Postulate I – w = VMP

VMP = the **additional** revenue (value, sales) generated by hiring an **additional** unit of labor; $\Delta TR/\Delta L$

Why is w=VMP important?

It is the rule which yields the profit-maximizing rate of labor use. Thus, it tells us how many workers firms wish to hire at any given price. Since this is the same information the demand curve for labor gives, this is why the VMP curve is the demand curve for labor. This derivation of the demand curve is then used to help explain the problem of unemployment.

But first, we must make sure we understand what's going on — we must answer the following question:

Why does this rule work?

TABULAR EXPOSITION

L (hours)	Q (units)	TR=PQ P=$.50/unit ($)	TC=wL w=$5/hour ($)	π = TR - TC π = PQ - wL ($)
0	0	0	0	0
1	10	5	5	0
2	28	14	10	4
3	58	29	15	14
4	80	40	20	20
5	96	48	25	23
6	110	55	30	25
7	120	60	35	25
8	129	64.5	40	24.5
9	136	68	45	23
10	138	69	50	19

The firm should hire L*=7 because profits are maximized at this point (π=$25).

So where does w=VMP come in?

The firm can find the amount of labor to hire by a much simpler process -- i.e., set w=VMP:

L (hours)	Q (units)	TR=PQ P=$.50/unit ($)	VMP=ΔTR/ΔL ($)	w=$5/hour ($)
0	0	0	0	5
1	10	5	5	5
2	28	14	9	5
3	58	29	15	5
4	80	40	11	5
5	96	48	8	5
6	110	55	7	5
7	120	60	5	5
8	129	64.5	4.5	5
9	136	68	2.5	5
10	138	69	1	5

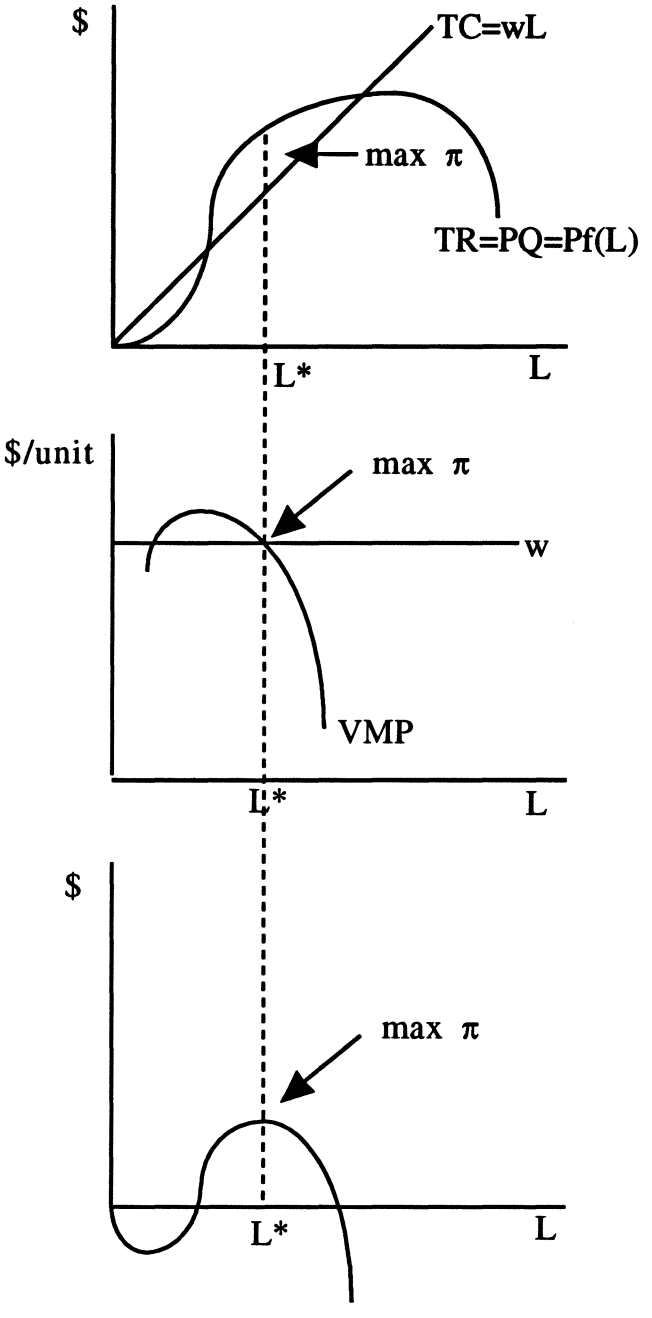
Now, suppose the wage increased to $7/hr, what would the firm do?
What if the wage changed to $11/hr, what would the firm do?

