


## PERFECT COMPETITION (PURE COMPETITION)

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	We are now ready to consider a market structure know as perfect competition.
What is perfect competition?	<p><b>Four Assumptions</b></p> <ol style="list-style-type: none"><li><b>1. Homogeneous Product</b> All firms in the market produce the same good. This rules out advertising, quality difference, and other forms of nonprice competition.</li><li><b>2. Many Sellers and Buyers</b> A large number of independent firms selling the product. Each buyer is also small relative to market. For example, a wheat farmer selling 5,000 bushels annually have no noticeable impact on the US wheat market in which more than 2 trillion bushels are traded annually.</li><li><b>3. No Barriers to Entry</b> Any entrepreneur is free to produce or not to produce in the industry.</li><li><b>4. Perfect Information</b> All sellers and buyers have perfect information, regarding prices, technology, and availability of products.</li></ol>
 What do you mean by free entry? Can you give us an example?	<p>Here is an example of free entry.</p> <p>Valentines came to the United States in 1847. Esther Howland, a woman who lived in Worcester, Mass. learned that her British cousins were using Saint Valentine's Day as a successful business.</p> <p>Howland established an assembly line to produce Valentine cards.</p> <p>One of her staff glued paper flowers on the cards and another added other embellishments and so on. In a few years Howland's business was making</p>

	<p>more than \$100,000 a year.</p> <p>That is not the end of the story. Gradually others copied and there were more firms producing Valentine cards.</p> <p>Why? Because the amount of money required to enter a card making business was not much, and hence entry into the industry was free.</p>
Are there different types of market structures?	The following table gives us a basic idea.

