

PRINCIPLES OF MICROECONOMICS, SEMESTER 1, 2016

Tutorial 6 (Due end of Week 8)

**Perfect Competition**

Q1. We have a perfectly competitive market with the following demand and supply functions:

$$Q_D = 10 - P \qquad Q_S = 3P - 6$$

a. Now consider a single firm in this market. What price does this firm face? What is its marginal revenue? What is its average revenue?

The price the firm faces is the same as the market price; so we just need to find the market equilibrium price:

$$Q_D = Q_S; 10 - P = 3P - 6; 16 = 4P; \underline{P = 4}$$

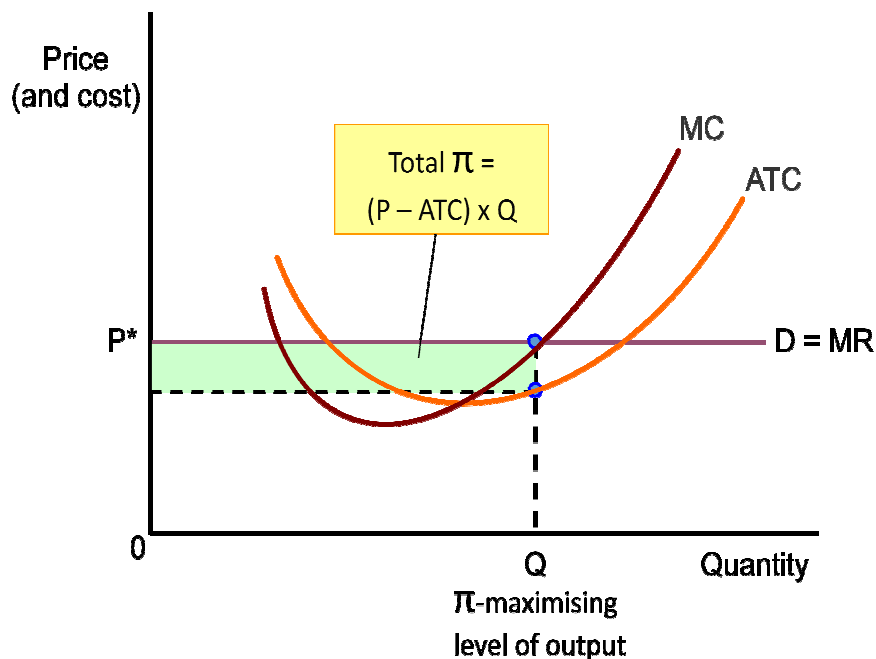
Because there is only one price in the market (because all products sold are identical), the MR and AR are both the price (i.e. the revenue for each additional unit sold is just the price you sell it for, and thus the average revenue is also the price); so  $\underline{MR = AR = 4}$

Now ignore the equations above (they are no longer relevant to the questions below):

b. We are told that the firm (and other firms like it) are making supranormal profit. What is supranormal profit? Draw a firm-level diagram of a firm experiencing supranormal profits.

Supranormal profit is where:  $\pi > 0$

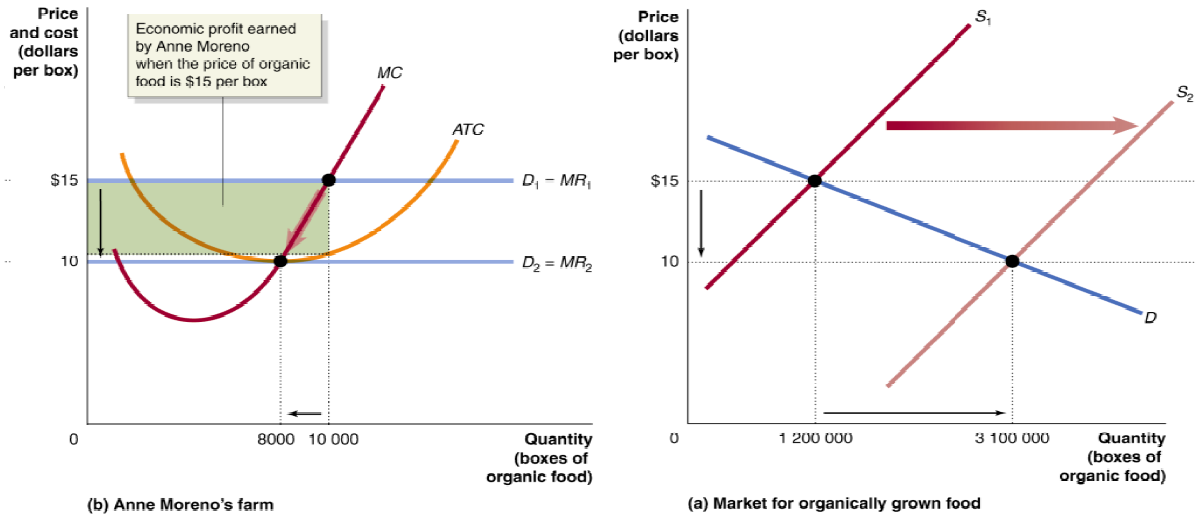
Taken from the lecture slides:



