Income Leisure Choice Theory

The Plan:

1. The Basic Model: Utility-maximizing choices.

2. Behind the Basic Model: Income and Substitution Effects

3. Evidence on the Basic Model

1. Income-Leisure Choice Theory: The Basic Model

- one of the most important decisions made by any individual is how to allocate time between activities in the market and all other activities
- time in the market yields income, perhaps also some intrinsic satisfaction. Call this "work".
- time at home also produces satisfaction. Call this "leisure". This typically doesn't yield income.
- but only a fixed amount of time is available
    - how to allocate time between these uses?
    - the answer to this question is thought of as "labor supply" but is actually much broader than that.

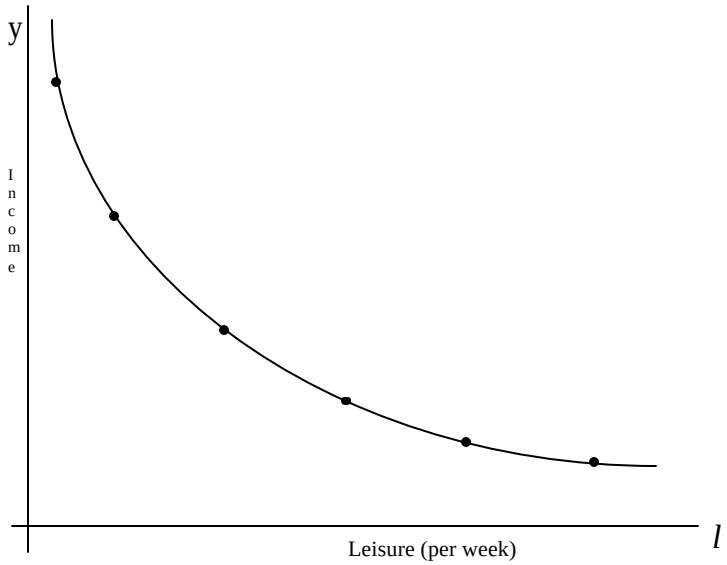
To analyse this decision, start with the following simple case:

- a single-adult household (multiple adult households are more complicated)
- the adult can work as much (or little) as he/she wants at $10/hour
- no fixed costs of working, no income taxes.
- Needs to decide how much work to accept

Order of Analysis

1. Preferences
2. Constraints
3. Optimal Choices
4. Comp. Statics
5. Understanding Comp. Stats: Income vs. Substitution Effects

(1) Characterizing preferences (using indiff. curves)



Properties of Indifference Curves

(Assuming both y and *l* are "goods" - i.e. you prefer more of both)

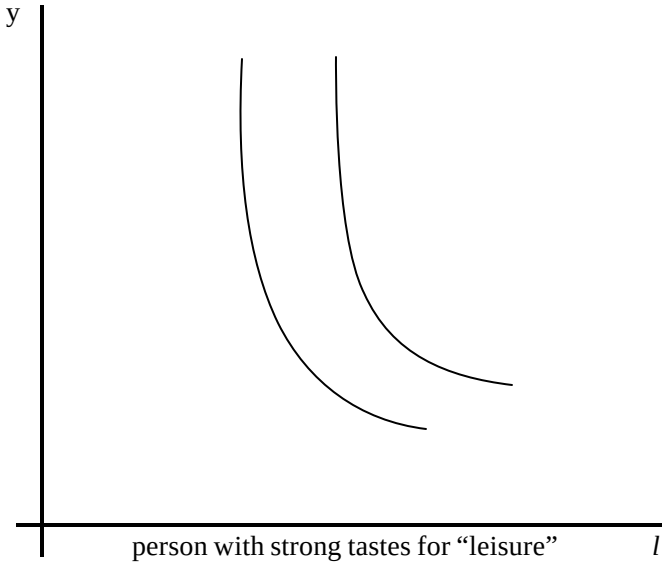
1. downward sloping:
$|\text{slope}| = \text{MRS} = MU_l / MU_y$
(the slope tells us the amount of income you're willing to give up to have 1 more hour to yourself)

