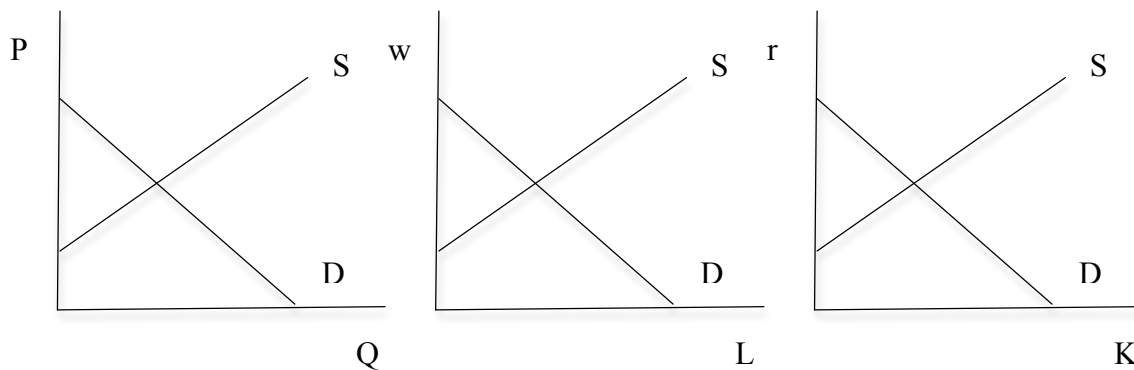


there are markets for everything. Two large categories of markets are product markets and factor markets. Up until now we've been implicitly considering product markets

today we'll consider factor markets, where inputs into making products are bought and sold



examples of factor markets include labor markets, capital markets, and the market for land (there are many other factors of production, but we'll look at these three)

one thing that is notable about all factor markets (as opposed to product markets) is that the demand in them is a derived demand. There is only a demand for factors because there is demand for the goods and services that they go into producing. For instance, consumers don't consume factors directly as inputs into their utility function. Instead, firms demand factors as inputs into their product. So the buyers are firms and the sellers are the owners of the factors. Owners can be firms as well, but can also be individuals or small groups.

Let's look at the labor market for an example of how a factor demand curve is derived.

Remember our short-run production function, where only one factor is variable:

$$Q = Q(L)$$

and assume the firm is a price-taker in both the output market and the labor market, so w and P are fixed. Assume no fixed costs to simplify the profit function
 Then as usual the firm maximizes profit, in this case by picking the amount of labor (since Q is a function of L , the maximization drops down to this level):

$$\Pi = PQ - wL = PQ(L) - wL$$

$$\frac{d\Pi}{dL} = P \frac{dQ}{dL} - w = 0$$

recall that $\frac{dQ}{dL} = MP_L$

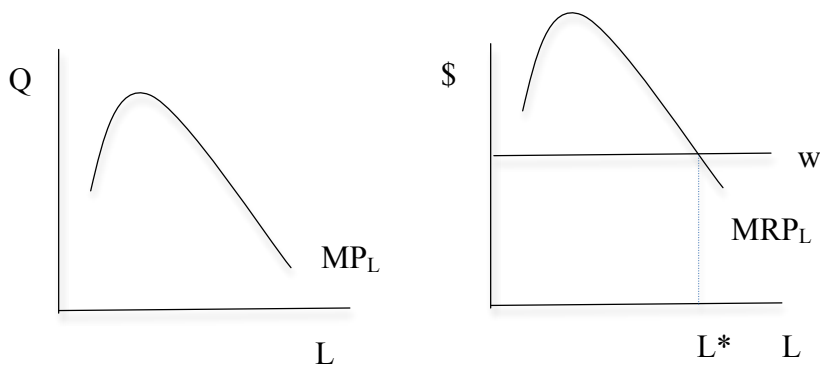
and define $P * MP_L = MRP_L$, the marginal revenue product of labor

then the profit-maximizing condition can be written as:

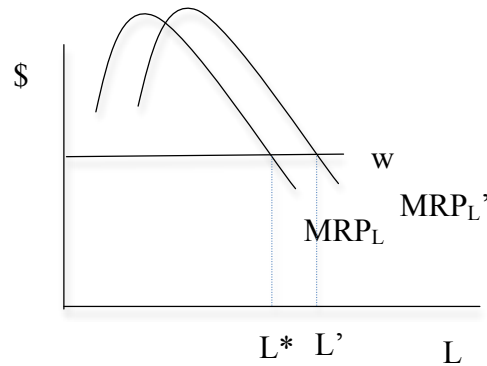
$$MRP_L = w$$

in other words, the additional revenue gained by hiring one more unit of labor has to be equal to the cost of hiring that unit of labor. So it is just another example of setting marginal benefit equal to marginal cost as an condition for optimization.

