Economics 311: Intermediate Macroeconomics
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**Perfect Competition, Monopolistic Competition, and Price-Cost Margins**

Under perfect competition, individual firms take the market price as a given, and produce at the point where Price (*P*) = Marginal Revenue (*MR*) = Marginal Cost (*MC*) = Average Cost (*AC*).

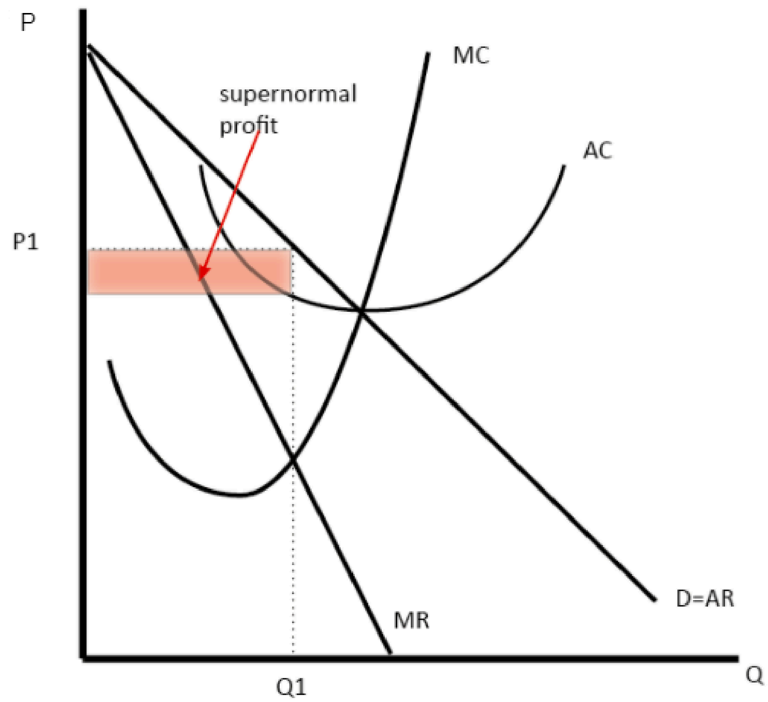
Suppose that this market is **perfectly competitive,** so the market price is set where *P*=*MR*=*MC*=*AC*=Demand. Let's have the market price be $20, and have the representative firm produce 210 units of output. At that output level, the marginal cost and average total cost are $20.

For this simple firm, the revenue is *P***Q* = $20*210 = $4,200.

Costs = *AC***Q* = $20*210 = $4,200.

Economic Profit = Revenue-Costs = $4,200 - $4,200 = $0

(Note that this is not "accounting profit" but rather "economic profit," which accounts for the opportunity cost of time.)




If this market is **Monopolisticly Competitive**, then the firm has some market power to set prices. The firm would set *Q* where *MC* = *MR*, this will push *P* above *AC*, allowing for some profit. Suppose that here the firm chooses *P* = $26, produces *Q* = 200, where *AC* = $21.

Revenue = *P***Q* = $26*200 = $5,200.

Costs = *AC***Q* = $21*200 = $4,200.

Profit = Revenue - Costs = $5,200 - $4,200 = $1,000.

Price-Cost Margin = *P* - *MC* = $26 **- $18** = **$8**

Note that the firm could produce more, where the *P* > *MC*, but it chooses not to because doing so would reduce profits. (To sell the extra units, it would have to lower the price on every unit it sells.)

## Simple Linear Example of Monopolistic Competition

We will do a little trick here where we make things linear so that factor inputs and output produced move together. Suppose that this firm produces output using *only* labor, which we will denote as $N$.

Let the wage be $W$ = \$20 per hour.

Production Function: Output = $Q = 2*N$

*Inverse* Demand Function: $P = 50 - Q$ (This is the inverse demand faced by the firm.)

Note: Inverse demand is P as a function of Q. Demand is Q as a function of P.

Demand here would be $Q = 50 - P$

Marginal Revenue = 50 - 2*$Q$ (Same intercept as the demand curve but twice the slope.)

MC of output (from adding another hour of production)

= ΔCosts/ΔOutput = (Wage per worker)/(Output per worker) = \$20/2 = \$10

The firm sets $P$ and $Q$ to maximize its profits, which is where $MR = MC$.

$MR = MC \Rightarrow 50 - 2*Q = \$10 \Rightarrow Q = (50-10)/2 = 20$

$P = 50 - Q = 50 - 20 \Rightarrow P = \$30$

Revenue = $P*Q = \$30*20 = \$600$

Costs = $AC*Q = \$10*20 = \$200$

(Economic) Profit = Revenue - Costs = $\$600 - \$200 = \$400 >> \$0$

Price-Cost Margin = $P - MC = \$30 - \$10 = \$20$

$P = 50 - Q \Rightarrow Q = 50 - P \Rightarrow dQ/dP = -1$

Elasticity = $dQ/dP * P/Q = -1* 30/20 = -1.5$

Note that a firm could hire an extra worker, pay her \$20, and she would produce two units of output that would sell for \$28 each (moving down the demand curve by two units). The worker thinks, if this firm would just hire me and pay me \$20, I would create output worth 2*\$28 = \$56, so why not hire me?! However, the firm chooses not to do this because doing this would reduce total profits, because to sell the extra units this worker would produce would mean the firm had to cut the price of all the units it sells.

In this example, there is a going wage of \$20 per hour. An assumption like that is probably fine for something like gasoline, where the price of gasoline is \$3/gallon everywhere, and everyone pays the same. But this is more problematic for labor markets where wages often differ, even for people who work in similar roles for the same employer. As such, if we move away from a model of perfect competition to one where there is a spread between the value of the marginal product a worker can produce and the amount a worker is paid introduces the possibility of **wage bargaining**.

Inverse Demand Function: $P = A - a*Q$ (Where $A$ is the intercept and $a$ is the slope.)

Demand Function: $Q = A/a - P/a$

$dQ/dP = -1/a$

Elasticity of Demand: $\eta = dQ/dP * (P/Q)$ ($\eta < 0$ because as P goes up, Q goes down.)

Example: Four monopolized markets

(What effect does the magnitude of the elasticity have on the PCM and why?)

| | | | | |
|---|---|---|---|---|
| Intercept | 100 | 100 | 50 | 30 |
| Slope | 10 | 20 | 10 | 3 |
| MC | $20 | $20 | $20 | $20 |
| Quantity | | | | |
| Price | | | | |
| Elasticity | | | | |
| Profit | | | | |
| Price-Cost Margin (PCM) | | | | |

| | | | | |
|---|---|---|---|---|
| Intercept | 100 | 100 | 50 | 30 |
| Slope | 10 | 20 | 10 | 3 |
| MC | $20 | $20 | $20 | $20 |
| Quantity | 4 | 2 | 2 | 2 |
| Price | 60 | 60 | 35 | 25 |
| Elasticity (-1*P/Q) | -1.5 | -1.5 | -2.33 | -5 |
| Profit | $160 | $80 | $23 | $8 |
| Price-Cost Margin (PCM) | $40 | $40 | $15 | $5 |