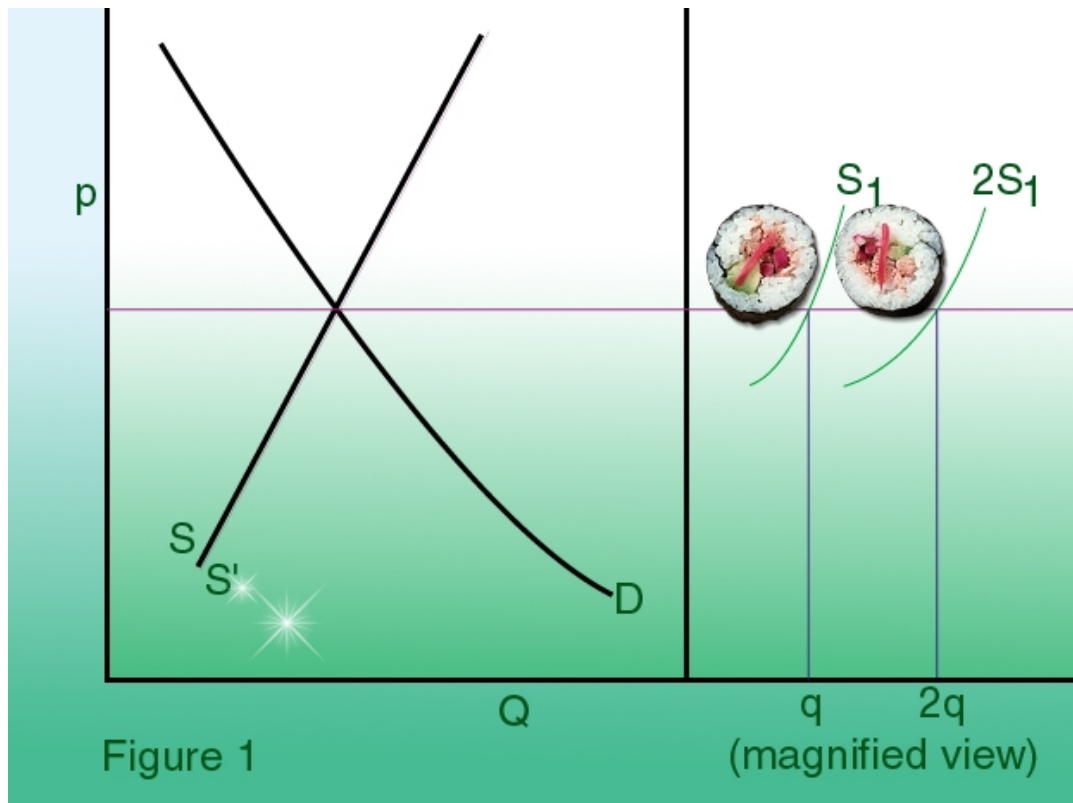
### Range of Market Structure

Monopoly	Oligopoly	Monopolistic Competition	Perfect Competition
One firm	few firms	Many buyers + sellers	Many buyers + sellers
no close substitutes	Prices and outputs are interdependent	Differentiated products	Homogenous products
Entry barriers	Some entry barriers	No entry barriers	No entry barriers
Potential long run profit	Potential long run profit	No profit in long run	No profit in long run
Market power and price setting	Shared market power and control over price	Little market power + little control over price	No market power. price taking

