Chapter Three

Preferences

Preferences

- Behavioral Postulate:
  - A decisionmaker always chooses its most preferred alternative from its set of available alternatives.

- So to model choice we must model decisionmakers' preferences.

Preference Relations

- Comparing two different consumption bundles, **x** and **y (why bold?)**:
  - strict preference: **x** is more preferred than is **y**.

  - weak preference: **x** is as at least as preferred as is **y**.

  - indifference: **x** is exactly as preferred as is **y**.

3

Preference Relations

- Strict preference, weak preference and indifference are all preference relations.

- Particularly, they are **ordinal** relations; *i.e.* they state only the order in which bundles are preferred.

- What does ordinal mean?

4

Preference Relations

- $\succ$ denotes strict preference so $\mathbf{x} \succ \mathbf{y}$ means that bundle **x** is preferred strictly to bundle **y**.

- $\succsim$ denotes weak preference;

- $\mathbf{x} \succsim \mathbf{y}$ means **x** is preferred at least as much as is **y**.

5

Preference Relations

$\sim$ denotes indifference; $\mathbf{x} \sim \mathbf{y}$ means **x** and **y** are equally preferred.

- $\mathbf{x} \succsim \mathbf{y}$ and $\mathbf{y} \succsim \mathbf{x}$ imply $\mathbf{x} \sim \mathbf{y}.$

- $\mathbf{x} \succsim \mathbf{y}$ and (not $\mathbf{y} \succsim \mathbf{x}$) imply $\mathbf{x} \succ \mathbf{y}.$

6

Assumptions about Preference Relations

- **Completeness**: For any two bundles **x** and **y** it is always possible to make the statement that either

$$\mathbf{x} \succsim \mathbf{y}$$

or

$$\mathbf{y} \succsim \mathbf{x}.$$

- Or both, which means indifference.
- Thus, we can say we assume that we are able to have preferences over bundles.

7

Assumptions about Preference Relations

- **Reflexivity**: Any bundle x is always at least as preferred as itself; *i.e.*

$$\mathbf{x} \succsim \mathbf{x}.$$

8

4

Assumptions about Preference Relations

- **Transitivity** (consistency): If
  x is at least as preferred as **y**, and
  y is at least as preferred as z, then
  x is at least as preferred as **z**; *i.e.*

  $$\mathbf{x} \succsim \mathbf{y} \text{ and } \mathbf{y} \succsim \mathbf{z} \implies \mathbf{x} \succsim \mathbf{z}.$$

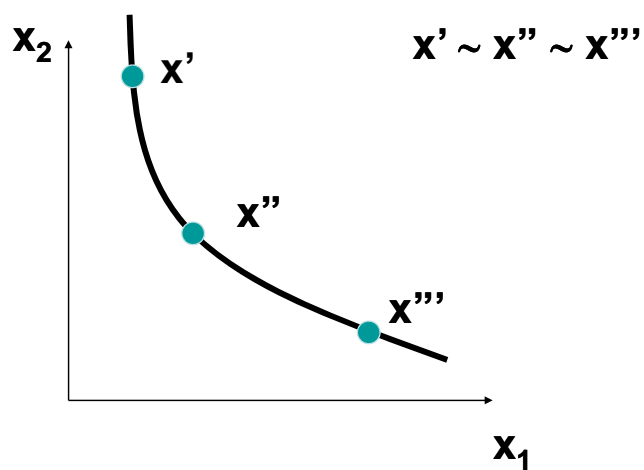- Complete + Reflexive + Transitive is sometimes referred as **rational** preferences. Are they reasonable?

9

Indifference Curves

- Take a reference bundle **x'**. The set of all bundles equally preferred to **x'** is the indifference curve containing **x'**; the set of all bundles **y** $\sim$ **x'**.

10

5

Indifference Curves

x_2

x'

x"

x'''

$x' \sim x'' \sim x'''$

x_1

Indifference Curves

x_2

x

z

y

$z \succ x \succ y$

x_1

Indifference Curves

x_2

I_1

x

z

I_2

y

I_3

x_1

All bundles in I_1 are strictly preferred to all in I_2.

All bundles in I_2 are strictly preferred to all in I_3.

Indifference Curves

x_2

x

WP(x), the set of bundles weakly preferred to x. WP(x) includes I(x).

