Question 1

With rising income and influence of media, there is a rising consumption of cigarettes. To reduce the rising consumption, Singapore imposes indirect tax on cigarettes while Philippines introduces minimum price for cigarettes.

(a) Explain how each of the above policy affects consumers' expenditure on cigarettes. [10]

(b) Using demand and supply analysis, discuss whether indirect tax or minimum price is more effective in reducing quantity of cigarettes sold with rising income and influence of media. [15]

a) To reduce the negative effects due to consumption of cigarettes, government can either raise tax or set a minimum price. This will result in a rise in price and hence discourage and reduce consumption of cigarettes. However, the impact on consumer expenditure (Price x Quantity) depends on the PED value of cigarettes. An indirect tax can be imposed on the cigarettes to discourage consumption of cigarettes. With a rise in tax, this will increase the unit cost of production on the producers. Less profit will be made with the same selling price. Hence, firms will be less able and willing to supply a good at any given price. This shifts the supply curve for cigarettes leftwards from S_1 to S_2 as shown in Figure 1.

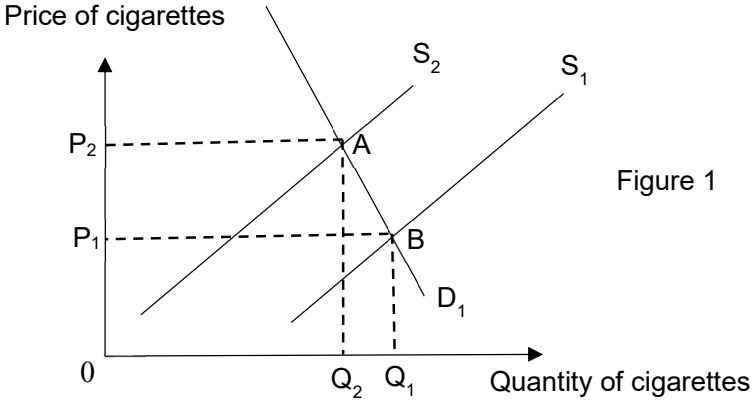


Figure 1

As cigarettes is quite additive in nature, the demand for cigarettes tends to be price inelastic. With a fall in supply, price rises and quantity demanded falls by less than proportionate. Hence total expenditure for consumers rises. Before tax, consumer expenditure is shown in the area $0P_1BQ_1$. After tax, consumer expenditure rises from $0P_1BQ_1$ to OP_2AQ_2. Hence, an indirect tax on cigarettes will result in consumers paying a higher price and given that the demand is price inelastic, consumer expenditure will rise. In general, the demand for cigarettes as a whole is price inelastic. However, with the introduction of electronic cigarettes, they may be viewed as substitutes for the traditional cigarettes. Hence, the demand is for cigarette may be price elastic.

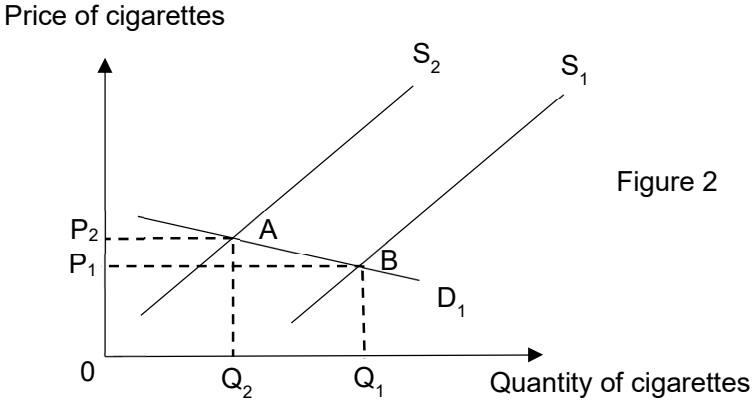


Figure 2

In this case, with a fall in supply, price rises and quantity demanded falls by more than proportionate. Hence total expenditure for consumers will fall. Before tax, consumer expenditure is shown in the area $0P_1BQ_1$ in Figure 2. After tax, consumer expenditure falls from $0P_1BQ_1$ to OP_2AQ_2. Hence, an indirect tax on cigarettes will result in consumers paying a higher price. Whether consumer expenditure will rise or fall will depend on the price elasticity of demand for cigarettes.

To discourage the consumption of cigarettes, government can also set a minimum price. A minimum price is a price set above the equilibrium price, making the price of cigarettes to rise Before government impose a minimum price, consumer expenditure is shown in the area $0P_1BQ_1$ in Figure 3. After imposing a minimum price at P_2, the consumers' expenditure rises to OP_2AQ_2. This has the same effect of an indirect tax.

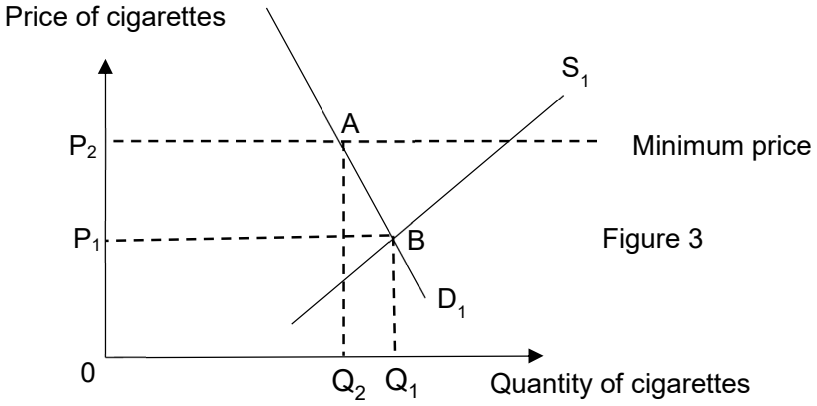


Figure 3

Hence, with a minimum price set on cigarettes will result in consumers paying a higher price and given that the demand is price inelastic, consumer expenditure will rise.

In conclusion, both indirect tax and minimum price will result in higher prices and lower quantity. Whether the consumer expenditure will rise or fall will depend on the elasticity of demand for cigarettes. Given the demand tends to be price inelastic, consumer expenditure is expected to rise.

b) Given a rising income and influence of media, whether indirect tax or minimum price is more appropriate in reducing the quantity of cigarettes sold will depend on how effective these policies are considering the benefits, costs and any unintended consequences of these policies.

With rising income, the demand for cigarettes will rise assuming that the cigarettes is a normal good. Given the influence of media, advertising encourage consumption of cigarettes and changes the taste and preference of consumers and hence increase the demand for cigarettes and make the demand more price inelastic. With a rise in indirect tax, it raise the unit cost of production of firms causing the supply to fall and shift to the left. With a rise in demand and a fall in supply for cigarettes, price rises while quantity is uncertain.

Assuming the demand rises more than the fall in supply, both price and quantity will rise P_1 to P_2 and Q_1 to Q_2 respectively, making indirect tax ineffective in reducing the quantity of cigarettes sold as shown in Figure 4.

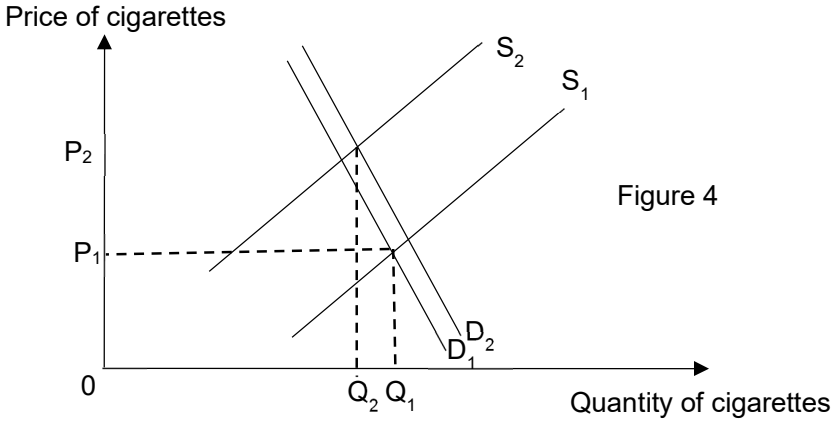


Figure 4

Hence, the effectiveness of an indirect tax in reducing cigarettes consumption will depend on the extent of the shifts in the demand and supply curve.