← increased concentration

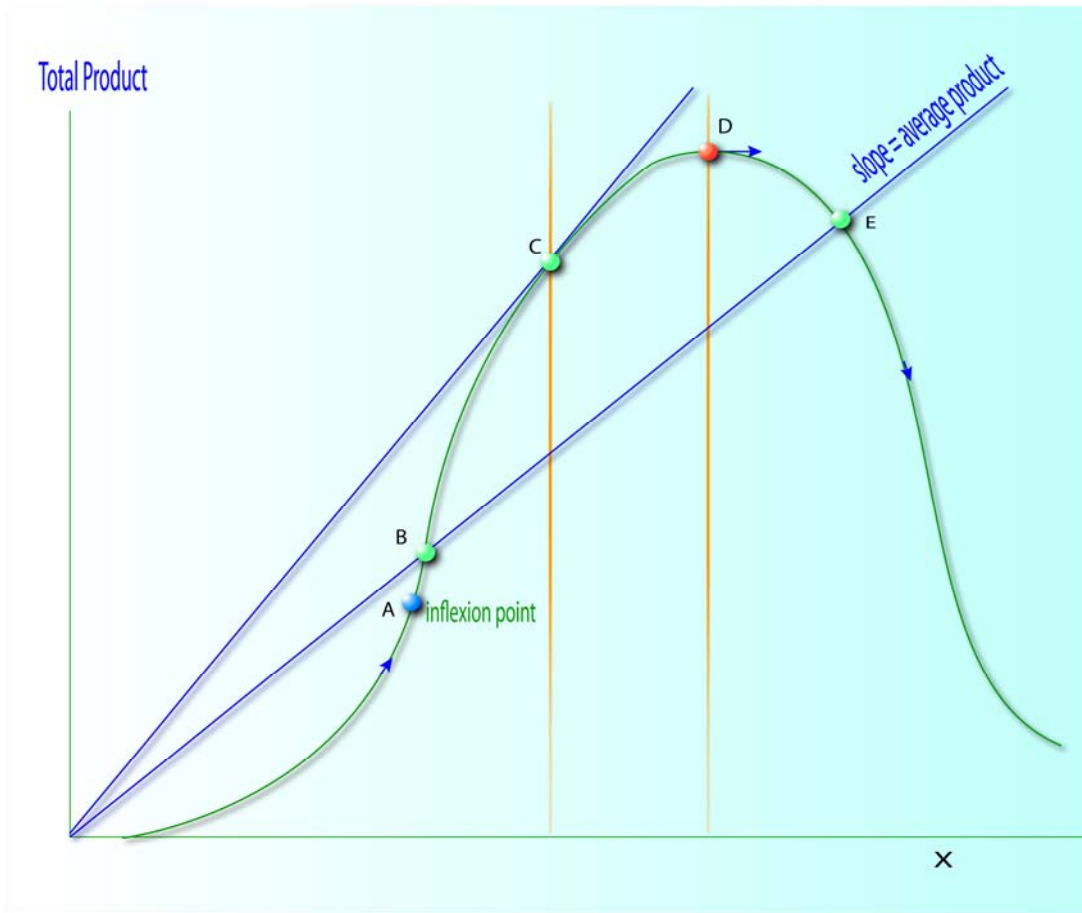
less concentration →

## Market Demand versus Demand Curve of a Competitive Firm



Demand Curve of a Single Firm =  $P$  = horizontal  
Market Demand  $\rightarrow$  negatively sloped.

	<p><b>SHORT RUN PRODUCTION DECISION</b></p> <p>Profit function of a competitive firm</p> <p>In the SR, a competitive firm has a fixed amount of the capital input and can change its output only by adjusting the quantity of its variable input. In the two-factor case, labor is the variable input in the US.</p>
<p>How does a firm determine how many workers to hire?</p>	<p>In the SR, the total product is given by</p> $q = f(\bar{K}, L), \quad (1)$ <p>where the bar denotes that it is a fixed input in the