I(x)

I(x).

x_1

Indifference Curves

x_2

SP(x), the set of bundles strictly preferred to x, does not include I(x).

x

I(x)   I(x).

x_1
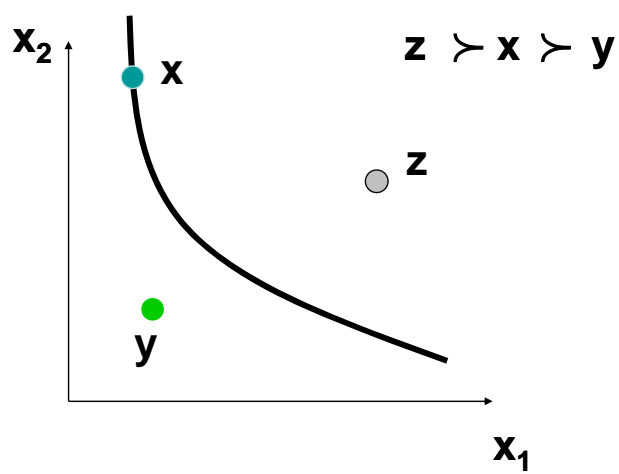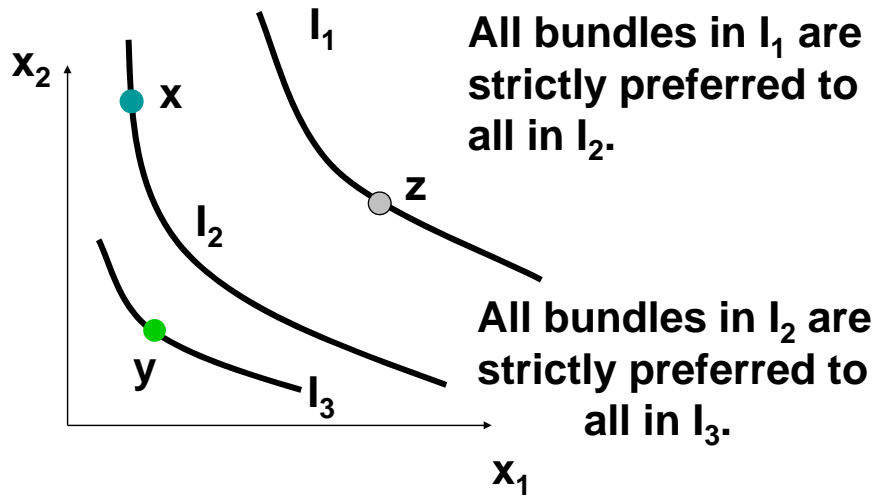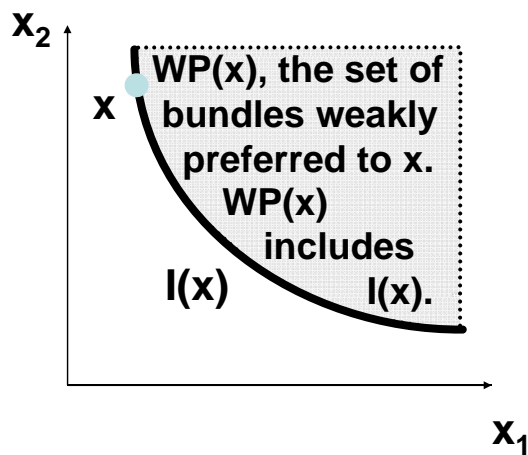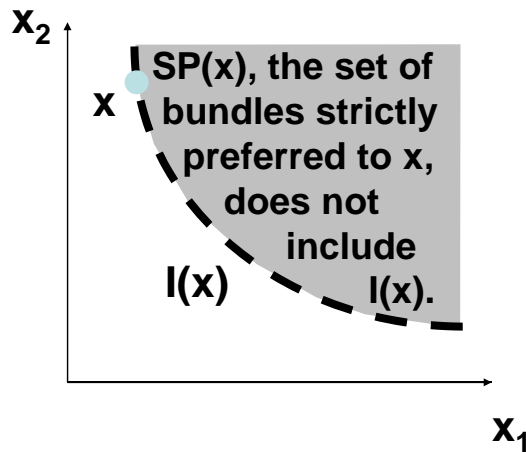
15