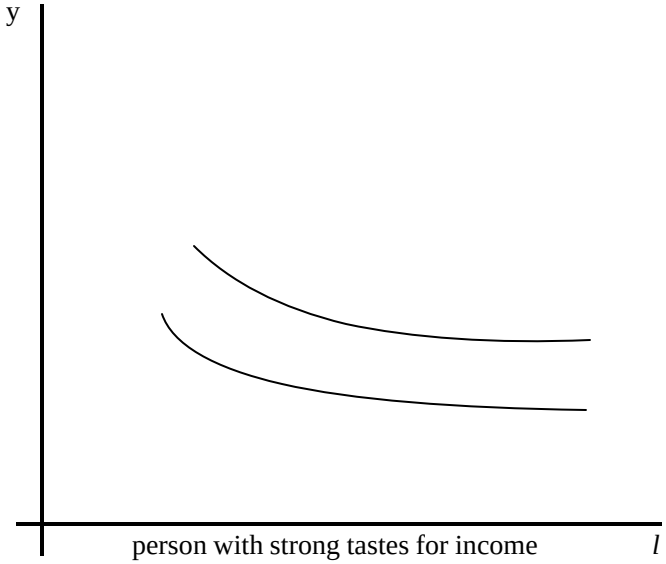
2. |slope| (MRS) diminishes as move right
(this means that the more "leisure" you already have, the less income you'll give up to have even more leisure)

3. a whole family of IC's exists; every bundle has an IC through it

4. IC's further from origin correspond to higher levels of utility

Understanding Indifference Curves:





(b) Characterize Budget constraints

! what are the combinations of y and *l* that you can achieve given wages, child support payments, etc.?

h = time working (in market)
y = income
w = wage (e.g. $10)
G = other income (e.g. child support from spouse)

Thus: **y = w h + G**

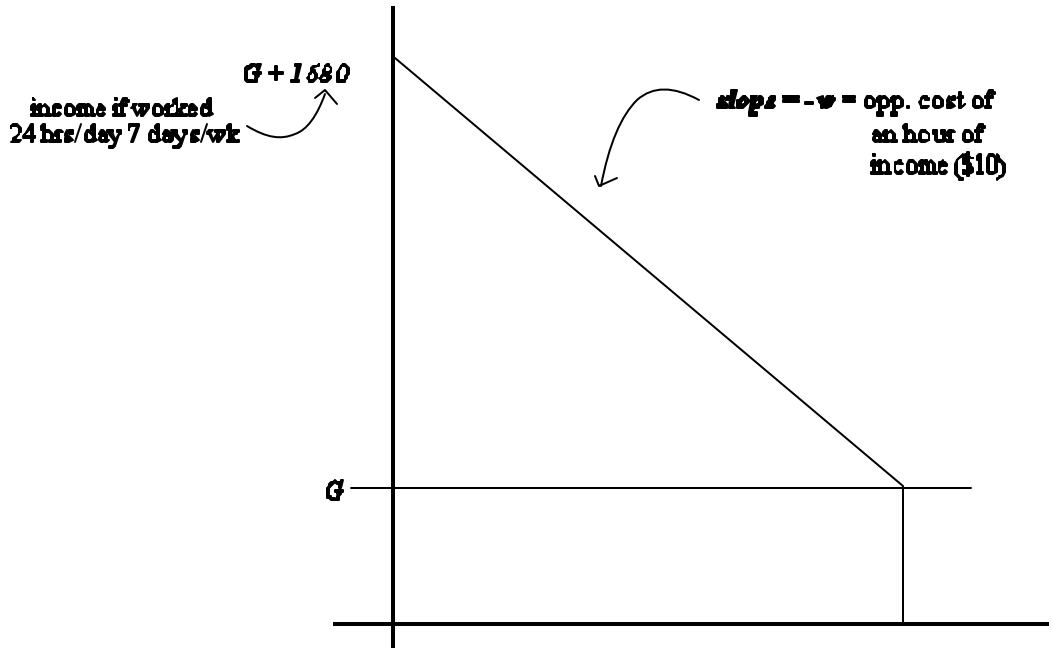
To graph this with y and *l* as axes, need to express it in terms of *l*, not *h*. On a weekly basis:

h = T - *l* Therefore in terms of y and *l*:

y = w (T - *l*)+ G

y = (wT + G) - w*l*

! if w=$10, T=168 then wT=1680. Feasible set looks like:



note: in general | *slope of budget constraint* | = *w* (wage rate)