Whether a minimum price is effective in reducing consumption of cigarettes will depend on the amount of minimum price set and the extent of the shift in demand due to rise in income and influence of media. Whether a minimum price is effective in reducing consumption of cigarettes will depend on the change in demand. With a minimum price P_2 set above the equilibrium price P_1, it forces the firms to sell cigarettes at P_2. Quantity sold will fall from Q_1 to Q_2. Assuming the demand rises to a large extent from D_1 to D_2, quantity will rise from Q_2 to Q_3, making minimum price ineffective in reducing the quantity of cigarettes sold as shown in Figure 5.

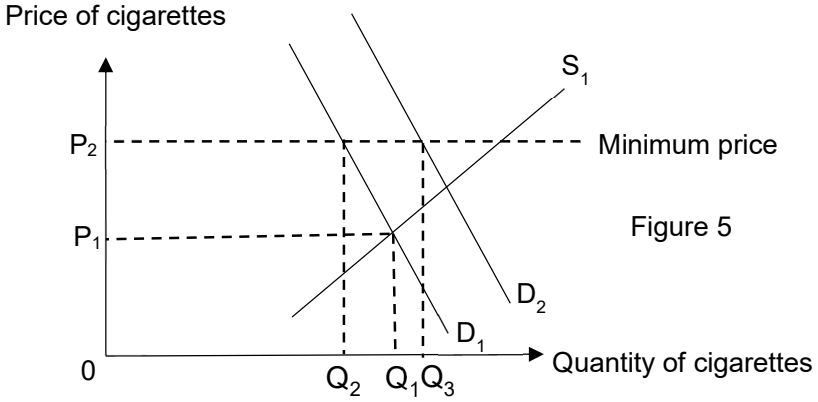


Figure 5

However, if the demand rises to a small extent from D_1 to D_2, quantity will fall from Q_1 to Q_3, making minimum price effective in reducing the quantity of cigarettes sold as shown in Figure 6.

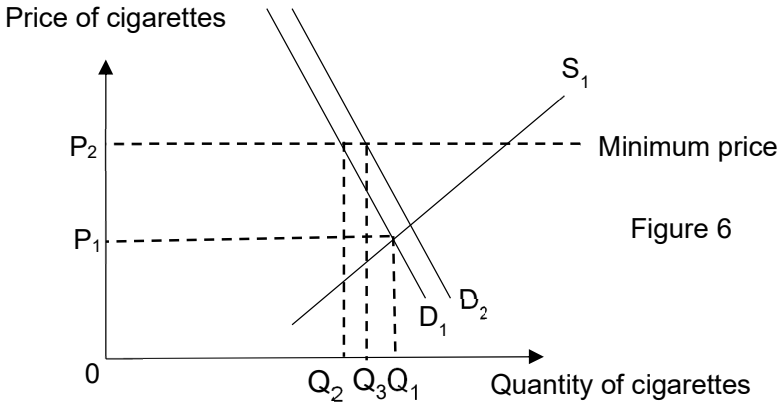


Figure 6

Whether a minimum price is effective in reducing consumption of cigarettes will depend on the amount of minimum price set. With a minimum price set at P_2 and demand shift from D_1 to D_2, the quantity of cigarettes will rise from Q_1 to Q_2, making minimum price to be ineffective in reducing quantity of cigarettes. However, if the minimum price is set higher at P_3, then quantity will fall from Q_1 to Q_3, making minimum price to be effective in reducing quantity of cigarettes.

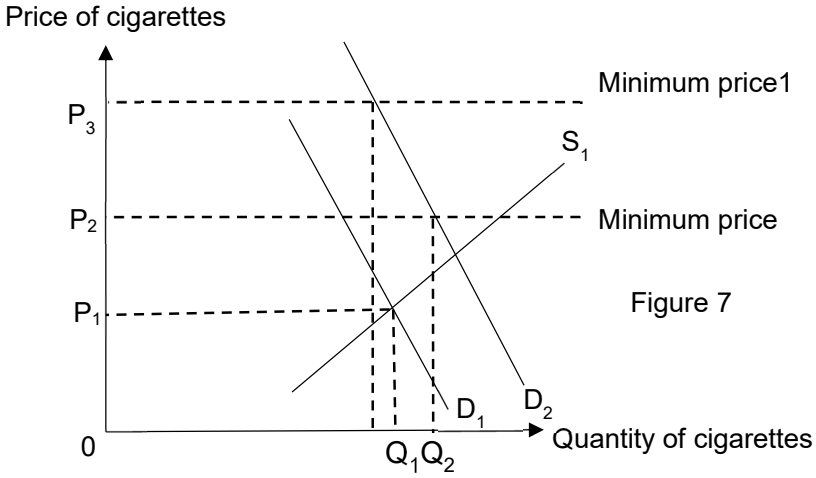


Figure 7

Hence, the effectiveness of setting a minimum price in reducing cigarettes consumption will depend on the extent of the minimum price set. Overall, the effectiveness of setting a minimum price, given a rise in demand, in reducing cigarettes consumption will depend on 1) the extent of the shifts in the demand and 2) the extent of the minimum price set above the equilibrium price.

Both indirect tax and minimum price aim to reduce the quantity of cigarettes sold. However, the effectiveness of the policies will depend on the YED, benefits, cost and any other unintended consequences that the policies may bring about. The effectiveness of the policy will depend on the YED for cigarettes. If the demand for cigarettes is income inelastic and with a rise in income, the rise in demand may be insignificant compared to a fall in supply due to indirect tax. Hence, reducing the quantity of cigarettes sold may be effective.

On the other hand, if the YED for cigarettes is income elastic. In this situation, the rise in demand for cigarettes is likely to outweigh the fall in supply due to indirect tax resulting in a rise in the overall quantity. Hence, reducing quantity of cigarettes sold may not be effective. Taxes though may reduce the consumption of cigarettes, it does not address the root cause of the problem.

However, the benefits of having an indirect tax is that government will be able to raise revenue from this increase in indirect tax on cigarettes. The tax revenue received maybe used for other government expenditure like healthcare, infrastructure and so on. It can even be used to fund

public education, convince the consumers of the ill effects of cigarette so as to reduce the demand for cigarettes. This may be more effective in targeting the root cause of the problem.

Furthermore, taxes allow price mechanism to work effectively and correct market failure due to overconsumption of cigarettes, clearing the market without causing misallocation of resources due to surpluses or shortages. Minimum price, on the other hand, may reduce the consumption of cigarettes but will not address the root cause of the problem, similar to an indirect tax.

However, the cost of implementing a minimum price is that government will have to absorb the surpluses arises from this policy by buying up the remaining cigarettes that are not sold. This will increase government expenditure which will incur high opportunity cost unless the government is able to export and sell the goods out of the country.

Furthermore, as long as minimum price is in place, there will always be a surplus as producers have the incentive to produce more due to higher prices. This will lead to over allocating of resources in the production of cigarettes, resulting in allocative inefficiency. Having a minimum price on cigarettes can also lead to black market. Hence, close monitoring is also required to ensure producers are unable to sell the cigarettes below the minimum price. This will probably incur higher monitoring cost to the government to enforce the law.

In conclusion, both policies like indirect tax and minimum price are ineffective in reducing the quantity of cigarettes sold as they do not target at the root cause of the problem. However, with a rise in income and influence of media, indirect tax on cigarettes seems to be more effective than a minimum price in reducing the quantity of cigarettes sold considering the benefits and costs of both policies. Hence, both policies can only be a short term measure. In the long run, government needs to target at the root cause of the problem which is educating the consumers to reduce consumption of cigarettes due to the negative effects of cigarettes.

Question 2

In an era marked by escalating threats of competition, some businesses are confronted with the need to maximise revenue or maximise profit, often using pricing and non-pricing strategies.

(a) Explain the likely effects on a firm's pricing decision when its objectives changes from profit maximisation to revenue maximisation. [10m]

(b) Discuss the alternative strategies that a profit maximising firm could adopt in view of increasing competition in the market. [15m]

(a) Firms may be set up to pursue different objectives which include profit maximisation, sales revenue maximisation, or market share dominance. However, the traditional objective of firms is always assumed to be profit maximizing. And when a firm changes its objective from profit maximisation to revenue maximisation, it will impact upon its price and output level.

A firm maximises profits when economic profit is positive. To achieve this, the firm must produce the output where (TR-TC) difference is maximum. The marginalist principle explains that profit-maximising occurs at the output level where MC=MR, such that MC is rising.

