

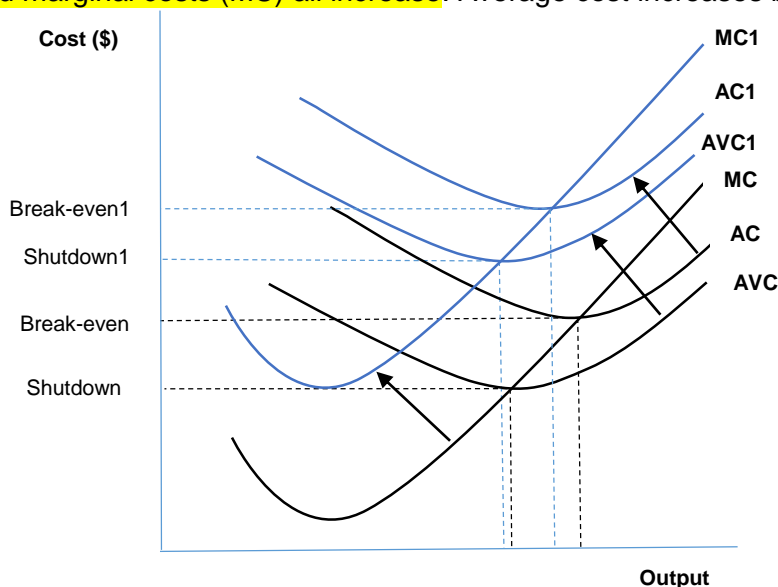
Impact of high dairy prices on chocolate production in the short run

[The concept covered in this exemplar is diminishing returns and supply. The student also explained elasticity of demand in detail and applied the concept to the chocolate market, justifying the implications for consumers and producers using calculated PED co-efficients, XED and YED economic theory and economic models.]

[The student explained in detail how Diminishing Returns leads to the supply curve supported by data and an accurate model plotted from the data.]

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Milk solids are one of the main ingredients in the production of milk chocolate and account for 28% of the final block of chocolate. High dairy prices (milk products) will increase a chocolate firm's cost of production. As dairy prices rise, the cost of raw materials (dairy products) for chocolate firms will rise and therefore increase the firms total cost of producing chocolate. The increase in costs of production will have many effects on the producer. As their cost of raw materials increases the average costs (AC), average variable costs (AVC) and marginal costs (MC) all increase. Average cost increases because it is measured by



total cost divided by quantity (TC/Q) and as high dairy prices increase costs of production, total cost and therefore AC will increase. This is shown on the graph where AC increases to AC1.

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AVC is TVC/Q ; because milk/dairy product is a variable input for chocolate producers, an increase in the price of dairy will increase the AVC to $AVC1$. Marginal

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cost is the change in total cost (or TVC) that comes from making or producing each additional item (change in the quantity of output) in the short run. As the dairy product is a variable input, if the firm were to produce one extra block of chocolate, the total cost would increase, therefore increasing marginal cost from MC to $MC1$.

Break-even is the point at which revenue covers all economic costs ($P=AC$). It is the point where marginal cost equals average costs ($MC=AC$) and is labelled Breakeven on the vertical axis. Shutdown point is the price at which revenue just covers variable costs (where $P=AVC$ and $MC=AVC$) and is labelled Shutdown on the vertical axis. Because of the increase in costs, the break-even point increases to Break-even 1 and the shutdown point increases to Shutdown 1.

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The chocolate firms supply curve can be derived from the marginal cost curve ($MC=S$ above minimum AVC).

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Supply decreases as shown by the shift left of the MC curve when costs of production increase, and price increases and output decreases.

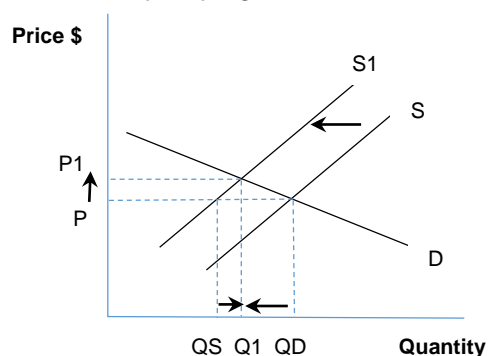
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In the short-run, at least one factor of production is fixed, but many decisions are still made around variable inputs and investment during this period. Therefore, chocolate producers could decide to act in three different ways to an increase in costs of dairy products.

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One way is to decrease production as seen above, and if a firm's MR is greater than MC then this could actually increase profits. Secondly, they could change the variable inputs used in production (reduce the costs of raw materials and labour). Thirdly, achieving economies of scale by increasing production to decrease AFC, and if a firm's MR is less than MC then this would help increase profits.

Chocolate firms could minimise the effects of high dairy prices by taking advantage of economies of scale, when output (Q) increases average costs decrease, because AC is average fixed costs (AFC) + AVC, so while AVC remains constant as output increases AFC decreases, because fixed costs are now spread over more output. Chocolate firms can achieve this by buying in bulk, technical economies can be achieved by investing in the



latest technology or specialised equipment, and managerial economies by using specialisation, and this helps reduce AFC and therefore helps counteract higher dairy prices.

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A decrease in production/supply of chocolate from S to S1 causes a shortage of chocolate at the original price as shown on the model. Market forces means price would increase to P1 as consumers bid up the price and therefore producers will increase the quantity supplied

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from QS to Q1, and QD decreases to Q1 as other consumers are not willing or able to buy chocolate at the new price, thus creating a new market equilibrium price and quantity (output). Cadbury was able to keep output relatively constant even when the dairy prices rose. This is because they were able to lower other variable costs to counter the rise in dairy prices. During 2007 dairy prices doubled in a little over 6 months, and instead of decreasing output, Cadbury, during this time, decreased the cost of production in other areas of variable costs, like trimming chocolate block sizes by 50g and probably reducing labour costs where possible. Additionally, they admitted in 2009 that they had replaced cocoa butter with cheaper vegetable oils, including environmentally harmful palm oil. These changes reduced the variable input costs of raw materials and therefore they were able to keep sale price constant, and Cadbury thought they could therefore maintain similar profit margins.

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However, these changes to the product came at a cost to the company, as many consumers did not like the new taste, and many consumers and the Auckland Zoo (a retailer) boycotted the product because of the palm oil, and they all switched to a substitute good like Whittaker's Chocolate, which decreased Cadbury's sales, and therefore total revenue and profit. http://www.nzherald.co.nz/element-magazine/news/article.cfm?c_id=1503340&objectid=11382530

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When producers decide to change raw materials to lower the variable costs, consumers may react negatively to these changes. Using cheaper, inferior raw materials can lead to real trouble for companies who make an elastic (luxury) product. As in the case of Cadbury, switching to palm oil caused many consumers to boycott their chocolate and cease consumption of their product completely.