Cost Analysis

- Types of Costs
  - Short-Run
    - Fixed costs (FC)
    - Sunk costs
    - Short-run variable costs (VC)
    - Short-run total costs (TC)
  - Long-Run
    - All costs are variable
    - No fixed costs

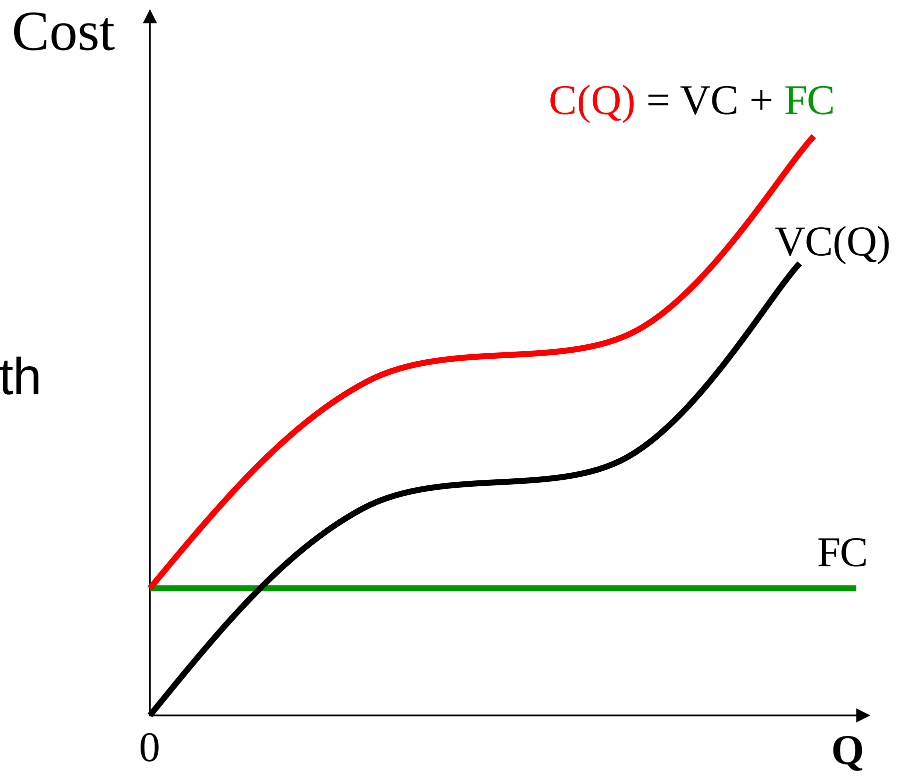
Total and Variable Costs

C(Q): Minimum total cost of producing alternative levels of output:

$$C(Q) = VC(Q) + FC$$

VC(Q): Costs that vary with output.

FC: Costs that do not vary with output.