With reference to Figure 1, a firm would produce up to 0Qmax where the MR = MC and set the price of the good as determined by the average revenue curve (AR) or demand curve (D) for that particular level of output.

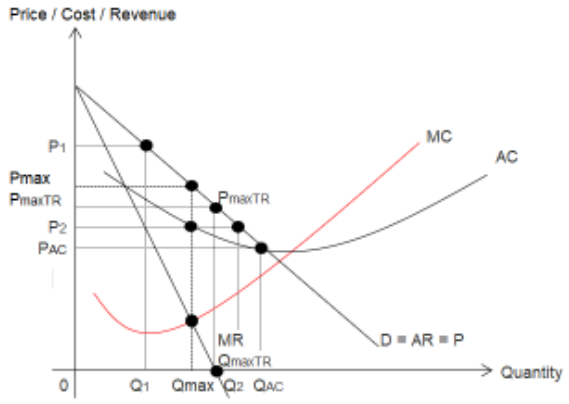


Figure 1

Marginal revenue is the additional revenue gained from the production of an additional unit of output while the marginal cost is the additional costs incurred in producing that additional unit of output.

If a firm is currently producing at Q_1 where the MR > MC, the firm has the incentive to produce more since the firm gains more revenue from its sale (MR) than it adds to the cost (MC) in getting that unit produced. The firm should increase its production as long as the MR from each unit sold exceeds its MC of producing that output. Hence, the firm can increase its total profits by producing additional unit of output until it reaches the level where MR = MC at Q_{max}.

On the other hand, if a firm is producing at Q_2 where the MC > MR, it implies that the additional cost incurred in producing an additional unit is higher than the additional revenue earned, and as a result make a loss on that unit. The firm should reduce its production if the MC from each unit sold exceeds its MR of producing that output.

With reference to Figure 1, a firm would produce up to 0Qmax where the MR = MC and set the price of the good at 0Pmax as determined by the average revenue curve (AR) or demand curve (D) for that particular level of output.

A firm can also practice price discrimination to profit maximise through raising total revenue.

Third degree price discrimination is defined as a price strategy where consumers are segmented into distinct groups and are being charged different prices for the same product for reasons not arising from cost differences. Firms can charged a higher price for consumers with a price inelastic demand and a lower price for other consumers with a price elastic demand.

Price discrimination is commonly practice in airline tickets where lower airfares for those who buy in advance (like leisure travelers) as compared to those who buy last minute (like business or urgent travelers)

As the firms charge a higher price for those with demand price inelastic, it will lead to a less than proportionate fall in quantity demanded, ceteris paribus, leading to higher revenue earned since the increase in revenue from increase in price will be more than the revenue lost from fall in quantity demanded.

On the other hand, when the firms charge a lower price for those with demand price elastic, it leads to more than proportionate increase in quantity demanded, ceteris paribus, leading to higher revenue earned since the increase in revenue from increase in quantity demanded will be more than the revenue lost from fall in price.

With total cost faced by the firm being the same regardless of whether it price discriminates or charges a single price, price discrimination allows firm to earn more profits as total revenue earned has increased.

Firms may opt for revenue maximisation instead of profit maximisation. Revenue maximisation enables a firm to capture a bigger market share. This is usually an objective of a new firm that is trying to penetrate a market.

Revenue maximisation behaviour may also arise due to the separation of ownership and management. A manager of a firm may choose to revenue maximise if his salary is based on the proportion of the revenue generated by the firm for e.g. sales commission. In this case, the objective of the manager would be to revenue maximise instead of profit maximise.

A revenue maximising firm will increase output so long as MR is positive. Hence the firm will keep increasing its output until MR=0. At the output Q2, where revenue is maximized, the price is Pmaxtr. At this output, the whether the firm makes supernormal or subnormal profits would depend on the position of the AC curve.

Hence, when the firms change objective from profit maximising to revenue maximising, they will charge a lower price compared to profit maximisation at where MR=0.

In conclusion, firms would charge a different price depending on their objective.

(b) With rising level of competition, firm are likely to implement various pricing and non-pricing strategies to remain competitive and maintain their market share and profits. These companies will need to also consider their competitor's possible reactions to their new decisions.

Profit maximising firms could implement process innovation to reduce cost of production.

Profit maximising firm can implement process innovation which involves improving the method of production to make it more efficient. This would reduce the marginal cost and average cost of production. An example is how Amazon process innovate to maintain its market dominance as it faced intense competition in the e-commerce industry. Amazon optimized its supply chain processes through predictive analytics and machine learning algorithms. This enable Amazon to forecast demand accurately, reduce excess inventory, and minimise shipping times. Amazon also implemented robotics and automation in its fulfilment centers to increase operational efficiency. Robots reduce labour cost and errors increase productivity. This process innovation adopted has enable Amazon to become known for its fast and reliable shipping, which differentiate it from other companies, and enable it to maintain its position as the dominant player in the e-commerce industry.

Process innovation would increase efficiency of production which lowers average cost and marginal cost. This enables the firm to enjoy cost savings advantage over its rivals, allowing it to lower its price and be more price competitive. Furthermore, process innovation would change taste and preference of consumers in favour of their services and goods, and make it demand price inelastic, leading to a rise in total revenue. With a higher revenue and lower cost, it will enable the firm to enjoy higher supernormal profits and maintain their market dominance and share in the midst of rising competition.

Evaluation: Process innovation requires significant financial and human resources. Small firms which have less resources and funds can act as a barrier to implement process innovation compared to large firms.

[Trade-off]:Some of the process innovation may reduce consumers' experiences and welfare. For example, in the retail and F&B industries where strategies to reduce labour cost may lead to poorer customers' experiences.

In view of rising competition, profit maximising firm could implement product innovation.

Product innovation involves improving the quality of the goods and services or developing new products through research and development. For example, Apple Inc. faced rising competition in the smartphone market in the mid-2000s as competitors were releasing smartphone with features that challenged Apple's dominance in the industry. To maintain its market dominance and profit margin, Apple continued to invest heavily in research and development (R&D) to develop new iPhone models with improved hardware, software and features.

Furthermore, Apple regularly rolled out updates to its IOS operating system, introducing new features, security enhancements, and performance improvements. These updates not only improved the user experiences it also helped Apple retain customer loyalty, making demand for their products price inelastic.

These product innovations increase the demand for Apple's iPhone. Moreover, product innovation creates a real product differentiation, causing consumers to view its products as less substitutable with other rival's products, causing demand to become more price inelastic.

With successful product innovation, the AR=DD curve of the firm will increase and becomes more price inelastic. As a result, profit maximising output and price will increase, resulting in higher total revenue earned.

Evaluation:
However, R&D would incur high level of cost of production. Assuming that the increase in total revenue is more than the increase in total cost, profits level of the firm will increased.

Constraint: The extent which firms can product innovation depends on the level of supernormal profits earned in the long run which is determined by the size of the firm and nature of industry.

Time period: Whether the effectiveness of product development can be sustained into the long term, depends on the complexity of the R&D and whether it can be patented. For R&D which can be easily replicated and is not protected, the R&D is only effective in the short term.

In view of rising competition, profit maximising firm could implement aggressive advertisement.

Effective advertising can help a company to change taste and preference of consumers in favour of their products and increase the willingness of consumers to purchase it, causing AR=DD to increase. In addition, advertisement allows a firms to communicate its unique value proposition compared to competitors and help its to create a distinct brand identity, causing demand for the product to become more price inelastic as consumers now perceived the products of rivals as less close substitutes via imaginary product differentiation. An example is where Amazon introduced Prime Day, an annual sales event exclusively for its Prime members. This marketing initiative not only encouraged new Prime sign-ups but also boosted sales, effectively competing with other major shopping holidays such as Black Friday and Cyber Monday.

Evaluation: Advertisement can be costly and doesn't contribute to improvement of variety and quality of products. Furthermore, resources spent on advertising could be allocated more effectively in other areas such as R&D to improve quality of products.

Advertisement sometimes emphasizes potential losses over negative consequences if consumers do not take a specific action, such as subscribing to a service. This exploits consumers' cognitive bias toward avoiding losses, even at the expense of potential gains.

Also, firms may exploit salience bias in their advertising and marketing strategies through repeating key messages that enhance their salience, using visual attentions to draw the attention to the promotion, and may mislead consumers to purchasing the goods.

Effective advertising could help to boost profits and protect profit maximising firm's market share during rising competition. However, it may worsen consumers' welfare.

