

Basic Consumer Theory

Behavioral Economics

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Basic Consumer Theory

A man walks into a bar... what does he buy?

To answer this question, we need to know several things:

What is available?

What does he like?

What do things cost?

How much money does he have?

The goal of consumer theory is to understand and predict consumer behavior.

Fundamental Assumption of Consumer Behavior – Consumers act to maximize their own well-being subject to constraints, such as income, information, time

Consumption Set

A consumer allocates limited income among different consumption categories.

Consumption set – The space of all possible bundles of goods and services

Without loss of generality, we can analyze consumer behavior in a commodity space of only two goods.

Examples:

Good 1 and Good 2

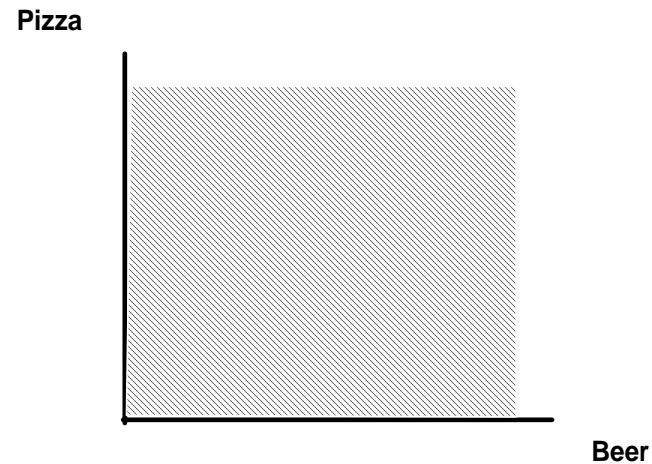
Beer and pizza

Food and clothing

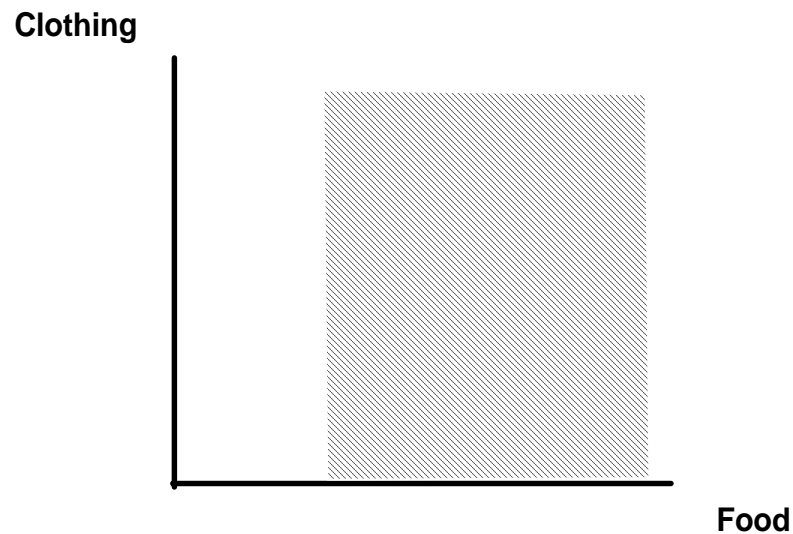
Food and all other goods

Consumption today and consumption tomorrow

Consumption Sets



Note that consumption sets may be restricted due to feasibility constraints, such as survival allocations:



Consumption Sets

Application: Constrained consumption sets might account for seemingly odd behavior

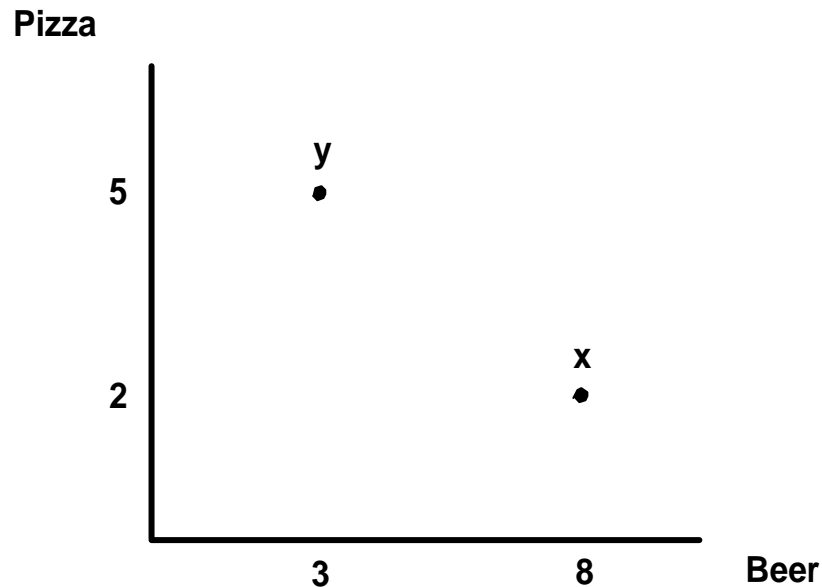
Risk preferences: Someone who is going to starve anyways might accept a gamble at very poor odds for a chance at a decent meal

Time preferences: Someone who is going to starve today might forgo a very large payoff tomorrow for a very small amount today

Bundles

Define a commodity bundle $x = (x_1, x_2)$ as a certain combination of good 1 and good 2.

