Labor/Leisure Model of Labor Supply[1]
In-Class Problem[2]

Suppose a worker for whom an own wage elasticity of demand is -.70 experienced a wage change in a perfectly competitive labor market due to a 10% decrease of available workers in that market. Also suppose that before the change in available workers, the market clearing wage for workers was $25 per hour with a 50% wage premium for working more than 8 hours per day.

a) Given what you know, provide a Labor/Leisure Model of Labor Supply before and after the labor supply change in this market. Be sure to specify all relevant points on this model.

To complete the relevant points in the model we need to know the wage levels before and after the change. With an own wage elasticity of demand of -.70 resulting from a 10% decrease in workers, we can calculate the change in wage,

$$\eta = \frac{\%\,\Delta\, labor}{\%\,\Delta\, wage} = \frac{-10\%}{\%\,\Delta\, wage} = -.70$$

$$10\% \ = (\%\,\Delta\, wage)(-.70)$$

$$\frac{-10\%}{-.70} = 14.28\% \ \ wage$$

We see that a -10% change in labor yields a 14.28% change in wage, so with a pre-change wage of $25, the post-change wage is:

$$\$25\ x\ 1.1428 = \$28.57$$

In a labor/leisure model we know that the labor/leisure axis (X) is transected at 16 units of leisure (0 units of labor). The intercepts on the wage/income axis (Y) are affected by the 50% wage premium for more than 8 units of daily labor, so we find the wage/income axis intercepts are as follows:

Pre-change: $(\$25)(8) + (1.5)(\$25)(8) = \$200 + \ \$300 = \$500$

Post- change: ($28.57)(8) + (1.5)($28.57)(8) = $228.56 + $342.84 = $571.40

The slope of the respective lines representing the pre and post labor supply change are the negative of the wage [(wage)(-1)] represented by each line or line segment:

Pre-change: (25)(-1) = -25 and (1.5)(25)(-1) = -37.5
Post-change: (28.57)(-1) = -28.57 and (1.5)(28.57)(-1) = -42.85

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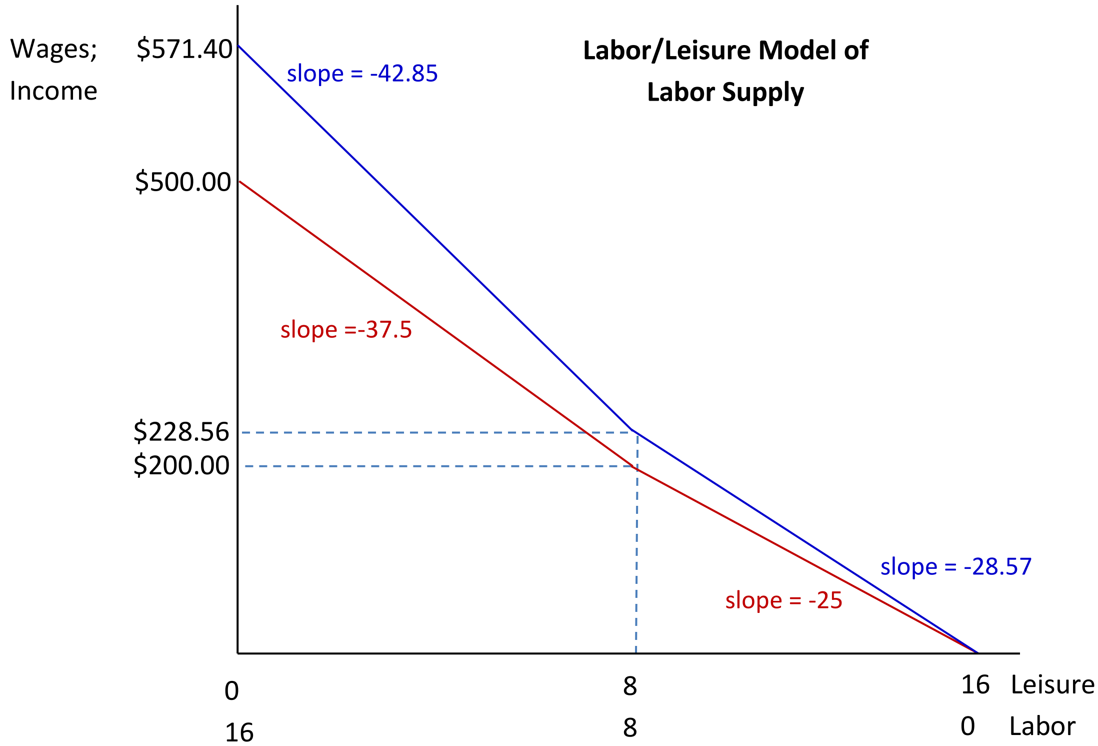
[1] This In-Class Problem is intended to present an abbreviated discussion of the included economic concepts and is not intended to be a full or complete representation of them or the underlying economic foundations from which they are built.

