

Example 1:

Bryan has just received a \$1000 paycheck. His two favorite goods that he consumes are video games and movie tickets. Video games are \$50 each and Movie Tickets are \$10 each.

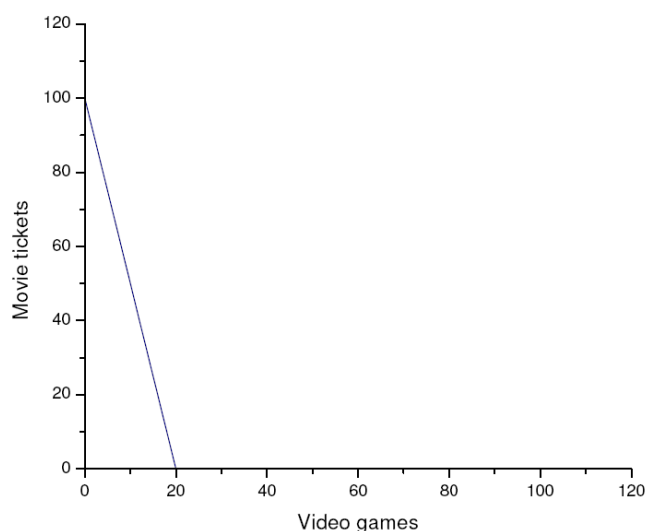
1. Write down the equation for Bryan's budget constraint

$1000 = 50 \cdot VG + 10 \cdot MT$, where VG is the number of video games and MT is the number of movie tickets

2. Find Bryan's real income in terms of movie tickets and real income in terms of video games.

The real income in terms of movie tickets is $1000/10 = 100$, the real income in terms of video games is $1000/50 = 20$.

3. Graph Bryan's budget constraint with video games on the X-axis and movie tickets on the Y-axis. Show the budget set on your graph.



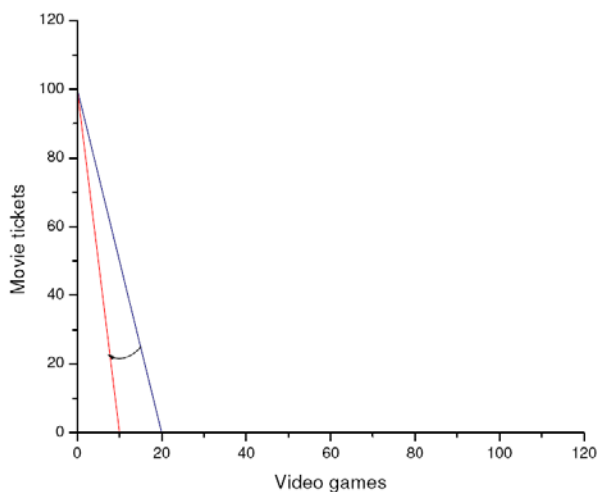
The budget set is a triangle bounded by the axes and the budget line.

4. What is the slope of Bryan's budget constraint? What are the intercepts?

The slope is $-P_{VG}/P_{MT} = -50/10 = -5$, this is the real price of video games in terms of movie tickets. The intercepts are the same as real incomes from part (2): vertical intercept is 100; horizontal intercept is 20.

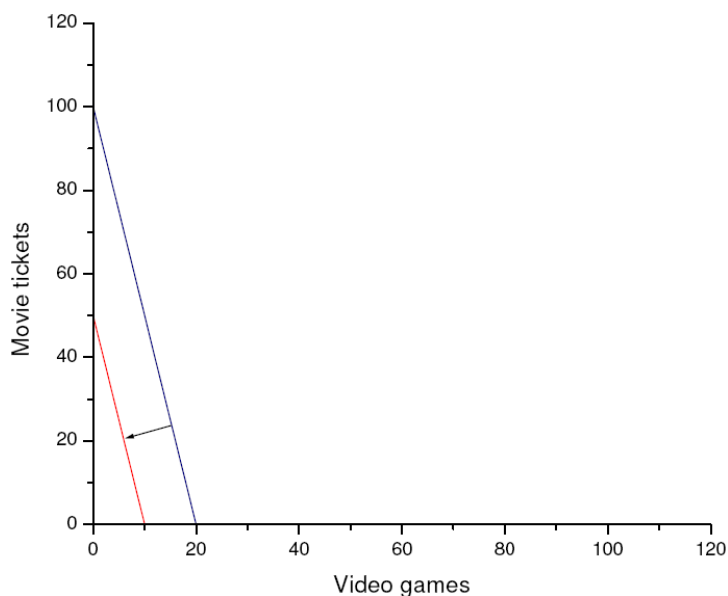
5. What happens to the budget line if the price of video games doubles?