Consider two different bundles of pizza and beer.



Here bundle $x = (8, 2)$ and bundle $y = (3, 5)$

Preferences

How does the consumer feel about these various bundles?

Assumptions about preferences:

1. Completeness- Given any two bundles x and y , either:

$$x \succ y$$

$$x \succ y$$

$$x \sim y$$

(We can also distinguish between weak and strong preference)

2. Transitivity-

If $x \succ y$ and $y \succ z$, then $x \succ z$

Preferences

If preferences are complete and transitive, then the preferences are rational.

(Implicit is that there is only 1 preference between x and y , and such matters as how the question phrased, or what the current status quo is, are irrelevant)

How well does the rationality (complete and transitive) assumption conform to real-world behavior?

As it turns out, very well. This one isn't controversial.

Preferences

3. Monotonicity (More is better)

More of a commodity is always better

Note that monotonicity rules out satiation; we assume more of a good is always better. When satiation seems unreasonable, it's probably because of constrained time.

Also note that this structure does not preclude talking about bads – commodities where less of a good is preferred (such as pollution, garbage, probability of lung cancer)

Monotonicity Application

How can we tell if a consumer will prefer bundle x to bundle y ?

Monotonicity makes things a little easier:

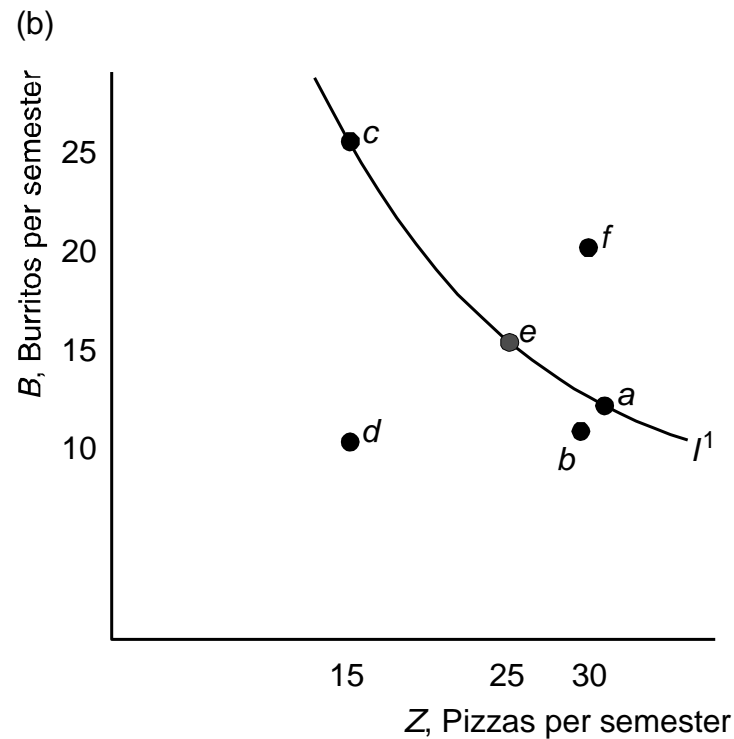
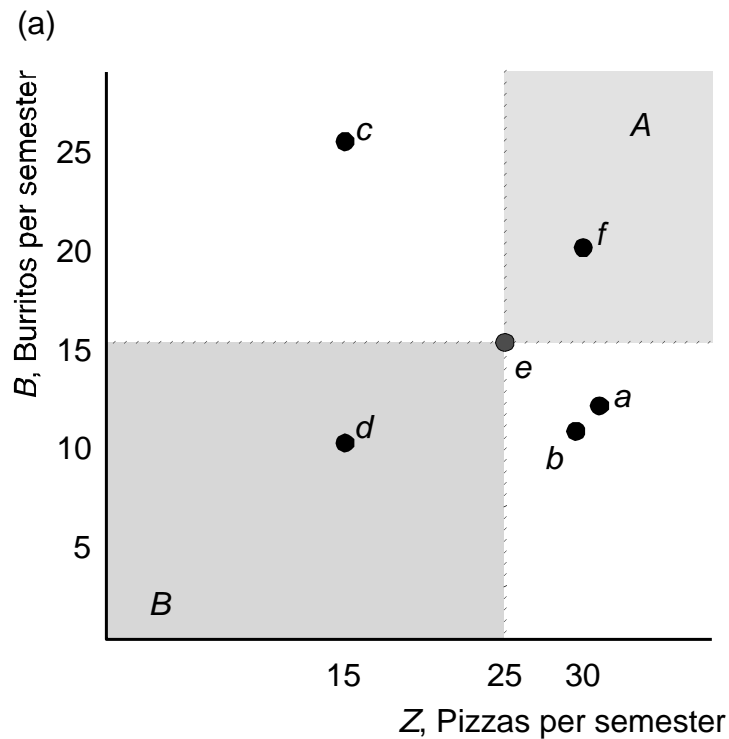
If x has more of BOTH good 1 and good 2 than y ($x > y$), then monotonicity implies that $x \succ y$

If $x \geq y$, x is at least weakly preferred to y , and strictly preferred if the commodity i that $x_i > y_i$ is a good.

Indifference curves

With the above properties of preferences, we can now create “preference maps” of indifference curves.

