits might choose to spend large sums on research and development (R&D).	[2]
	• According to Extract 6, Volkswagen is investing heavily on battery-powered technology to become the world leader in battery-powered. With significant market power, a firm with significant market power like Volkswagen enjoys long-run supernormal profits and this enables the firm to carry out R&D. Process innovation helps to reduce average costs of production, while product innovation helps to increase demand for its products and also make demand more price inelastic which would raise the firm's revenue. • Hence, such firms are incentivised to spend on R&D to maintain high barriers to entry to retain its dominant position and make larger or at least maintain its supernormal profits.	
(c)	Explain, with reference to Extract 8, what might be the opportunity cost of the $19 billion invested by the Singapore government to build the country into a global R&D hub.	[2]
	• Opportunity cost refers to the value of the next best alternative forgone. • The opportunity cost of the $19 billion invested by the Singapore government to build the country into a global R&D hub is the increase in real GDP that could be gained by investing the $19 billion on training of local talents or the gain in society welfare by building more hospitals.	
(d)	Explain how the creation of an innovative culture in Singapore is likely to have benefitted the Singapore economy.	[6]
	• The creation of an innovative culture in Singapore is likely to help Singapore achieve sustained economic growth. Sustained growth occurs when an economy's national output increases over an extended period of time without inflationary pressures. This happens when there is both actual growth and potential growth. • An innovative culture would likely bring about greater inflow of foreign direct investment (FDI) as foreign companies deemed Singapore to be more profitable for doing business (Extract 8) as an innovation culture allows for more product and process innovation. An increase in FDI would increase the investment expenditure (I) in Singapore hence increasing aggregate demand (AD).  	

- This results in an unplanned run down of stocks and firms step up on production by hiring more factors of production, including labour. As factor income increases, induced consumption increases as well, causing real national income to increase by multiples from Y_1 to Y_2. Hence an innovative culture would bring about actual growth and a fall in demand-deficient unemployment as real output increases in Singapore.
- Furthermore, an innovative culture would bring about potential growth for Singapore's economy. This is because the increase in FDI inflow would increase the quantity and quality of capital in Singapore. There could also be more R&D which can increase productivity level or the state of technology, resulting in an increase in LRAS and an increase in the full employment output level from Y_{f1} to Y_{f2} as Singapore's productive capacity rises.
- With actual growth and potential growth achieved, Singapore enjoys sustained economic growth, low unemployment and price stability with the creation of an innovative culture in Singapore.

(d) Discuss whether subsidising the purchase of electric cars would improve the efficiency of resource allocation in the market for transport in Singapore. [8]

Command	Discuss whether
Start Point	subsidising the purchase of electric cars
End Point	improve the efficiency of resource allocation
Content	Market failure, externalities, allocative efficiency, subsidy
Context	market for transport in Singapore

Introduction

In the market for transport in Singapore, there is an overconsumption of petrol and diesel vehicle on the road due to negative externalities. Hence subsidising the purchase of electric cars is a possible policy that the government could implement to reduce the consumption of petrol and diesel vehicle.

Point 1: There is an overconsumption of petrol and diesel vehicle on the road due to negative externalities

- According to Extract 5, emission of nitrogen oxides (NO_2) from car exhaust regularly exceeds safe levels, resulting in heart and lung diseases. The air pollution imposes external costs on households staying near the road as they incurred healthcare costs that are not compensated by the petrol and diesel vehicle owners.

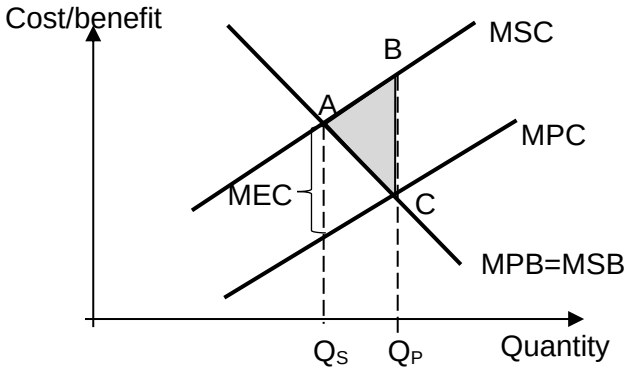


Figure: Market for petrol and diesel vehicle usage

- When a driver uses a petrol and diesel vehicle, he enjoys private benefits in terms of satisfaction due to greater comfort and shorter travelling time. He also incurs private costs such as the price of the vehicle and petrol. To maximum net utility, the driver considers only his private benefits and private costs. This leads to the market equilibrium output Q_P, where MPB=MPC.
- Due to the negative externality in consumption, the social costs of driving petrol and diesel vehicles are higher than the private costs (MSC>MPC). Hence the MSC lies above the MPC by a vertical distance equal to marginal external cost (MEC). Assuming no positive externalities, the marginal private benefits (MPB) is equal to marginal social benefits (MSB). The socially optimal output is given by Q_S, determined by the intersection of the MSB with the MSC.
- Since $Q_P > Q_S$, the driver over-consumes petrol and diesel vehicles, leading to an over-allocation of resources. Between Q_P and Q_S, marginal cost to society is greater than marginal benefit to society. This means that societal welfare could have been improved by reducing quantity of cigarettes consumed to the socially optimal output of Q_S. This forgone societal welfare is the deadweight loss (area ABC), leading to allocative inefficiency.