(c) Utility Maximization

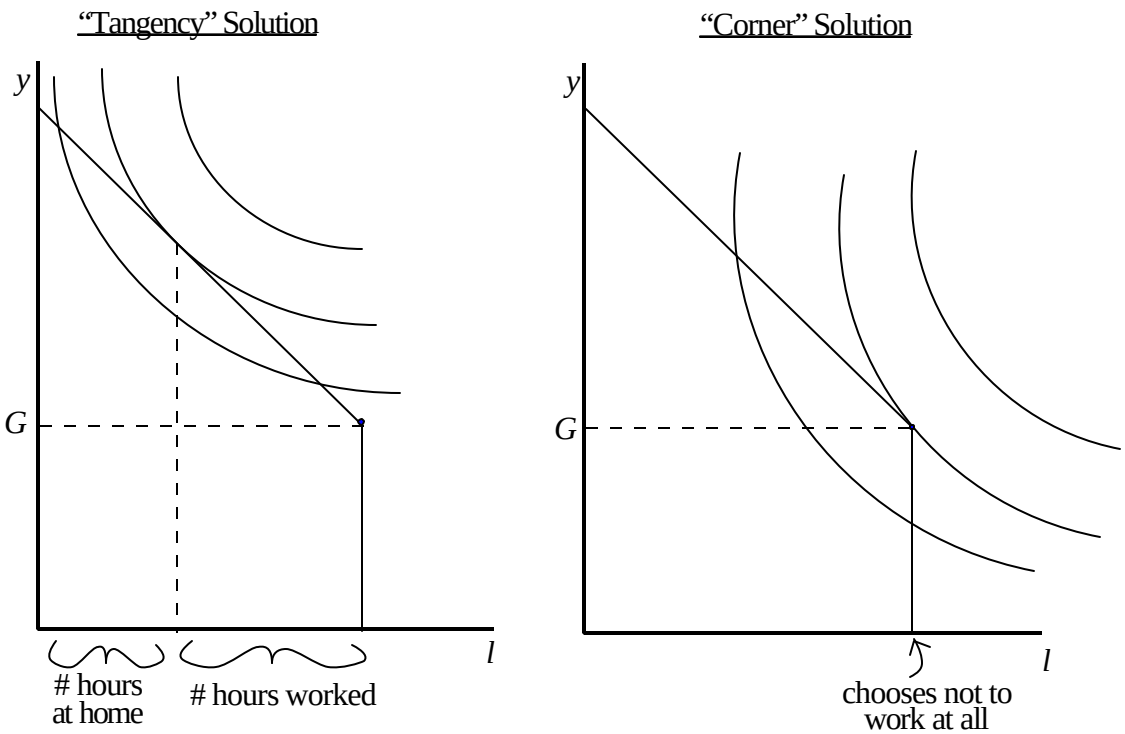
What is the individual's best policy?

! Characteristic of best policy:

unless individual is at a "corner" (doesn't work at all)

$$*slope\ of\ I.C.* \ ' \ MRS \ ' \ \frac{MU_l}{MU_y} \ ' \ w \ ' \ *slope\ of\ B.C.*$$

(This is the U-max rule)



(d) Comparative Statics

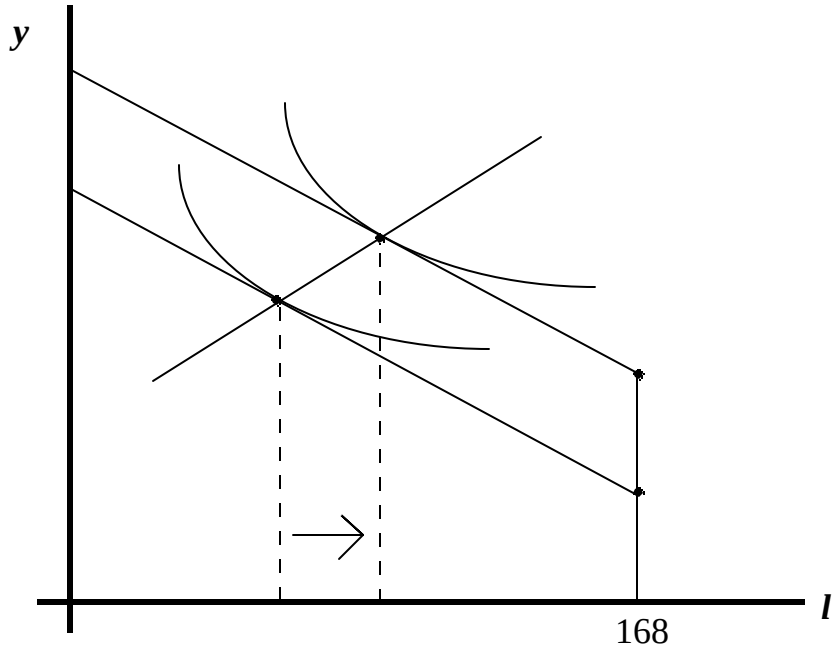
(i) Effects of other income, G (eg. court settlement gives more child support)

recall the budget constraint is: $y = (wT + G) - wl$

- ↑ G raises y intercept
- raises income at l=168 (h=0)
- leaves slope unchanged

What you typically expect:

- y, l both normal goods (pos. sloped ICC)
- if l normal, ↑ other income ⇒ work less



(ii) Effects of an increase in wages

! consider a higher wage, say $12/hour. What does this do to B.C.?

