

Quick Review Utility Maximization

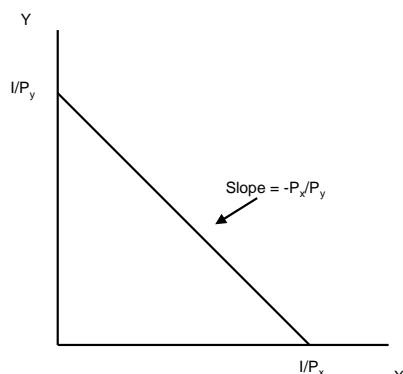
Econ 40565
Fall 2007

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Quick review – Consumer maximization

- Max $U(x,y)$ subject to $I = P_x X + P_y Y$
- Slope of the budget constraint is $-P_x/P_y$
- What does the slope of the budget constraint represent?
 - How much Y do you need to give up to get one more unit of X
 - Suppose $P_x = \$6$ and $P_y = \$2$, slope = -3
 - You need to sacrifice 3 units of y to get one more x

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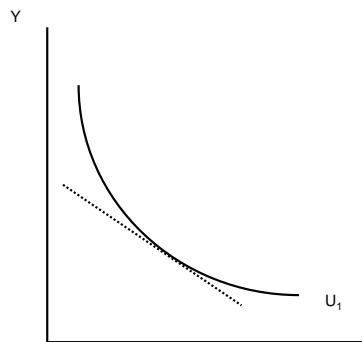
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- Indifference curve, collection of points that represent equal utility
- Slope of the Indifference curve
 - Line just tangent to the curve
 - Slope equals Marginal rate of substitution
 - $MRS = -MU_x/MU_y$

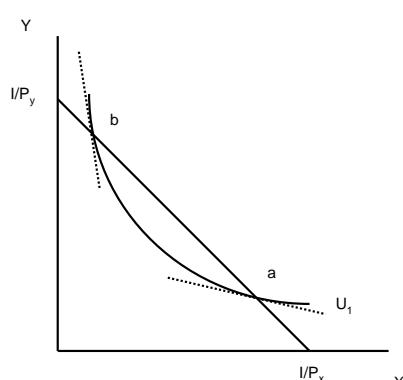
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- Represents the amount of y you need to give up to consume one more unit of X and keep utility the same
- $MU_x = 0.5$ and $MU_y = 2$, $MRS = -1/4$
- To get one more 1 x , you need to give up 1 quarter y – holding utility constant

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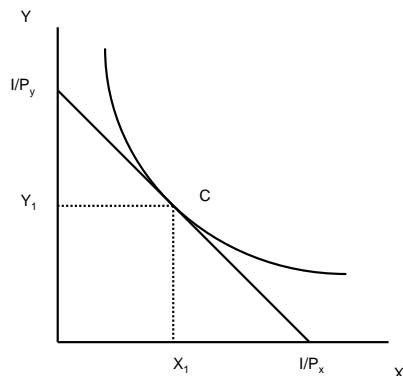
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- Notice at point B
 - $MU_y/MU_x > P_x/P_y$
 - $MU_y/P_x > MU_y/P_y$
 - Extra utility from spending \$1 on X is greater than the utility from taking \$1 from Y
 - Therefore, should increase spending on X
- Notice at point A
 - $MU_y/MU_x < P_x/P_y$
 - $MU_y/P_x < MU_y/P_y$
 - Extra utility from spending \$1 on Y is greater than the utility from taking \$1 from X
 - Therefore, should increase spending on Y

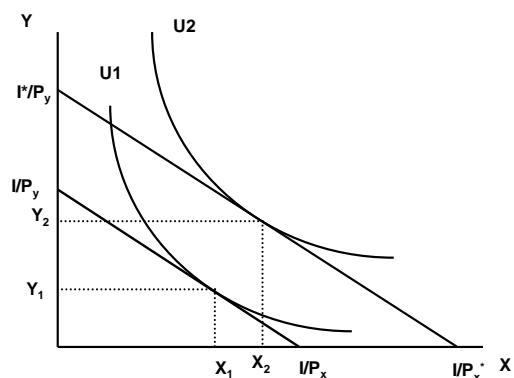
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- Notice at point C
 - $MU_y/MU_x = P_x/P_y$
 - $MU_y/P_x = MU_y/P_y$
 - Extra utility from spending \$1 on X is equal to the extra utility from taking \$1 from Y
 - Therefore, you cannot re-arrange spending and make yourself better off