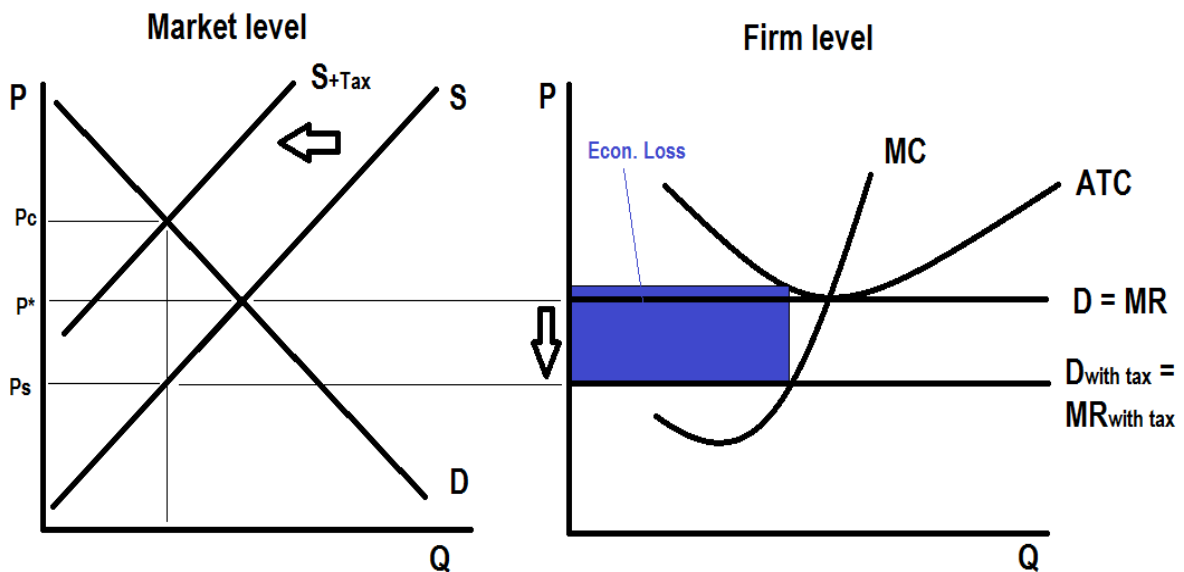
c. Given the supranormal profits in the market, what will be the effect on the market over time? What will the long-run position be? Illustrate your answer using both market-level and firm-level diagrams, labelling the areas of profit/losses as necessary.

Because there are low or no significant barriers to entering a perfectly competitive market, more firms will enter until the supranormal profit is competed back down to zero economic profit ( $\pi = 0$ ).

Taken from lecture slides (please ignore the prices, quantities and comments - the important thing here is the just the DIAGRAMS):



d. Assume that the market is in long-run equilibrium. The government places a tax on the market. What will be the effect on the market? Illustrate your answer using both market-level and firm-level diagrams, labelling the areas of profit/losses as necessary.



- e. How big would the tax have to be to cause the firms in this market to shut-down temporarily? What about permanently?

**Temporary shutdown:** The effect of the tax would have to be big enough to reduce the price to below average variable cost (AVC); this is because, in the short-run, fixed costs are already spent and cannot be altered or recovered, so only variable costs matter to our decision-making process. We will keep producing if we can cover our variable costs **because**, even though we will still make a loss if  $P < ATC$ , we will **minimise our loss**.

**Permanent shutdown:** The effect of the tax would have to be big enough to reduce the price to below average total cost (ATC). In the long-run, if we cannot cover our costs, we will leave the market.

- f. What are the advantages to consumers in a perfectly competitive market? What are the disadvantages?

Perfect competition is the **only** market where consumer surplus (CS) is maximised without any government intervention; it is the best natural market structure for consumers! The major disadvantage is the lack of choice consumers face in the market, as all products are identical.

### Monopoly

**Q2.** PNG Power is the sole distributor of electricity in Port Moresby. The market is composed of the following functions:

$$Q_D = 300 - P \qquad MC = 20$$

The ATC curve intersects the demand curve at a cost of 50 per unit, and touches the MC curve where  $Q = 310$ .