Indifference Curves Cannot Intersect

x_2 I_2 **From I_1, x ~ y. From I_2, x ~ z.**
I_1 **Therefore y ~ z. But from I_1 and I_2 we see (most likely) y $\succ$ z, a contradiction.**

x   **They are not on the**
y   **same**
indifference
z   **curve**

x_1

16

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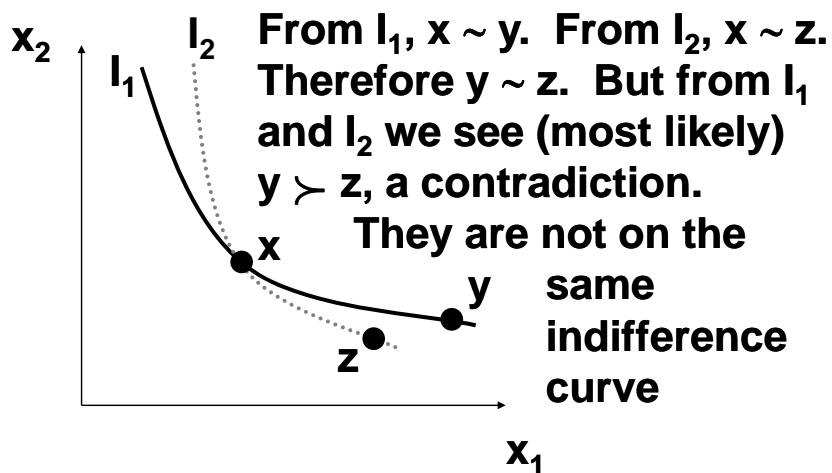
More Assumptions

- When I wrote most likely above we saw the contradiction came from the fact that bundles were not on the same indifference curve.

- However to state $y \succ z$, we need to add the assumption that more is better, which is called *monotonicity* or monotonic preferences. (See below)
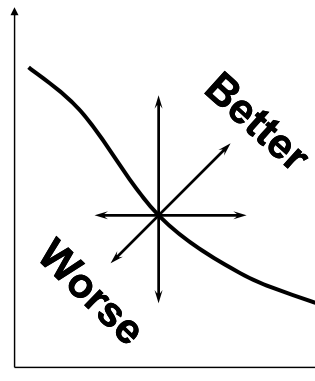
17

Slopes of Indifference Curves

- When more of a commodity is always preferred, the commodity is a *good*.

- If every commodity is a good then indifference curves are negatively sloped.

18

Slopes of Indifference Curves

Good 2

Better

Worse

Good 1

Two goods ➡ **a negatively sloped indifference curve.**
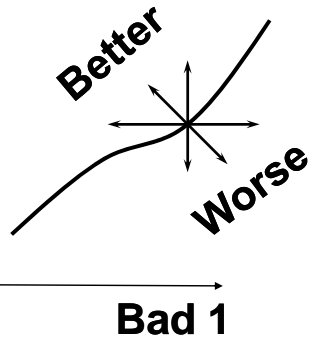
19

Slopes of Indifference Curves

- If less of a commodity is always preferred then the commodity is a *bad.*

20

Slopes of Indifference Curves

Good 2

One good and one bad ➡ a positively sloped curve. But treat a bad as absence of bad to get downwards sloping curves again
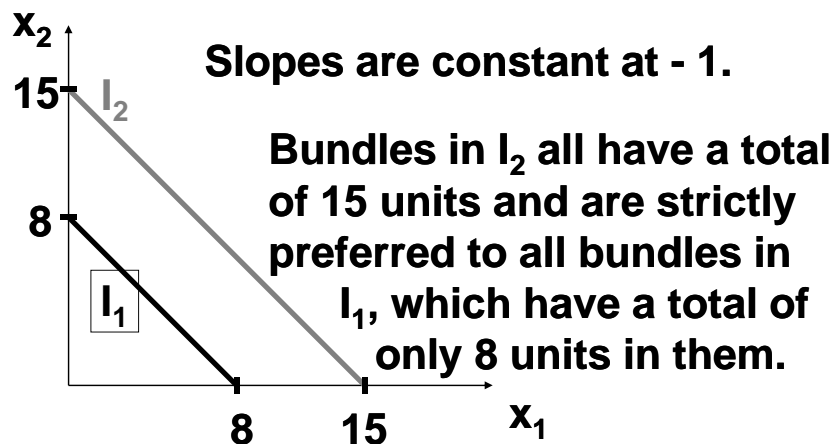
Better

Worse

Bad 1

21

Extreme Cases of Indifference Curves; Perfect Substitutes

- If a consumer always regards units of commodities 1 and 2 as equivalent, then the commodities are **perfect substitutes**

- Only the total amount of the two commodities in bundles determines their preference rank-order.
- Examples Coke and Pepsi cola (for some at least)

22

Extreme Cases of Indifference Curves; Perfect Substitutes

x₂

Slopes are constant at - 1.