! recall: $y = (w T + G) - w L$

- thus both the intercept and the | slope | rise

In our example:

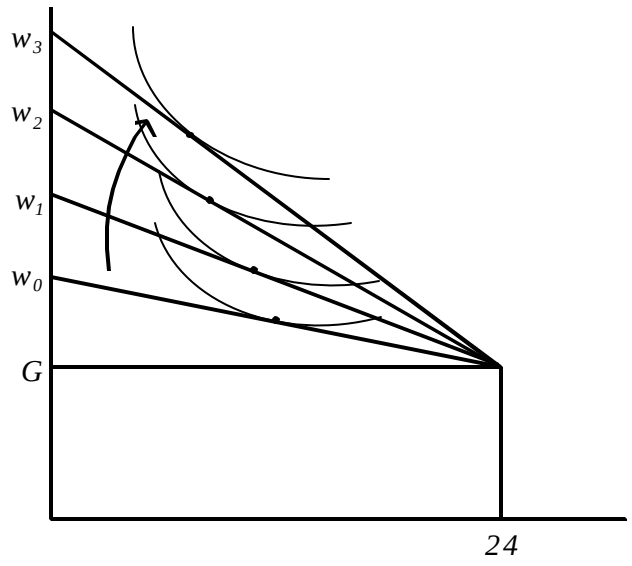
! Old B.C.: $y = 10 (168 - l) + G$
$= 1680 - 10 l + G$

! New B.C.: $y = 12 (168 - l) + G$
$= 2016 - 12 l + G$

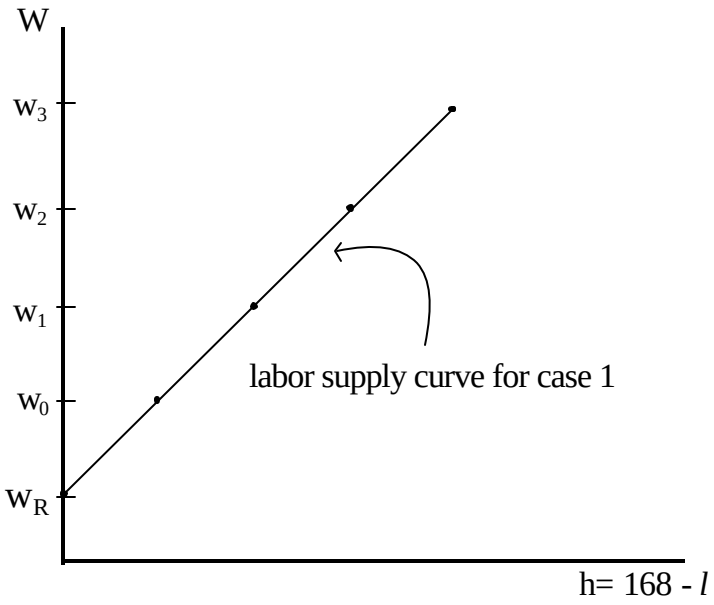
^ Y-intercept and slope has increased but
income at zero hours work (l=168) is unchanged at G

Now there are two cases, even if leisure is a normal good:

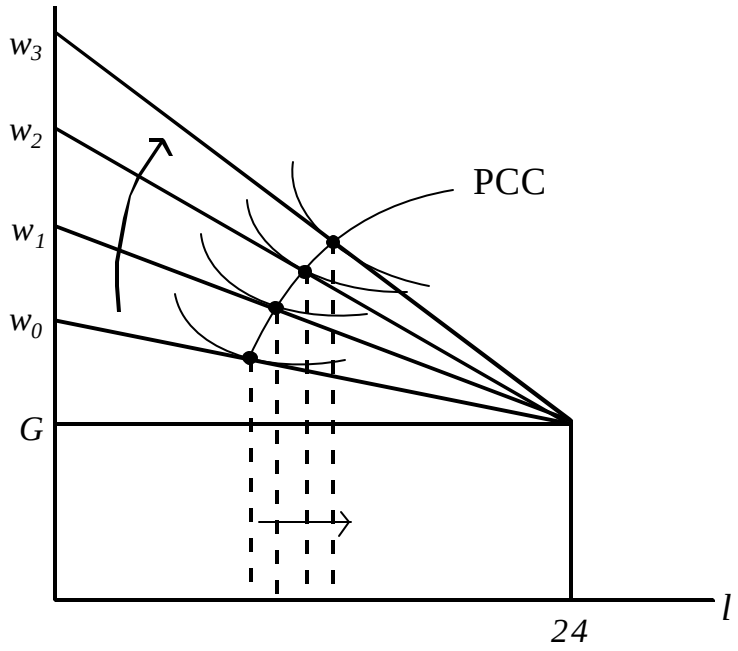
case 1: raise wages continuously, starting at w_0:



! This generates a negatively-sloped "price offer curve" (higher wages lead to less leisure and more income. The labor supply curve for case 1 thus looks like:



case 2: again, raise wages continuously, starting at w=0



! as the wage rises, works less.

! This would, of course, generate a negatively-sloped labor supply curve.

! Does this make sense?

2. Behind the Basic Model: Income and Substitution Effects

Plan: a. Income and substitution effects for purchased goods (should be review)
b. Income and substitution effects for goods that are sold (such as labor)

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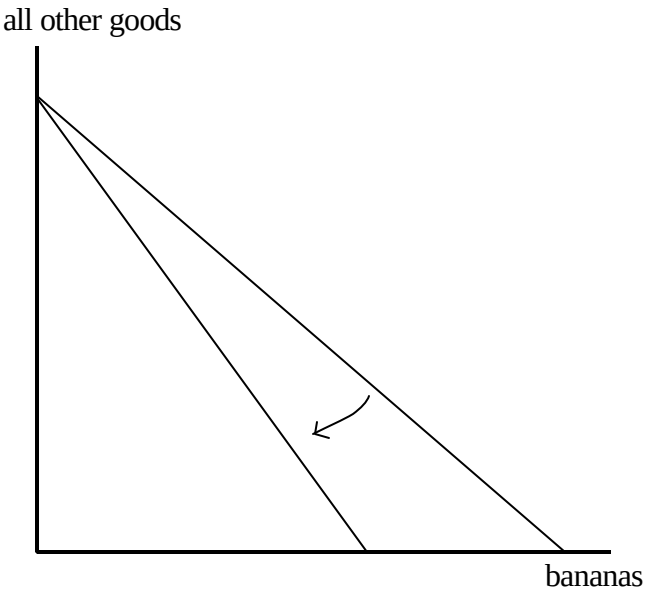
a. Income and substitution effects for purchased goods

! To see what's going on with labor, recall the theory of income and subs. effects of a price change for consumer goods. This helps us understand the effects of a price change by decomposing it into two components: income and substitution effects.

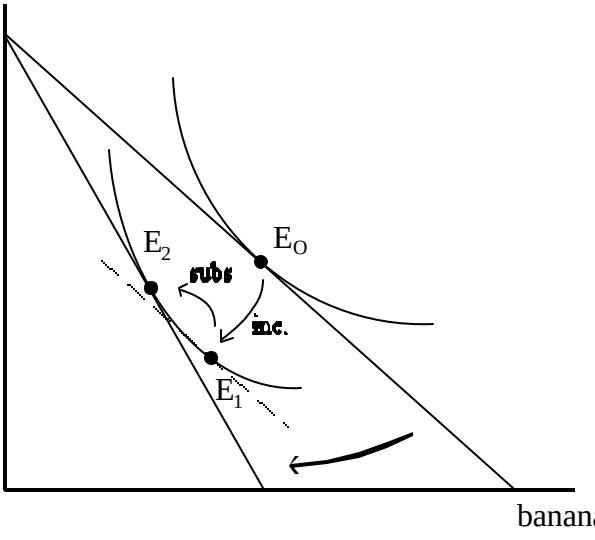


[We'll assume in all cases that goods are normal]

! consider an 8 in the price of bananas

! slope of b.c. increases: this raises the opportunity cost of a banana and gives rise to a substitution effect

