

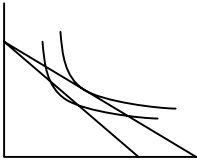
Review

Utility maximization

$$\text{Max } U(x,y) \text{ subject to } P_x \times x + P_y \times y \leq M$$

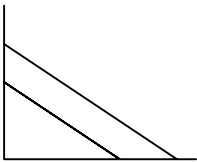
Solution (demand functions)

$$x(P_x, P_y, M) \quad y(P_x, P_y, M)$$



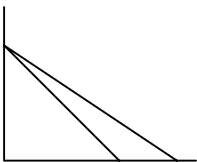
Income Effect

The effect based on a change in *income*



Substitution Effect

The effect based on a change in *price*



Expenditure minimization

$$\text{Min } P_x \times x + P_y \times y \text{ subject to } U(x,y) \geq \bar{U}$$

Solution (Hicksian demand functions)

$$X_h(P_x, P_y, \bar{U})$$

$$Y_h(P_x, P_y, \bar{U})$$

where

$$\bar{U} = U(x^*, y^*)$$

H = Hicksian

Labor Supply

Labor supply is the theory of the individual decision of how much to work at the going wage. Since the alternative to working is leisure, we can formulate a theory of the demand for leisure, and deduce the underlying labor supply behavior.

Composite commodity – A composite commodity allows us to think of more than two goods, while still using the two-good tools and diagrams.

Now, the normal equation for the budget line is...

$$P_x \times x + P_y \times y \leq M$$

x => good of interest (e.g. cups of coffee, gallons of gasoline, hours of leisure)

y => dollars spent on all other goods (composite commodity, this the new feature)

With a composite commodity, $P_y = 1$, because the price of one dollar spent on other goods is one dollar.

$$P_x \times x + y \leq M$$

For many people their income is determined by how much they work (i.e., income, M, isn't just given). In economics, we consider a model to look at this. Naturally, it will be quite stylized because it is a complicated problem.

We are imagining that an individual can work as many hours as he or she wishes (up to 24) at the going wage. In our model we use the following variables:

w = going wage rate per hour worked

h = hours of leisure

work = 16 – h (assume 16 hours of free time per day minus the number of hours of leisure)

C = dollars on other goods – “consumption”

As you work more hours you can spend more on other goods. If you could earn the same amount of money (other things being equal) people would choose to work less.

Now derive the budget constraint:

$$C = (16 - h) \times w$$

(what you consume, i.e., dollars spent on other goods, must be equal to what you earn. (16-h) is hours worked, which we multiply by the wage for labor earnings.)

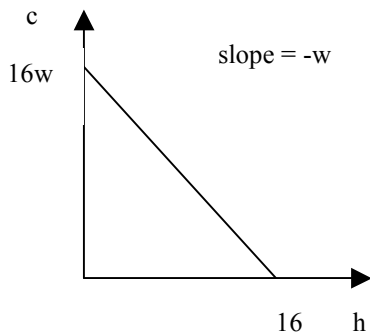
Rearrange:

$$C + wh = 16w$$

or

$$(1/w) \times C + h = 16$$

From the first formulation, we see that w is effectively the price of leisure – what you give up, the amount you lose, if you take one extra hour of leisure.



We have discussed that it is possible that the demand for a good is *upward sloping* (*Giffen good*). Likewise it is possible that the demand for leisure could be upward sloping – you would only expect to see this when income effects are very strong. A change in the wage rate would have a substantial effect on your income so if as income increases the demand for leisure goes up then it is a theoretical possibility that the demand for labor could slope up (or the supply of labor slope down).

As we increase the wage rate – two effects

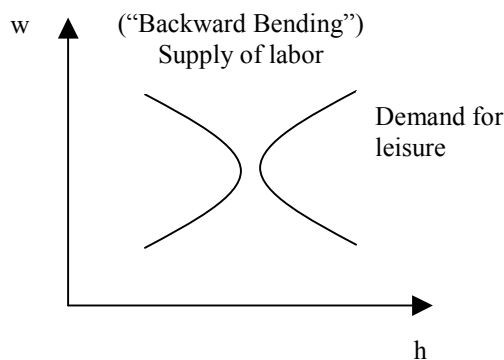
- 1) Substitution effect – a change in wage rate affects the “price of leisure”. For instance, if the wage rate increases, it becomes more costly to take time off, so you would want to work more hours. Therefore, the demand for leisure decreases.
- 2) Income effect – a change in wage rate affects income. For instance, if the wage rate increases, income is greater, so you would want to work fewer hours. Therefore, the demand for leisure increases. Or as wage decreases, you feel (are) poorer so want to work more hours.