Bundles in I₂ all have a total of 15 units and are strictly preferred to all bundles in I₁, which have a total of only 8 units in them.
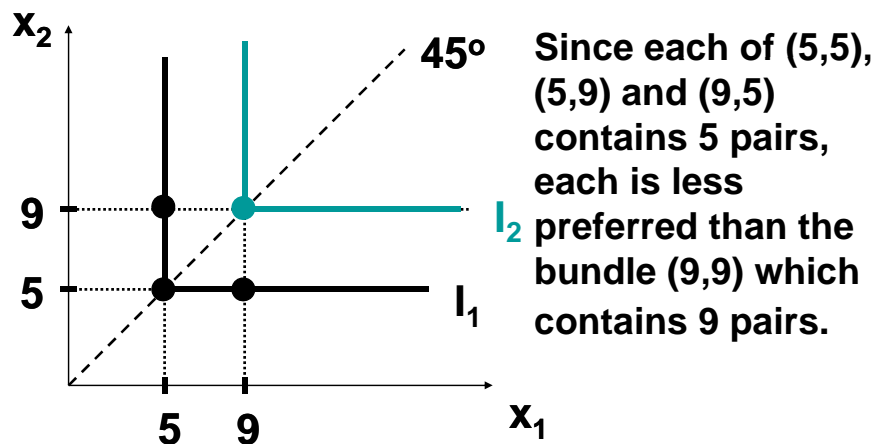
15 — I₂

8 —

I₁

8   15   **x₁**

23

Extreme Cases of Indifference Curves; Perfect Complements

- If a consumer always consumes commodities 1 and 2 in fixed proportion (in this example, one-to-one), then the commodities are **perfect complements**

- Only the number of pairs of units of the two commodities determines the preference rank-order of bundles.

- Example: left and right shoes

24

12

Extreme Cases of Indifference Curves; Perfect Complements

x_2

$45°$

9

I_2

5

I_1

5   9

x_1

Since each of (5,5), (5,9) and (9,5) contains 5 pairs, each is less preferred than the bundle (9,9) which contains 9 pairs.
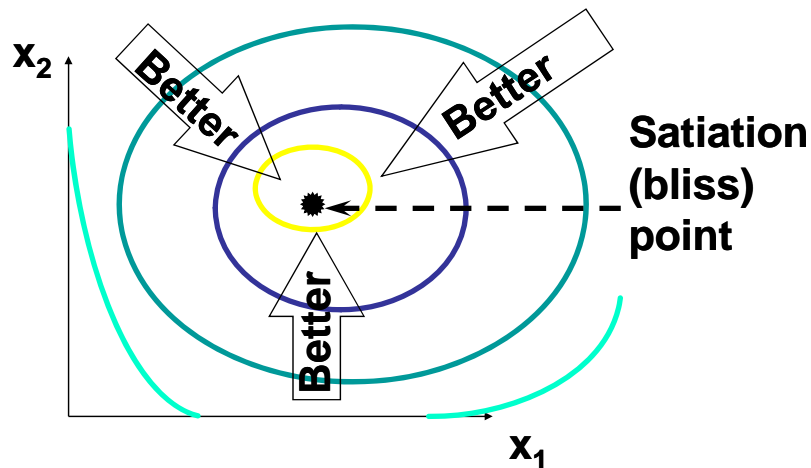
25

Preferences Exhibiting Satiation

- A bundle strictly preferred to any other is a **satiation point or a bliss point.**

- What do indifference curves look like for preferences exhibiting satiation?

- Example: ounces of ice cream within an hour having no freezer available

26

Indifference Curves Exhibiting Satiation

x_2

Better

Better

Better

Satiation (bliss) point

x_1

Indifference Curves for Discrete Commodities

- A commodity is **infinitely divisible** if it can be acquired in any quantity; *e.g.* water or cheese.

- A commodity is **discrete** if it comes in unit lumps of 1, 2, 3, … and so on; *e.g.* aircraft, ships and refrigerators.

