Consumer Theory

- How do consumers make choices about which goods to buy
- How do consumers react to changes in the world around them?

Rational choice model

- standard model that economists use to describe decision making

- Decisions are made based on
  1. Preferences
     - What do people want?
  2. Budgets
     - What can people afford to buy?

What is a model?

- A collection of assumptions

- assumptions are combined to make predictions about what will happen in the "real world"
- Predictions are only as good as our assumptions

Problem

- All assumptions are false!
- The accuracy of a model is a function of how "good" the assumptions are

- There is no scientific way to test assumptions

We have to think very deeply about what our assumptions are

Budget constraints

- 2 goods in the economy tacos and beer

b: quantity of beer consumed (in glasses)

t: quantity of tacos

Price of tacos: \$2

price of beer: \$5

Total expenditures:

$2t + 5b$

- Suppose you have \$40 in your pocket at the beginning of the night
- Total expenditures must be less than (or equal to) 40

$$2t + 5b \leq 40$$

Example

- Suppose I buy 5 tacos. How much beer can I purchase?

$$2t + 5b = 40$$

$$t = 5$$

$$2 \cdot 5 + 5b = 40$$

$$10 + 5b = 40$$

$$5b = 30$$

$$b = 6$$

We can have at most 6 beers

Note: we will always assume that consumers can purchase fractions of goods

In general

x_1: quantity of good 1

x_2: quantity of good 2

P_1: price of good 1

P_2: price of good 2

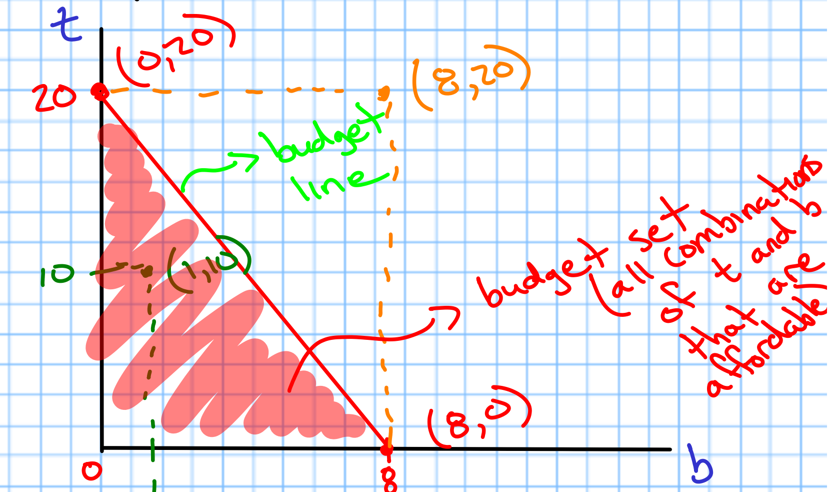
m: income

Define (x_1, x_2) as a consumption bundle

- We say that the bundle (x_1, x_2) is affordable if:

$$P_1 x_1 + P_2 x_2 \leq m$$

Exampe: $5b + 2t \leq 40$



- Suppose we consume only tacos. How many can we buy?

  $b=0 \rightarrow 40 = 2t$

  $t = \frac{40}{2}$

  $t = 20$

- Suppose we consume only beer. How much?

  $t=0 \rightarrow 40 = 5b$

  $\frac{40}{5} = b$

  $8 = b$

- Is (1, 10) affordable?

  $1 \cdot 5 + 10 \cdot 2 = 25 \leq 40$

- Is (8, 20) affordable?

  $8 \cdot 5 + 20 \cdot 2 = 40 + 40 = 80$

  $80 \geq 40$

  $\rightarrow$ no

- <u>Budget line</u>

  $P_1 X_1 + P_2 X_2 = m$

  total expenditure = income

  $\rightarrow$ bundles on the budget line can be consumed but the require us to spend all of our income

Budget line:

$$p_1x_1 + p_2x_2 = m$$

Solve for x_2 in order to express the budget line as a function of x_1

$$\frac{\cancel{p_2}x_2}{\cancel{p_2}} = \frac{m - p_1x_1}{p_2}$$

$$x_2 = \frac{m - p_1x_1}{p_2}$$

$$x_2 = \frac{m}{p_2} - \frac{p_1}{p_2}x_1$$

Think of this as a function

$$x_2 = x_2(x_1)$$

input: x_1 (quantity of good 1 consumed)

output: x_2 (quantity of good 2 that can be purchased after consuming x_1 of good 1)

What is the slope of this function?