<u>Point 2: Subsidising the purchase of electric cars could reduce the consumption of petrol and diesel vehicle</u>

- According to Extract 5, electric cars are more expensive than their petrol or diesel substitutes. Hence a subsidy for producers of electric cars would reduce the costs of production, increasing the supply of electric cars and resulting in a fall in price of electric cars. Since petrol/diesel vehicles and electric cars are substitutes, with a positive cross elasticity of demand, a fall in price of electric cars would increase the demand for petrol and diesel vehicle. This would shift MPB curve leftward, reducing the consumption of petrol and diesel vehicle from Q_p to Q_s, thus improving the efficiency of resource allocation in the market for transport in Singapore as the deadweight loss is eliminated.

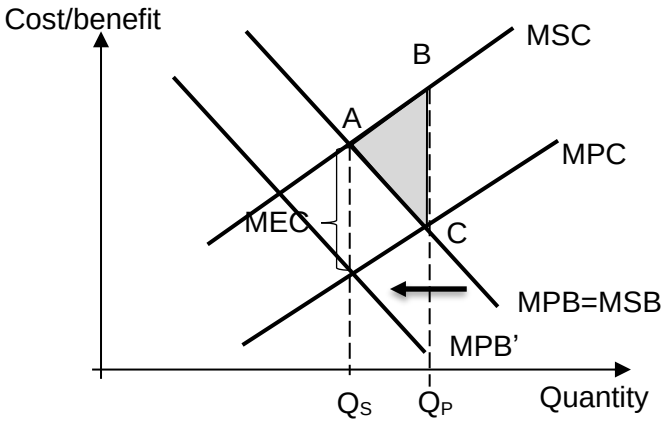


Figure: Market for petrol and diesel vehicle usage after subsidy on electric cars is given

<u>Evaluation/Conclusion</u>

- The effectiveness of the subsidy depends on:
  - The closeness of substitutes (magnitude of XED) between petrol vehicle and electric car in Singapore → the higher the XED value, the more effective the subsidy would be. There might be a lack of charging point in Singapore currently, hence drivers might not see electric cars as a strong substitute to diesel or petrol vehicle. Thus subsidising the purchase of electric cars is likely result in a less than proportionate decrease in consumption of diesel and petrol vehicle. Therefore, efficiency in resource allocation may only improved to a small extent.
    OR

- The amount of subsidy → the UK government currently provides a £3500 subsidy for the purchase of a new electric car, but many customers felt that the price is still too high. This is largely due to developing battery technology and expensive raw material (Extract 5). Hence a large subsidy would be required to incentivise petrol/diesel car owner to switch to electric cars. Given Singapore faces an ageing population and requires higher healthcare spending, a large subsidy might not be feasible as the Singapore government pursue fiscal sustainability. Therefore, subsidising the purchase of electric cars would not improve the efficiency of resource allocation in the market for transport in Singapore.

Level of Response and Descriptors		**Marks**
L2	Developed analysis of how consumption of petrol and diesel vehicles leads to allocative inefficiency AND how subsidising electric cars would improve the efficiency of resource allocation in the market for transport in Singapore.	4-6
L1	Under-developed analysis of how consumption of petrol and diesel vehicles leads to allocative inefficiency OR how subsidising electric cars would improve the efficiency of resource allocation in the market for transport in Singapore.	1-3
Evaluation		
E	Evaluative marks will be awarded for a conclusion reached with respect to a judgement made on whether subsidising electric cars would improve the efficiency of resource allocation in the market for transport in Singapore after consideration of the analysis provided.	1- 2

(e) Discuss the extent to which government policy can influence a country's comparative advantage in a good or service. [10]

Command	Discuss the extent
Start Point	government policy
End Point	Influence a country's comparative advantage
Content	Determinants of a country's comparative advantage, government policy
Context	A good or service

Introduction

- An economy is said to have a comparative advantage (CA) over another in the production of a good if it incurs a lower opportunity cost in producing the good or service. The opportunity cost of producing the good can be measured by the value of the next best alternative that can be produced with the same set of resource.
- A country's CA depends on differences in relative factor endowments (land, labour, and capital) and production processes of different goods which use these factors in different proportions. However, government could implement supply-side policies to increase the quantity and quality of such factor endowment, hence influencing its CA in producing a good or service.

Point 1: Supply-side policies could be implemented to influence a country's CA in a good or service.