Well-Behaved Preferences

- A preference relation is "well-behaved" if it is
  - **monotonic** and **convex.**

- **Monotonicity**: More of any commodity is always preferred (*i.e.* no satiation and every commodity is a good or absence of bad).
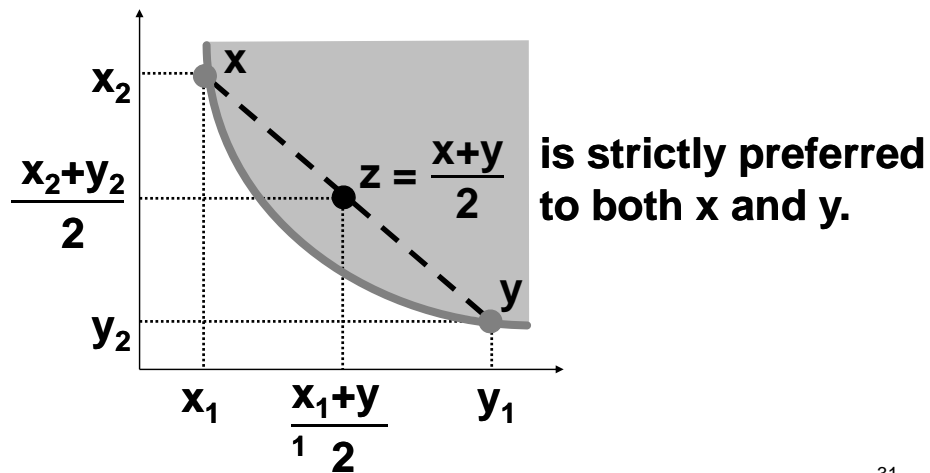
29

Well-Behaved Preferences

- **Convexity**: Mixtures of bundles are (at least weakly) preferred to the bundles themselves.

- E.g., the 50-50 mixture of the bundles x and y is
z = (0.5)x + (0.5)y and then we assume z is at least as preferred as x or y.

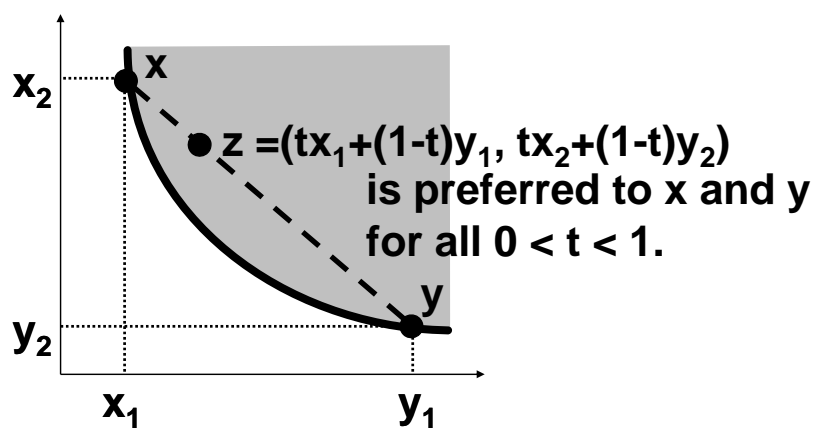- We can think of this as taste of diversification or aversion against extreme bundles
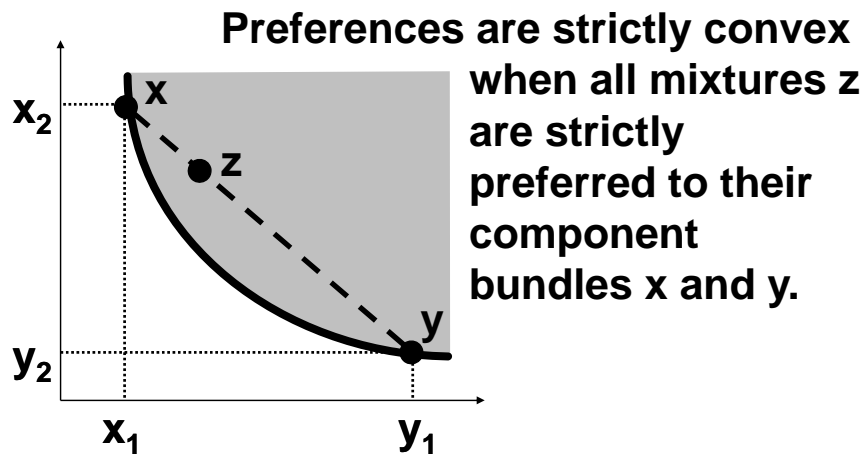
30

