

## Perfect Competition

There are two concepts of competition normally used in Economics:

1. The manner or process in which firms compete with one another for market share.
2. **A description of a particular market structure within which firms supplying similar products operates.**

We will use the second concept in here and your text, chapter 11.

### **So what is a Perfectly Competitive Market?**

It's a market structure with the following characteristics:

1. Large Number of Firms.
2. Firm's products are identical.
3. Free entry and exit of firms, i.e. there are no barriers to entry or exit.
4. There is complete information.
5. All firms are profit maximizing.
6. Every firm and consumer is a price taker.

**Why do we need all these restrictions or assumptions to think about a market structure where market forces work unimpeded?** In using Perfect Competition we are trying to examine how market equilibrium would look like and can be attained when neither producer (firms) or consumers has any market power to dictate it. Only then can a market operated unimpeded. To achieve that we hence need a set of bounds (fictitious it may be) to limit how players in such a market can act in order to understand how equilibrium is attained and equilibrium will be. We will go point by point to describe the necessity of the assumptions:

- **Why do we need a large number of firms?** The smaller the number of firms, the easier it would be for firms to communicate their strategies and perhaps circumvent the need for no one agent in the economy to have any market power. The larger the number of firms, the more insignificant their output in relation to total market output, or market supply. The larger the number of consumers, the more insignificant the purchases of one particular consumer.
- **Why do firms have to have identical products?** If we permit firms to differentiate their products on other dimensions such as color of the product, or quality, then it allows the firms to compete on grounds besides their prices, and gain market share and hence market power. Hence the products has to be the one and the same.
- **Why do firms need to have the flexibility of entry and exit?** If the technological advancement occurs such that the cost of production falls, then firms can potentially have higher profits. If this is the case, a truly competitive market structure must permit others to partake in these gains so that as before, no one firm has any market power.
- **Why do we need complete information?** Information is a vital ingredient in competition insofar as the firm with it can gain an advantage in obtaining market share, such as information to better technology. If every firm knows what the

- other firm has and has the same access to technology, then can no one firm gain more market share and power.
- **Why do we need all firms to maximize profits?** If we exclude this assumption, then firms could compete on other levels such as societal welfare, and other facets that are difficult to quantify, and outside of this very basic market structure we are trying to understand.
  - **Why are buyers and sellers price takers?** This goes back to our argument that agents or players in such a market can have no market power. If that is true, then none of the buyers and sellers cannot influence prices, and hence only then can the market operate unimpeded.

The above are justifications for **necessary conditions** for Perfect Competition.

### **How does this relate to what we have studied in terms of demand and supply?**

- Note that this does not necessarily mean that all firms have to have to operate at the same level of output, nor use have the same level of labor capital combination. Further, this does not alter our analysis of market demand and supply. That is a firm still faces a upward sloping supply curve, and the horizontal summation of all the industry's firm's supply curve gives the industry's market supply curve, and function.
- However, there are distinct differences in the demand that a firm faces. The demand that each firm faces is not a downward sloping demand curve, but horizontal straight line. Why would that be the case? The intuition is simple, by assumption, since output of each firm is small relative to total market output, each firm by definition can supply as much as it can without affecting the market price. Their sole limitation is that their choice in cost. However, the price the firm faces is still determined by market forces, i.e. by the intersection between market demand (Which is still downward sloping), and market supply.

### **Profit Maximizing Level of Output**

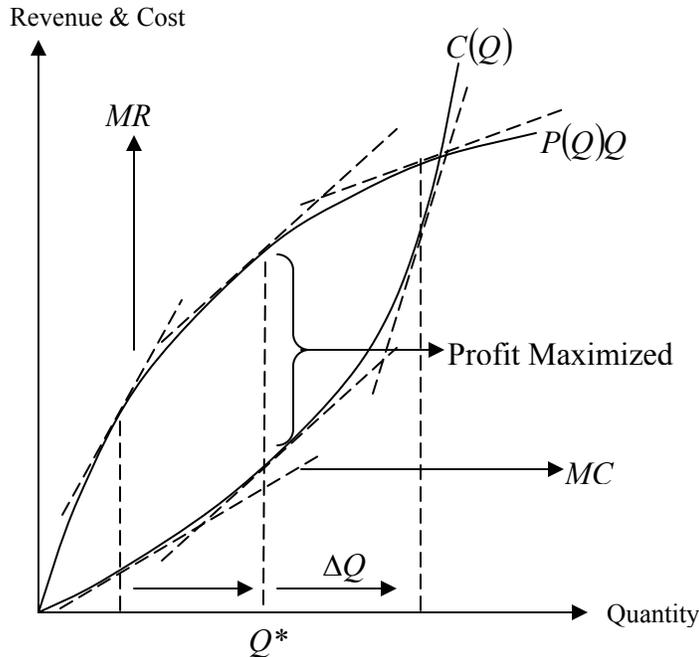
Generically, we can characterize a firm's profit maximizing decision by the following equality:

$$MR = MC$$

How do we obtain this? Recall the profit of a firm is described by

$$\max_Q \pi = \max_Q R(Q) - C(Q)$$

The firm's decision is to choose the level of output  $Q$  that would maximize its profit. Intuitively the technique or manner this is done is to change output by a unit at a time and compare the marginal revenue against the marginal cost. As long as the marginal revenue is greater than the marginal cost, the firm should raise its output by another unit. This search for the optimizing level ceases only when the marginal revenue is just offset by the marginal increase in cost. Diagrammatically,



