

### Q3

In recent years, natural calamities such as floods and earthquakes have caused the cost of raw materials to rise.

(a) Distinguish between variable costs and fixed costs and explain whether a rise in these costs will affect a firm's pricing decision differently. [10]

#### INTRODUCTION

Fixed and variable costs are two different types of costs in the short-run production period of a firm. The impact of a rise in these costs on a firm's pricing decision can be analysed using the cost-revenue framework.

#### BODY

##### Distinguish between fixed & variable costs

Distinguish well with definitions and examples:

Remember to use words like, 'on the other hand' to distinguish the two concepts clearly.

Variable Cost	Fixed Cost
Variable cost refers to cost that varies with output.	while fixed cost is cost that does not change with level of output
Variable cost is only incurred when production starts.	On the other hand, fixed cost is already incurred when production is zero.
<i>Note: The 2nd point is often left out.</i>	
Examples: Cost of energy, raw materials & daily rated workers will change with output.	Examples: The initial capital outlay even before production of a single unit. It is a lump sum that needs to be spent on tools and equipment, to buy land, building & infrastructure by business unit before production process can take place.
Exemplification details: When a car manufacturer increases the production of cars, they need to buy more raw material like steel and paint, pay more wages for overtime and there will be a rise in utility bills as machines are used more intensely. Thus variable costs increase with more output.  And when there is no production, these costs will not be incurred.	Exemplification details: When the same car manufacturer increases the production of cars, there will not be changes in the size of the factory or equipment that already exist or purchased when the manufacturing plant was first set up; the costs are already incurred even when production is zero and will not change with more output.

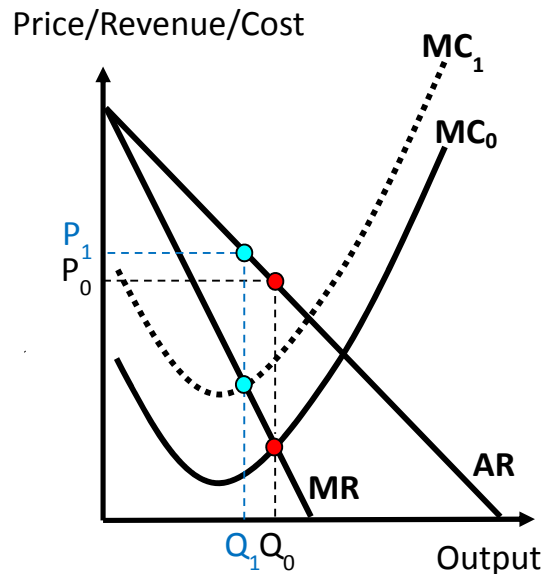
##### Explain how a firm makes its pricing decision

Assuming that the firm aims to maximise profits, it will produce an output where its marginal costs (MC) equals its marginal revenue (MR) and set its price on the corresponding point on its average revenue (AR).

Price will change when MR or/and MC change. So whether a change in VC or FC will change a firm's pricing decision will depend whether it changes MC.

##### Explain how an ↑ in VC & FC can affect a firm's pricing decision differently.

- An increase in variable costs (VC) will lead to an increase in MC as it is the additional cost arising from an additional output. ( $MC = \Delta TC / \Delta Q$  or  $MC = \Delta TVC / \Delta Q$ ).
- For example, rising oil prices can lead to an increase in the costs of jet fuel for an airline. Jet fuel is a variable cost as it varies with the number of flights conducted by the airline. If there are no flights, jet fuel cost will be zero.



As seen in the figure above, an increase in variable costs will cause the MC to increase from  $MC_0$  to  $MC_1$ , causing the firm to reduce its profit maximizing output from  $Q_0$  to  $Q_1$  where  $MC_1 = MR$ . Hence the firm will increase its price from  $P_0$  to  $P_1$ .