Well-Behaved Preferences -- Convexity.

x

x_2

$\dfrac{x_2+y_2}{2}$

$z = \dfrac{x+y}{2}$ **is strictly preferred to both x and y.**

y

y_2

x_1 $\dfrac{x_1+y_1}{2}$ y_1

31

Well-Behaved Preferences -- Convexity.

x

x_2

$z =(tx_1+(1-t)y_1, \ tx_2+(1-t)y_2)$

is preferred to x and y for all $0 < t < 1$.

y

y_2

x_1 y_1

32

16

Well-Behaved Preferences -- Convexity.

Preferences are strictly convex when all mixtures z are strictly preferred to their component bundles x and y.

x_2 — x

z

y_2

y

x_1

y_1

33

Well-Behaved Preferences -- Weak Convexity.
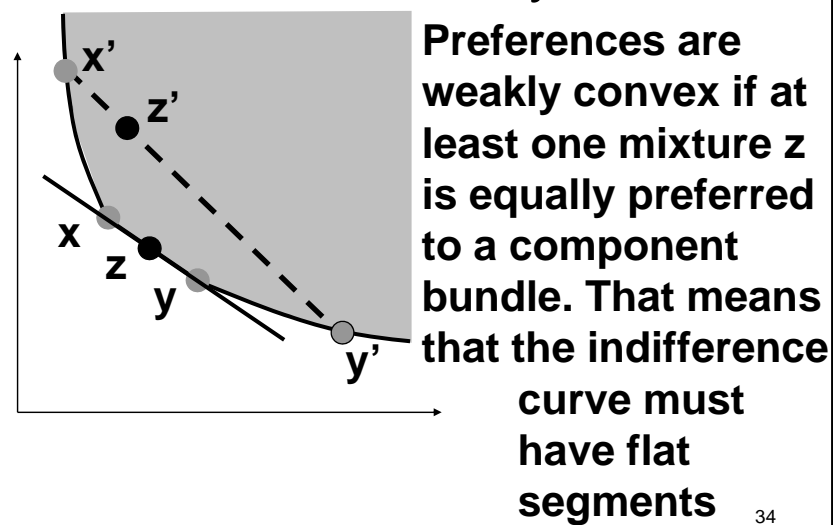
x'

z'

x

z

y

y'

Preferences are weakly convex if at least one mixture z is equally preferred to a component bundle. That means that the indifference curve must have flat segments

34

Non-Convex Preferences

The mixture z is less preferred than x or y.

Better

More Non-Convex Preferences

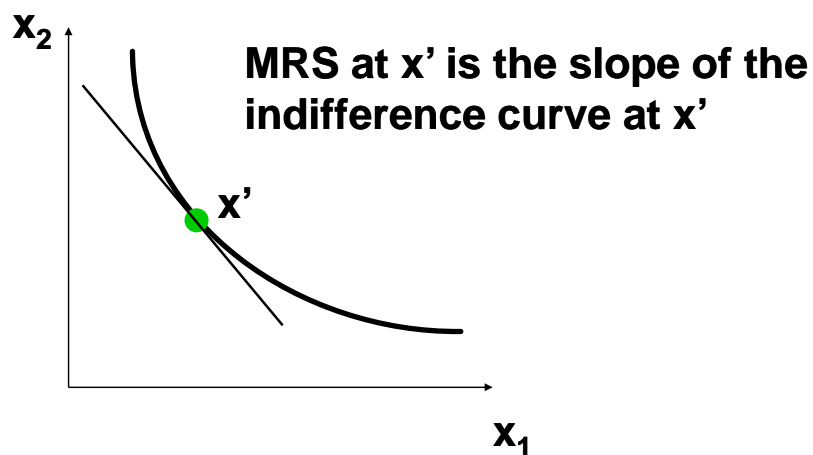**The mixture z is less preferred than x or y.**