Indifference curves – the set of all bundles that a consumer views as equally desirable



Indifference Curves

Properties of indifference curves:

- 1. Bundles on indifference curves that are further from the origin are preferred to those on indifference curves closer to the origin**
- 2. There is an indifference curve through every possible bundle**
- 3. Indifference curves cannot cross.**
- 4. Indifference curves slope downwards; they cannot slope upwards or “bend back” on themselves.**
- 5. Indifference curves are not “thick”.**

Indifference Curves

In the real world, what can go wrong?

Suppose people have imperfect perception, and can only distinguish between very different options:

**Eggshell ~ Pearl ~ Off-white ~ Ivory
but clearly Eggshell is preferred to Ivory**

Likewise, people might “satisfice” rather than maximize.

Again, this can lead to chains of outcomes that are individually indifferent, but clear preference between endpoints

These are both examples of transitivity violations

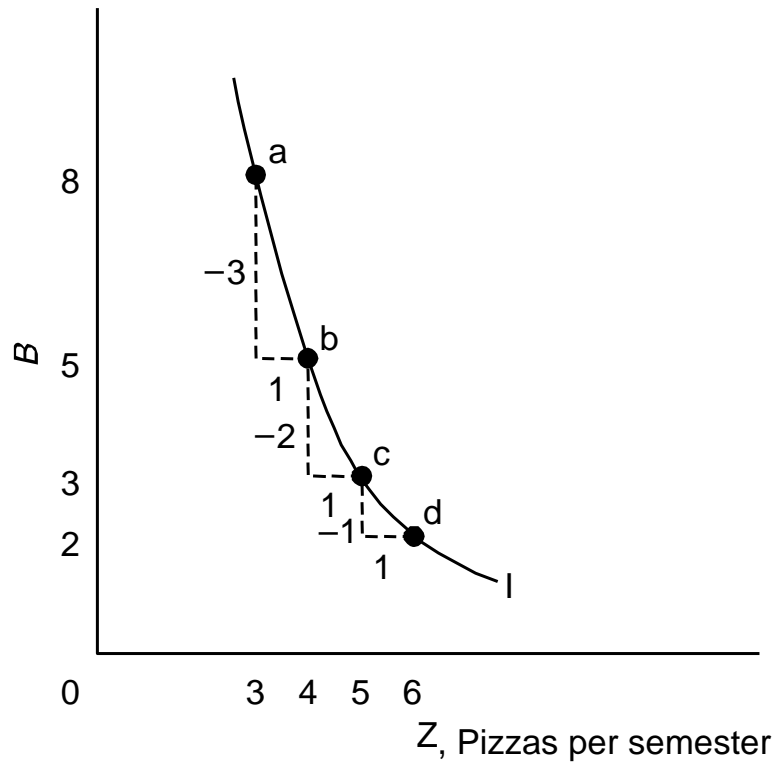
Indifference Curves

Given that a consumer is indifferent among all bundles on an indifference curve, she will be willing to trade any bundle along its indifference curve.

Marginal rate of substitution – The maximum amount of one good that a consumer will sacrifice to obtain one more unit of another good

Indifference Curves

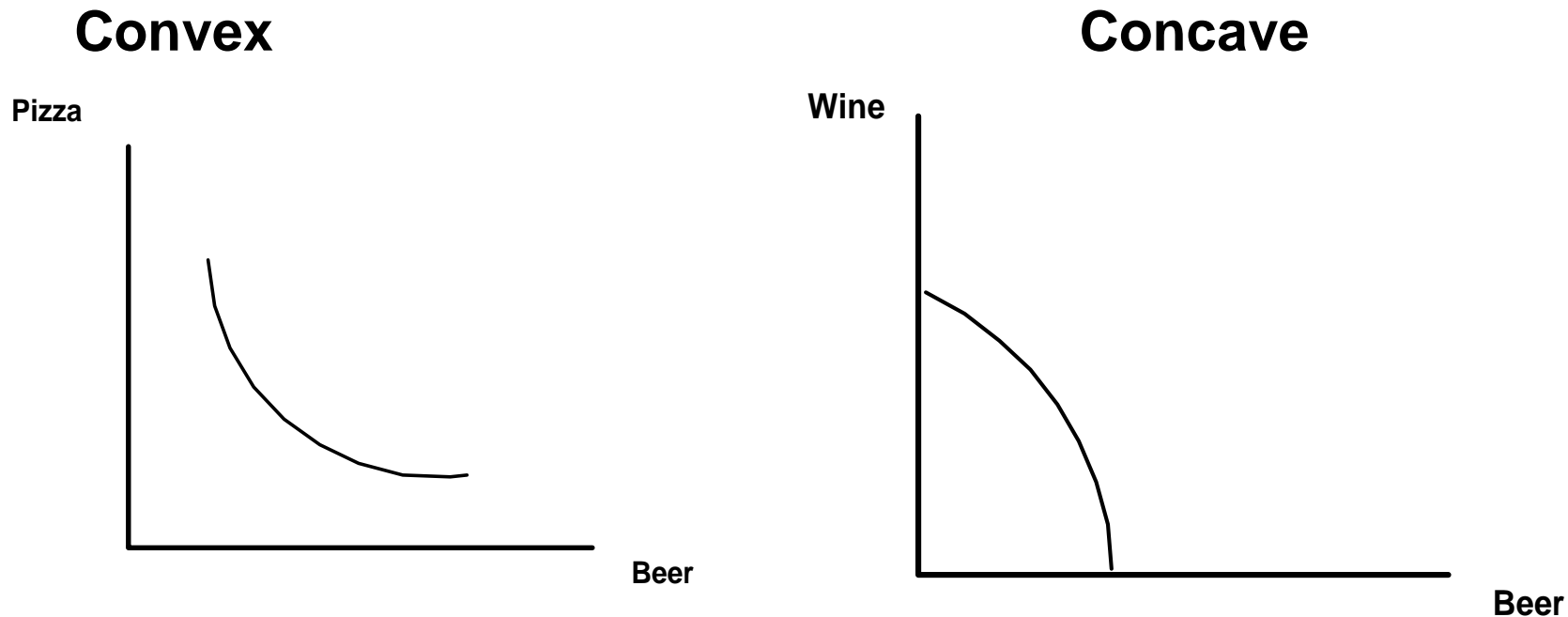
$$\text{MRS (of beer for pizza)} = \frac{\Delta \text{ Beer}}{\Delta \text{ Pizza}}$$