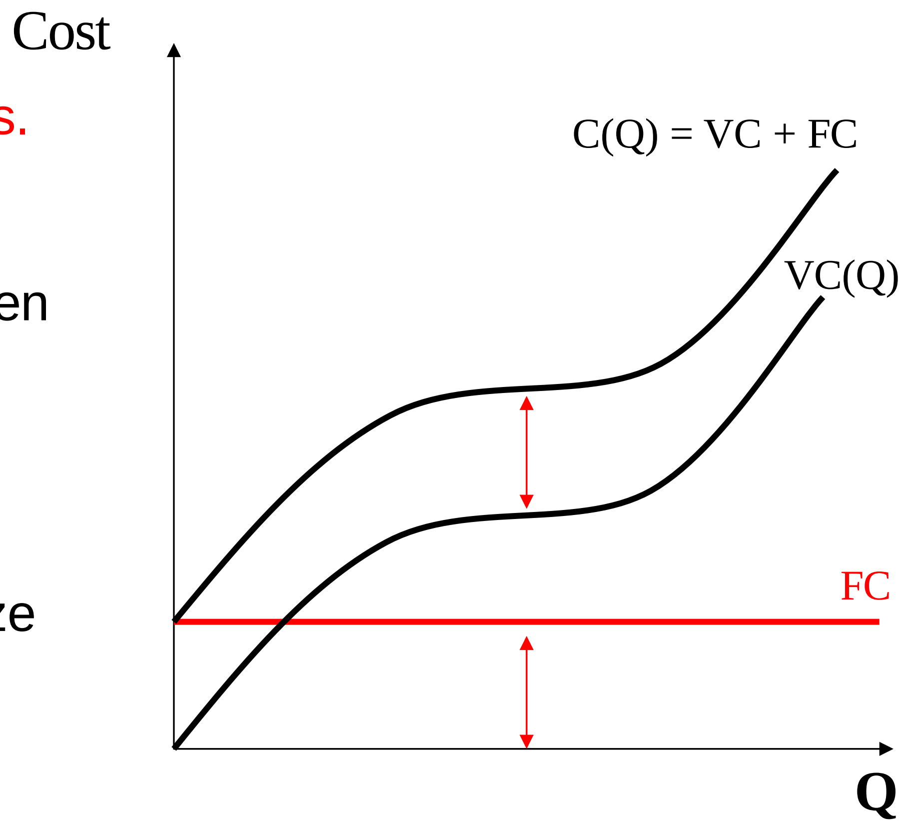


Fixed and Sunk Costs

FC: Costs that do not change as output changes.

Sunk Cost: A cost that is forever lost after it has been paid.