So the firm is generating the MRP curve, and it is equivalent to their demand curve for labor:



Note this is calculated assuming all other things are held equal, so shifts in the demand curve for labor occur if the price of other factors vary (in the medium run) or if the price of output changes. For instance, a rise in the output price increases the demand for labor:



What if the firm is a monopolist (or any case with a downward sloping demand curve for their product) in the product market?

then recall that P is a function of Q

$$\text{so } \Pi = P(Q)Q - wL = P(Q(L))Q(L) - wL$$

$$\text{then } \frac{d\Pi}{dL} = P \frac{dQ}{dL} + \frac{dP}{dQ} \frac{dQ}{dL} Q - w = 0$$

reorganize the first two terms:

$$\left(P + \frac{dP}{dQ} Q\right) \frac{dQ}{dL} = w$$

and reorganize the first term:

$$\left(P + \frac{dP}{dQ} \frac{P}{P} Q\right) MP_L = P \left(1 - \frac{1}{|\epsilon|}\right) MP_L = MR \cdot MP_L$$

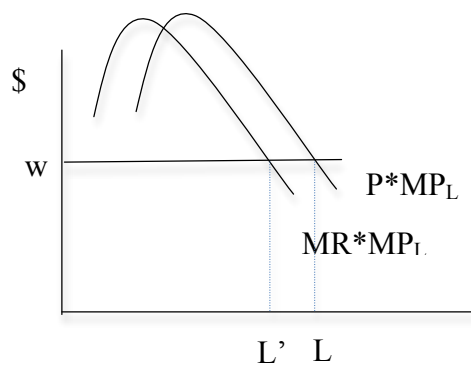
redefine MRP_L to a more general statement (since $P = MR$ is the case in the special case of perfect competition that we started this problem with):

$$MRP_L = MR * MP_L$$

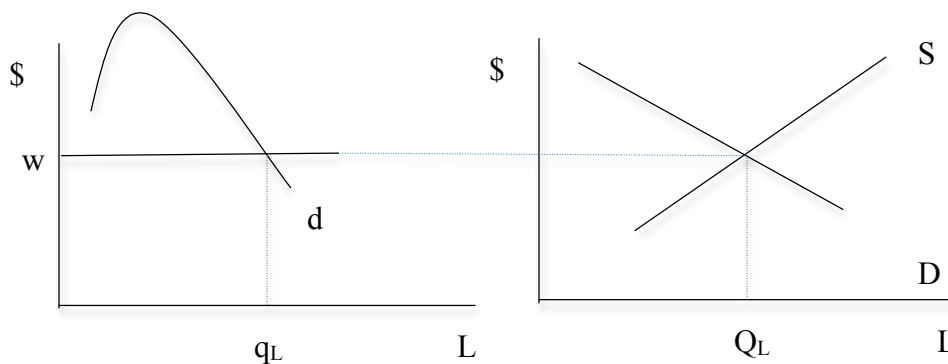
and we see the profit-maximizing condition for the monopolist is the same as before:

$$MRP_L = w$$

however, since in the monopolist case, $MR < P$, the monopolist demands less labor than a comparable firm that would act as if it were in perfect competition:



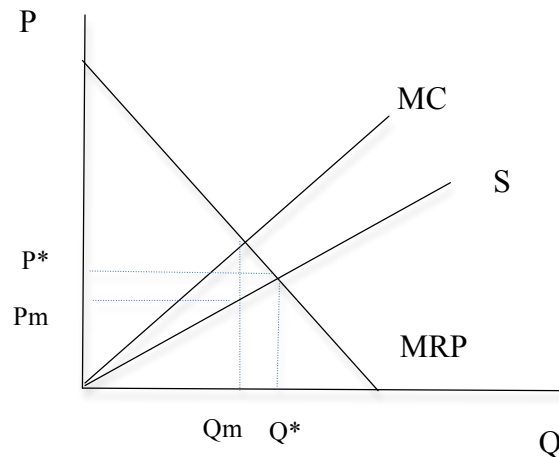
where does the wage w come from? The firm is still a price-taker in the labor market even if it is a monopolist in the product market, so it sees the labor supply curve as a horizontal line at the market wage, i.e., it thinks it can hire all the labor it wants at a given wage without affecting the level of the wage. But really it is coming from the intersection of supply and demand in the labor market as a whole. And thus changes in the labor market as a whole (shifts in demand and supply) are telegraphed to the individual firm through changes in the wage.



finally, what if the firm is not a price-taker in the factor market?