*Note: It is fine to draw a full diagram with changes in both AC and MC but the focus is not on changes in profit but pricing when MC changes. So to simplify the process, shifting MC will do.*

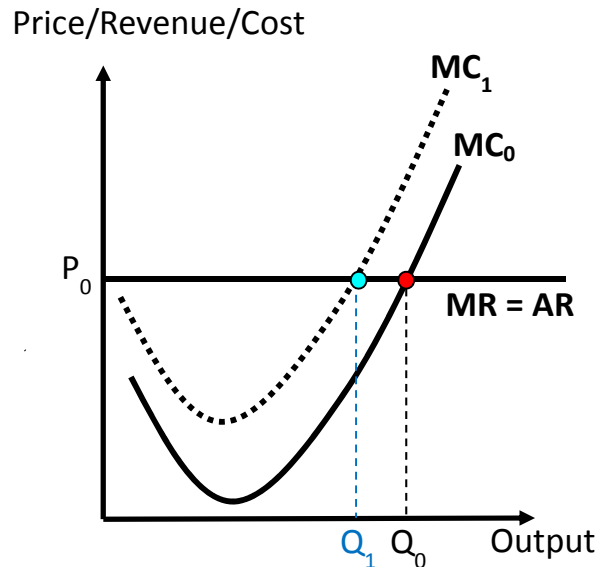
**An increase in FC such as the cost of advertising on television will not affect the MC of a firm since a change in  $\Delta TFC = 0$  and have no impact on  $\Delta TVC$ .** The cost of advertising is fixed as it does not vary with the number of products or services sold by the firm. If the firm does not produce or sell any output, it will still have had incurred the advertising cost. Hence an increase in fixed does not affect the MC of a firm as it does not vary with output. Therefore the profit maximizing output of the firm where  $MC = MR$  remains unchanged and the corresponding price is unchanged too.

*Note: There is no need for a diagram here to score well. Most importantly is the analysis.*

Hence for firms who are price-setters and face a downward sloping AR and MR, a change in VC and FC affect their pricing decision differently.

**Explain how an  $\uparrow$  in VC & FC does not affect a firm's pricing decision differently.**

However for a firm in perfect competition, the increase in such costs does not affect their pricing decision differently.



As seen in the diagram above, while the increase in MC from  $MC_0$  to  $MC_1$  causes the profit maximising output of a PC firm to fall from  $Q_0$  to  $Q_1$ , its price remains as  $P_0$  due to the horizontal AR it faces as a price taker.

Similarly as firms in imperfect competition, a change in fixed costs does not affect the MC of a PC firm either and hence its pricing decision remains unchanged.

Hence for a PC firm, as it is a price-taker facing a horizontal MR and AR, a change in either variable or fixed costs does not affect their pricing decision.

*Note: There is no need for a diagram for the analysis here. Just the idea of a price-taker in PC firm, will not change price when there's a change in VC and FC.*

*Note that technically speaking, if the increase in MC is widespread, the market supply curve ( $=\sum MC$ ) will fall the market price will increase, leading to an increase in the price of a firm via a change in AR/MR. But this is not within the A Level syllabus.*

## CONCLUSION

In conclusion, for a firm facing imperfect competition, an increase in VC will lead to it increasing its price while an increase in FC will not affect its pricing decision. For a PC firm, an increase in either costs will not affect their pricing decision. However given that a PC rarely exists and most firms face some degree of imperfect completion, the former is more likely to be observed.

### Marking Scheme

LEVELS	DESCRIPTION	MARKS
3	<p><u>L3 (10)</u></p> <ul style="list-style-type: none"> <li>Ability to recognise and explain clearly that the pricing decision is also affected by the type of firm (last mark)</li> </ul> <p><u>L3 (7 to 9)</u></p> <ul style="list-style-type: none"> <li>Ability to recognise and explain clearly that a change in variable costs affects the pricing decision while a change in fixed costs does not.</li> <li>Well-illustrated and explained diagrams.</li> <li>Distinguishes clearly the difference between fixed and variable costs.</li> <li>Shows good understanding of the difference between fixed and variable costs with the use of appropriate examples.</li> </ul>	7-10
2	<ul style="list-style-type: none"> <li>Ability to recognise and explain clearly that a change in variable costs affects the pricing decision while a change in fixed costs does not.</li> <li>A diagram was drawn but contains minor errors or adequately explained.</li> <li>Distinguishes clearly the difference between fixed and variable costs but only one contrast was being made.</li> <li>Lack or poor choice of examples of variable and fixed costs.</li> </ul>	5-6
1	<ul style="list-style-type: none"> <li>Major conceptual errors with little coherent explanations</li> </ul>	1-4

**(b) Discuss the extent to which a rise in cost of raw materials will result in an oligopolistic firm changing its price in reality. [15]**

#### INTRODUCTION

The cost of raw materials such as crude oil to an oligopolistic firm such as Esso is a variable cost as it increases as Esso increases the amount of petrol it sells and is not incurred if Esso does not produce any petrol. An oligopolistic firm faces imperfect competition and hence has a downward sloping demand curve. The earlier analysis in 3a) predicts a positive relationship between variable costs and an oligopolistic firm's pricing. However that may not happen in reality due to a variety of factors.