The budget line rotates inwards:



6. What happens to the budget line if both the price of video games and movie tickets double?

The budget line shifts inwards:



7. What happens to the budget line if Bryan's paycheck was \$500? Use the original prices for video games and movies.

The budget line shifts inwards, same as in 6

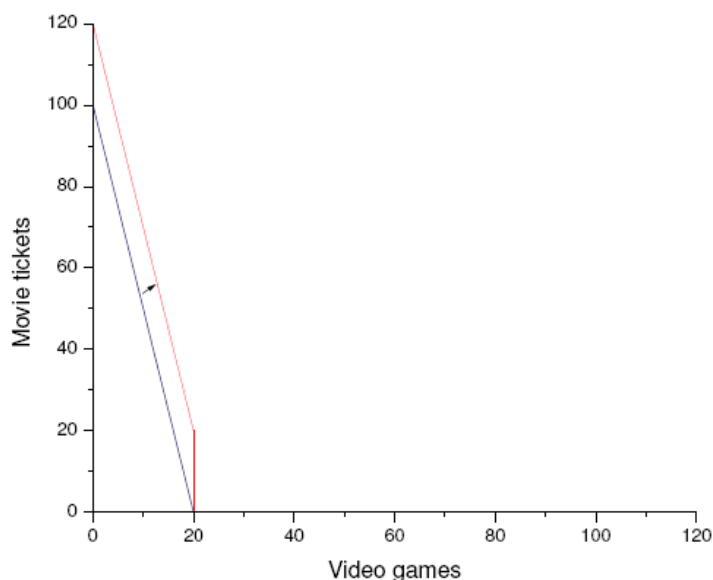
8. What is the difference between what happened in 6 and 7?

The reasons for the shift of the budget line are different, but the consequences (reduced consumer's budget set) are exactly the same

Week 1 Solutions (January 20, 2011)

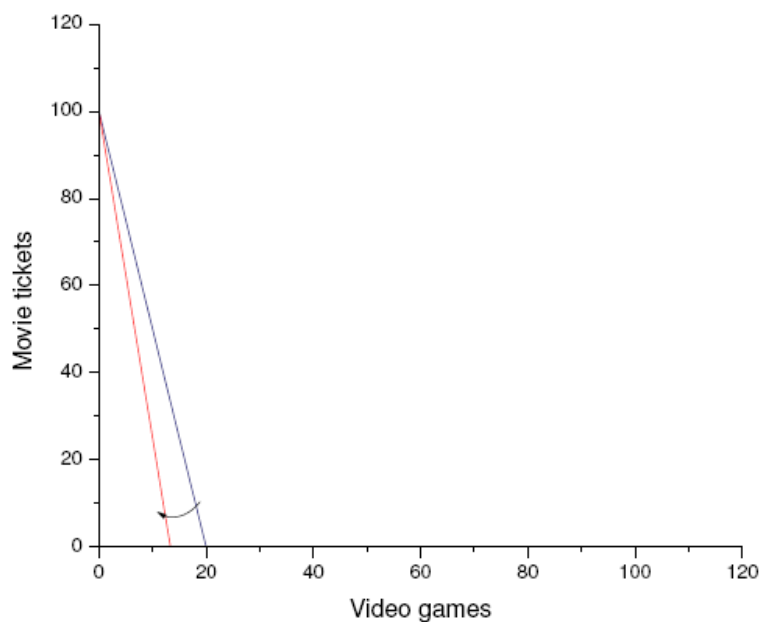
9. A non-profit organization promoting the development of alternative movie theatres provides Bryan with a grant of \$200 that can only be spent on movie tickets (Bryan doesn't care what kind of movies he sees). How does it affect the budget line?

The new budget line has a kink at $MT = 20$:



10. The government imposes ad valorem sales tax on video games at the rate of 50%. How is the budget set affected by this change? What is the relative price of video games in terms of movie tickets before and after tax introduction?