- a. Would PNG Power be a natural monopoly? Why / why not? What makes a monopoly a 'natural' monopoly?

Yes, it would be. A natural monopoly exists where multi-firm production is more costly than production by a monopoly - i.e. there are such big fixed costs and economies of scale in the market, that a second producer can never get big enough to compete with the established firm. PNG Power would be a natural monopoly because the fixed cost required to enter the electricity market - building their own power plants, power lines and poles, electrical substations - is simply so prohibitively high that no other firms could afford it *and* be guaranteed enough of the market to make it worth the cost.

- b. What is the supply curve in this market?

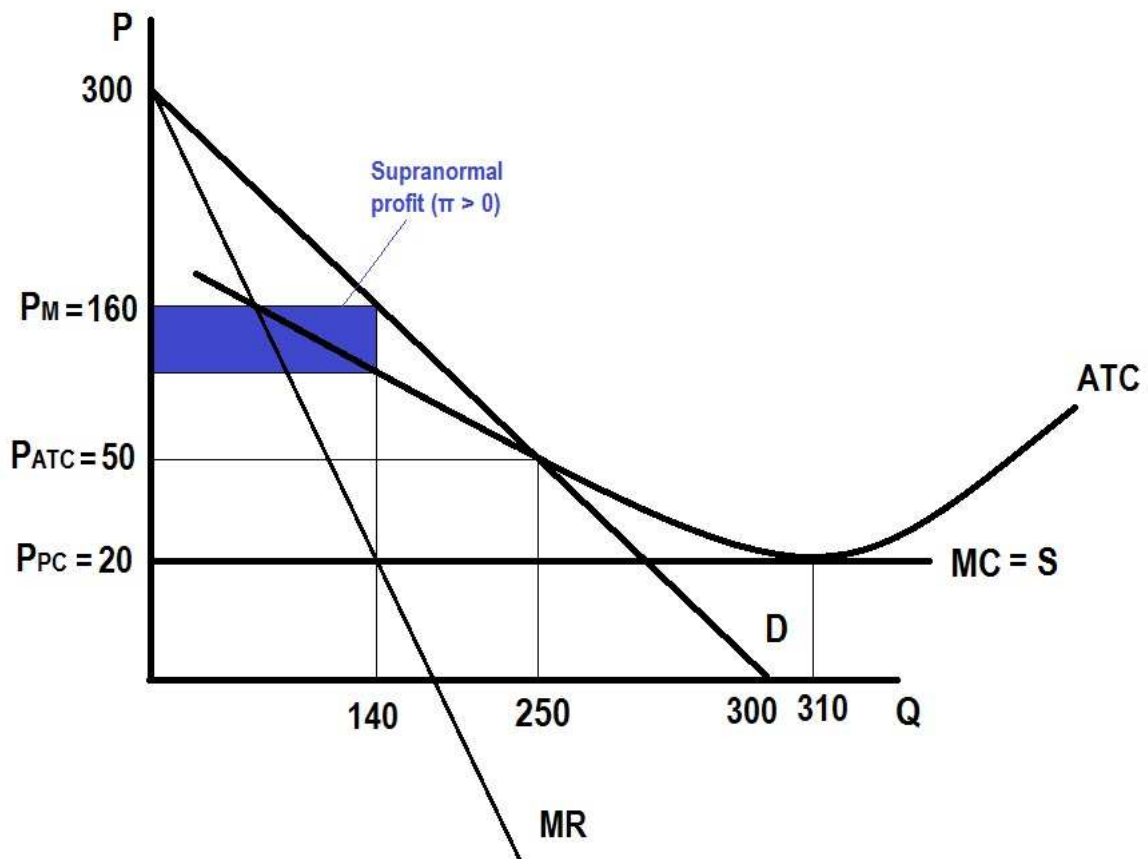
$Q_S = MC = 20$ . In a monopoly, the firm's supply curve (it's MC curve) is always the market's supply curve, because it is the only firm in the market.

c. What will be the equation for PNG Power's MR curve?

Half the *slope* of the demand curve with the same intercept, rearranged to make MR a function of Q:

$$\mathbf{MR = 300 - 2Q}$$

d. Graph this market and label the area of profit. What will be the profit maximising quantity and price in this market?