! b.c. moves closer to origin: this makes the household worse off and gives rise to an income effect



decomposition: if bananas normal

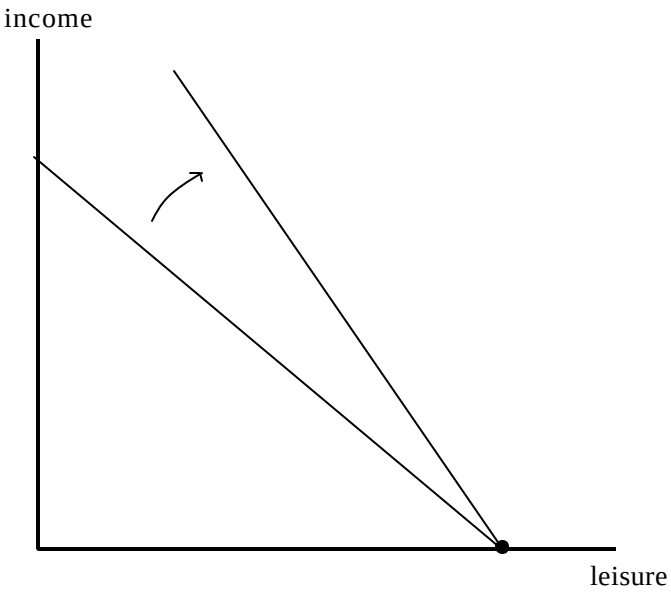
E_0 ! E_2 : total effect

E_0 ! E_1 : inc effect
(9 well-being to new level without changing opp costs)

E_1 ! E_2 : subs effect
(change opp costs to new level without changing utility).

Thus, for any normal good which is purchased by an individual, income and subs. effects of price changes reinforce each other, both tending to 9x when 8p_x

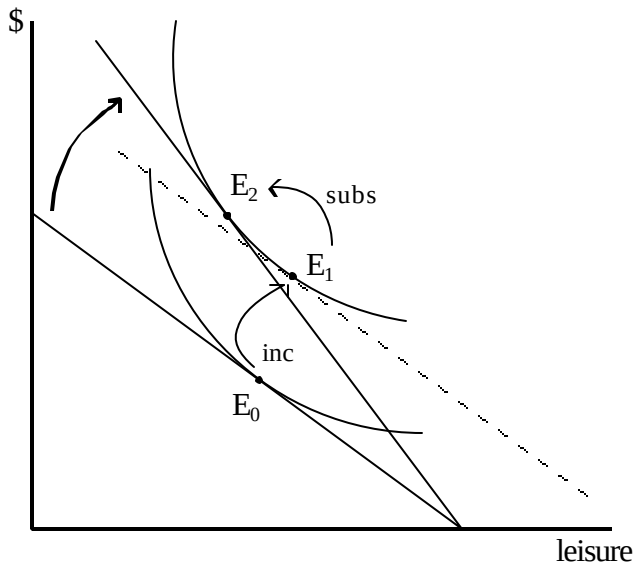
2) Now consider labor (or better, time), a good that you sell



! What happens when 8its price, the wage?

! |slope| of b.c. increases (steeper),8opp cost of an hour of leisure - subs effect

! b.c. further from origin; *better* off - income effect *(this is the part that is different from bananas)*



Consider two cases with different effects of a wage increase. Note that *leisure is a normal good in both cases*.

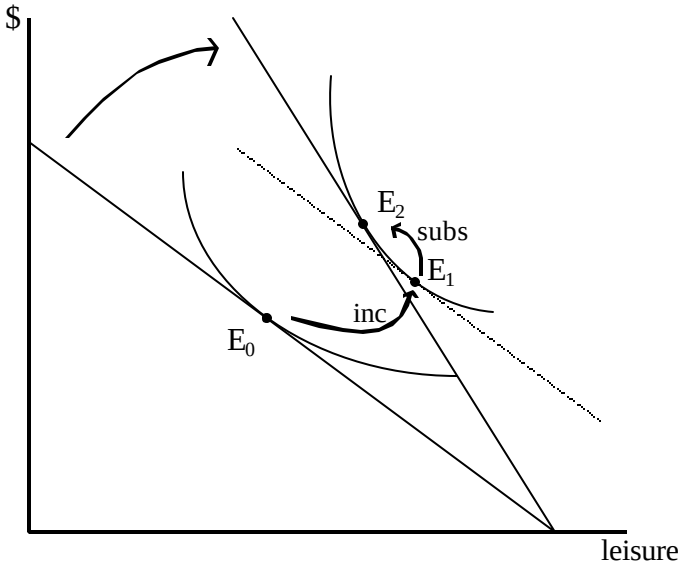
Case a: 8w = 8 L_S

E_0 ! E_1 : inc effect (change well-being without changing opp costs) [8 leisure, work less]

E_1 ! E_2 : subs effect (change opp costs without changing well-being) [9 leisure, work more]

! when leisure is normal, inc. and subs always work in opposite directions

! in this case, (case a) subs effect outweighs inc effect, so the total effect (E_0 ! E_2) involves an increase in labor supply.