SR. However, for simplicity, from now on, we will not attach a bar to the fixed input <math>K</math>. From (1), we note that there is one-to-one correspondence between output and labor, and hence we can obtain the labor requirement function,</p> $L = L(q, K), \quad (2)$
<p>The Labor requirement is simply read from the total product curve for given <math>K</math> (shown below) we studied earlier.</p>	<p>Right.</p> <p>We focus on the rising segment OABCD, ignoring the downward sloping segment of the TPL curve, because operating in that range implies waste of resources.</p>




Labor cost is written as

$$V(q, K) = wL(q, K). \quad (3)$$

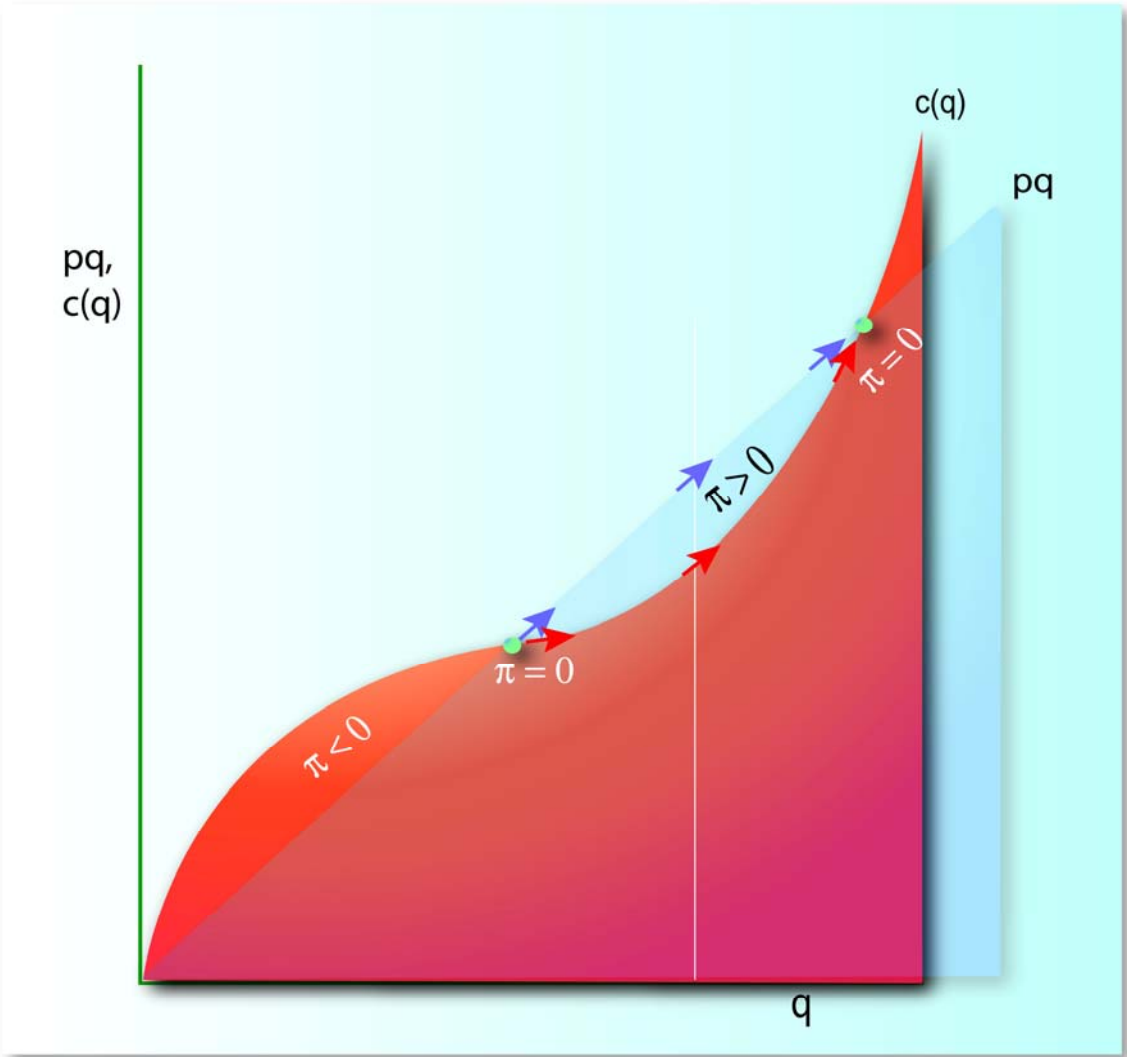
Adding the fix cost to the variable cost, we obtain the total cost function,