[2] This problem was developed by Rick Haskell (rick.haskell@utah.edu), Ph.D. Student, Department of Economics, College of Social and Behavioral Sciences, The University of Utah, Salt Lake City, Utah (2014).

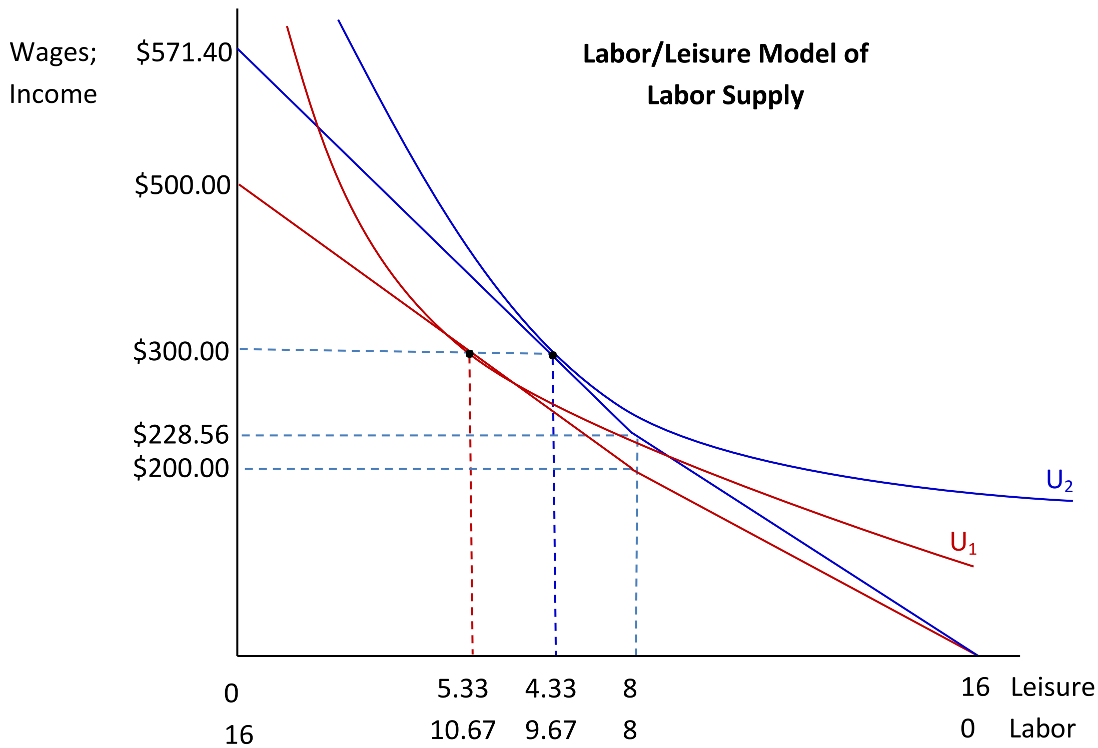


b) Now suppose that this worker has a daily budget of $300 and is allowed to work as many overtime hours as desired. Update the model to show the worker's utility preference as indicated by the worker's optimal balance of labor/leisure and daily income.

To do this we need to identify the number of daily hours of labor that equate to the $300 budget. Since $300 is greater than the amount that can be earned in the first 8 hours of labor at the pre or post-change rates , we know the worker will work some hours of overtime at the premium wage rate, which we'll call OT_N in the following equations:

Overtime hours required under the original wage (OT_1):
(\$25)(8) + (37.50)(OT_1) = \$300
(37.50)(OT_1) = 300 – 200
OT_1 = 100/37.50 = 2.67

Overtime hours required under the new wage (OT_2):
(\$28.57)(8) + (42.85)(OT_2) = \$300
(42.85)(OT_2) = 300 – 228.56
OT_1 = 71.44/42.85 = 1.67


Wages;
Income
$571.40
$500.00
$300.00
$228.56
$200.00
Labor/Leisure Model of
Labor Supply
U2
U1
0
16
5.33
10.67
4.33
9.67
8
8
16
0
Leisure
Labor