case b: 8w = 9 L_S

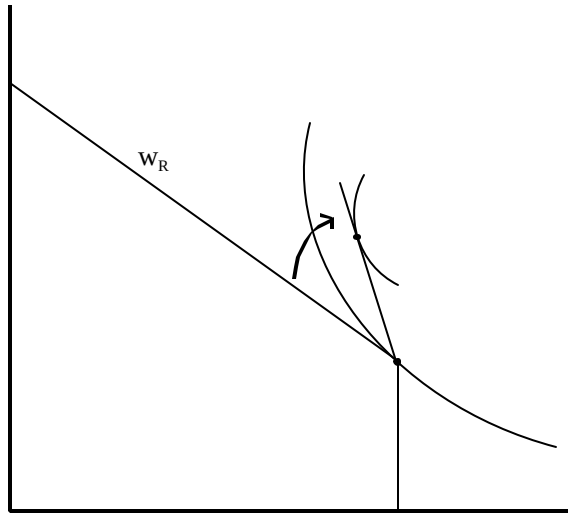
E_0 ! E_1 : inc effect [8leisure, 9 work]

E_1 ! E_2 : subs effect [9 leisure,8 work]

E_0 ! E_2 : total effect [9 leisure,8 work]

! now, INC outweighs SUBS and a wage increase leads rational individuals to work fewer hours.

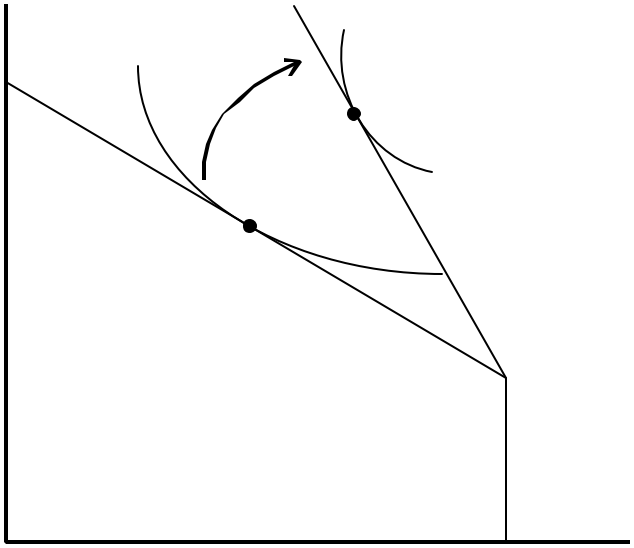
Avoiding "perverse" labor supply responses: when are they more or less likely to occur?



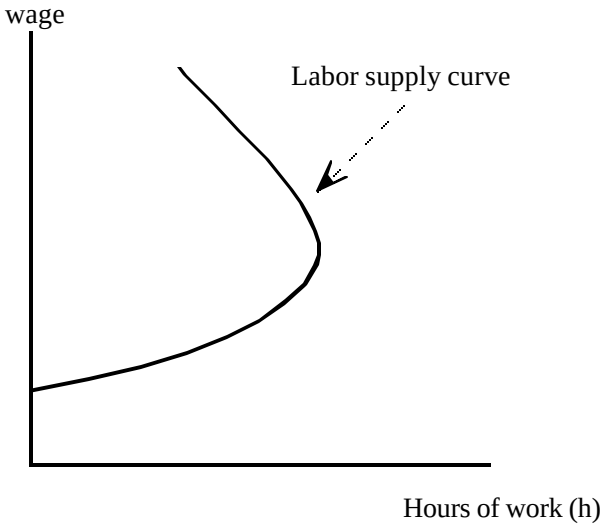
1. Participation decisions. An individual initially at the endowment point (not working at all) does not experience an income effect. Thus the decision *whether to work at all* always responds positively to the available wage.

When the initial level of h equals zero, a wage increase can do only one of two things: nothing, or raise labor supply. The lowest wage that draws the individual into the market is called the **reservation wage** (w_R).

By the same token, "perverse" responses are very likely if the initial level of work hours is high:



Putting the above two tendencies together, economists often posit a "backward-bending" labor supply curve, initially increasing, then decreasing...



2. Temporary wage changes:

The theory we have examined so far ignores the possibility of reallocating income and work among many periods with potentially different wages. In a life-cycle context, it is therefore most appropriate for analysing the effects of a permanent, unanticipated change in wages.