Decision makers should ignore sunk costs to maximize profit or minimize losses



Some Definitions

Average Total Cost

ATC = AVC + AFC

ATC = C(Q)/Q

Average Variable Cost

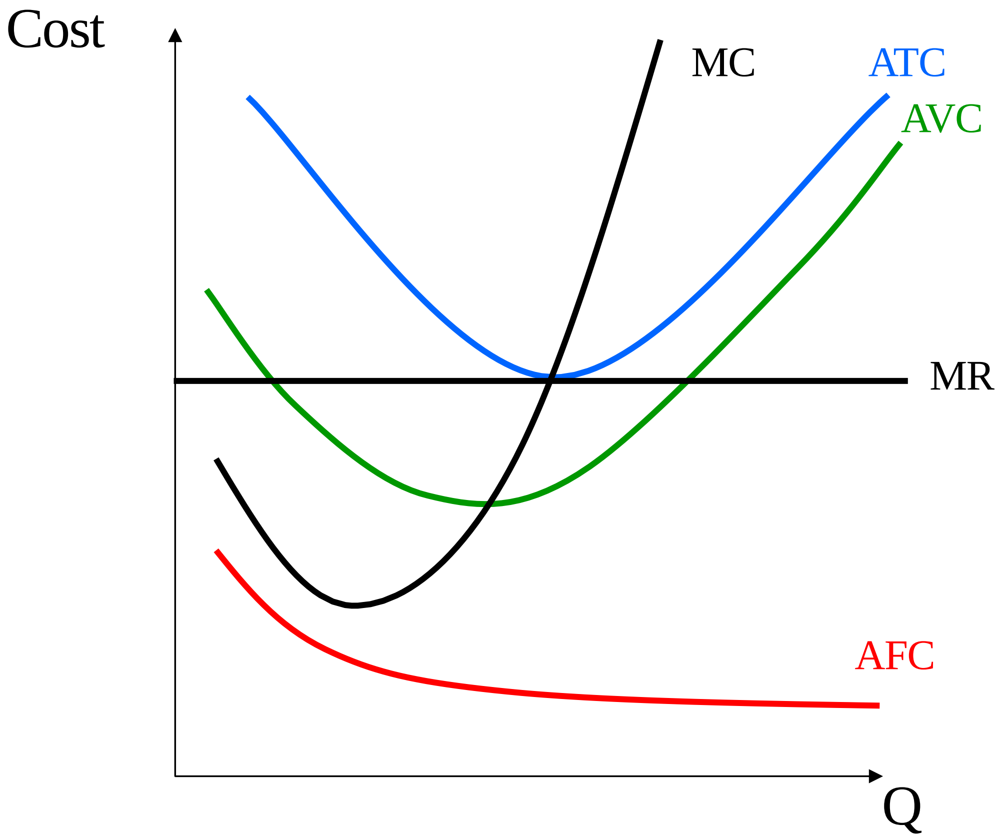
AVC = VC(Q)/Q

Average Fixed Cost

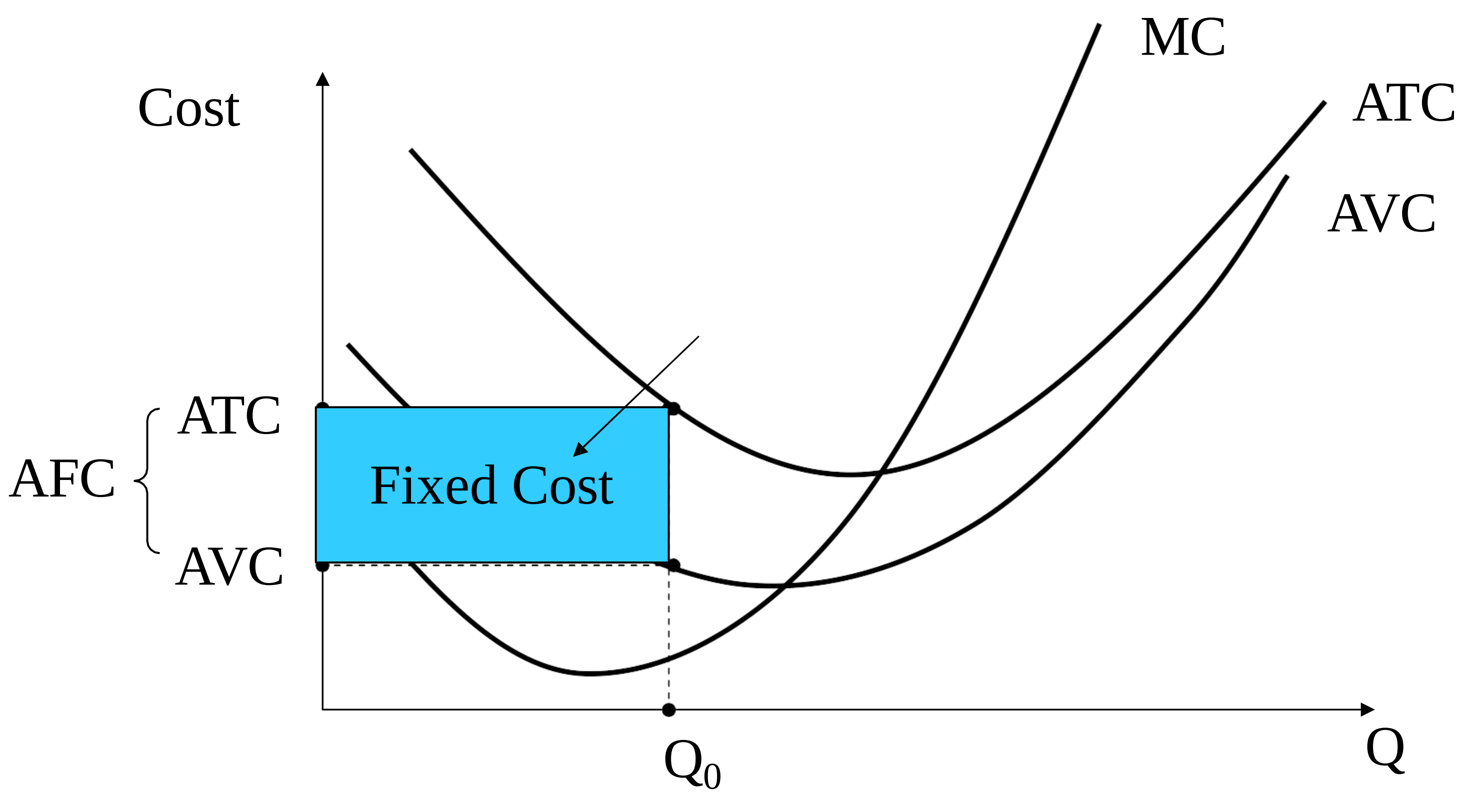
AFC = FC/Q

Marginal Cost

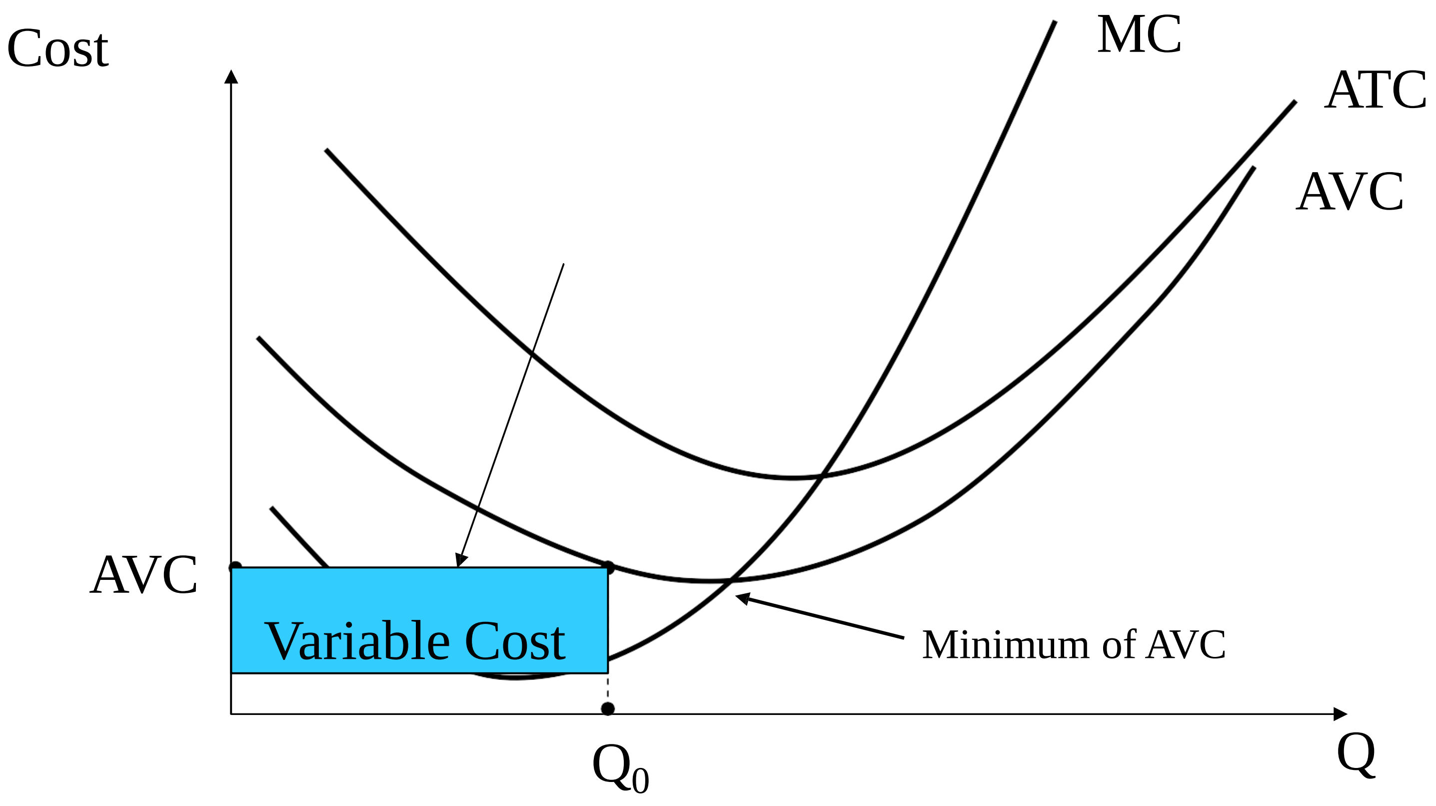
