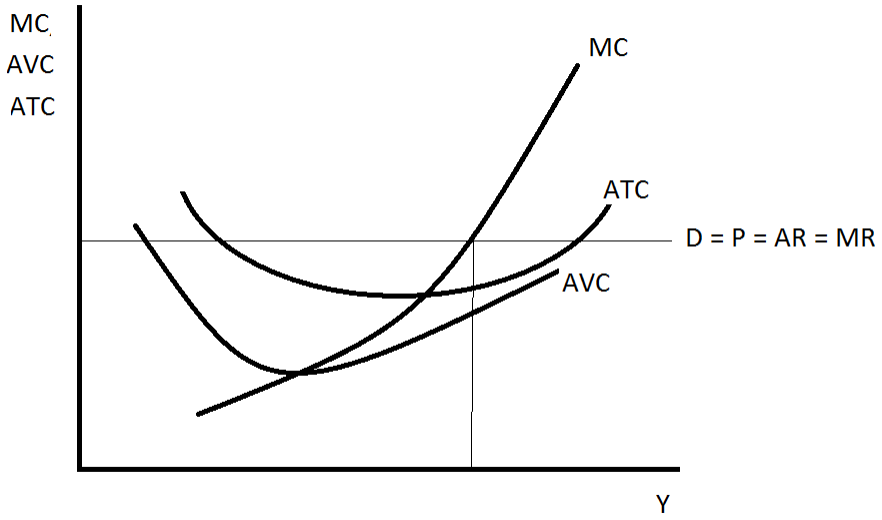
Short Run Competitive Equilibrium

In any economy, the determination of prices and outputs of goods and services is largely determined by the degree of competition in the industry[1]. What do we mean by competition and how does competition affect prices and quantities in the short run? This is the subject of this chapter. Equilibrium in the long run for pure competition will be discussed in the next chapter.

The short run in microeconomics is usually defined as the period in which *at least* one of the factors of production is relatively fixed and there is no entry of new firms into the market. In the previous chapter, we let capital be fixed, and with good reason. Labor then was free to be varied completely. The amount of labor chosen by the firm depends on the goal of the company and this we assume is the pursuit of maximum profits. Hence, in the short run the firm is assumed to purchase labor to maximize profits. This unique profit-maximizing level of labor corresponds to a unique profit-maximizing level of output. The short run supply curve of the firm emerges naturally from this optimization process.

The key to understanding short run equilibrium for a purely competitive firm lies in properly interpreting the average and marginal cost curves. Figure 1 shows this. The average total cost curve

Figure 1 -- Short run Equilibrium for a Competitive Firm



is represented by ATC, while the average variable cost curve is AVC. Note that although we have not chowed it, the Average Fixed Cost (AFC) curve is merely the ATC minus the AVC curves. The marginal cost is given by MC. These curves all have the standard shapes derived from the

[1] It will also be determined by the progress of technology and innovation in production, marketing, transportation, government, etc. and by basic demography and the evolution of tastes. Note that many of these things in turn still depend on the level of competition.

Total Cost and Total Variable Cost curves in the previous chapter. The average curves are all U-shaped and the marginal curve is upward sloping, intersecting the average at their minimum points.

The demand faced by the firm is perfectly elastic and is therefore horizontal. This horizontal line is the demand curve of the firm, the average revenue curve, the marginal revenue curve, and the price line the firm faces. Since the firm is small and cannot determine the price, the price is determined by market supply and demand. The firm is therefore a "price taker". Total revenue is equal to TR=PY. Thus, Average Revenue, AR, is equal to TR/Y = P, while Marginal Revenue, MR, is $\Delta TR/\Delta Y = P$.

If the price in the market (where market supply and demand meet) suddenly drops below minimum AVC the firm will find it is better to stop all production, lock the doors and go home. This is called a shutdown. The firm will always shut down if its losses are greater than Fixed Costs when attempting to operate at the point of MR=MC. Although MR=MC is the usual golden rule of profit maximization, the firm will NOT operate there if MR is less than minimum average variable cost. However, if the price line for the competitive firm lies above min AVC at the point where MR=MC, we will have positive production regardless of whether the firm makes money or not.

Our short run golden rule of profit-making can now be stated as the following

> Operate where MR = MC, but shutdown if MR is below min AVC

This is sometimes called the marginal rule. It began with the marginalist revolution in economic about 150 years ago. The idea behind the marginalist rule is to ask whether you should do a little more or a little less. If you answer no to both these questions, then you are at the highest point (or lowest point). If MR > MC then you should produce more, if MR < MC, then you should produce less (all provided you are above min AVC). If you are at MR = MC, you cannot increase profits, either by increasing or decreasing output, so stop there and begin producing that amount.