In view of rising competition, firms can adopt strategies to diversify into new markets or new products amid rising competition.

Firm can either diversify into new markets in other geographic regions where competition is less or diversify into other new products or services to cater to different customer needs and expand the product portfolio. Example, Coca-Cola, faced with competition in the carbonated beverage market, diversified by acquiring brands like Honest Tea and SmartWater to tap into the growing demand for healthier beverage options. This strategy allows Coca-Cola to reduce reliance on a single market and expand their customer base and also create new growth opportunities. As such, it will increase the total revenue earned.

Another example is Netflix. While it initially focused on the United States, it expanded aggressively in the international market and launched its service in numerous countries and regions worldwide. This also helps Netflix to gain market dominance and raise profits to compete against new competitors such as Disney+ and Apple TV+. Furthermore, it enable Netflix to reap extensive internal economies of scale, leading to cost savings which further increase their profits and enable them to price their streaming services at a competitive price, which help them to enjoy supernormal profits.

Evaluation: Diversification of products requires firms to manage multiple product lines or market segments which can be complex. It may give rise to diseconomies of scale which leads to higher average cost.

Profit maximising firms could adopt strategies to diversify into new untapped markets or new products to protect their level of profits.

In conclusion, firms could adopt a combination of strategies that target at raising revenue or lowering cost of production amid rising level of competition. However, it depends greatly on the firm's unique circumstances, industry which it is in and firm's objective. Cost-cutting strategies can improve efficiency and profitability, but they must be implemented to avoid compromise product quality. On the other hand, revenue strategies can drive growth but may require extensive investment in marketing and innovation.

For example, a technology company might invest heavily in digital transformation to automate manual processes and reduce administrative costs. This streamline operations, enhances efficiency, and cut operational expenses. While an e-commerce company facing stiff competition can invest in targeted marketing campaigns, leveraging social media, content marketing, and personalized advertising to reach a broader audience and boost sales.

Ultimately, the most effective approach often involves a balanced strategies that combines elements of cost control with initiatives to raise revenue.

For example, retail companies might focus on cost-cutting through workforce optimization by implementing software to reduce overstaffing during slow period. This helps to control labor costs while maintaining customer service levels. Simultaneously, the firms might want to invest to improve in-store customer experience and expand its products range.

However, sometimes the firms may change their objective from profit-maximising to other objective such as increasing market share, as such, they may switch to aggressive pricing strategies which may lead to them earning subnormal profits in the short term.

Question 3

Education serves many key private and social objectives. The benefits of education accrue not only to individuals, in the form of greater employability and higher wages; but also to society at large.

(a) Explain how the pursuit of self-interest by rational consumers may not lead to an efficient outcome in the education market. [10]

(b) Discuss the view that government intervention in the education market will always lead to efficient and equitable outcomes. [15]

(a) A rational consumer aim to maximise their welfare by consuming at an output where their marginal private cost (MPC) is equal to their marginal private benefit (MPB).

However, due to the presence of positive externalities and imperfect information in the education market, the pursuit of self-interest by rational consumers will not lead to an efficient outcome as there will be market failure.

Due to the presence of positive externalities in the education market, there will be allocative inefficiency which leads to inefficient outcome.

Rational consumers will consider MPC, additional school fees for every year of education, and MPB, additional increase in income for every year of education. They will then go to school and or get training up to the point where MPC= MPB at Qp (in Figure 1).

However, they will not consider positive externalities generated when they get educated, where there will be spillover benefit to third parties who are not involved in the production or consumption of education. For example, firms (third party) will benefit as they will be able to hire more productive employees, which will translate to higher output and revenue (marginal external benefit (MEB) / positive externalities). The presence of positive externalities will lead to a divergence of MPB and Marginal Social Benefit (MSB) by the distance of MEB.

Hence, the social optimal level of consumption of education will be at Qs where MSB = MSC. Given that Qp is less than Qs, there is an underconsumption of education. From every unit from Qp to Qs, MSB is more than MSC, resulting in a deadweight loss seen in area ABC in the Figure 1.

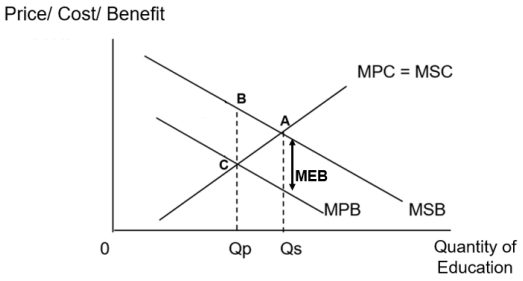


Figure 1

Thus, given there is a deadweight loss in education market due to positive externalities, there is an inefficient outcome in the education market.

As rational consumers have imperfect information regarding the true benefit of education, there will be an inefficient outcome in the education market, especially for tertiary education.

Rational consumers may underestimate the true benefit of tertiary education. For example, they may underestimate how an additional level of tertiary education will affect their income in the long term. As the result, the perceived MPB will be less than actual MPB.

Thus, rational consumers will only receive education where MPC is equal to MPBperceived. However, if they were aware of the actual MPB, they will consume at a higher level of Qa where MPBactual is equal to MPC. As such, there is an underconsumption of education. From every unit from Qp to Qs, MPBactual is more than MPBperceived, resulting in a deadweight loss seen in area ABC in the Figure 2.

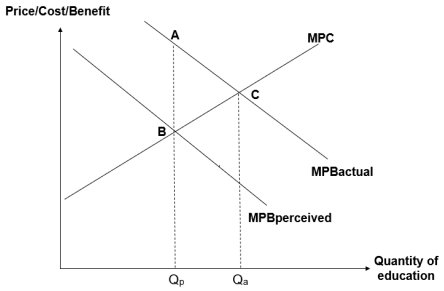


Figure 2

Thus, given there is a deadweight loss in education market due to imperfect information of true benefit, there is an inefficient outcome in the education market.

As the education market has positive externalities and imperfect information of true benefit, rational consumers will have the tendency to underconsume education. This will lead to an inefficient outcome in education. Governments will then intervene in order to ensure efficient allocation of resources in the education market.

(b) Education market will not have an efficient outcome due to the presence of positive externalities and imperfect information regarding its true benefits (especially in higher level education market). Inequity may occur especially if the education fees may be deemed unaffordable to some households, especially those in the lower income brackets.

Thus, government intervention through subsidies to consumers and public education regarding true benefits of education can help achieve efficient and equitable outcomes in the education market.

Nevertheless, even with government intervention, it may still be unable to achieve efficient and equitable outcomes due to the constraints of government (in terms of finance) and lack of accurate information, which could lead to government failure.

Government intervention in the form of subsidy to consumers and public education regarding true benefits of education will lead to efficient and equitable outcomes in the education market.

Government can provide a subsidy equivalent to MEB at Qs to consumers. This will increase their willingness and ability to consume education. This will lead to a rise in MPB from MPB to MPB_1, which coincide with MSB. Hence, the new market equilibrium output will be where MPB_1= MPC at Q_s (which is social optimal output as seen in Figure 3 below, correct the problem of underconsumption of education. This eliminates deadweight loss, which leads to an efficient outcome in the education market.