Now, the question lies in which effect – the substitution or income effect – is greater.

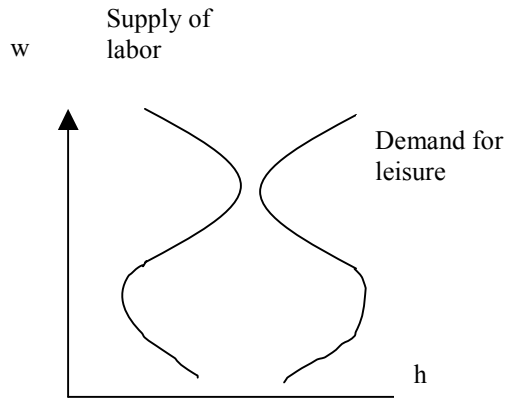
We could think that the change in wage rate affects people at different income brackets differently:

If you are at minimum wage and the wage goes up 50 cents, then the income effect may not be enough for you to take time off (the income effect is not greater than the substitution effect), so the supply of labor would increase (upward sloping supply of labor, downward sloping demand for leisure). But if you were in a higher income bracket, an increase in wage rate may allow you to take more time off (the income effect is greater than the substitution effect), so upward sloping demand for leisure downward sloping supply of labor.

The graph may look like something like this

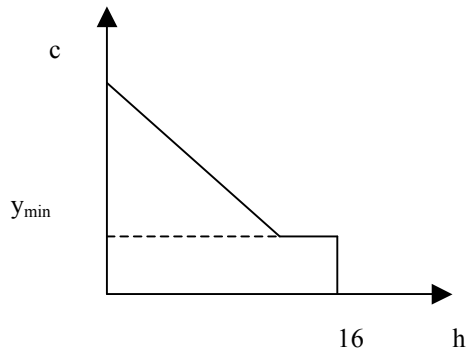


At lower wage rates the income effect dominates, so we see the typical slopes. At higher wage rates we see income effects dominating. Speculation: there might be one more change of slopes at the bottom. If you’re very poor, and wage goes down you may have to work more.



Now apply this theory to take into the existence of a rudimentary welfare scheme.

Welfare changes your budget set, not your preferences.

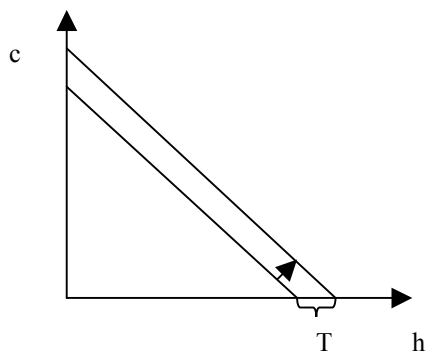


y_{\min} is the amount of income that a welfare recipient would receive if below this level.

The slope of the budget line gives us the price of leisure ($-w$). Notice that the piece of the budget line with welfare is flat, so the price of leisure is zero. It creates a range in which there is no motivation to work. People would prefer the corner point (to work nothing at all) than any other point within the welfare scheme. There is a group of people who may work a small number of hours, but who no longer have the incentive to work.

Some alternatives to the basic welfare system

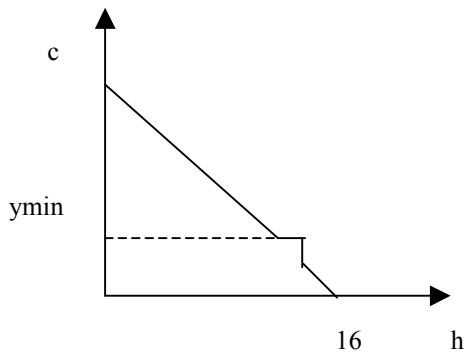
One alternative to consider is to provide a transfer to an individual unrelated to the number of hours they work. But then you end up giving welfare to those who don't need it. If you give everyone a transfer amount (T), then the budget line shifts up. One implication of this is that the disincentive to work (above) has been removed. By shifting the budget set, you have kept the same slope of the line, therefore the cost of leisure is the same. Therefore there is no substitution effect, but all income effect. As income increases you would want to work less. This scheme may encourage people to take more hours of leisure.



Two other examples of welfare schemes

Minimum work requirement

You must work at least three hours a day to qualify for welfare.
 At least we are removing the incentive to work zero hours, however, the incentive to work in the range of hours above the minimum is low within the range of the welfare. To get rid of this, you may not pay the full wage rate for welfare.



Earned income tax credit

(see article)