From the equation we can also derive the condition. Differentiating the profit function with respect to  $Q$ , the choice of output is then

$$\frac{d\pi}{dQ} = \frac{dR(Q)}{dQ} - \frac{dC(Q)}{dQ} = MR - MC = 0$$

$$\Rightarrow MR = MC$$

That is profit is maximized when marginal revenue is equal to marginal cost. But how do we relate this to the perfect competition structure, that is what happens when a firm has no say in prices. In that case, the firm's profit can be written as

$$\max_Q \pi = \max_Q PQ - C(Q)$$

$$\Rightarrow \frac{d\pi}{dQ} = P - \frac{dC(Q)}{dQ} = P - MC = 0$$

$$\Rightarrow P = MC$$

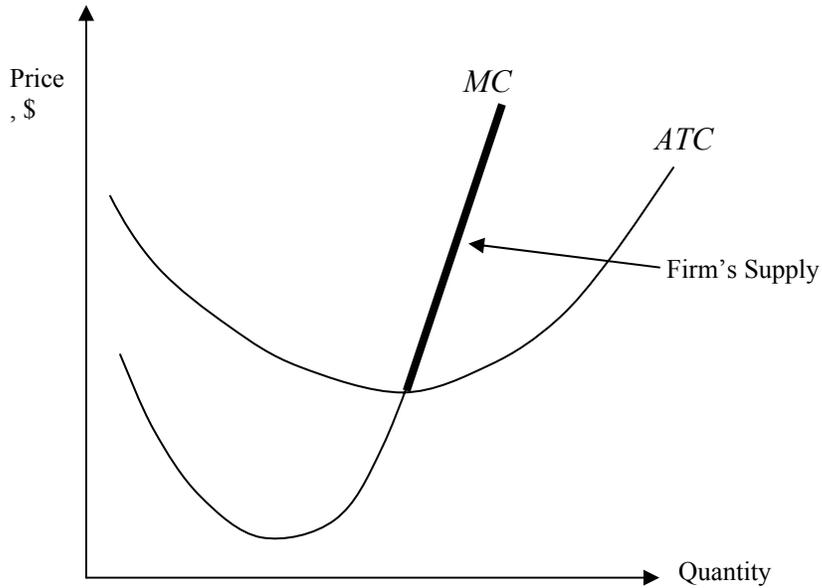
That is since firms are price takers in a perfectly competitive market structure, their revenue is increased by just the price of a unit of product, which means the marginal revenue is just the price. All the firm need to do is to find the level of output which gives a marginal cost that equates that of the price it can charge to the consumers. **(Question: How would the total revenue curve look like for a price taking firm?)**

### Implications for the firm's Supply Curve

This idea of profit maximization for a firm, has implies that the  $MC$  curve is actually the supply curve for the firm. How is that? Recall that supply curve is just a schedule of output supplied at every price. While what we have shown is that the profit maximizing condition is that the firm would produce output levels such that  $P=MC$ . Therefore, the supply curve is just the segment of the marginal cost curve above the average total cost.

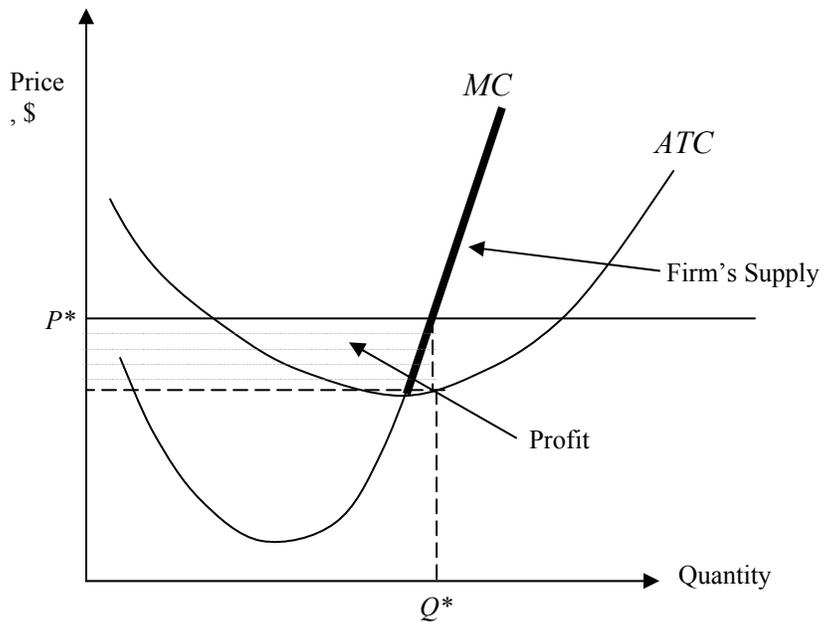
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This is because all levels of production where prices are below the average total cost induce a loss, as opposed to a profit.