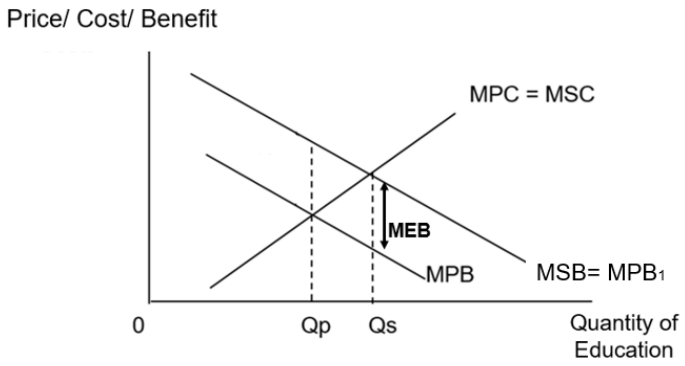
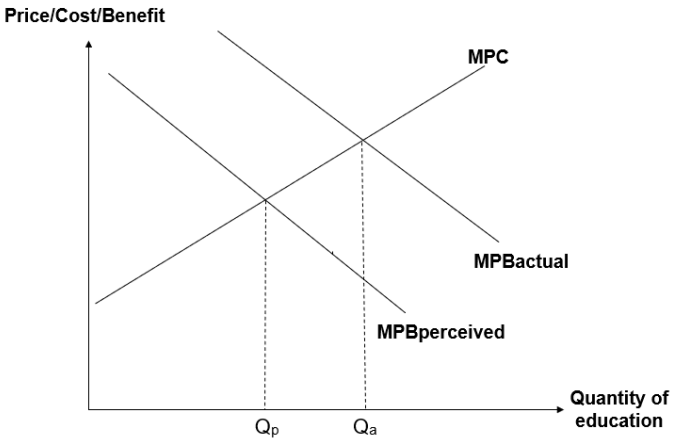


Figure 3

Government could use income criteria to determine the level of subsidy to consumers and ensure that lower income households will receive more subsidy. This will allow them to be more willing and able to go to school. Taking Singapore as an example, the Ministry of Education's Financial Assistance Scheme (FAS) provides financial assistance for education to low-income families with gross household income of SGD$2,500 or a per capita income of less than SGD$625. Students eligible for FAS receive a full waiver of miscellaneous fees, and partial subsidy on national examination fees. Education policy in Singapore is designed to ensure that no child is disadvantaged because of their financial background. As a result, it will lead to a more equitable outcome as consumers could receive education regardless of income level.

Education market could also fail to achieve an efficient outcome due to imperfect information of true benefits. This is prevalent in tertiary education. Hence, government could assist the tertiary education providers (e.g.: universities / polytechnics) to organise outreach to share and educate consumers of the merits of receiving education in their education institutions. This will bridge the information gap between perceived and actual benefit of education, causing MPBperceived to increase to coincide with MPBactual. This will lead to consumers increase consumption from Q_p to Q_a, which is the optimal level of consumption. Deadweight loss is eliminated, resulting in efficient allocation of resources.



Thus, when government intervene by providing subsidy to consumers and public education, it could lead to efficient and equitable outcomes.

However, government intervention may not lead to efficient and equitable outcomes in education market.

In the case of subsidy to consumers, there may be a case of imperfect information regarding MEB because it is difficult to quantity the third-party benefit. Hence, it is possible for governments to over-estimate the subsidy given to consumers. This could lead to an increase of MPB to MPB_2, which will cause market equilibrium output to increase to Q_p' as seen in Figure 5. It could then lead to a larger deadweight loss of area ADE (which is bigger than original deadweight loss of ABC). This means education market will not have an efficient outcome. Furthermore, governments would incur a higher opportunity cost where the funds that was used to subsidise consumers to have more education could have been use more efficiently in other areas such as healthcare.

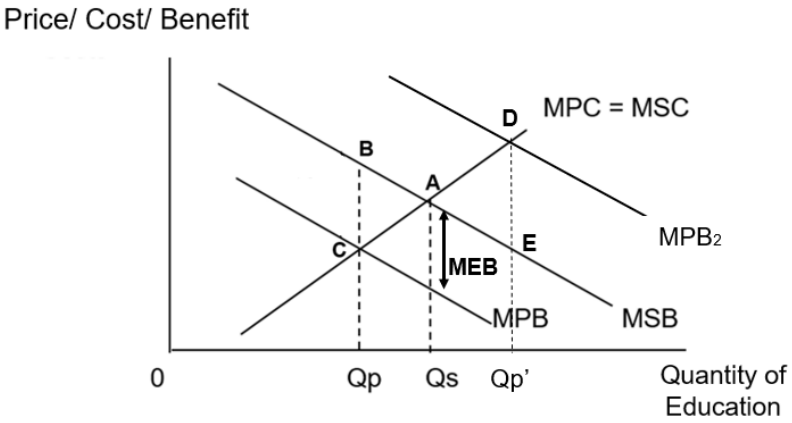


Figure 5

Additionally, lower-income households may lack awareness of the financial assistance programs available to them. Moreover, the current income threshold, set at a gross household income of SGD$2,500, may no longer align with the escalating cost of living. Unforeseen crises, such as the sudden illness of a family member, have the potential to abruptly disrupt the financial stability of these lower-income households. The existing income criteria do not adequately account for such financial challenges. Perhaps a more beneficial approach would involve conducting a case-by-case analysis for financially vulnerable households.

In the case of public education to reduce imperfect information in education market, it would take a long time to change mindset towards higher education of certain courses (especially towards

master certain degrees/training). Secondly, consumers may not be receptive to the information provided by tertiary institution due salience bias, where consumers may disregard information provided by the tertiary institution in favour of what was presented by their family members.

Thus, the limitations of the subsidy to consumer and public educations could prevent the education market from achieving efficient and equitable outcomes.

Ultimately whether government intervention could help education market from achieving efficient and equitable outcomes will depend on 1) the government's ability to get accurate and updated information 2) constraints of governments' budget.

As mentioned above, the effectiveness of subsidy to consumers and public education could depend on governments' ability to get accurate information regarding the marginal external benefit of different education level and its ability to present the information in a manner that increase receptiveness among consumers regarding the true benefits of different tertiary education system. For subsidy to consumers, the failure to estimate MEB accurately could lead to government failure in the education market (where the education market will lead to a more inefficient outcome after government intervention compared to before government intervention).

Secondly, the ability for governments to be achieve equitable outcome will depend on the constraint of government finances. If a government has large government debt and is unable to finance subsidy to consumers, the government will be unable to provide enough subsidy to ensure lower income households will be able to afford education, thus failing to achieve a more equitable outcome.

Question 4

Governments have aims in relation to economic growth, employment, and inflation.

(a) Explain the consequences of failing to achieve these aims. [10]

(b) Discuss whether conflicts in government macroeconomic aims limit the scope for the use of fiscal policy in an economy. [15]

(a) Governments aim to achieve sustained economic growth, low unemployment rate and stable prices. There are dire consequences in failing to achieve these objectives.

The first macro aim is to achieve sustained economic growth.

Governments aim for sustained economic growth, with both actual and potential growth via increase in both aggregate demand (AD) and aggregate supply (AS) over time, with sustained increase in real output/ GDP as below.

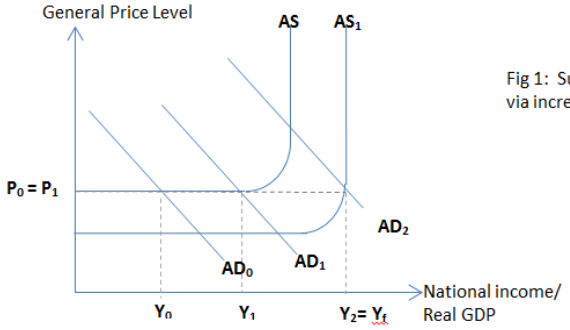


Fig 1: Sustained economic growth via increase in AD and AS

Failing to achieve sustained economic growth, for example, with stagnant growth, where AD and AS remained at AD_0 and AS_0, could lead to stagnant income levels, and limited/ no improvement in material standard of living. In addition, there is no increase in labour demand (as labour is a derived demand for output), thereby leading to no job creation, which could lead to unemployment if the workforce increase or with existing excess labour.

In addition, with negative economic growth, household income levels fall and this reduces purchasing power. If savings falls, the ability to consume goods and services is educed and hence it leads to a fall in SOL. With negative economic growth, the economy is producing a lower level of output. This implies that there will be less goods and services available to satisfy the population's needs and wants and this decreases the country's standard of living. With firms producing a lower level of output, derived demand for labour will fall (raises unemployment within the economy), hence fall in wages. This reduces consumption of goods and services, resulting in a fall in material SOL.

The government will collect less tax revenue. Expenditures to improve infrastructure and the ability to implement policies to overcome the macroeconomic issue of lower/negative economic growth will be hindered and this may further worsen the country's living standard.

Hence, failing to achieve sustained economic growth, there could be dire consequences on standard of living and unemployment.

The second macro aim is to achieve low unemployment.

Crucially, governments aim for low unemployment. When national output remained far below full employment level, when Y_0 is below Y_f, at the horizontal part of AS curve, the national income remained well below potential output, resulting in massive unemployment as labour supply far exceeds labour demand, with unemployment of resources (a sign of market inefficiency), low

household income and hence, likely leading to low standard of living. In addition, high unemployment could also lead to political reprisal, often causing governments to fall.

With rising unemployment, household income falls and this results in a fall in consumption and AD. As AD decreases, business confidence will dampen and firms may hold back their investment plans and AD will fall further, leading to a fall in real GDP and production.