#### BODY

##### (1) Kinked Demand Curve/Competitive Behaviour of Rivals

**Scenario 1: A rising in variable cost will not lead to a rise in price.**

- In a competitive oligopoly and selling homogeneous product, it is assumed that rival firms will match any price decrease initiated by any one firm among them, but will not match any price increases.
- If firm X raises the price of its product above the current ruling price because there is a rise in variable cost, rival firms are not likely to follow suit because then they can gain more customers from the higher-priced firm. This means the original firm X which raises its price would experience a substantial or more than proportionate fall in quantity demanded and reduce revenue. Thus, the firm would be reluctant to raise its price. The demand curve will be price elastic above the ruling price.

#### Evaluation:

- But if the rise in raw material costs is substantial across the entire industry, the price will change.
- Kinked demand curve theory assumes homogeneous product but in reality goods are differentiated: reduce PED and CED – the ability to raise price to have little impact on output.

(Not required for this question but to have a complete picture of the kinked demand curve for price rigidity or stickiness: If firm X were to lower its price, rival firms would also lower their prices so as to preserve market share. Firm X would experience only an insignificant increase in sales, i.e. less than proportionate increase in quantity demanded and total revenue will be less than before. Thus, it would be reluctant to lower its price. The demand curve will be price inelastic below the current ruling price. This theory helps to explain the phenomenon of **price stickiness** or **price rigidity** under oligopolistic market structures. This is the behaviour in which prices in the oligopolistic industry tend to change very little over time.)

**Scenario 2: A rising in variable cost will lead to a rise in price via collusion – explicit and/or tacit**

- Collusion takes place within an industry when rival companies cooperate for their mutual benefit. Collusion most often takes place within the market form of oligopoly, where the decision of a few firms to collude can significantly impact the market as a whole. Cartels are a special case of explicit collusion. Collusion is tacit where the behaviour of each firm is the result of an unwritten rather than formal agreement.
- Firms within an oligopolistic industry might decide to collude to raise price when there is an increase in costs of raw materials.
- They could do this tacitly by following the pricing policy of a recognised leader. The leader could either be the dominant firm [market leader] or just any firm that is adept at reading market conditions [so-called barometric price leader]. Price will only change if a rise in costs affects the profit margin. The principle is the same: each firm will act in the same way in the interests of the group as a whole.
- ComfortDelgro- the dominant taxi company in Singapore of almost 60% market share is always the one that initiates a fare hike while the rest will follow suit. Another example is pricing of petrol retailers in Singapore tend to be highly responsive to the increases in the cost of crude oil.

Evaluation: Collusion especially in the form of cartel is illegal in most countries, so the government might intervene and restrict the extent of the rise in price.

**(2) Ceteris Paribus Condition Does Not Hold****A Simultaneous ↓ in DD**

The ↑ in costs might be accompanied by a ↓ in demand. E.g. due to competition by other firms, economic recession, etc. Hence pricing by the oligopolistic firm might not ↑ if the ↓ in DD (AR & MR) completely or more than offsets the ↑ in MC.

Evaluation: However, the ↑ in costs and ↓ in demand may not happen simultaneously. Hence prices may still ↑ at least in the short-run, before it is adjusted downward later when faced with the ↓ in DD. Hence this depend on the time horizon taken to observe the impact of higher cost of raw materials on a firm's pricing.

**A Simultaneous ↓ in other Costs**

The ↑ in cost of raw materials might be offset by a ↓ in other variable costs. E.g. ↑ in labour productivity/tech. that requires a smaller cabin crew per flight may offset the fuel costs of an airline.

Evaluation: However, the cost of raw materials tend to form a major component of a firm's costs. Unless the simultaneous ↓ in costs is in other major costs such as labour costs, MC is still more likely to ↑ overall.

**(3) Government Intervention for Essential Products and Services**

Oligopolists have large market shares and may abuse their monopoly power with the claim of a rise in VC. And if the industry is of an essential product/service, government may intervene with price-control.