Better
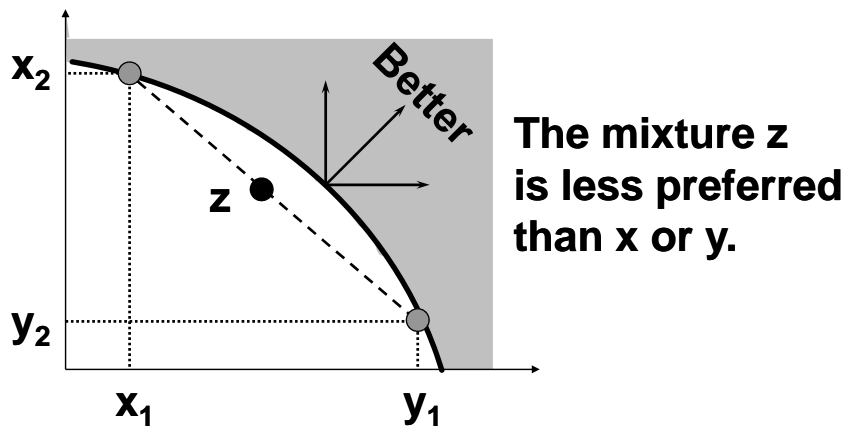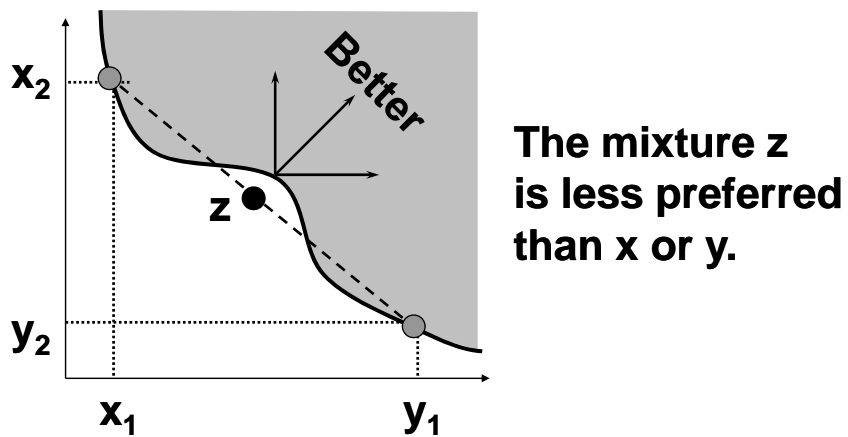
Slopes of Indifference Curves

- The slope of an indifference curve is its **marginal rate-of-substitution (MRS).**

- This measures at which rate at which the consumer is willing to trade a tiny bit of one good for little more of the other. **I.e. while being indifferent, staying on the same indifference curve**
- How can a MRS be calculated?
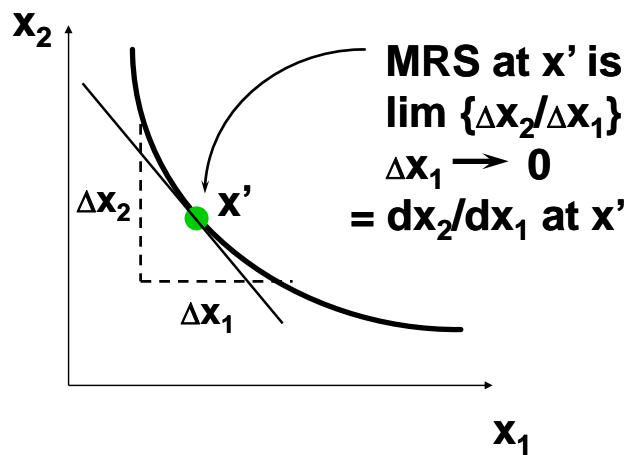- Naturally it must be the **slope** of the curve
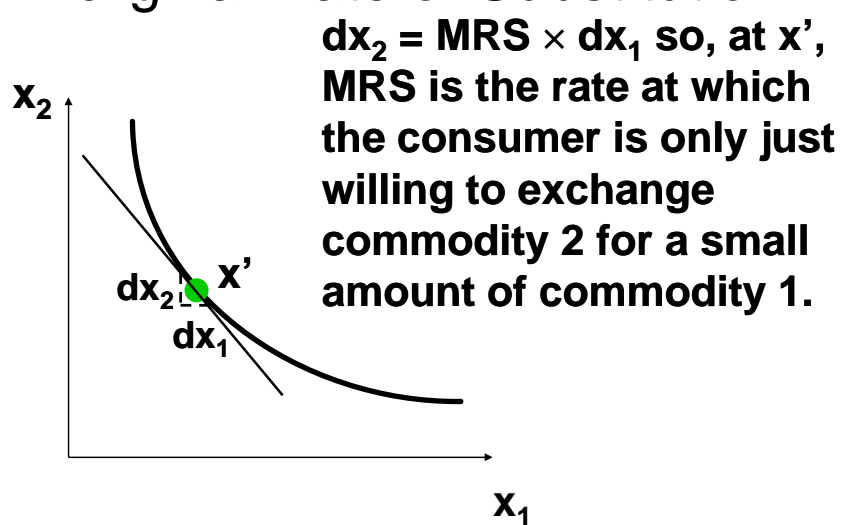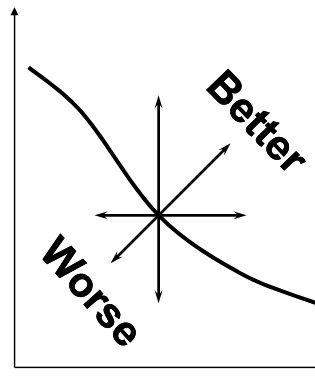
37