$$C(q, K, w) = wL(q, K) + rK, \quad (4)$$


where  $rK$  is the fixed cost because  $K$  is given.


 <p>Then the firm's profit is the difference between revenue and cost:</p> $\pi = pq - C(q, K, w).$	<p>It looks complicated. In the SR, K is fixed and the wage rate are fixed in the market, we can suppress it for SR problems.</p>
<p>We can then write it as:</p> $\pi = pq - C(q), \quad (6)$ <p>where p is market price, q is output, and C(q) is production cost.</p>	

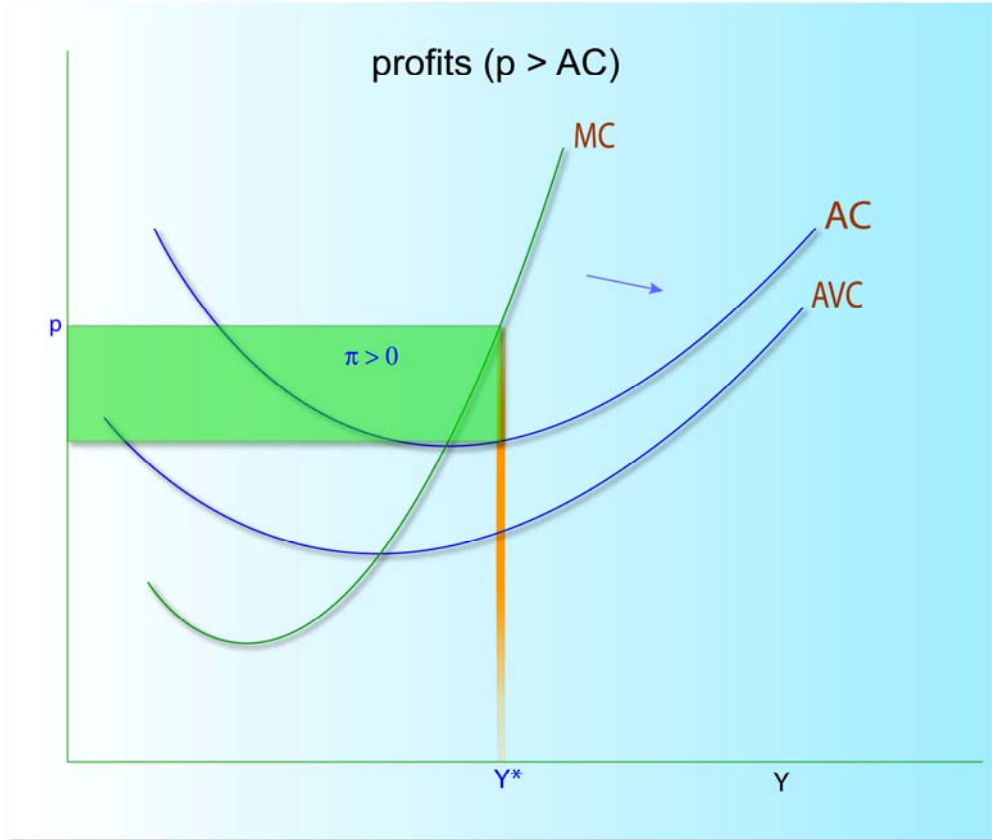
	<p><b>Two Breakeven points</b></p> <p>A breakeven point is the level of output where profits are zero. A firm usually has two breakeven points. Depending on the market price, there may be one or no breakeven point.</p> <p>Figure 1 depicts two breakeven points, A and D, where profits are zero.</p>
<p>We saw this diagram before. A ray from the origin generally intersects the cost curve at two different points.</p>	<p>Right. Those points are called the breakeven points, because firms break even.</p>
<p>At those breakeven points, profits must be zero.</p>	<p>Right. Alternatively, revenue is equal to production cost.</p> $pq = C(q).$



	<p><b>Who is to blame for declining prices?</b></p> <p>In the United States, the prices of basic farm products such as wheat, corn, and poultry are set on commodity exchanges, which is a competitive market. The world's most important commodity exchanges are located in Chicago, and they bring together under one roof all the potential buyers and sellers of particular commodities.</p> <p>For example, the price of wheat is set on the Chicago wheat commodity exchange, which brings together all buyers and sellers of wheat in the world. Brokers who arrange wheat transactions do so for a middleman's fee—usually less than 1% of the transaction.</p>
<p> Who is then responsible for declining prices? Farmers must be unhappy when prices of their products fall!</p>	<p>When farm prices fell by 15% in 1986, farmers drove their tractors and traveled to Chicago to protest the low price.</p> <p>To their frustration, the farmers found no responsible party to whom they could complain.</p>
<p>Were the brokers responsible?</p>	<p>Farmers could not blame the brokers who worked on the floor. They were not culpable! All the brokers did was to execute orders to buy and sell.</p>
<p>Were the grain buyers guilty?</p>	<p>Farmers could not find buyers to blame.</p> <p> Even the largest buyers of farm products (such as Nabisco and General Foods) accounted for such a small fraction of</p>

	market demand (i.e., a perfectly competitive market) that they could not be blamed for falling prices.
 The consumers must be guilty.	<p>Ultimately, it is consumers that determine market demands.</p> <p>Nevertheless, we cannot sue or complain to consumers why they are not willing to pay more or why they are not consuming more. It is their prerogative! They are exercising their right in the market place.</p>
Maybe some sellers were responsible for the declining prices.	<p>The farmers could not find any sellers to blame either, because even the largest seller was too small to influence farm prices.</p> <p>For example, the largest egg farm in the United States, located in California, produced only 1% of the aggregate US egg supply.</p>
Do you mean that no single buyer or seller is large enough to influence the price of any product in competitive markets?	<p>Right.</p> <p>This example illustrates that <i>prices are set impersonally</i> by the forces of supply and demand.</p>