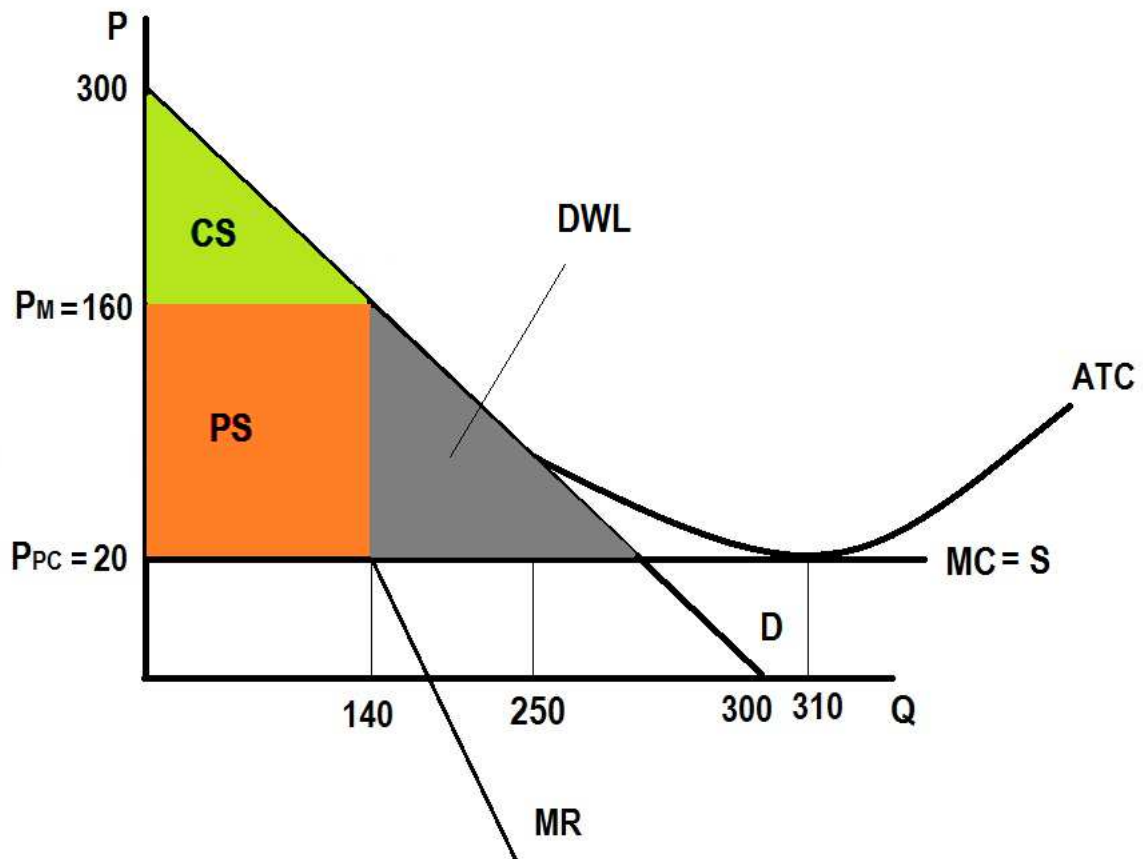
$\pi$ -maximising quantity will be where  $MC = MR$ ;

$$MC = 20 = MR = 300 - 2Q; \Rightarrow 20 = 300 - 2Q; \Rightarrow \mathbf{Q = 140}$$

Substitute  $Q = 140$  into the demand equation to get price:

$$140 = 300 - P; \Rightarrow \mathbf{P = 160}$$

e. Shade the areas of consumer surplus, producer surplus and dead weight loss in the market.



f. The government chooses to regulate the price as if the market were perfectly competitive. What price will they set? Critically assess the government's policy.

The perfectly competitive price in any market is simply where the demand curve equals the supply curve - in this case, it is at a price of 20. However, the problem with this price is that it is below the ATC at the equilibrium quantity for that price... meaning that if PNG Power were to set a price as if it was in perfect competition, it would experience economic losses! So the govt. policy, whilst good for consumers (because of the low price and big CS), is **not sustainable**.

g. The government is still keen to regulate the price. What advice would you provide them, and why?

Given that PNG Power has lots of positive externalities (spillover benefits for society), it makes sense for the government to seek to benefit the consumer as much as possible.

I would thus suggest that they adopt 'ATC pricing'. This is where they set the price equal to 50, because this is where ATC intersects the demand curve and we can thus have  $P = ATC$ . This is the lowest **sustainable** price for PNG power to adopt, because it is the lowest price we can set without PNG Power experiencing economic losses (at  $P = ATC$ ,  $\pi = 0$ ). It also provides the maximum sustainable CS and minimises DWL as much as is sustainably possible.