The MRS is the slope of the indifference curve

Indifference Curve Shapes

Indifference curves are convex if the MRS declines as you get more of the good being traded for.



Indifference curves are convex when mixtures/averages are preferred, and Concave when extremes are preferred.

People like variety; most goods we will consider will have convex indifferent curves.

Some Intuition

What do the indifference curves look like for a consumer who **STRONGLY** prefers good 1?

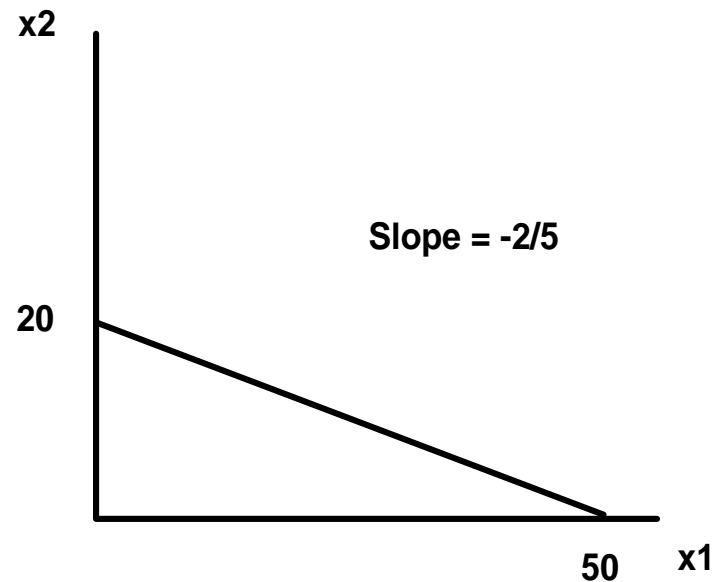
Someone who prefers good 2?

Note that this is reflected mathematically in the MRS as well.

Constraints

Important but subtle point: Note that preferences and constraints are determined entirely independently.

Suppose a consumer can buy two goods, x_1 and x_2 , with a given income. The consumer has \$100 and the price of x_1 is \$2 and x_2 is \$5. What can she afford to buy?



Budget Set

Budget line- The bundles of goods that can be bought if the entire budget is spent on the goods at these prices

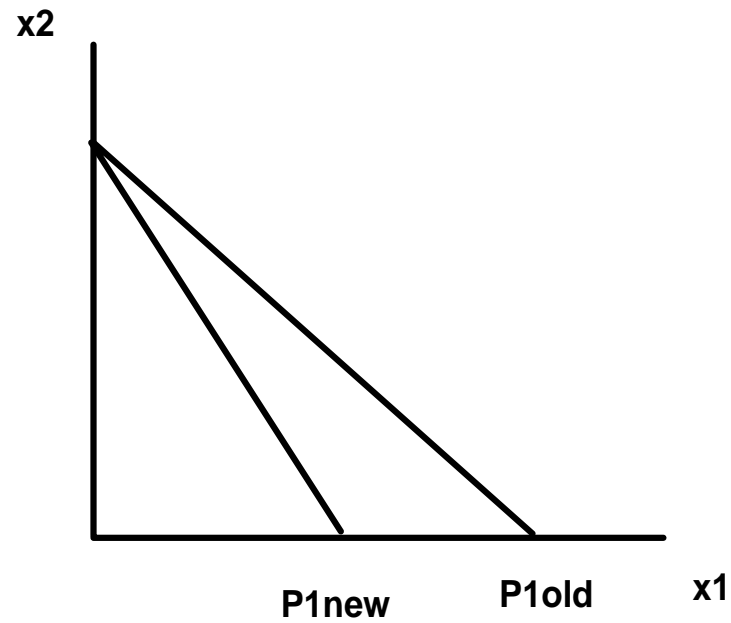
$$P_1 X_1 + P_2 X_2 = I$$

Budget Set (Opportunity Set) – The bundle of goods which the consumer can afford to buy, which includes all of the goods inside the budget line