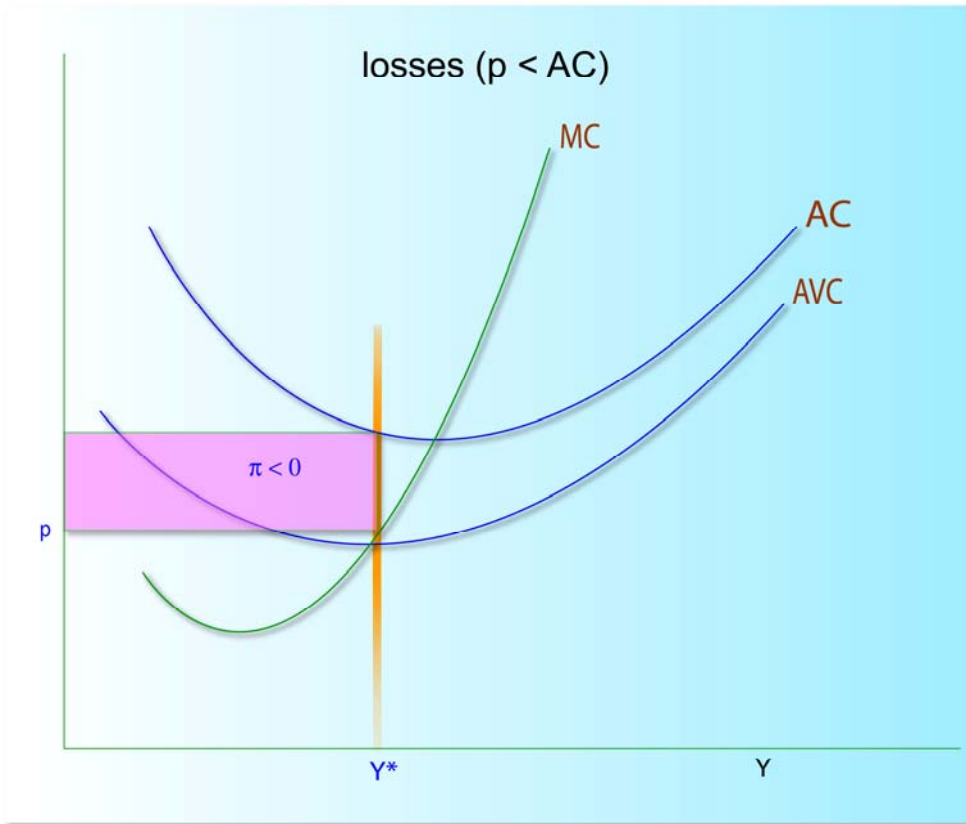
	<p><b>The Firm's Problem</b></p> <p>A competitive firm's problem in the SR is to choose <math>q</math> to maximize its profit in (6), i.e., to choose output <math>q</math> to maximize the vertical distance between revenue and cost curve, <math>\pi = pq - C(q)</math>.</p>
<p>It looks like an unconstrained maximization problem. So one needs to choose the level of output where the profit function reaches its peak, i.e., its slope is zero. I can do this.</p> <p>Thus, differentiating (6), we get the FOC:</p> $\frac{d\pi}{dq} \equiv \pi' = p - C' = 0. \quad (7)$	<p>That is, price must be equal to MC.</p> <p>The profit function must be concave to permit a maximum. The SOC is:</p> $\pi'' = -C'' < 0, \text{ or } C'' > 0. \quad (8)$ <p>The condition <math>C'' &gt; 0</math> means that the slope of MC must be increasing (i.e., the cost function is convex). If MC curve is U-shaped, this means that optimal output occurs to the right of the minimum of MC.</p> <p>Can you summarize the output decision rule in the SR?</p>
<p>Absolutely.</p> <p>Choose the output where <math>P = MC</math>, and make sure MC is rising.</p>	<p> There is one more condition.</p> <p><b>SHORT RUN DECISION</b></p> <p>If <math>p \geq \min AVC</math>, then choose <math>q</math> such that</p> <ol style="list-style-type: none"> <li>(1) FOC: <math>P = MC</math>,</li> <li>(2) SOC: MC is rising (or MC cuts P from below).</li> </ol>