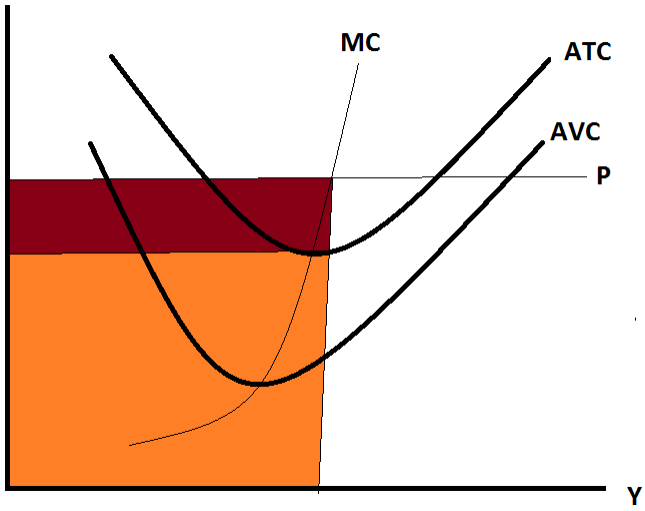
Note that the firm will choose anywhere along the MC curve that the price line intersects and that is above min AVC. For this reason, we say that the MC curve above min AVC is the individual supply curve for the purely competitive firm. Any movement in market price, P, will move the firm up along its MC curve. This shows that the short run supply of the firm is upward sloping. Adding together these individual firm supplies horizontally will result in the market supply of the good or service and it will likewise be upward sloping in typical cases.

If the MR (i.e. price line) is above min ATC at MR = MC, then the firm will have positive short run profits. These above-normal profits are sustainable in the short run, but in the long run new competition will enter the market and such profits must inevitably dwindle to normal levels. These normal levels of profits must cover the opportunity cost of alternatively investing in safe government securities, as well as overcoming the risk aversion the owners feel is associated with this line of business. The risks perceived by the owners of capital will vary over time with changing conditions in the market, including the likelihood of serious competition entering the market in the

future. Thus, it will not be true that the risk premium embodied in the normal level of profits per dollar invested of capital will be the same across all industries. That is, it will not be sufficient to consider the average level of profitability in the industry in the past. This makes it quite difficult to assess the normal level of profits for any one industry. Very risky enterprises will require a high profit rate as its normal profit rate.

We can now consider how profits, revenue, costs, etc. are calculated given the graph of the equilibrium of the firm. Once properly understood, these are easy to read off the graphs. The MR

Figure 2 – Reading Information Off the Graphs



line is just the price line since the firm is a price taker. Thus, equilibrium, where profit is maximized, is where P = MC. Note that this point is above min AVC so the firm will not shut down. Also, note that the point is above min ATC which means that positive operating profits will be earned by the firm in the short run. These profits are equal to the dark brown area in Figure 2. Total revenue is equal to the dark and light brown areas added together. Total costs are equal to the light brown area. Profit is therefore the difference between these two. It will be useful for the student to consider the problem of calculating total revenue, total cost, and profit for various levels of P. This is especially true for levels of price that do not cover min AVC. In this case, the firm does not operate at *any* positive level of output, but shuts down instead.

Much has been written about the level of corporate profit taxes. Some people feel that raising the corporate profits tax is a good thing since it forces the rich to pay more. Marxists claim that profits are always immorally earned and should be distributed to workers anyway, so taxing them and letting the government use the tax revenue is perhaps a next-best solution. However, taxing profits impacts on firms and on the economy, in general. The most important effect is not on short run output or prices, but on long run investment. Taxing profits will not stop firms from maximizing profits, so *the firm will continue to operate at MR=MC*. The major problem with the corporate tax is that it results in firms having less funds to use for research, to improve their technology, and to modernize their facilities. Gradually, these firms will begin to lose to foreign competitors who may be taxed less. Indeed, things are more complicated than this. Applying a higher rate of corporate

taxation threatens some types of industries, particularly those that have high risks associated with them, such as new firms and new small businesses where risks of bankruptcy are often significant. High normal profit levels in certain industries mean that cost curves are higher than those in other industries. Heavily taxing corporate profits can turn otherwise above-normal profits into sub-normal profits. It can ruin certain businesses and possibly entire industries. In addition to this, profits that are distributed to stockholders are taxed twice. First at the corporate level and again at the individual level after dividends are paid. In fact, if the dividends are held and then later given as a bequest or as a gift to relatives, they can be taxed a third time. Finally, there has been an important discussion on the topic of "carried interest" and how payments to general partners of investment funds should be taxed for their efforts – should they pay individual tax on their remuneration or a capital gains tax on the money they make managing the fund. Paying the capital gains tax is one way of mitigating the typical double taxation of income in corporations. See this.

(P1) Why do we say that MC determines the output produce, while AVC determines whether we shut down or not?

(P2) Show graphically that MC intersects ATC at the minimum point of ATC.

(P3) How do economists define the short run?

(P4) What sort of things change as we move from the short run to the long run?

(P5) Why is the demand curve for the pure competitor flat?

(P6) Explain why the demand curve is the AR curve and the MR curve.

(P7) Why do companies need profits?

(P8) What factors affect the normal profit rate in an industry?

(P9) Explain the short run determination of profits for a competitive firm.

(P10) What are the basic conditions for an industry to be purely competitive?