$$P_1 X_1 + P_2 X_2 \leq I$$

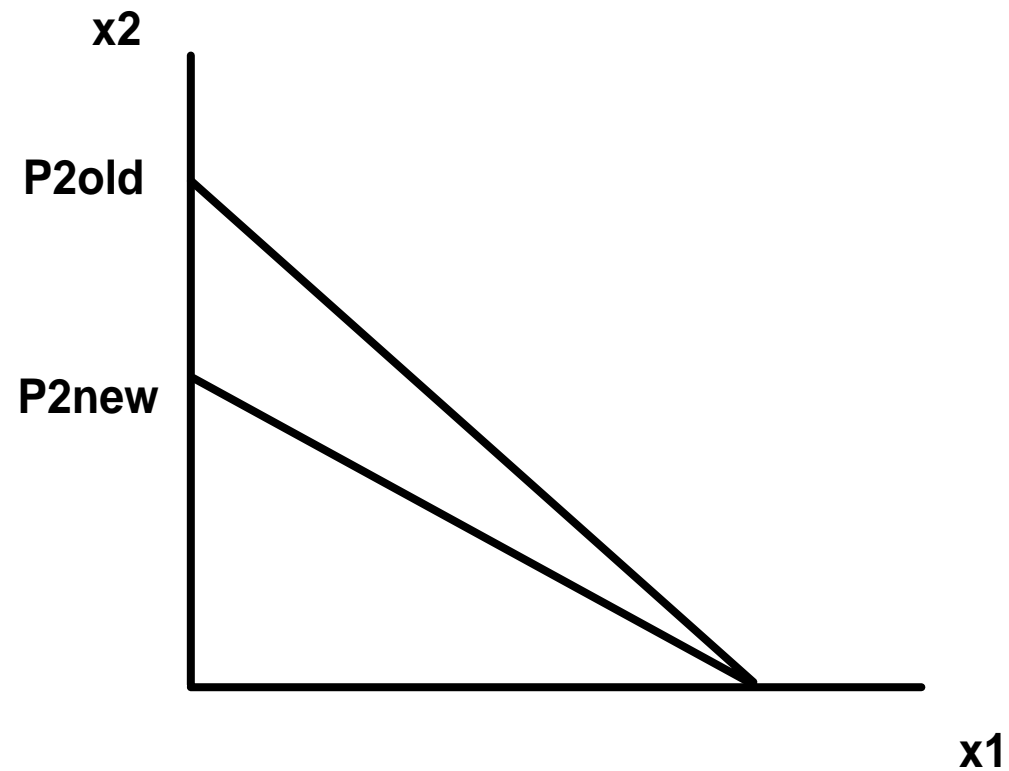
Price Changes

What happens when the price of good 1 increases?



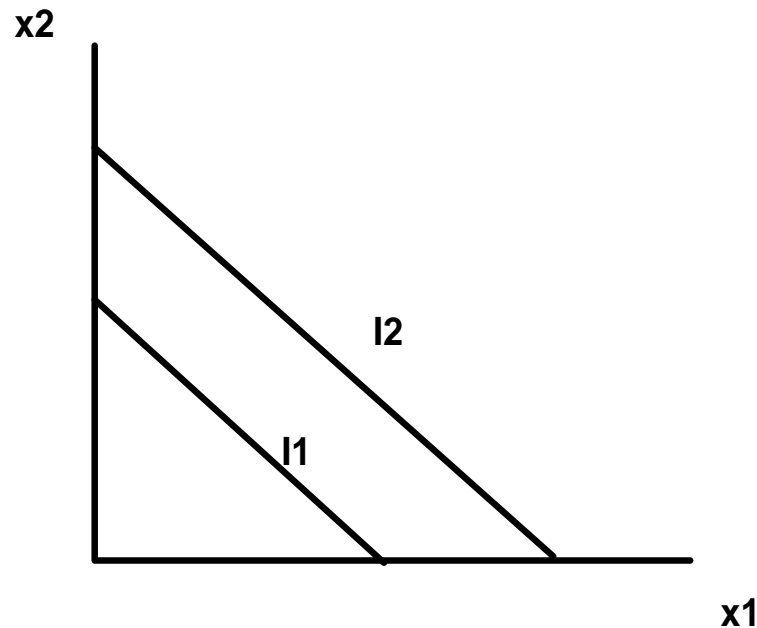
Price Changes

Likewise, what happens when the price of good 2 increases?



Income Changes

What happens if income changes?



Note that this is identical to BOTH prices increasing by the same percentage.