With tax the effective price of video games is \$75, so the new budget constraint is $1000 = 75 \cdot VG + 10 \cdot MT$. On the graph the budget line shifts inwards, same way as with usual price increase (the new horizontal intercept is 13.3):



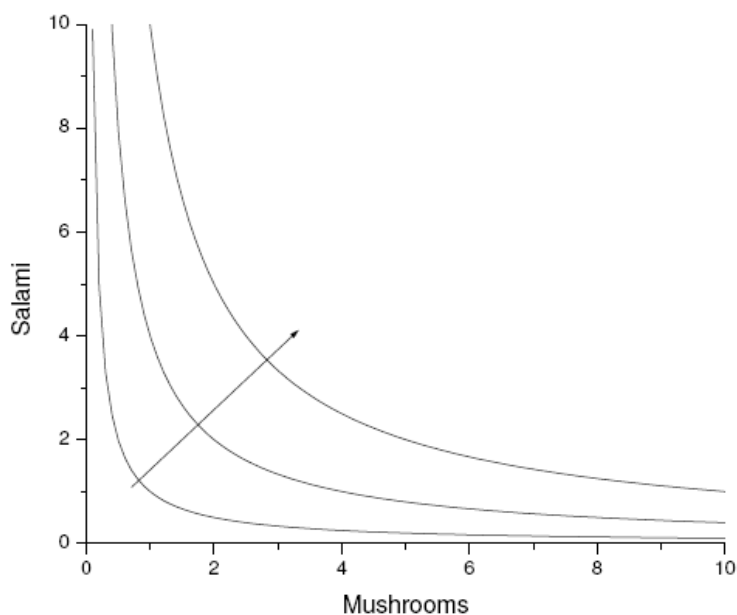
Week 1 Solutions (January 20, 2011)

Example 2:

There are two kinds of toppings available for pizza: mushrooms (M) and salami (S). Putting mushrooms on horizontal axis and salami on vertical axis, illustrate the following preferences by plotting indifference curves:

1. Utility from pizza can be described as $U = \sqrt{MS}$.

To get an indifference curve, graph $S = \frac{u^2}{M}$, where u is any constant:

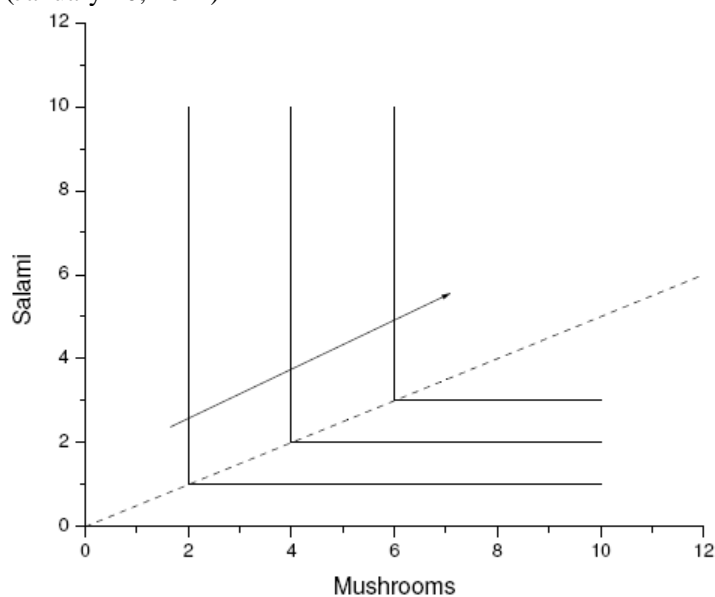


MRS is negative. The preferences are strictly convex and strictly monotonic.

2. You only like pizza if it has both mushrooms and salami, mixed in proportion 2:1.

Indifference curves are L-shaped, aligned along a ray with a slope 1/2 (salami and pizza are perfect complements):

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The preferences are convex and monotonic.

3. You are indifferent between having mushrooms and salami in pizza. What is the marginal rate of substitution?

Indifference curves are straight lines with slope -1 (salami and pizza are perfect substitutes), $MRS = -1$:



The preferences are convex and strictly monotonic.

4. You like salami, and you don't care whether there are mushrooms in your pizza. What is the marginal rate of substitution?

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Indifference curves are horizontal lines, $MRS = 0$:



The preferences are convex and monotonic.