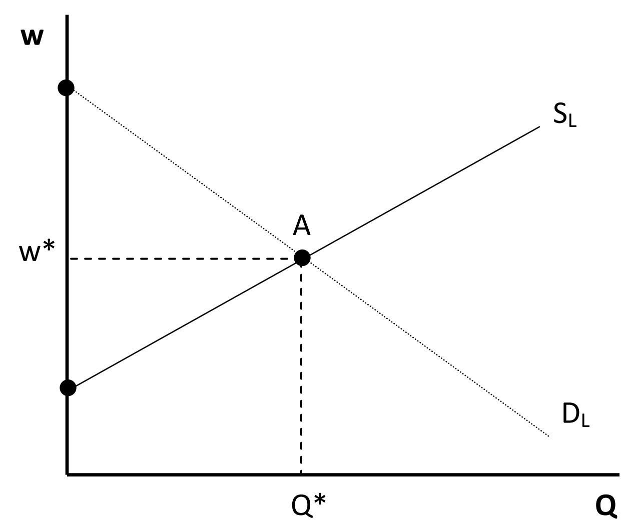
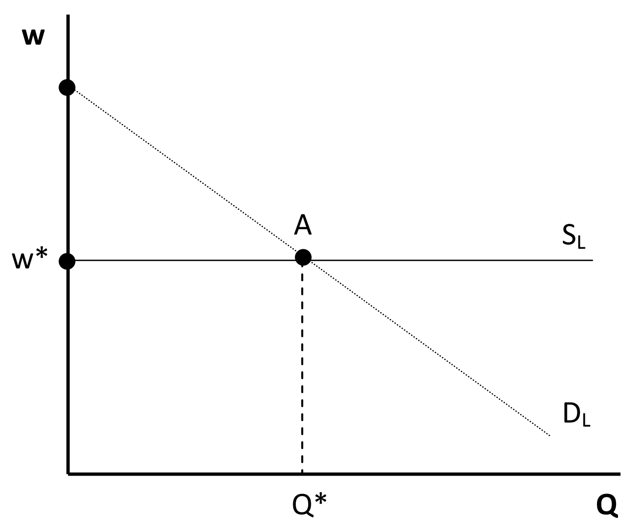
The Hiring Decision
Econ 201/Haworth

Let's consider a labor market with many demanders and many suppliers. The goal of that market is to determine a wage (w*) and how much labor to hire (Q*). Here's the graph below, where w is the price of labor (wage) and Q is the quantity of labor hired. If we assume that everyone works the same # of hours (e.g. everyone is full-time), then we could say Q = # of laborers, and that Q* is how many laborers get hired at the current wage.



Suppose we adapt things a bit and consider a situation where suppliers are all willing to work for the same wage. One way to characterize that on a graph is as follows:



That graph says that all laborers are willing to supply labor at the wage w*. E.g., let's say the wage is $15. Ok, then the graph says everyone is willing to work for $15, and that demanders can "buy" as much labor as they want for $15 per laborer (let's also refer to laborers as "workers" from now on).

When we discuss the hiring decision, however, we're talking about individual demanders of labor (we call them firms) deciding how many workers to hire – we're not talking about how many workers get hired within the market as a whole. To get to that more "micro" decision, let's do this. Consider what hiring labor does for each firm. Hiring workers allows the firm to produce goods and services that the firm can then sell. E.g., let's say that our firm produces candy bars. Of course, to get those workers, the firm must pay them a certain wage. Let's assume it's the same wage set by our market in the graph. I.e., let's assume that w* = $15. All firms must pay their workers $15 in order to get those workers to produce candy bars.

How much output can these workers help the firm produce? I.e., how many candy bars can these workers produce. We can provide an answer in one of two ways. First, by giving you a production function like $Q = \sqrt{100L}$ where you plug values of L (labor) into the function and calculate how much output (Q) you'll get from that. A second, more basic approach, would be to do all of that work myself (i.e. plugging values of L into some production function) and then reporting the results within a table. That's what we did with the table below - I plugged each value of L into the production function above and then calculated an amount of Q.