Let's do the case of monoposony (one buyer, many sellers). Assume the firm is a price-taker in the output market (so $MR = P$)

then the firm faces the entire supply curve for the market realizes that in order to hire more workers, they must raise the wage. This means that MC is now greater (instead of equal to) than the wage.



the firm sets $MRP = MC$ to solve for their optimal quantity of labor, and then drops down to the supply curve to see how much they have to pay. We end up with a lower wage and a lower quantity of labor compared to the “competitive” market case!

We can show this formally as a solution to the firm's profit maximization problem:

$$\Pi = PQ - wL = PQ(L) - w(L)L \quad (\text{note now } w \text{ is an increasing function of } L)$$

$$\frac{d\Pi}{dL} = P \frac{dQ}{dL} - w - \frac{dw}{dL}L = 0$$

$$PMP_L = w + \frac{dw}{dL}L \frac{w}{w}$$

$$MRP_L = w \left(1 + \frac{dw}{dL} \frac{L}{w}\right)$$

$$MRP_L = w(1 + \frac{1}{\epsilon_S}) = MC_L$$

and note that the right hand side here, which we now define as MC, is $> w$ if the elasticity of labor supply is less than infinity (i.e., the supply curve is upward sloping)

Indeed, the MC curve has twice the slope of the Supply, or wage, curve (clarify that the intercept may not be in the first quadrant always)

Note the very strong parallels to the monopoly case:

--in monopoly, MR diverges downward from D/P; in monopsony, MC diverges upward from S/w

--monopolists don't have a supply curve (just MC) because the quantity supplied depends on the elasticity of demand; monopsonists don't have a demand curve (just MRP) because the quantity demanded depends on the elasticity of supply

--in monopoly, price is higher than in perfect competition and is higher than MR; in monopsony, price is lower than in perfect competition and is lower than MC

--in both monopoly and monopsony, fewer units are traded than in perfect competition; thus both are inefficient, generating deadweight loss, and are also not Pareto optimal

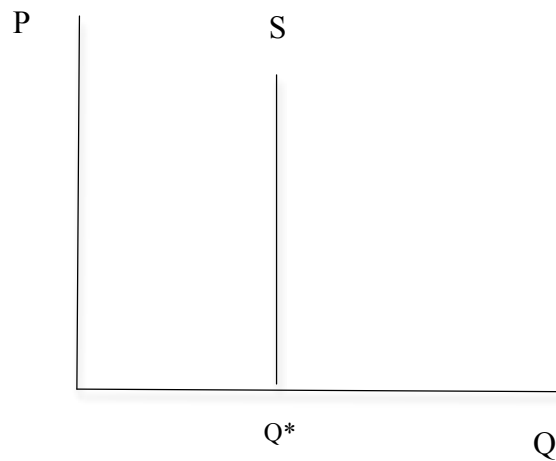
finally, what happens if a monopoly meets a monopsonist? For example, in the labor market what if the workers unionize and enter into collective bargaining as a single entity (a union) with a monopsony employer. In other words, a bilateral monopoly case.

This case is difficult to analyze because it involves strategic elements. One thing to note is that it does not automatically return us to the competitive outcome. Indeed, it is quite likely that the outcome in the market will lead to fewer units traded than in a competitive market.

Other factor markets, such as the market for physical capital, can be analyzed similarly.

A couple of issues arise in particular factor markets. One occurs in the market for land. Land may be viewed as being in completely inelastic supply, and thus all payments to land may be viewed as surplus, or what is generally referred to as rent. Rent is any amount paid to a unit of a factor above the minimum necessary to induce that unit to enter the factor market.

This fact about the market for land leads to the general principle espoused by many economists and politicians that landlords, or landholders, should be taxed heavily: taxing something that is in inelastic supply doesn't lead to deadweight loss!



Of course any buildings or other property on land are capital, not land, and may be subject to removal or deterioration under the more general tax of a property tax.

secondly, labor markets seem different from other factor markets because the factor being sold is people's time. Where does labor supply come from? From people's utility maximizing decisions on how to allocate their time between consumption (and in order to buy things to consume they need to trade hours of their time for money, unless they have a nonearned source of income) and leisure:

this leads to an individual labor supply curve. Note that individuals are also price-takers on the other side of the labor market. They see a demand curve for their labor as a horizontal line at the given wage w and set their "marginal disutility of working" (their marginal cost) equal to the wage (their marginal benefit).

