

Econ 100A - Problem Set 4

Supply of Labor

1. Let $U(L_e, I) = L_e^2 I$. What is the individual's labor supply function ($L_a(w, I_0)$)? How many hours does the individual work if the wage (w) is 10\$/hr and non-wage income (I_0) is 320\$/wk?
2. Illustrate the income and substitution effects of a rise in a consumer's wage, w , upon their labor supply.
3. Using one budget line and 1 indifference curve, illustrate a case in which an individual's wage is such that the individual chooses not to work at all.
4. Your friends (some macroeconomists) have a theory that people's utility functions $U(L_e, I)$ for leisure and disposable income might take the linear form, $U(L_e, I) = L_e + I$. Show that they are idiots. (Hint: Try drawing a picture and think about what this theory implies as wage rates get very high.)
5. Use budget lines and indifference curves to illustrate the case where a simultaneous doubling of the wage rate and a doubling of my non-wage income would have no effect on my labor supply.
6. Using two indifference curves and two budget lines, illustrate how a change in the wage rate and/or non-wage income could actually raise a consumer's utility, even though they end up consuming less leisure as a result of the change.
7. Using at least 3 indifference curves and 3 budget lines, illustrate the preferences of an individual whose supply of labor curve is upward sloping for low wage levels and backward bending for high wage levels.
8. If my utility function for leisure time and disposable income takes the form $U(L_e, I) = \min[L_e, I]$ what is the formula for my labor supply function $L_a(w, I_0)$?

Supply of Capital

9. You've just won the state lottery and will receive 20 annual payments of \$70,000, with the first payment arriving 1 year from today. It is easy for you to borrow or lend on the capital market at an interest rate of 8% per year. If someone offered to buy your stream of winnings for a one-time payment of \$1,000,000, would you sell?
10. Using indifference curves and budget lines in the (c_1, c_2) plane, illustrate a situation in which a rise in the interest rate, i , causes someone to change from being a borrower to a saver, but leaves them with exactly the same utility as they had before.

11. Using budget lines and indifference curves, illustrate the case of an individual with utility function $U(c_1, c_2)$ over two-period consumption streams, who faces an interest rate of $i=10\%$ per period, and who would save \$10 if their income stream were $(I_1, I_2)=(\$100, \$100)$, but who would borrow \$16 if their income stream were $(I_1, I_2)=(\$200, \$200)$

12.

- a. Without using graphs or equations, give a verbal explanation of why the income and substitution effects of a rise in the interest rate would almost surely lead a borrower to borrow less. Explain your answer in terms of relative prices and purchasing power.
- b. Now use graphs to illustrate your explanation.