

Intermediate Microeconomics. Lecture 5

Budget Constraint

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1 Budget Constraint

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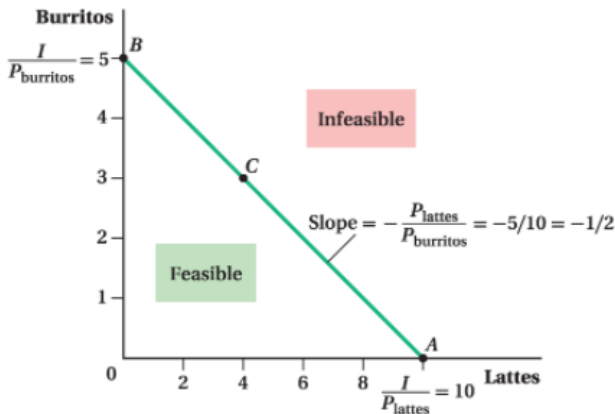
4 Nonstandard BC

Budget Constraint

A **budget constraint** is a curve that describes the entire set of consumption bundles a consumer can purchase by spending all her/his income

- Suppose Sarah has an income of \$50 to spend on burritos (which cost \$10 each) and lattes (\$5 each)
- If Sarah spends her entire income on lattes, then she can consume 10 lattes
- She can also buy 5 burritos and no lattes

Budget Constraint (an example)



Goolsbee et al., *Microeconomics*, 3e, © 2020 Worth Publishers

Figure: The Budget Constraint

Budget Constraint

The mathematical formula for a budget constraint is

$$I = P_X X + P_Y Y$$

where P_X and P_Y are the prices for 1 unit of goods X and Y , respectively

- The equation simply says that the total expenditure on the two goods equals the consumer's total income
- Any combination of goods on or below the budget constraint is a feasible bundle
- Any combination of goods above or to the right of the budget line is an unfeasible bundle

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The Slope of the Budget Constraint

We can see the equivalence between relative prices and the slope of the budget constraint by rearranging the budget constraint

$$I = P_X X + P_Y Y$$

$$P_Y Y = I - P_X X$$

$$Y = \frac{I}{P_Y} - \frac{P_X}{P_Y} X$$

- If X increases by one unit, Y falls by $\frac{P_X}{P_Y}$
- Marginal Rate of Transformation: $MRT = \frac{P_X}{P_Y}$

Example: Budget Constraint

Remember Sarah's example

$$I = P_L L + P_B B$$

$$50 = 5L + 10B$$

$$B = \frac{50}{10} - \frac{5}{10}L$$

$$B = 5 - \frac{1}{2}L$$

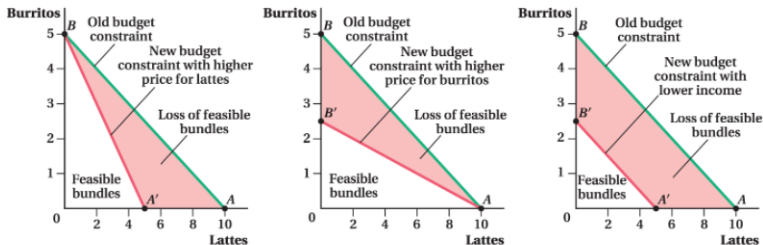
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Factors that Affect the Budget Constraint

Because relative prices determine the slope of the budget constraint, changes in relative prices will change its slope



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Figure: Effects of Price or Income Changes on the Budget Constraint

Factors that Affect the Budget Constraint (example)

Braden has \$20 per week that he can spend on video game rentals (R), priced at \$5 per game, and candy bars (C), priced at \$1 each.

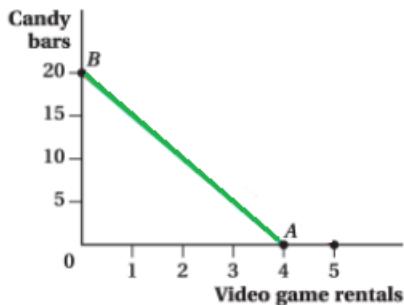
- Write an equation for Braden's budget constraint and draw it on a graph that has video game rentals on the horizontal axis. Be sure to show both intercepts and the slope of the budget constraint

$$I = P_R R + P_C C$$

$$20 = 5R + C$$

$$C = 20 - 5R$$

Factors that Affect the Budget Constraint (example)



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Figure: Braden's budget constraint

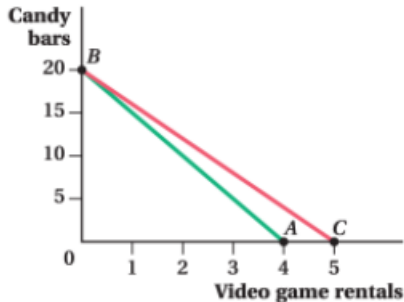
Factors that Affect the Budget Constraint (example)

- Assuming he spends the entire \$20, how many candy bars does Braden purchase if he chooses to rent 3 video games?
5 candy bars
- Suppose that the price of a video game rental falls from \$5 to \$4. Draw Braden's new budget line

$$20 = 4R + C$$

$$C = 20 - 4R$$

Factors that Affect the Budget Constraint (example)



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Figure: Braden's new budget constraint

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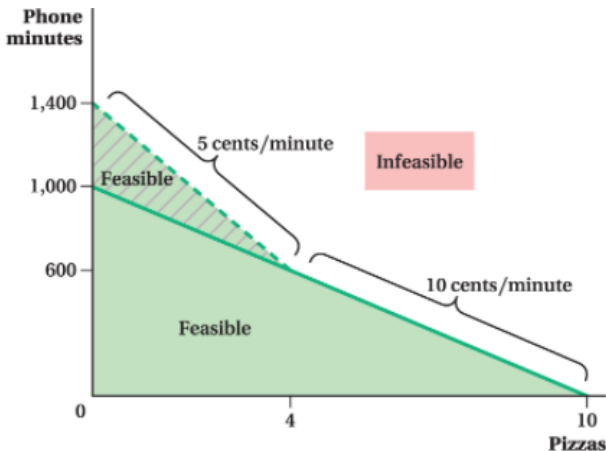
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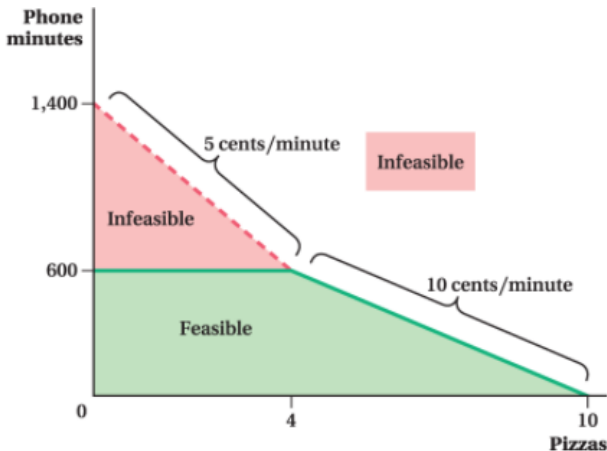
Quantity Discounts



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Figure: Quantity Discounts and the Budget Constraint

Quantity Limits



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Figure: Quantity Limits and the Budget Constraint