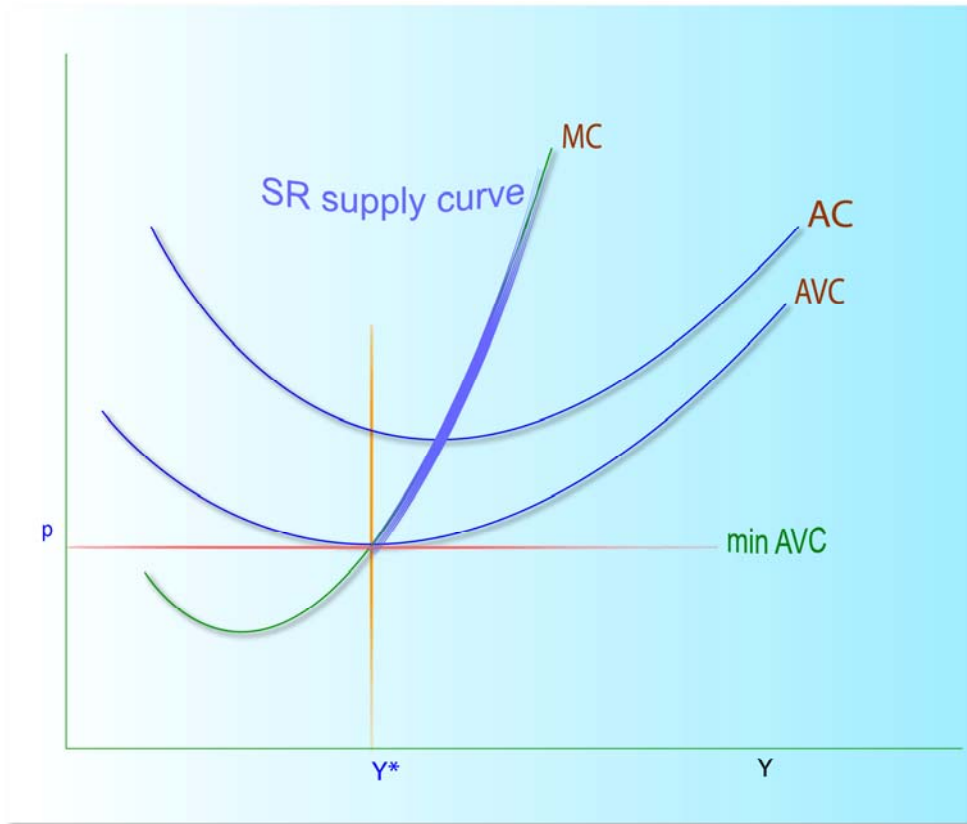


To be or Not to Be: That is the question

This is a critical question many failing businesses are facing in a recession.

<p><b>DO YOU MEAN “To Shutdown or Not”?</b></p>	<p>Right.</p> <p>If <math>P &lt; AC</math>, then it is better to produce and minimize loss, if <math>P &gt; AVC</math>  This is because the firm can still minimize loss, and the minimum loss incurred will be less than the fixed cost which is sunken cost. That is, the loss will be smaller if the optimal output were produced.)</p>
<p>What if price = AVC?  Should you shut down?</p>	<p>If <math>P = \min AVC</math>, then <math>pq = wL</math>, and <math>\pi = -F</math>, whether output is positive or no output is produced. Thus, the firm is indifferent.</p> <p>From the social viewpoint, the firm should stay, instead of laying off all the workers. The government (and ultimately consumers) has to pay their unemployment compensations.</p>
<p>Then minimum AVC puts a limit on the supply curve.</p>	<p>Right.</p> <p><b>Short Run Supply curve</b>  = MC curve above the min AVC.</p>





The SR supply curve stops at the minimum of AVC.