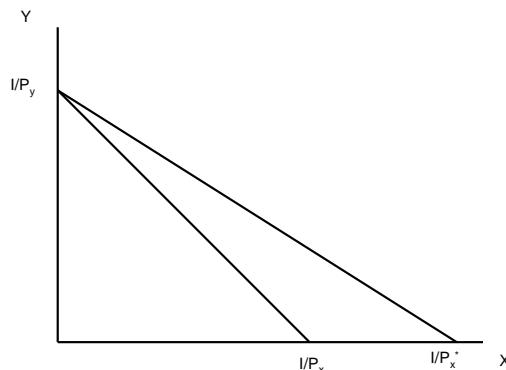
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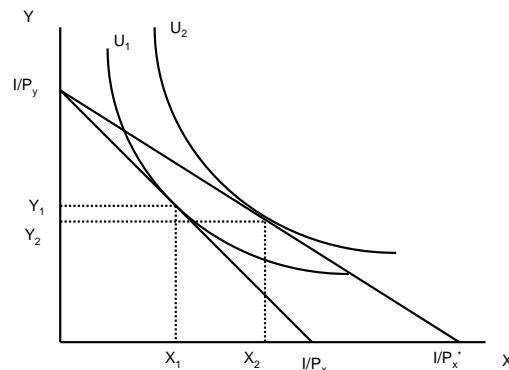
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- Suppose price of X falls to P_x^*
- Maximum amount of Y you can purchase is still I/P_y
- Maximum amount of X you can purchase is not I/P_x^*
- Budget constraint rotates about point C
- Slope of budget constraint is now $-P_x^*/P_y$
- Amount of y you need to give up to get X has now increased

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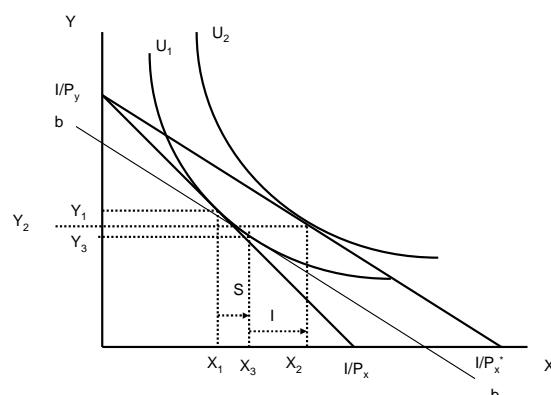
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- Price of X has fallen relative to Y
 - Substitution effect, encourage more consumption of X, less of Y
 - Every dollar now goes farther, real income has increased, X is normal good, so income effect says you should increase X and Y
- Net effect
 - Unambiguous increase in X
 - Uncertain impact on Y

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- To isolate income effect, draw line parallel to new budget constraint until just tangent to old indifference curve (thin line bb)
- Movement along old indifference curve is only attributable to change in prices
 - Substitution effect
 - Utility is the same, therefore, movement is due only to price changes

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- Compare demands between the two parallel budget constraints
 - Only difference is income (price ratios the same)

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- Along X axis
 - X_1 to X_3 same utility, different prices, sub effect
 - Notice that sub effect is (+)
 - X_3 to X_2 same prices, different income, income eff
 - Notice income effect is (+)

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- Along Y axis
 - Y_1 to Y_3 same utility, different prices, sub effect
 - Notice that sub effect is (-)
 - Y_3 to Y_2 same prices, different income, income eff
 - Notice income effect is (+)

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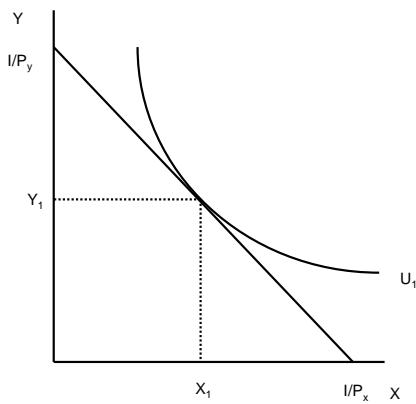
Example 2

- Price of Y increases to P_y^*
 - Substitution effect
 - Increase x, decrease y
 - Income effect
 - Relative income has dropped
 - If Y and X are normal goods, demand for both should drop

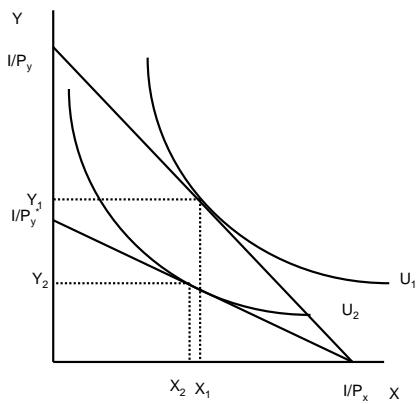
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- Substitution effect
 - Y_1 to Y_3 (-)
 - X_1 to X_3 (+)
- Income Effect
 - Y_3 to Y_2 (-)
 - X_3 to X_2 (-)

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