Marginal Rate of Substitution

x_2

MRS at x' is the slope of the indifference curve at x'

x'

x_1

38

Marginal Rate of Substitution

x_2

MRS at x' is
lim $\{\Delta x_2/\Delta x_1\}$
$\Delta x_1 \longrightarrow 0$
= dx_2/dx_1 at x'

Δx_2 x'

Δx_1

x_1

39

Marginal Rate of Substitution

dx_2 = MRS $\times$ dx_1 so, at x',
MRS is the rate at which
the consumer is only just
willing to exchange
commodity 2 for a small
amount of commodity 1.

x_2

dx_2 x'

dx_1

x_1

40

Normal MRS & Ind. Curve Properties

Good 2

Better

Worse

Two goods ➡ **a negatively sloped indifference curve**
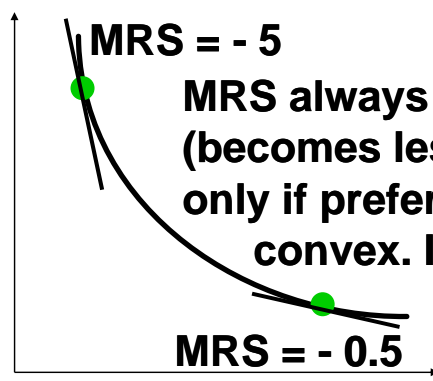
➡ **MRS < 0.**
Why ?

Good 1

41

Normal MRS & Ind. Curve Properties

Good 2

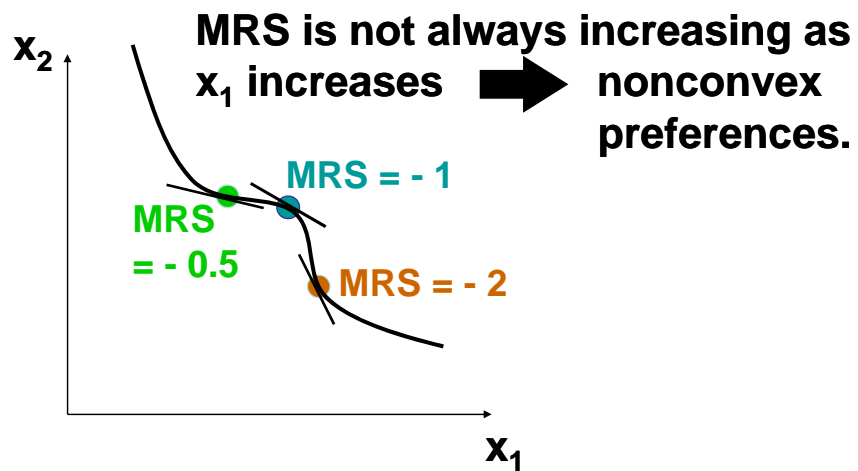**MRS = - 5**

MRS always increases with x_1 (becomes less negative) if and only if preferences are strictly convex. Intuition?

MRS = - 0.5

Good 1

42

Fishy MRS & Ind. Curve Properties

MRS is not always increasing as x_1 increases ➡ nonconvex preferences.

MRS = - 1

MRS = - 0.5

MRS = - 2

43