Marginal Cost

Some examples

Marginal cost is what is added to total cost when one more unit of output is produced. For the company below, which produces televisions, compute the values of *ATC* and *MC*.

Q	*TC*	*ATC*	*MC*
1000	250,000		
1050	255,000		

Therefore, we compute *MC* by the following rule: $MC = \left(\frac{\Delta TC}{\Delta Q}\right)$

Note that *MC* is NOT the same as *ATC* ! *MC* is what is ADDED to cost when another unit is produced, *ATC* is what each unit costs to produce.

Marginal cost is also what is added to total variable cost when one more unit of output is produced (we get the same answer whether we compute *MC* using *TC* or *TVC* because all changes in *TC* must come from changes in *TVC* – because fixed costs are fixed!).

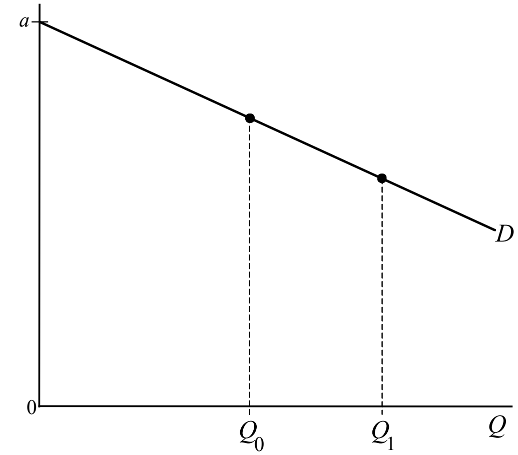
Therefore, we can also compute *MC* by the following rule: $MC = \left(\frac{\Delta TVC}{\Delta Q}\right)$

Suppose our company above, which produces televisions, has increased its production and now has the numbers in the table below. Use *TVC* to compute *MC*. Suppose *TFC* = \$230,000. Compute the values of *TC* and use them to find *MC*. Verify that this is the same answer you would get if you used *TVC*.

Q	*TC*	*TVC*	*ATC*	*MC*
2000		170,000		
2030		172,100		

Suppose our television company is now producing *Q* = 3000 televisions and it has *TC* = \$540,000 and *MC* = \$30. What is *ATC* ? What is approximate *TC* if the company produces *Q* = 3001 televisions? What is approximate *TC* if the company produces *Q* = 2999 televisions?

Why a straight-line demand curve has a straight-line *MR* curve



Equation for a straight-line demand curve:

$$p = a + bQ$$

Then total revenue (*TR*) is:

$$TR = pQ = aQ + bQ^2$$

and marginal revenue (*MR*) is:

$$MR = \left(\frac{\Delta TR}{\Delta Q}\right) = \left(\frac{TR_1 - TR_0}{(Q_1 - Q_0)}\right)$$

$$= \left\{\frac{\left[aQ_1 + bQ_1^2\right] - \left[aQ_0 + bQ_0^2\right]}{(Q_1 - Q_0)}\right\}$$

$$= \left\{\frac{a(Q_1 - Q_0) + b(Q_1^2 - Q_0^2)}{(Q_1 - Q_0)}\right\} = \left\{a + b\left[\frac{(Q_1^2 - Q_0^2)}{(Q_1 - Q_0)}\right]\right\}$$

But since: $(Q_1^2 - Q_0^2) = (Q_1 - Q_0)(Q_1 + Q_0)$ then:

$$MR = \left\{a + b(Q_1 + Q_0)\right\}$$

and if we define the midpoint between Q_0 and Q_1 as: $\bar{Q} = \left(\frac{Q_1 + Q_0}{2}\right)$ then:

$$MR = \left\{a + 2b\bar{Q}\right\}$$

This tells us that *MR* lies on a straight line which is twice as steep as the demand curve.