Clearly, given a wage, the firm sets the VMP equal to the given wage in order to determine the profit-maximizing amount of labor to hire.
Demand curves are things that tell us, for a given price, how much an agent wants to buy. Since the VMP tells us exactly what a demand curve for labor would tell us, the VMP=D_L.

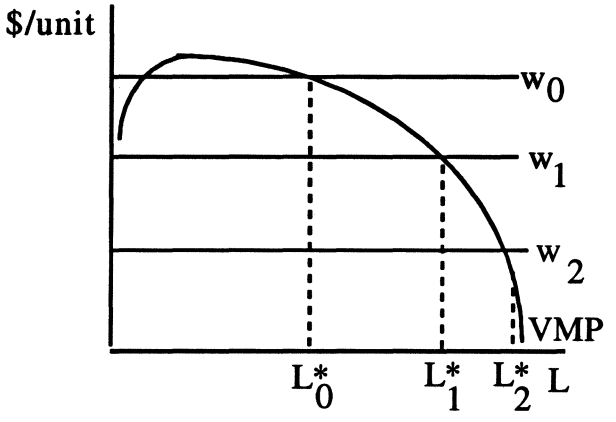
Finally, the market demand curve is the sum (horizontal sum, to be exact) of all individual demand curves. Thus,

$$D_L = \Sigma D_L = \Sigma VMP$$

GRAPHICAL EXPOSITION



Given that the firm sets VMP equal to w in order to determine the profit-maxmizing amount of labor (that is, the amount of labor it's going to hire), the VMP tells us the optimal amount of labor for any given wage.
Since the demand curve for labor tells us the same thing, VMP=D_L.



We're halfway there! We have the demand for labor curve so now we need to derive the supply of labor curve.

Postulate II -- w = MdisU

MdisU = the **additional** disutilty generated by working an **additional** hour of labor;
= ΔTdisU/ΔL

Why is w=MdisU important?

It is the rule which yields the utilty-maximizing number of hours to work. Thus, it tells us how many hours laborers wish to work at any given wage. Since this is the same information the supply curve of labor gives, this is why the MdisU curve is the supply curve of labor. This derivation of the labor supply curve is then used to help explain the problem of unemployment.

But first, we must make sure we understand what's going on -- we must answer the following question:

Why does this rule work?

TABULAR EXPOSITION

L (hours)	Total Disutility ($)	TI=wL w=$5/hour ($)	NetG=TI - TC = wL - TdisU ($)
0	0	0	0
1	.2	5	4.8
2	.7	10	9.3
3	1.5	15	13.5
4	2.5	20	17.5
5	5	25	20
6	8	30	22
7	13	35	22
8	20	40	20
9	36	45	9
10	74	50	-24

The laborer should work L*=7 because Net Gain (or Net Utility) is maximized at this point (NetG = $22).

So where does w=MdisU come in?

The laborer can find the amount of labor to work by a much simpler process -- i.e., set w=MdisU:

L (hours)	Total Disutility ($)	MdisU $	w=$5/hour ($)
0	0	-	5
1	.2	.2	5
2	.7	.5	5
3	1.5	.8	5
4	2.5	1.0	5
5	5	2.5	5
6	8	3.0	5
7	13	5.0	5
8	20	7.0	5
9	36	16.0	5
10	74	38.0	5