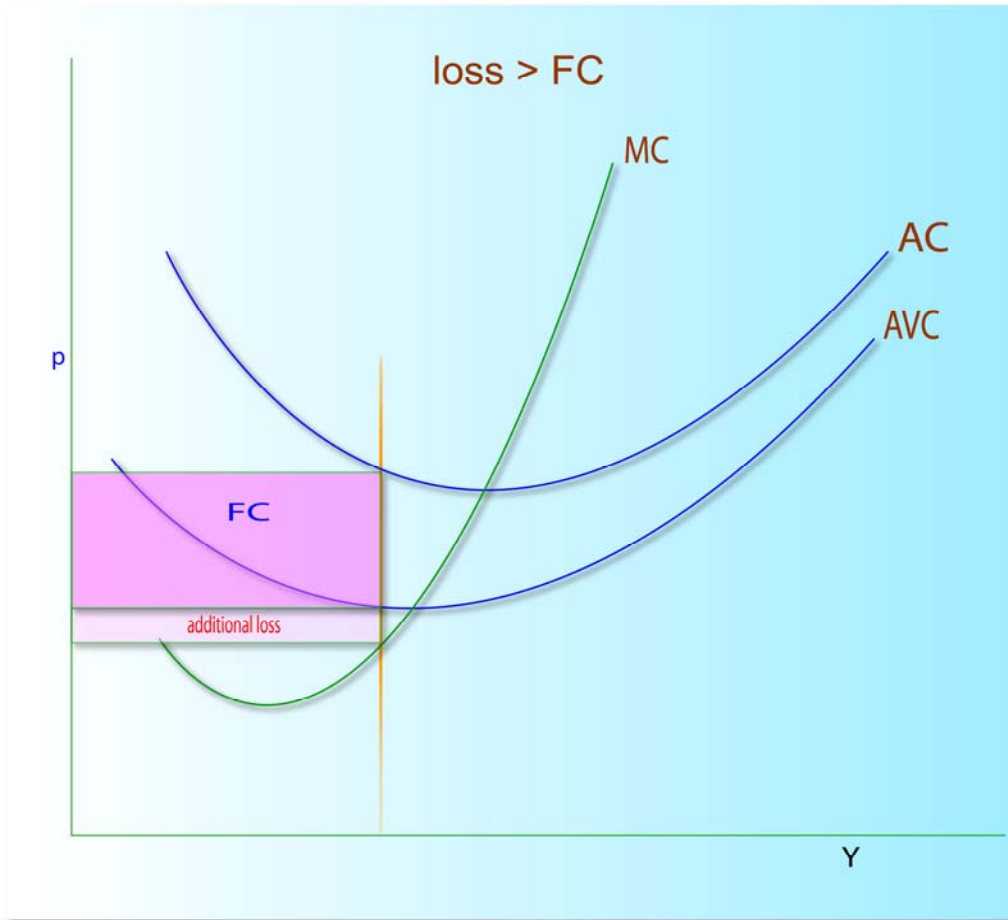
## The Weyerhaeuser example

The Weyerhaeuser Company illustrates the point. This highly profitable wood and paper-products company reported a net income of \$277 million in 1986.

This profit, however, represented only a 5.8 percent return on the billions of dollars the company had spent to build or purchase its network of paper mills and sawmills, its vast array of high-technology machinery, its forests, and its many other assets.

At this rate of return, Weyerhaeuser could have earned more money if it had sold off all those holdings and invested the proceeds in Treasury notes or bonds, which paid above 7% in 1986. (From Wall Street Journal).

## Shutdown Decision



If price falls below the minimum of AVC, then the firm should shut down, because one cannot even cover the variable cost, and loss would be greater if some output were produced. This explains why sometimes firms layoff workers. Many dot com companies went under during the last couple of years.