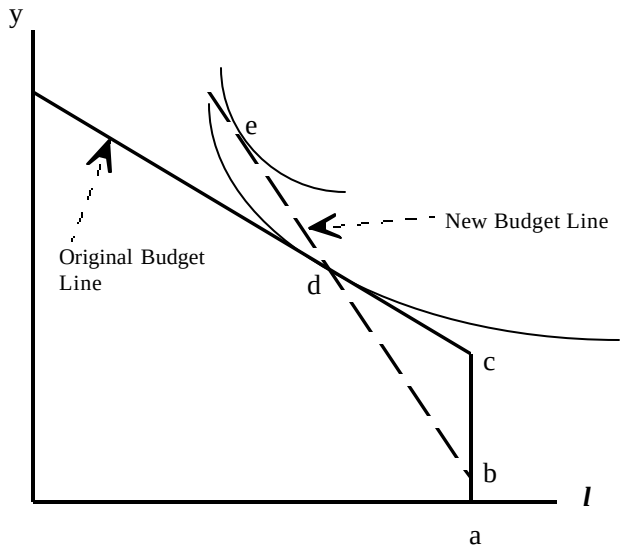
For temporary wage changes (whether anticipated or not), income effects are unimportant if the consumer can freely save and borrow income across periods. Thus the theory predicts that people should always respond positively to wage increases they expect to be temporary. (This is the point of the lifecycle labor supply models discussed in pp 69-77 of the text).

Illustration: Consider your own labor supply response if:

a. your wage rose to $10,000 per hour for the rest of your life. (income effects matter; likelihood you will reduce your lifetime labor supply)

b. your wage rose to $10,000 per hour for just today. (income effects less important, you will probably work more hours today than you would have otherwise.)

3. Compensated wage changes: Suppose that I first raise your wage, but then cut your nonlabor income by just enough that you can just afford your original allocation of income and leisure. (Example: raise the piece rate while reducing the daily minimum pay). By undoing the income effect, this "compensated" wage increase will increase effort for sure. It will not raise income or utility as much as an uncompensated wage increase.



-new budget line is steeper than original, but has a lower level of "guaranteed" income:
old "non-labor" income: ac
new "non-labor income: ab

-the new level of non-labor income is selected to make the original equilibrium, d, just affordable.

-the new equilibrium will be at e, which is always to the left of d. (As long as indifference curves are convex). Thus labor supply rises unambiguously.

A Final Note on Basic Labor Supply Theory:

Although L is different from most goods because it is something we sell, it's not different from any other good households sell. The conclusions about effects of labor supply apply to anything that households are involved with and sell.

- examples: savings (application to current negative savings rates)
  peasant rice farmers
  natives and furs
  blood and organs

(In all these cases, an increase in outside income, and/or an increase in the market price of the good, can lead to a reduction in the amount supplied to the market).

Testing and Implementing Labor Supply Theory

There have been five main approaches:

1. "Traditional", cross-section studies.

-In a sample of several thousand persons (focus has often been married women), regression studies have been done on the correlation between the hourly wage they can earn and the number of hours they work. Typically, they "control" for other possible impacts on labor supply, such as the number and age of children in the household.

-do those who earn a high hourly wage work more hours? Yes.

-do those whose husband's total earnings are higher work fewer hours (this is meant to capture the idea of income effects)? Perhaps surprisingly, yes, but only if you control for wages (i.e. if you compare women whose *own* wage rates are the same)

But these correlations could be explained by other things

-for example, suppose some women have higher "tastes for work" than others (preference for income versus leisure; flat indifference curves). Suppose they worked more hours in the past, and suppose that this greater investment in work has resulted in a higher wage today. High-wage women will thus be observed to work more hours than other women today, but this is not a causal effect of the higher offered wage.

2. Panel data studies.

-Observing a large number of individuals over several years, do people tend to work more hours in years when their hourly wage is higher than "normal"?

Yes, but it's not clear how much of this is driven by voluntary labor supply choices. (High hours *and* high wages could both be demanded/offered by firms in "good" times), without the high hours being a voluntary response to the higher offered wages.)

3. Social experiments.

-there are some social experiments on the effects of negative income taxes on labor supply, with implications for income and wage elasticities of labor supply. We will discuss these under "social policy effects on labor supply".

4. "Natural" experiments

-studies of lottery winners and recipients of unanticipated bequests find negative income effects on labor supply. (though not large). See Imbens, Rubin and Sacerdote.

5. *Laboratory Experiments.*

-leisure is a normal good for pigeons
-when faced with compensated wage increases, pigeons work harder. (Battalio, Green and Kagel, American Economic Review September 1981, pp. 621-632.