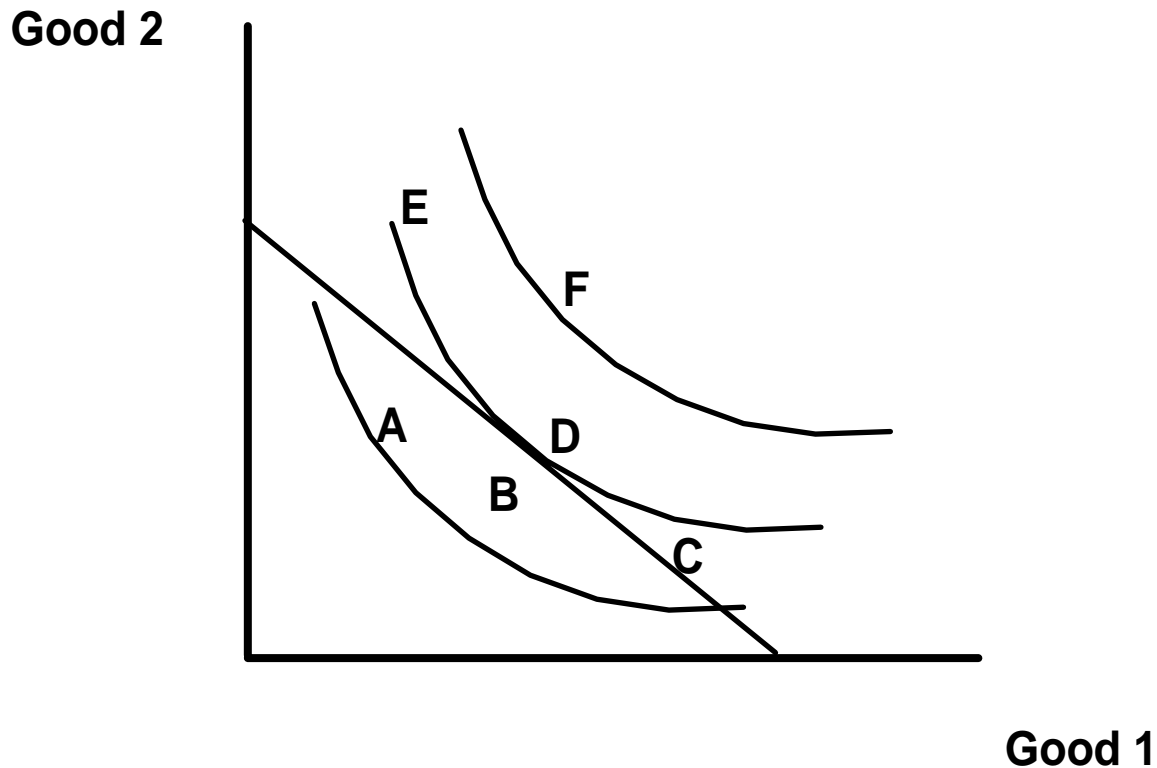
For example, a 10% increase in P_1 and a 10% increase in P_2 due to inflation is identical to a 10% decrease in income.

Constrained Consumer Choice

Recall the fundamental assumption of consumer choice- that consumers maximize well-being subject to their constraints

How can we find this point? By finding the bundle in the budget set that yields the most happiness i.e. is on the highest indifference curve

Optimization



A: B is better and affordable, so A isn't optimal

B: D is better and affordable

C: Is affordable, but D is better

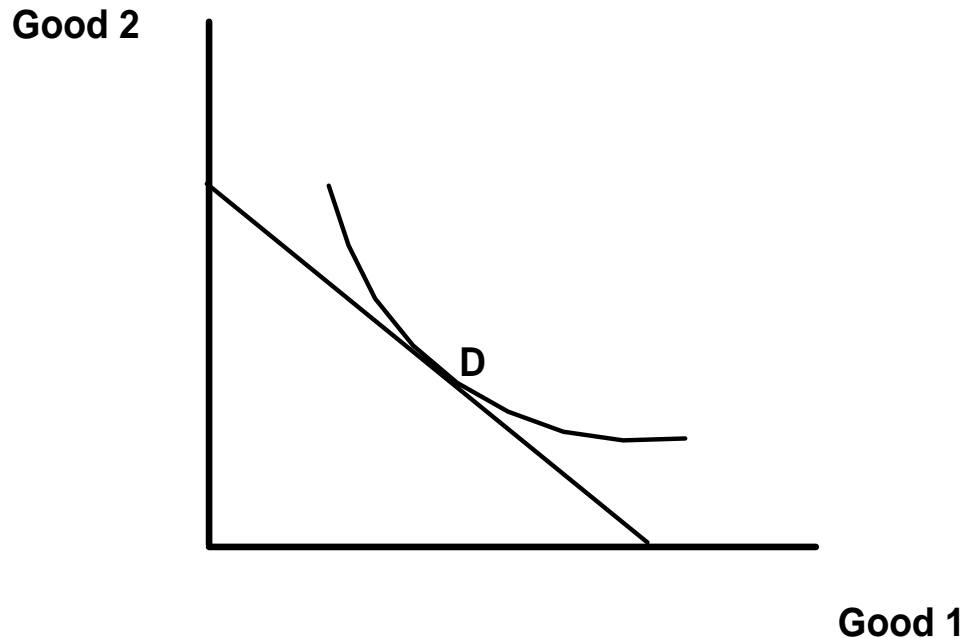
E: Indifferent to D, but not affordable

F: Better, but can't afford it

Hence D is the optimal bundle

Optimization

How can we characterize the optimal consumption bundle?



1. Optimal bundle is affordable
2. Indifference curve is tangent to the budget line

This implies that $MRS = P_1 / P_2$
slope of indifference curve = slope of budget line

Optimization

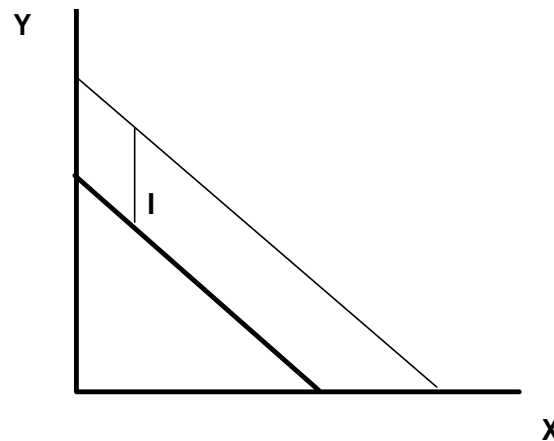
To build some intuition, recall what the indifference curves of a consumer who strongly preferred good 1 look like.