- According to Extract 8, despite a lack of natural resources and a small population, Singapore has become an innovation hub due to various supply-side policies that the Singapore government has implemented.
- For example, there are educational policies that ensure a high-quality skilled workforce. Singapore has retained a best-in-world ranking for tertiary education (Extract 7), leading to productivity and manufacturing gains. This rise in productivity would reduce the unit costs of production, which reduces the opportunity costs of producing R&D, resulting in Singapore having CA in R&D.
- There was also investment in advanced technology sectors, which made it a base for high-end manufacturing. The expansion of the R&D sector would result in all firms enjoying costs saving through external economies of scale (EEOS). EEOS arise from the sharing of common resources between firms and the outsourcing of production processes to supporting firms, due to industry expansion. When EEOS are experienced, firms' LRAC will shift down. All firms enjoy a lower cost at every level of output, regardless of their size. For example, transportation and communication costs will fall as government improves transport infrastructure. The reduction in cost of production reduces the opportunity costs of producing R&D, resulting in Singapore having CA in R&D.

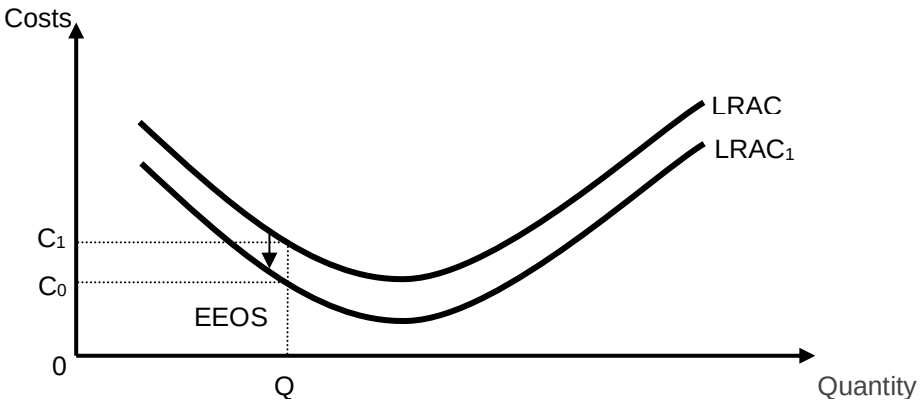


Figure: External economies of scale leading to lower LRAC

Intermediate evaluation: Supply-side policies might be ineffective in influencing a country's CA in a good or service.

- However, as seen in Extract 8, Singapore still faces a talent shortage despite having abundance of capital due to government policies. While the Singapore government has implemented policies to train locals with the necessary technological skills, Singapore simply cannot afford to compete with the huge talent pool that other larger countries such as China and US have. Training also takes time, and it also depends on the receptiveness of the local workforce to go for such training. Therefore, government policies might not be able to influence a country's CA, especially in the short run.
- While the shortage of talent could be address through attracting foreign talent, such policy is unsustainable as Singapore has limited land to accommodate large increase in foreign talents and it might also result in unintended consequences such as property price inflation due to increase in demand for property from these foreign talents.

Point 2: Other factors could also influence a country's comparative advantage.

Germany seems to have lost its CA in car manufacturing due to technological disruption (Extract 6). Technological disruption is a natural process as firms seeks to maximise profit, hence they would seek innovation to increase their profits. As technology advances, the emergence of electric vehicle has led to a crisis in the German car industry, as German car manufacturers are unable to compete with other EV manufacturers who have access to raw

material such as lithium to make the battery for electric vehicle. This also shows how natural endowment of factor inputs could influence a country's CA. Countries who have lithium would have the CA in producing electric vehicle as the opportunity costs would be lower than other countries without access to lithium as they must import these raw materials at a higher cost.

Other possible factors: ageing population, depletion of natural resources.

Intermediate evaluation: These factors (technological disruption and access to raw material) could be influenced by government.

- Technological disruption could be accelerated by government policies such as increase spending on R&D and education. Without such spending, there might be underproduction of R&D activities due to positive externalities as firms do not consider the external benefits of R&D to other firms and the wider economy.
- Firms might not have the technology or financial ability to extract the lithium without government support, hence unable to exploit its CA.
- Government protectionist measures could also help to protect/maintain a country's CA. For example, foreign direct investment could be prevented from into the country to access its natural resources or implementation of import tariff to protect infant industry.

Summative Evaluation

- In conclusion, government policy can influence a country's CA in a good or service to a large extent, especially for a small country like Singapore, as opposed to a resource-rich country. The rise in the 2020 Bloomberg Innovation Index ranking for Singapore could be largely attributed to deliberate government policies that allocate resources to create an innovation hub in the country.
- While natural comparative advantage could be lost due to technological disruption or depletion of natural resources over time, government policies could help a country to regain or gain new CA. For example, the German government could use its fiscal surplus to invest and safeguard Germany's position as the top innovative nation and protect its declining car manufacturing industry.

Level of Response and Descriptors		**Marks**
L2	Developed analysis of how government policy and one other factor can influence a country's comparative advantage in a good or service.	5 – 7
L1	Underdeveloped analysis of how government policy or one other factor can influence a country's comparative advantage in a good or service.	1 – 4
Evaluation		
E	For an evaluation that justifies the extent to which government policy can influence a country's comparative advantage in a good or service	2 – 3
E1	For an evaluation / judgement that is unsubstantiated.	1