E.g. Increment in bus fare in Singapore is insignificant like 3 cents when there is a rise in fuel and labour costs.

**(4) Alternative Theories of the Firm****Revenue Maximisation**

If a firm chooses to maximize its revenue (produce where  $MR = 0$ ), ↑ in its costs are irrelevant to its output & hence pricing decision.

Evaluation: However in most sectors, managers are rewarded based on profitability of the company rather than earn revenue-based commissions. Hence this is less likely.

**Unable or Unwilling to Maximise Profit**

An oligopolistic firm earning healthy profits and suffering from the principal-agent problem might engage in profit satisficing behaviour and hence not change its price (esp. to avoid all the additional work involved with changing prices).

Evaluation: However this is an unlikely reason for an oligopolistic firm facing thin profit margins, especially in light of weak global economic conditions in recent years.

**CONCLUSION**

In conclusion, there are various plausible reasons why a rise in the cost of raw materials may not be met with an increase in the pricing of an oligopolistic firm. However in reality, these factors are unlikely to happen or are not strong enough to counteract the expected increase in pricing. As observed in reality, more often than not, an increase in a major cost such as that of raw materials is followed by higher prices unless there is some form of regulated pricing by the government.

*\* Any other reasonable stand is accepted as long as it is justified and aligned with the points raised in the body of the essay.*

### Marking Scheme

LEVELS	DESCRIPTION	MARKS
3	<ul style="list-style-type: none"> <li>Clear and rigorous analysis of 2-3 factors <b>(MUST INCLUDE POINT 1)</b> that may not result in an oligopolistic firm increasing its price in reality.</li> <li>Able to make use of appropriate examples &amp;/or well explained diagrams.</li> <li>Examines the extent to which these factors happen in reality.</li> </ul>	9-11
2	<ul style="list-style-type: none"> <li>Analysis of point 1 is thorough (both kinked demand curve theory and tacit collusion)</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>2 to 3 factors that may not result in an oligopolistic firm increasing its price in reality but analysis is somewhat lacking.</li> <li>Choice of examples could be better</li> <li>Does not or vaguely considers the extent to which the factors raised happen in reality.</li> </ul>	6-8
1	<ul style="list-style-type: none"> <li>Lack application to the given context of oligopolistic firms and variable cost changes.</li> <li>Points raised were poorly explained and lack the required analysis.</li> <li>No consideration to the extent to which the factors raised happen in reality.</li> </ul>	1-5
E2	A conclusion justified with economic analysis	3-4
E1	An unjustified conclusion	1-2

### Standardisation Outcome (16 Sep 2015)

Scripts	Part (a)	Part (b)
<b>A</b>  <b>8 + 10 = 18</b>	L3(L): 8  Able to distinguish VC and FC well and addressed the question with correct concepts.  Not L3(U) <ul style="list-style-type: none"> <li>Left out part of definition of VC and FC</li> <li>Did not analyse well why rise in VC will increase both MC and AC while rise in FC will increase AC only</li> <li>Did not include PC pricing</li> </ul>	L2(U): 8 + E1: 2  Thorough explanation of point 1 but no other factors.  Not an E2 as the conclusion did not make good sense and there is no consideration of other factors. But within the essay, there's good attempt to evaluate like large rise in VC, product differentiation.
<b>B</b>  <b>5 + 8 = 13</b>	L2(L): 5  Able to distinguish VC and FC rather well but left out part of definition of VC and FC  Did not address the question how a rise in VC and FC will affect pricing decision differently – combined the analysis of the rise in both costs. Side-track to other factors which are for part (b).  Not L1 as concepts are there.	L2(L): 6 + E1: 2  Coverage of point 1 is there but explanation can be more contextualised + no other factors  Not an E2 even though the conclusion is better than script A as there is also no consideration of other factors and within the essay, there's little attempt to evaluate.
<b>C</b>  <b>5 + 5 = 10</b>	L2(L): 5  Though understood what are VC and FC, unable to distinguish them well and left out part of definition.  Addressed the question how a rise in VC and FC will affect pricing decision differently – but explanation is muffled with profit motive and not linking to changes in MC – lacked good understanding.	L1(LU): 4 + E1: 1  Demonstrated knowledge and some attempt to answer the question. But from the inclusion of firms reducing price, candidate has not understood the question.  E1 as there is a 'however' so attempt to discuss.