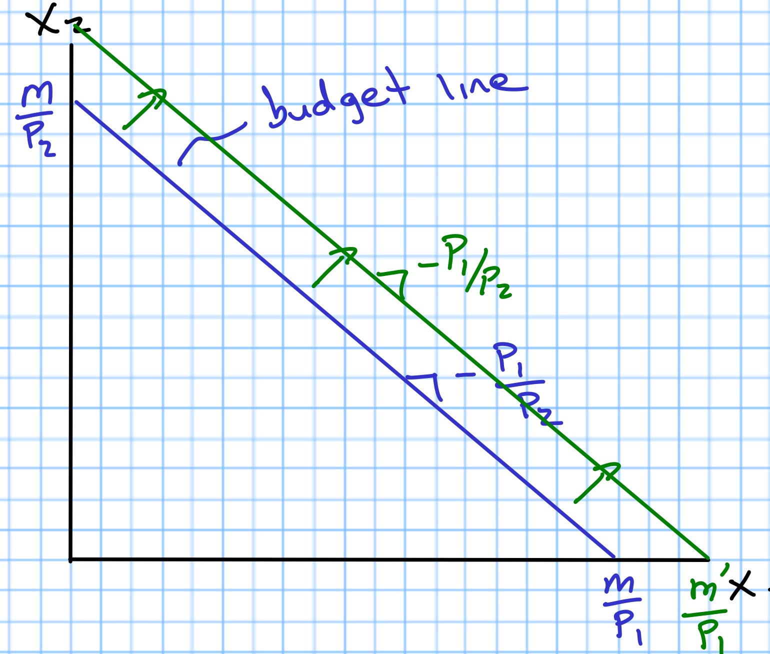
Mathematically: $-\frac{p_1}{p_2}$

(think $y = mx + b$)

Intuitively: A small change in x_1 results in a $-\frac{p_1}{p_2}$ change in the amout of x_2 we can consume

→ amount of x_2 that I have to give up to consume 1 more x_1

→ The slope of the budget line is the <u>opportunity</u> <u>cost</u> of consuming more x_1 in terms of x_2



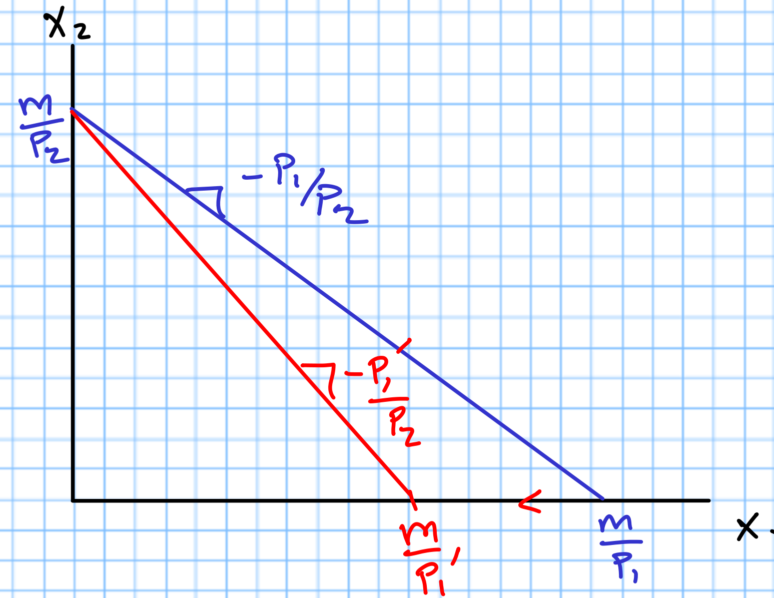
Suppose income increases to m'. What happens to the budget line?

→ changes in income result in parallel shifts in budget line

- Income changes don't affect the opportunity cost
- Slope remains the same

Price changes

Suppose P_1 increase to P_1'



Examples Suppose P_1 and P_2 both increase 5%

$P_1' = 1.05 P_1$

$P_2' = 1.05 P_2$

Original Budget line:

$P_1 X_1 + P_2 X_2 = m$

After price increase:

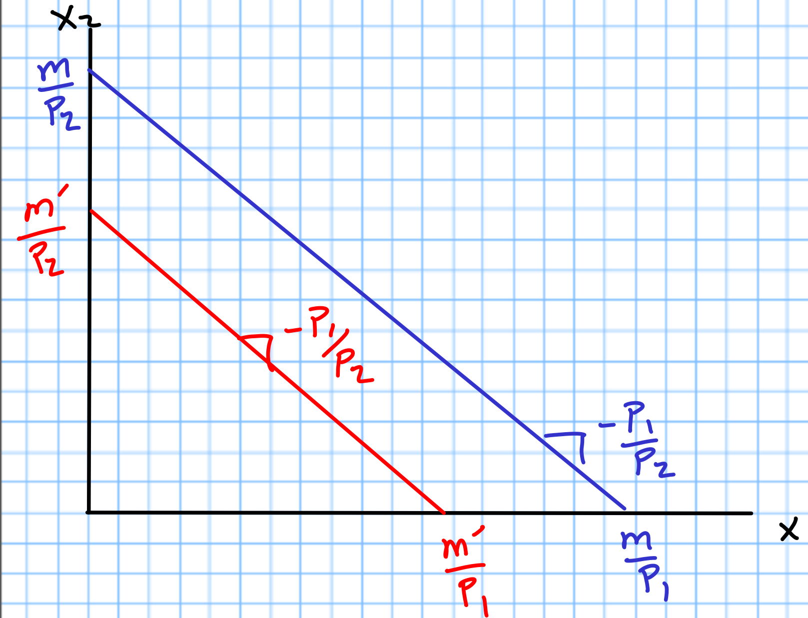
$1.05 p_1 X_1 + 1.05 P_2 X_2 = m$

$1.05 (P_1 X_1 + P_2 X_2) = m$

$P_1 X_1 + P_2 X_2 = \dfrac{m}{1.05}$

Let $m' = \dfrac{m}{1.05}$

$P_1 X_1 + P_2 X_2 = m'$



- Proportional changes in prices have the same effect as changes in income

- Suppose prices and income all increase by 5% (inflation)

Original budget line:

$$p_1 x_1 + p_2 x_2 = m$$

$\hookrightarrow$ $1.05 p_1 x_1 + 1.05 p_2 x_2 = 1.05 m$

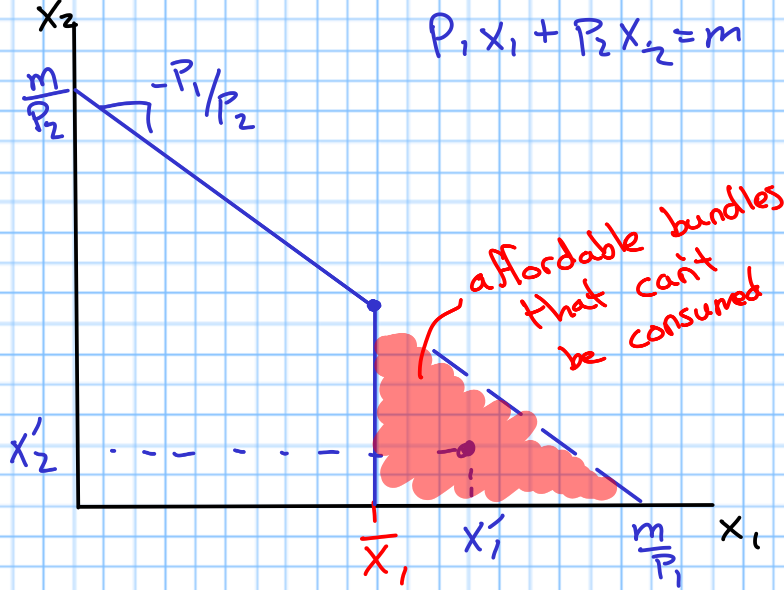
$$\frac{\cancel{1.05}(p_1 x_1 + p_2 x_2)}{\cancel{1.05}} = \frac{\cancel{1.05} m}{\cancel{1.05}}$$

$$p_1 x_1 + p_2 x_2 = m$$

$\rightarrow$ Proportional changes in all prices and income (inflation) does not affect our budget set.

Rationing

- Government (or someone else) places limits on the amount of a good that can be consumed
- Examples
  - Oil in 1970's America
  - Water during natural disasters
- Let's suppose good 1 is rationed. Consumers can't buy more than $\bar{x}_1$ of x_1



Composite goods

- So far we've only considered "economies" with only two goods
- The real world has many, many more goods
- Say that x_2 is a composite good
  - → a representation of all goods that aren't x_1
  - → x_2 is everything left over after we consume x_1

- Let's call the composite good "c"
- Set the price of c to $P_c = 1$

Budget line:

$$p_1 x_1 + c = m$$

Suppose I buy 10 units of x_1. How much c can I buy?

$$c = \underbrace{m}_{\text{income}} - \underbrace{10p_1}_{\text{expenditure on } x_1}$$

Consumption of c is simply my leftover income after consuming x_1

- The total amount of income (money) left in my pocket that I can spend on other goods