High unemployment can put a strain on government finances. There is increased spending on unemployment benefits and other welfare payments plus falling tax revenues from income tax and GST, when people's incomes fall due to unemployment and restrict their spending. This can be at the expense of government expenditure in other areas, compromising on its ability to achieve its other macroeconomic objectives such as price stability (spending on infrastructure) and favourable balance of payments (investing on R&D).

Hence, failing to achieve low unemployment, there could be dire consequences on standard of living and investment and economic growth.

The third macro aim is to achieve stable prices.

High and unanticipated inflation creates uncertainty. Businessmen are less willing to take the risk associated with any investment project. Uncertainties during inflation make long term planning for firms difficult as doubts are raised about the price that output will sell for in the future especially if the inflation rate is variable. Budgeting becomes difficult and firms would reduce planned capital investment spending. This would lower investments which would thus have a negative effect on the economy's long run potential growth.

High rate of inflation also affect a country external trade balance.

Assuming the cause of inflation is due to cost push inflation, domestic goods become relatively more expensive and if the country has a higher rate of inflation than that of its trading competitors, it will have problems with its balance of payments because its exports become less competitive in foreign markets. Assuming that PEDx>1, quantity demanded for exports would decrease by more than proportionately and thus export revenue would fall. At the same time, foreign goods would become more competitive in domestic markets. This will lead to a greater demand for the relatively cheaper imports and thus demand for imports would increase. Overall, balance of trade would deteriorate. This is of particular concern for an economy which is heavily dependent on external trade.

Hence, failing to achieve stable prices would have dire consequences on investment and economic growth.

Therefore, failure to achieve the 3 macro aims will ultimately adversely affect a country's standard of living.

(b) Macroeconomic objectives include low inflation and unemployment rate, healthy balance of payments and sustained economic growth. To achieve these aims, government may implement fiscal policy. However, there are limits to the use of fiscal policy and conflicts in macroeconomic aims is one of the possible factors. Other factors that may limit the use of fiscal policy include size of multiplier, degree of resource utilization and size of debt.

Using expansionary fiscal policy to boost actual growth and reduce unemployment may conflict the goal of healthy balance of payments (BOP).

Besides the rise in G, expansionary fiscal policy may also be through cutting taxes such as income tax, which increases disposable income and boosts purchasing power. This causes consumption (C) to rise. Also, they can cut corporate taxes, which allows firms to retain more after tax profits. This increases the profitability of investment projects, and as firms have more after tax profits, they would be encouraged to increase investment spending (I).
The rise in AD from the increase in C, I and G would increase NY via the multiplier. As NY rises, household income would rise. Since imports (M) are an income induced expenditure, M would rise. Ceteris paribus, the balance of trade (BoT) and hence current account would worsen, worsening the BOP.

Such a conflict of macroeconomic aims may limit the use of fiscal policy.

Whether this would limit fiscal policy depends on the current economic situation as well as the type of fiscal spending.

If the country currently faces a large deficit on its trade balance and BOP, this may limit the scope of fiscal policy. However, during a serious recession, the government may see unemployment and recession as the most pressing problems, and regardless of the state of its BOP, may prioritize the use of expansionary fiscal policy to reduce the recession.
If fiscal spending is on areas with supply side effects such as education, training and R&D grants and susbsidies, there may be long term impacts that improve labour productivity which reduce firms' average costs and hence boost export (X) competitiveness. If X rises more than the rise in M explained earlier, the balance of trade (X-M) and BOP position would therefore improve in the long run.

Hence the extent to which such a conflict in macroeconomic aims would limit fiscal policy depends on which macroeconomic problems are more pressing in the short run, and on the expected long run effects of fiscal policy.

Besides conflict of aims, other factors may limit the scope for the use of fiscal policy. One such factor is the size of the multiplier (k).

The size of k is affected by marginal propensity to withdraw (mpw). It can be represented by k=(1/mpw). Whether the size of k is large depends on its marginal propensity to import (MPM), marginal propensity to tax (MPT) and marginal propensity to save (MPS). If a country was to have a high MPM, MPS or MPT, like Singapore, it would mean that the size of k would be small. Conversely, when MPW is small, like the USA, it would mean that the size of k would be large.
With a large k, the extent of change in NY due to a change in fiscal policy would be larger. This makes fiscal policy more effective in helping a government manage economic problems. For example, if Singapore (assume k=1.25) and USA (assume k=5) were both facing a deflationary gap of $500m (below full employment, Yf), USA would only need to boost AD by $100m while Singapore would need to boost AD by $400m for their NY to rise by $500m and return to Yf.

Thus, the size of k can limit the scope of fiscal policy in a country.

Another factor affecting the effectiveness of fiscal policy would be the level of government debt.

If the government has no reserves, expansionary fiscal policy needs to be financed by borrowing, which depletes the amount of loanable funds in the economy, causing interest rates to rise. Rising interest rates increase both costs of borrowing and returns to savings. Higher returns to savings increases the opportunity cost of C, encouraging savings, hence causing C to fall. Higher cost of borrowing increase interest payments on loans, reducing net profitability of investment for firms, hence causing I to fall. The fall in C and I may offset the increase in G and hence AD may not rise in an economy, hence limiting the effectiveness of fiscal policy in boosting growth during a recession.

Many developed countries like USA, European countries and Japan currently have large government debt and hence the scope for fiscal policy in these countries would be limited, as compared to countries such as Singapore where due to fiscal prudence over the years have built up healthy reserves and can use fiscal policy more extensively when the need arises.
Hence, the level of government debt may impact the scope for fiscal policy in a country.

In conclusion, the use of fiscal policy may lead to conflicts with other macroeconomic objectives but it is not the only factor which limits the scope of fiscal policy. Factors such as the current economic situation, the types of fiscal spending, the size of k and the level of government debt are also likely to limit the use of FP. The issues discussed have centred mainly around expansionary fiscal policy, and not all are applicable for contractionary fiscal policy. The main factor limiting the scope for contractionary fiscal policy is public opinion and political pressure from raising taxes and cutting spending. The Eurozone problems in Greece where the government lost the recent elections after a spade of austerity measures highlight this.

Question 5

In the sphere of economic governance, when governments encounter a more imminent macroeconomic challenge, they often display a proactive inclination to revise their established economic priorities.

(a) Explain two ways a government can achieve inclusive growth. [10]

(b) Discuss the view that inclusive growth should always be the economic priority of a government. [15]

(a) Explain two ways a government can achieve inclusive growth. [10]

Inclusive growth indicates a rate of growth that is sustained over a period. It is broad-based across economic sectors and creates productive employment opportunities for the majority of the country's population. It is economic growth with benefits enjoyed by every sector of the society.

Before a country can achieve inclusive growth, a country must first aim to achieve sustained economic growth. Here are two ways a government can achieve inclusive growth.

A government can strategically boost its expenditure via expansionary fiscal policy with a focus on supply-side dynamics, aimed at achieving sustained economic growth.

One way for a government to achieve this is by supporting firms as they embark on endeavours related to digital transformation, innovation, and research and development. A government can increase its expenditure by co-funding or by offering financial grants that bolster firms in their initiatives. An illustration of such efforts can be observed in Singapore's Enterprise Development Grant or Productivity Solutions Grant, which serves to elevate business capacities enhancing productivity through innovation and automation of exiting processes through use of IT solutions and equipment. These government-backed endeavors instill a heightened sense of assurance among firms, consequently cultivating an environment conducive to increase investments. This, in turn, incentivises enterprises to adopt digital technologies, enabling them to adeptly navigate shifting consumer behaviors and preferences. Consequently, firms are prompted to allocate more resources to procure technologically advanced capital equipment for their production processes.

With an increase in government and investment expenditures, the aggregate demand (AD) increases. Assuming that the economy is currently operating near full employment, an initial increase in AD leads to a multiplied effect on national income via the multiplier effect, as the autonomous injections into the economy stimulate further rounds of income-induced spending. This, in turn, leads to achieving actual growth.

In the long run, the increase in productive capacity resulting from higher government and investment expenditures on capital equipment, technologies, research and development brings about an increase in aggregate supply (AS). As a result, it allows AD to increase without stoking undue inflationary pressures, thus paving the way for the attainment of potential growth.

Consequently, sustained economic growth is achieved.

