Épreuve de section européenne

Marginal and average costs and economies of scale

The marginal cost of an additional unit of output is the cost of the additional inputs needed to produce that output. Practically, when the produced quantity x is large enough, the marginal cost is approximated by the derivative of total production costs with respect to that quantity x.

Marginal cost and average cost can differ greatly. For example, suppose it costs \$1000 to produce 100 units and \$1020 to produce 101 units. The average cost per unit is \$10, but the marginal cost of the 101st unit is \$20.

Economies of scale are said to exist if an additional unit of output can be produced for less than the average of all previous units — that is, if long-run marginal cost is below long-run average cost, so the latter is falling. Conversely, there may be levels of production where marginal cost is higher than average cost, and average cost is an increasing function of output. For this generic case, minimum average cost occurs at the point where average cost and marginal cost are equal (when plotted, the marginal cost curve intersects the average cost curve from below).

Adapted from *Wikipedia* and various sources

Questions

1. If we call x the number of units produced (the output), and $C(x)$ the total production costs, according to the text, how could we express the approximated marginal cost and the average cost per unit ?

2. Describe and explain the situation that appears in the example of the second paragraph : does it correspond to a situation allowing economies of scale ?

3. Justify which curve corresponds to the marginal cost and which one to the average cost, and then explain which part of the graph underneath corresponds to economies of scale, and then explain how the graph illustrates the "generic case" described in the last paragraph of the text.