Faced with a budget set, how does his optimal bundle compare to someone who strongly prefers good 2?

Income Changes

How does consumer behavior change when the budget line changes?

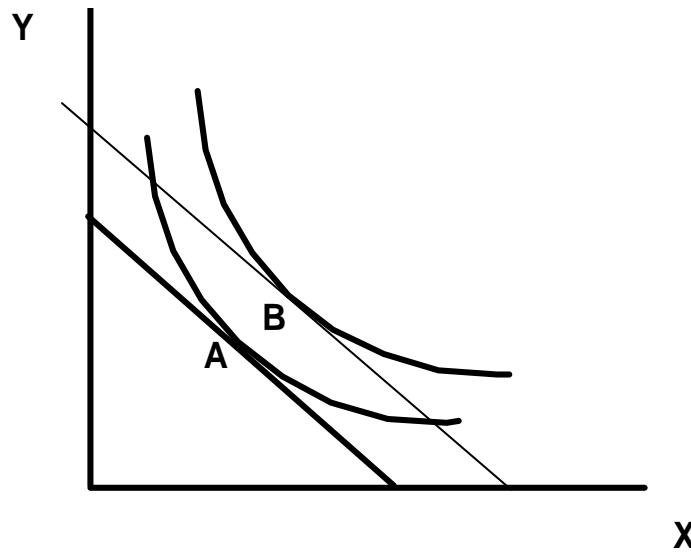
Recall that a change in income causes a parallel shift of the budget line by the amount of the income change.



**What does this do to a consumer's optimal consumption bundle?
Consider the case of an increase in income. Now she can afford a better bundle than her bundle, so her optimal bundle must change.**

Income Changes

Suppose after the income change the consumer's new optimal bundle is B

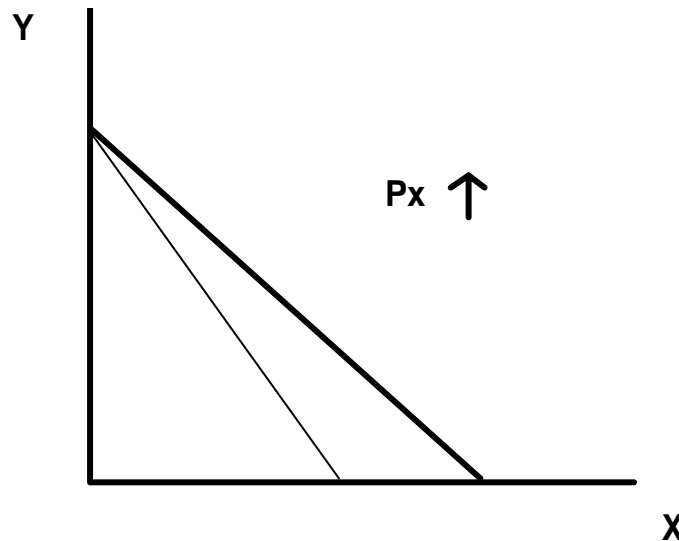


Note that after the income increase, the consumer consumes more of both good X and more of good Y

Price Changes

How does the consumer respond to price changes?

Recall that a price change for just one of the goods causes the budget line to pivot:



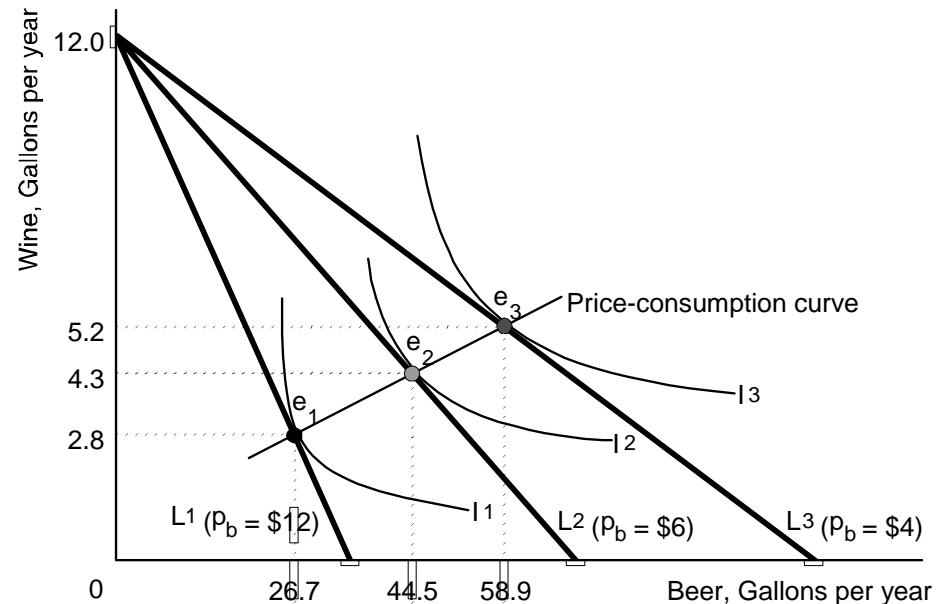
Deriving Demand

We construct a demand curve by holding income, tastes, and the prices of other goods constant; varying the own price of the good; and then examining how the optimal bundle changes.