### How do we determine profits graphically?

If a firm has positive profits,



You should show yourself how to depict zero profits, and loss as in your text.

**What is the role of profits?**

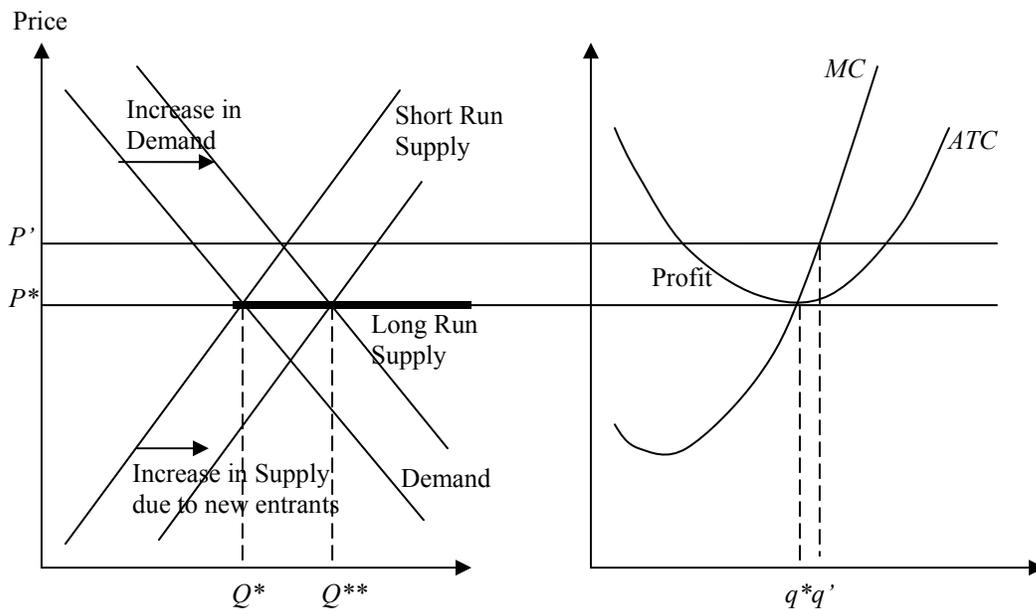
Here's the juncture we see the significance of our assumption on the lack of barriers to entry in a perfectly competitive market structure. Suppose firms are making positive profits as our diagram above. A perfectly competitive industry, hence would permit new entrants into their midst. This then mean that incumbent firms would see their profits dwindling as this happens. As long as there are positive profits, profit maximizing firms would continue to enter, eventually driving profits to zero.

Can you use the same idea to rationalize our assumption for there being no barriers to exiting an industry under perfect competition? What is the role of losses?

This analysis is for the long run, since all firms that make up the industry can make production choices, and entry-exit decisions, to meet new competition or changing demand among its consumers. In the short run, perfect competition is characterized by a fixed number of firms, and this may result in firms earning profits, just breaking even or losses. However, in the long run, since the full menu of decisions is available to firms, there can only be zero profits. This argument is further supported by our assumption of complete information, that is all available technology is known, and no one firm retain rights, or advantage by hoarding the most efficient technology.

**Can we merge the demand and supply concepts with this notion of perfect competition?**

We will now relate our earlier discussions with perfect competition. Consider an initial long run market equilibrium where all firms make zero profits where demand and supply intersects, such that the equilibrium price and quantity is  $P^*$  and  $Q^*$ , while the equilibrium quantity produced by a competitive firm is  $q^*$ .



Now suppose there is an exogenous (something outside of our model) event increases demand for the industry's product, and demand shifts to the right.

- At the new price,  $P'$  all incumbent firms make positive profits. This then induces entry of new firms into the industry to gain a share in the profits available.
- This consequently increases the level of output supplied at every price, and the market supply shifts to the right. Eventually bringing the equilibrium price back to the original price of  $P^*$ , and an equilibrium level of output  $Q^{**}$ .
- At this price, as before all firms earn zero profit, and we are back to the long run competitive equilibrium.

### Long Run Supply

In the case above, we have mapped out a long run supply curve which is horizontal. This tells us that as new entrants enter the industry, they do not bid up the prices of factor inputs, and hence as the industry's output rises, cost of inputs remain constant. Recall our discussion on economies of scale. This then implies we have implicitly assumed the industry exists in a constant cost environment. We call this **Constant Cost Industry**.

What happens if the industry is **Decreasing Cost Industry** such that as output levels rise due to new entrants, prices of input fall.

- This then implies that the ATC will shift down as more firms enter, and all firms can sustain a lower equilibrium price at which they earn zero profits in their long run equilibrium.
- This would result in an increase in supply such that at equilibrium, the new equilibrium price is below  $P^*$  in our above diagram.
- In the long run then in such an industry, the long run supply curve is downward sloping!

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An interesting observation can be made here. In the long run, the supply curve is more elastic than the short run supply. This then mean that in the long run, firms adjusts to quantity, while in the short run, adjustments is through varying prices.