L	**Q**
0	0
1	10.0
2	14.1
3	17.3
4	20.0
5	22.4

The firm's goal is determine how many workers to hire. To do that, the firm must ask what each additional worker provides in terms of extra output. Ultimately, we want to know how much benefits those workers provide the firm, but producing candy bars is only part of the answer. I.e. it doesn't help the firm to have a bunch of candy bars in the warehouse, it helps the firm to sell those candy bars. Therefore, the firm must first calculate the change in output (ΔQ) that each worker provides (i.e. how many extra candy bars each worker allows the firm to produce). Once the firm calculates the change in output, the firm must then also determine the value of that extra output. Let's assume that the firm sells candy bars at $5 per candy bar. Note that in the table below, we calculated the change in output and the value of that extra output.

L	**Q**	**ΔQ**	**P x ΔQ**
0	0	—	—
1	10.0	10.0	$50.00
2	14.1	4.1	$20.71
3	17.3	3.2	$15.89
4	20.0	2.7	$13.40
5	22.4	2.4	$11.80

Here's how to read the last two columns above.

When the firm hires their first worker, they go from L = 0 to L = 1. That worker helps the firm produce 10 candy bars. Since hiring no workers yield no output, we can say that hiring the first worker gives the firm an extra 10 candy bars (i.e. ΔQ). Those 10 candy bars can be sold for $5 per candy bar, so the first worker provides $50 in benefit for this firm (P x ΔQ).

If the firm hires a second worker (i.e. if L = 2), then that worker helps the firm produce another 4.1 extra candy bars. I.e., by having 2 workers, the overall output of candy bars is now 14.1 units, where the first worker added 10 units and the second worker added 4.1 units. Again, since candy bars are sold for $5 per candy bar, this second worker created $20.71 in extra benefit for our firm (i.e. $5 x 4.1). The remaining values are calculated similarly.

So again, how much labor should the firm hire? We know the benefit of each worker, but what about the cost? Let's go back to our assumption that each worker will cost the firm $15 (i.e., our assumption that w = $15). We can add the cost of each worker to fifth column. Since the cost of each worker is equal to what we pay them, and what we may them is the wage, the final column is just "w", the wage paid.

L	**Q**	**ΔQ**	**P x ΔQ**	**w**
0	0	—	—	
1	10.0	10.0	$50.00	$15
2	14.1	4.1	$20.71	$15
3	17.3	3.2	$15.89	$15
4	20.0	2.7	$13.40	$15
5	22.4	2.4	$11.80	$15

We're now ready to look at the hiring decision. In the end, this decision is exactly the same as what we discussed with buying donuts. There's a marginal benefit (MB) represented as P x ΔQ and a marginal cost (MC) represented as w. Our goal is to find where MB = MC. Of course, if that point doesn't exist, then we go as far as possible before MB < MC.

If the firm hires a first worker, then the worker creates $50 in benefit (MB = $50) and only costs the firm that $15 cost (MC = $15). Since MB > MC, we know that the first worker is worth hiring.

If the firm hires a second worker, then the worker creates $20.71 in benefit (MB = $20.71) and only costs the firm that $15 cost (MC = $15). Since MB > MC, we will hire that worker too.

If the firm hires a third worker, then the worker creates $15.89 in benefit (MB = $15.89) and only costs the firm that $15 cost (MC = $15). Since MB > MC, we will hire that third worker.

Suppose the firm hires a fourth worker. If so, then this fourth worker only creates $13.40 in benefit (MB = $13.40), but will cost the firm that $15 wage (MC = $15). When MB < MC, we know that this is a signal to do less. I.e., the firm will never hire a worker if that worker provides less benefit than cost. In other words, the firm will not hire a fourth worker.

Therefore our hiring decision conclusion would be that in this setting (i.e. where $Q = \sqrt{100L}$, the firm pays $15 per worker and sells output at $5 per unit), the firm should hire 3 workers.