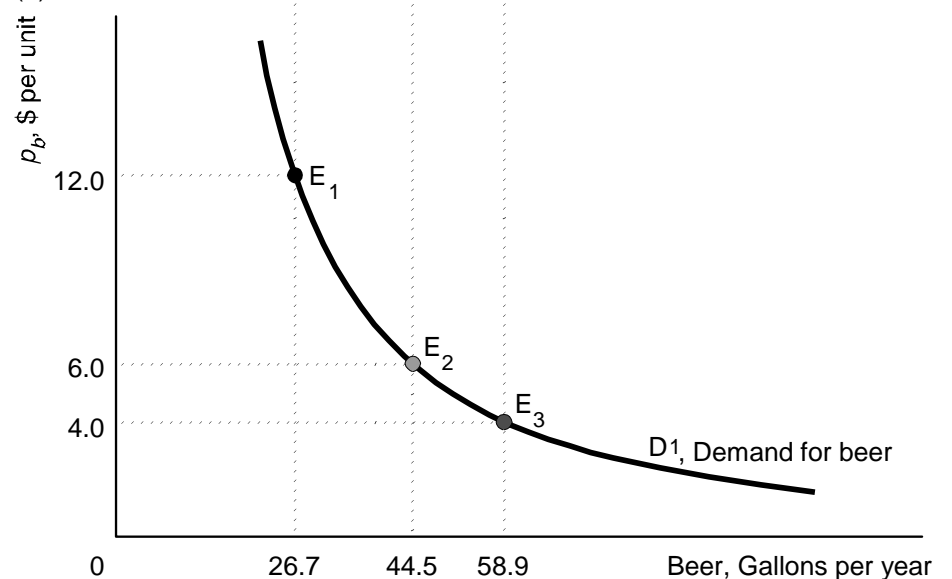
Consider how purchases change as the price of the good falls:

Note that as the price of the good fell, the quantity demanded increased. Thus the demand curve is downward sloping

(a) Indifference Curves and Budget Constraints



(b) Demand Curve



Utility

How can we numerically represent preferences?

A utility function $u : \succ \rightarrow \mathbb{R}$ is a representation of the preference mapping \succ if for all x and y , $u(x) > u(y)$ if and only if $x \succ y$

A utility function assigns numerical values to consumption bundles.

A bundle with higher utility gives higher happiness.

Two bundles with the same utility give the same happiness; hence the consumer is indifferent.

Utility

Ordinal numbers – solely assign rank

Cardinal numbers – magnitude has meaning

***Any* function $u(\cdot)$ such that $u(x) > u(y) \leftrightarrow x \succ y$ is a valid utility function.**

Without some restrictions, utility functions are ordinal, NOT cardinal. A bundle yielding 10 utility is NOT twice as good as a bundle with 5 utility. All we can say is that it is better.

However, in this class, we *will* be imposing the structure for cardinal utility. In this class (at least for the risky and intertemporal choice sections) the magnitudes of the utility functions will have meaning.

Utility

Utility functions are both more and less complex than students think they are.

Less complex: All a utility function does is assign a number to a good to capture preferences, how desirable the good is

More complex: There's a LOT of information in that

Utility

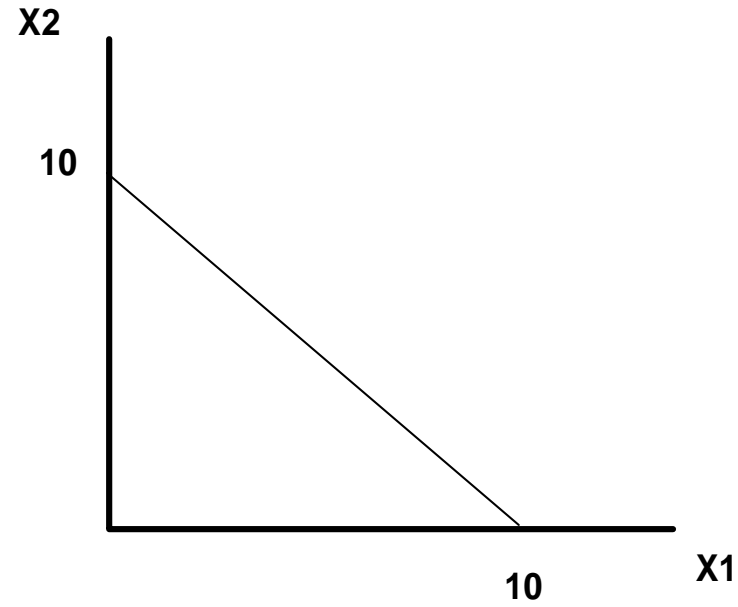
Indifference curves are thus all the combinations of good 1 and good 2 such that utility equals a constant:

$$U(x_1, x_2) = C$$

For example, suppose $u(x_1, x_2) = x_1 + x_2$. What would the indifference curves look like?

Utility

$$x_1 + x_2 = 10$$



This is an indifference curve of perfect substitutes, which should make intuitive sense.