As firms undergo digital transformation, very often workers without digital skills are made redundant, resulting in structural unemployment. With an increase in the supply of these workers, their wages are consequently depressed. Therefore, a government can increase its expenditure to upskill her workforce, addressing digital gaps to uplift low-wage workers and aiming to achieve inclusive growth.

Some schemes available in Singapore for this purpose are known as the SkillsFuture Career Transition Programme (SCTP) and the Progressive Wage Model (PWM). The SCTP supports mid-career individuals in acquiring industry-relevant skills to improve employability and pivot to new sectors or job roles. Meanwhile, the PWM is designed to uplift resident lower-wage workers through annual wage increases, opportunities to upskill and improve productivity, and the provision of a clear career progression pathway.

Government expenditure to co-fund and subsidise workers for skills upgrading ensures a competitive and resilient workforce. It enables working adults, regardless of their starting qualifications, to continue building and deepening their skills and competencies throughout their lives. These skills upgrading better equips workers with skill sets needed in higher value-added industries, such as medical technology and data analytics skills that fulfill evolving labor market requirements. This, in turn, makes them more employable and increases their chances of commanding higher wages.

Such a policy creates productive employment opportunities for all, ensuring growing incomes for everyone, especially lower-skilled and lower-wage workers in Singapore. This achievement aligns with the macroeconomic aim of inclusive growth.

In conclusion, the aforementioned are two ways through which a government can achieve inclusive growth, with the initial goal of attaining sustained economic growth.

b) Discuss the view that inclusive growth should always be the economic priority of a government. [15]

Inclusive growth should be a government's economic priority due to its benefits and positive impact on other macroeconomic aims. For example, low and stable inflation, lower unemployment, and higher standard of living for the majority of the country's population.

However, whether inclusive growth should always take precedence as the economic priority of a government depends on the current economic situation it faces. If a government encounters a more imminent macroeconomic challenge, it will revise its established economic priorities to address the current most pressing challenge and shift its focus to another macroeconomic aim.

Inclusive growth, that is preceded by sustained economic growth, should be a government's economic priority as it brings about low and stable inflation, lower unemployment, and higher standard of living for the majority of the country's population.

Sustained and inclusive growth fosters a non-inflationary economic expansion, offering numerous benefits. Low and stable inflation correlates with a thriving economy and robust profits. When one anticipates such inflation stability, they can shield themselves from its adverse repercussions. This fosters the gradual growth of real wages over time, as workers incorporate inflation considerations into their wage agreements. Consequently, households experience an enhancement in their purchasing power, enabling them to access a wider array of goods and services. Overall, increased consumption levels bolster material standards of living. For example, trade unions can engage in negotiations to secure higher nominal wages, thereby preserving their members' real incomes.

Additionally, sustained growth leads to gradual increases in real profits for firms. As the general price level rises moderately, it signals growing demand for goods and services, translating into higher revenues for firms. Assuming cost of production remains stable due to contractual agreements, firms witness higher profits. These rising profits entice firms to increase their investments, consequently boosting another round of actual and potential economic growth through increased production of goods and services. Moreover, as real GDP rises, the derived demand for labor increases, driven by firms' need for additional resources to meet the growing demand for goods and services, ultimately leading to a reduction in the unemployment rate.

The achievement of sustained and inclusive growth represents a phase of economic expansion characterised by higher wages and profits, as previously explained. This, in turn, enables the government to collect more tax revenue, providing greater financial support to lower-income households. Such support can take the form of enhanced healthcare subsidies and utility rebates, like the U-Save rebates offered to Singaporean households living in three- and four-room flats, typically covering approximately one to two months of their utility bills. These measures collectively enhance both the material and non-material standard of living for the majority of the country's population.

Hence, with the benefits and positive impact on other macroeconomic aims, inclusive growth should be a government's economic priority.

However, if a government faces a more imminent macroeconomic challenge, such as a rapidly escalating national debt crisis and the adverse repercussions it brings, it may prioritise the adoption of austerity measures to reduce its national debt and restore confidence, instead of focusing on inclusive growth as its economic priority.

A rapidly escalating national debt crisis triggers a cascade of negative consequences. As a government accumulates more debt, it inevitably faces higher interest payments, diverting a substantial portion of government revenues away from critical public services and vital investments. The uncertainty stemming from a national debt crisis can deter both domestic and foreign investors, thereby hindering long-term economic growth prospects. Additionally, rising debt levels may prompt credit rating agencies to downgrade a country's creditworthiness, resulting in elevated borrowing costs and diminished access to international capital markets.

Consequently, there arises an imperative for a government to prioritise the adoption of austerity measures when confronted with such an imminent macroeconomic challenge. The primary objective of these measures is to reinstate fiscal discipline and stability to the government's finances. Austerity measures often entail significant reductions in government spending across diverse sectors, including healthcare, education, social welfare programs, infrastructure, and public services, all aimed at curbing the budget deficit. Simultaneously, a government may opt to raise taxes to generate additional revenue, encompassing higher income taxes, sales taxes, or other forms of taxation, in an effort to bridge the fiscal gap.

In light of this, when a government faces an impending macroeconomic challenge, such as an escalating national debt crisis, its paramount economic priority becomes the restoration of private sector confidence. The hope lies in spurring private sector spending to rejuvenate the economy. Consequently, the inevitable public spending cuts, which can adversely affect citizens' access to essential public services, particularly impacting lower-income groups, emerge as a trade-off that a government must grapple with.

In conclusion, the economic priority of a government is not fixed but rather contingent on the prevailing economic circumstances it confronts. When a government faces a more immediate macroeconomic challenge, it is compelled to reevaluate its established economic objectives and pivot its focus toward addressing the most pressing issues.

Take, for instance, countries like Singapore, which have consistently enjoyed robust economic growth and low unemployment rates. In such cases, pursuing inclusive growth to mitigate income inequality and elevate the living standards of the majority of the population aligns naturally with their economic priorities. Conversely, consider an economy like Greece, grappling with macroeconomic woes such as soaring national debt and recession. In this context, pursuing inclusive growth may not stand as the foremost economic priority. Rather, the immediate imperatives for the government become taming the high national debt and reviving the economy from recession, given the adverse consequences these issues entail. Hence, the government of Greece might opt to prioritise national debt reduction over inclusive growth if the benefits of doing so outweigh the associated costs.

Question 6

The United States (US) trade deficit rose 17.7 per cent in 2020 to US$679 billion, highest since 2008. The US government sought to narrow the gap by imposing taxes on imported goods on a scale unseen since the trade wars of the 1930s.

(a) Explain the possible causes of a trade deficit in a country. [10]
(b) Assess whether protectionism aimed to reduce the large and persistent balance of trade deficit might cause more problems than it solves for the United States. [15]

a) Explain the possible causes of a trade deficit in a country. [10]

The balance of trade (BOT) is a sub account within the current account on the balance of payments. BOT records the export revenue and import expenditure on goods and services. It is given by the value of Export Revenue (X) – Import Expenditure (M). A trade deficit occurs when the import expenditure exceeds the export revenue i.e. [X – M] < 0.

One of the cyclical factors is the **relative rate of inflation of the economy as compared to its competitors**.

When a country's inflation rate is relatively higher than its competitors, this will mean that there is a relative increase in the price of its exports. If the demand for its exports is **price elastic**, the rise in relative prices will lead to a more than proportionate decrease in the quantity demanded of its exports. As such, the country's export revenue would fall.

At the same time, the country's domestic goods will be relatively more expensive compared to its imports. Hence, domestic consumers will switch to foreign imports resulting in a rise in the import expenditure.

With a fall in export revenue and a rise in import expenditure, there will be a fall in net exports. This would lead to a (X-M<0) large trade deficit assuming X=M initially.

Another cyclical factor is the **rising domestic national income**. A rising income may lead to higher demand for imports.

An increase in import expenditure can be due to increase in import of capital goods to meet the increase in production of goods and services. For example, US imports heavily on foreign machinery and industrial supplies which it does not have for its production of goods and services. Imports of such capital goods increased in 2021 to the highest level since 2014.

On the other hand, with economic recovery from the COVID-19 pandemic, the US economy grew 5.7% in 2021, after the government provided nearly $6 trillion in pandemic relief, which fueled consumer spending on goods. The US consumers enjoy an increase in income and hence purchasing power and demand for imports of foreign luxury goods would increase. The imports of consumer goods surged $1.8billion, driven by cellphones and other household goods. The extent of the rise in imports due to a rise in the level of domestic income depends on the marginal propensity to import. As the demand for such goods is income elastic, the quantity demanded for imports increase more than proportionately than the increase in income resulting in a rise in import expenditure. Therefore, assuming X=M initially, this would have led to a large BOT deficit.