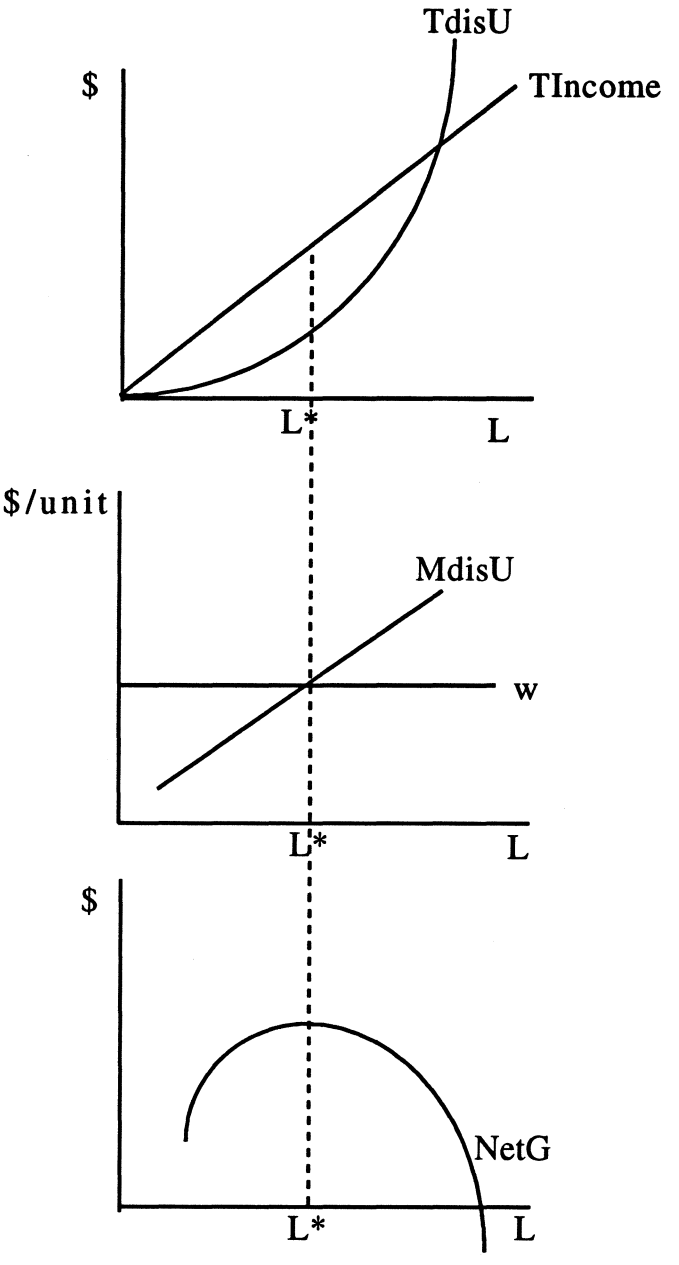
Now, suppose the wage increased to $7/hr, what would the worker do?
What if the wage changed to $16/hr, what would the worker do?

Clearly, given a wage, the worker sets the MdisU equal to the given wage in order to determine the optimal amount of hours to work.
Supply curves are things that tell us, for a given price, how much an agent wants to sell. Since the MdisU tells us exactly what a supply curve of labor would tell us, the MdisU=S_L.

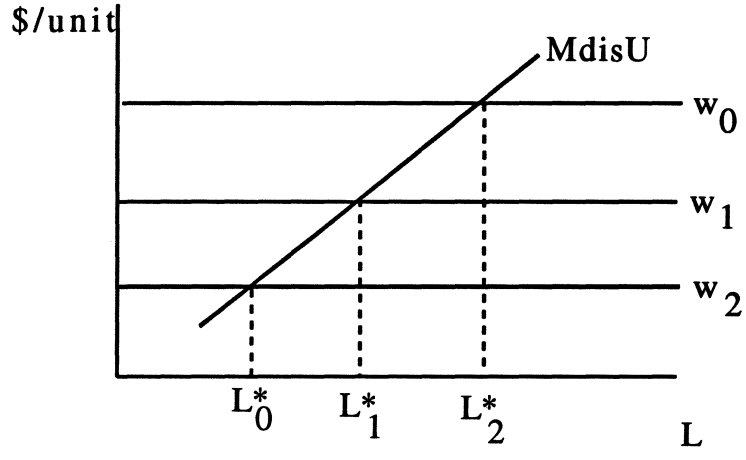
Finally, the market supply curve is the sum (horizontal sum, to be exact) of all individual supply curves. Thus,

$$S_L = \Sigma S_L = \Sigma MdisU$$

GRAPHICAL EXPOSITION



Given that the worker sets MdisU equal to w in order to determine the net gain-maximizing amount of labor (that is, the amount of labor he's going to work), the MdisU tells us the optimal amount of labor for any given wage.
Since the supply curve of labor tells us the same thing, MdisU=S_L.



In fact, labor supply is not derived this way today. If you take Labor Economics, you will see that the consumer/worker faces a constrained optimization problem, choosing goods and leisure to maximize utility subject to a budget constraint.
Having derived demand and supply for labor, we can put the two together to show the equilibrium level of employment.
Unemployment occurs when the wage fails to clear the market. There are various reasons for this, as Keynes says in Chapter 2 of the General Theory (page 6 of 16 in the Word doc). But then Keynes argues that this framework is wrong. Postulate I (demand for labor) is OK, but Postulate II (supply of labor) is wrong.
Keynes' belief on why Postulate II is wrong rests on the concept of ***money illusion***.