MC = DC/DQ



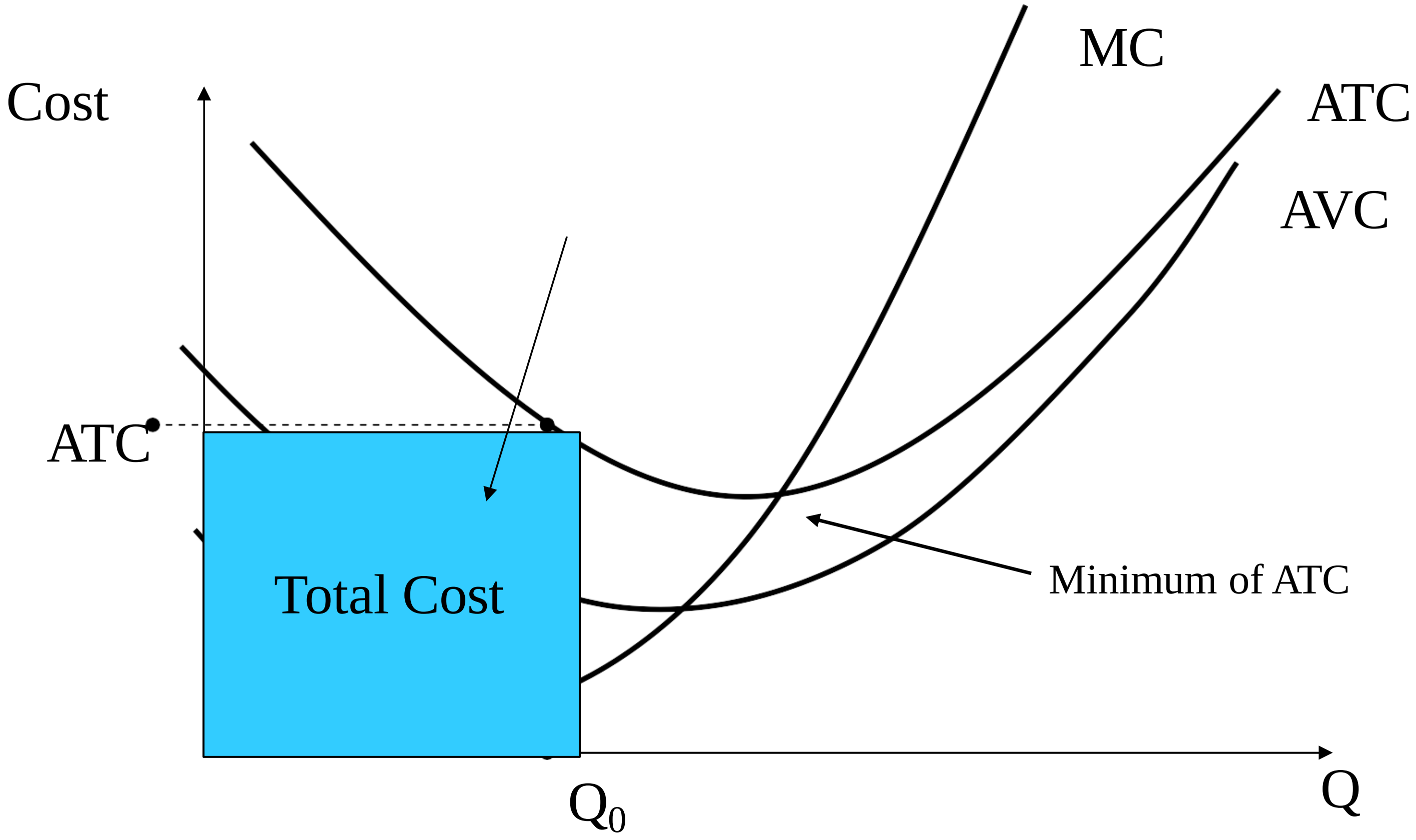
Fixed Cost



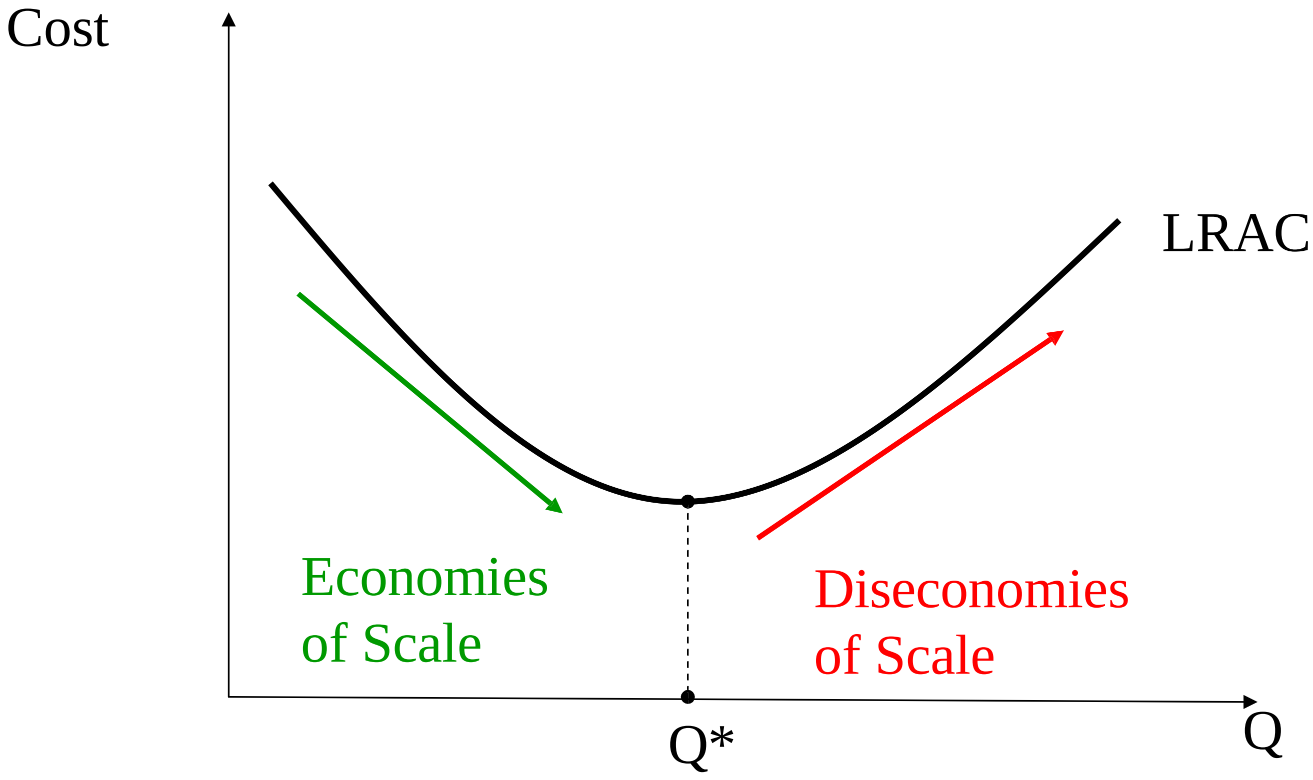
Variable Cost



Total Cost



Long-Run Average Costs



Fixed, variable, and total costs

OUTPUT	FC	VC	TC
0	2000	0	2000
1	2000	100	2100
2	2000	180	2180
3	2000	280	2280
4	2000	392	2392
5	2000	510	2510
6	2000	650	2650
7	2000	800	2800
8	2000	960	2960
9	2000	1140	3140
10	2000	1340	3340
11	2000	1560	3560
12	2000	2160	4160

Average and marginal costs

OUTPUT	AFC	AVC	ATC	MC
0				
1	2000.0	100.0	2100.0	100
2	1000.0	90.0	1090.0	80
3	666.7	93.3	760.0	100
4	500.0	98.0	598.0	112
5	400.0	102.0	502.0	118
6	333.3	108.3	441.7	140
7	285.7	114.3	400.0	150
8	250.0	120.0	370.0	160
9	222.2	126.7	348.9	180
10	200.0	134.0	334.0	200
11	181.8	141.8	323.6	220
12	166.7	180.0	346.7	600

Conclusion

- To maximize profits (minimize costs) managers must use inputs such that the value of marginal of each input reflects price the firm must pay to employ the input.

- Cost functions are the foundation for helping to determine profit-maximizing behavior in future chapters.