Another cause of trade deficit can be due to **a loss of comparative advantage** of an economy in the production of certain goods. This is a structural problem of the economy.

A country loses comparative advantage with respect to other competitors due to improved efficiency of competitors and / or a decrease of internal efficiency. This would result in higher cost of production and result in higher prices for the goods compared to the competitors. As a result, exports would fall leading to trade deficit ceteris paribus. For example, due to higher labour cost, many developed countries such as the US lost its comparative advantage in the production of lower value, labour-intensive manufactured goods (such as textile and toys) to the low-cost developing countries such as China or India where there is an abundance supply of lower cost labour. Thus, as Chinese goods are cheaper, imports of Chinse goods by the US would increase, increasing the import expenditure of the US. On the other hand, as US produce labour intensive goods are more expensive, exports by US for such goods falls. An increase in import expenditures and a fall in exports earnings would result in a balance of trade deficit.

Thus, a trade deficit can be due to various underlying cyclical and structural factors. A trade deficit may be a problem if it is persistent and large as it can lead to a deficit in the balance of payments and depletes the country's foreign currency reserves. Thus, it is necessary for the government to identify the cause of the trade deficit problem and implement the appropriate policy to reduce the deficit.

b) Assess whether protectionism aimed to reduce the large and persistent balance of trade deficit might cause more problems than it solves for the United States. [15]

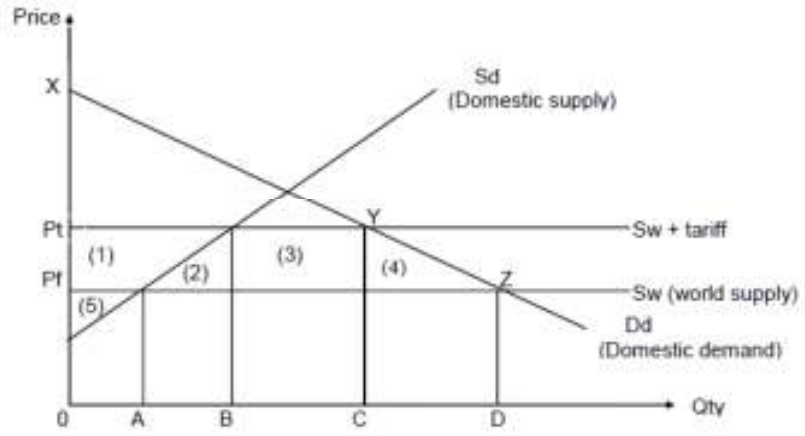
Protectionism is a policy of sheltering the domestic industries from foreign competition through the imposition of trade barriers/ protectionist measures on the import of foreign goods and services. Governments, such as the US, may adopt protectionist policy measure such as a tariff to restrict free trade, in order to overcome its large and persistent trade deficit.

Protectionism can reduce the large and persistent balance of trade deficit in US.

Import tariffs are taxes that are levied on products when they are imported into the country. Imposition of such tariffs results in higher prices of imported goods relative to prices of domestic goods. This will encourage consumers to switch away from the relatively more expensive imports to domestically produced goods, hence lowering import expenditure, reducing trade deficit.

How import tariffs restrict the volume of imports
Before the imposition of the tariff, at the world price of Pf, consumption was OD units, of which OA units is from domestic production source and remaining quantity supplied of 0AD is from imports.

Diagram 1: Economic effects of a tariff - price taker country



However, after the imposition of the tariff, the market price rises by the full amount of the tariff to Pt. At price Pt, domestic production increases by AB to OB units. Imports are reduced from AD to BC units. From the above, the imposition of the tariff has raised the price of imports, resulting in a reduction in imports and an increase in domestic production. This means lesser import expenditure, allowing trade deficit to be reduced.

Imposition of tariff can also help with developing infant industries which can reduce the US trade deficit in the long term.

US may have potential comparative advantage in a new infant industry but as a latecomer to the market, it cannot compete with established foreign industries, which are operating at a much lower costs. At the initial stage of operation, the infant industry faces high initial cost of production unless output is expanded sufficiently to reap economies of scale and establishing market networks. Once they have achieved a comparative advantage, the protection can then be removed when they are able to compete internationally.

How does adoption of import tariffs in the case of infant industry reduce the trade deficit
With reference to the tariff diagram, by imposing import tariffs, domestic production would increase by AB. The rise in domestic quantity supplied enables the infant industries to produce on a larger scale, thus reaping IEOS and enjoy cost savings. Also, by selling at a higher prices and quantity, the firms in the

infant industries enjoy higher revenues and profits. These profits can be used on R&D to further develop cost savings and more efficient technology. If the infant industry is successful, it in turn allows US to gain comparative advantage in the industry which will enhance US's export revenue in the long term, countering the trade deficit that US is facing.

Protectionism also helps to protect the US economy against dumping.

Dumping is a type of predatory pricing behaviour and can often be a concern for domestic firms facing overseas competitors who are selling their goods in the international markets below its fair market value.

Goods are dumped when they are sold below their marginal cost of production or significantly below selling prices in the home market. An example is China's steel industry which was experiencing significant excess capacity and China has been accused of dumping its steel products on US, selling them below the marginal cost. Many steel companies in US faced financial challenges and had to lay off workers or shut down operations due to the flood of cheap Chinese steel in their markets. This negatively impacted US's trade deficit, as well as economic growth and unemployment.

<u>How tariff protect the economy against dumping?</u>
To protect their domestic steel industries, US implemented anti-dumping measures such as import tariffs to counteract the unfair competition caused by artificially low-priced Chinese steel imports. The imposition of import tariffs increases the price of Chinese steel and reduce the price advantage of dumped Chinese steel. As such, US import expenditure on the dumped goods is reduced, which reduces the US trade deficit, as well as protecting US employment and economic growth.

Protectionism aimed to reduce the large and persistent balance of trade deficit can cause more problems than it solves for the United States.

One of the problems that can result from imposing a tariff is the possible beggar-thy-neighbour effect and retaliation from trading partners, both of which causing worsening of BOT deficit in US, rather than solving it.

With US imposing tariff on imported solar panels/steel and aluminum from all nations, including China, it resulted in countries such as China to see a fall in their export revenue and aggregate demand, in turn via multiplier effect, causing fall in real GDP in countries like China. This fall in China's national income in turn results in lowering in purchasing power to buy US's goods and services, leading to fall in US's export revenue, leading to worsening of BOT deficit in US, rather than solving it.

Furthermore, when US bought lesser steel from China via the imposition of tariff, China retaliated with lowering the imports of soya beans from US, leading to US facing fall in export revenue, leading to worsening of BOT deficit in US, rather than solving it.

Another problem that is created from the imposition of tariff is the deadweight loss incurred.

Refer to the diagram in the answer in body paragraph 1. With a tariff imposed on imports, the producers will experience a rise in producer surplus of area 1 due to the ability to sell at higher price and at a higher quantity. The US government will also gain a higher tax revenue of area 3 from the tariff imposed on the imported goods. However, consumers experience a fall in consumer surplus of area (1+2+3+4) due to higher price and lower quantity consumed. Overall, there is a net loss of society welfare of area (2+4) as the welfare loss by consumer outweighs the gains by domestic producers and government. Society, on the whole, due to the tariffs leads to a loss of society welfare as tariffs promotes an inefficient allocation of resources by protecting inefficient domestic producers. Hence a tariff can create more problems, and at the same time, ineffective in solving the trade deficit, as mentioned in the earlier paragraph on the possible beggar-thy-neighbour effects and retaliation.

In the short term, protectionism may reduce the US trade deficit and not create too many problems as US has a relatively large domestic market to mitigate the negative impact/ unintended consequences of protectionism (eg fall in X due to beggar-thy-neighbour/retaliation that cause US growth to suffer).

But protectionism only provides a temporary solution to reducing the trade deficit as it does not deal with a underlying root cause on loss of comparative advantage. Thus, protectionism in the long term will not solve the US trade deficit. A long-term solution that tackles this root cause is to adopt supply-side policy, such as encouraging firms to do R&D and to encourage skills-upgrading. This will allow US to regain CA and be able to raise its export revenue in the long term, addressing the persistent and large US trade deficit.