Econ 201: Introduction to Economic Analysis

September 21 Lecture: Consumer Equilibrium

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Daily Far Side

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Preview of this class session

- We combine preferences and opportunities to determine the consumer's optimal consumption bundle
- Changes in consumer income will shift the budget constraint and lead to changes in optimal bundle
- Changes in price of a good leads to income and substitution effects on consumption of the good that may reinforce or offset one another

Consumer equilibrium

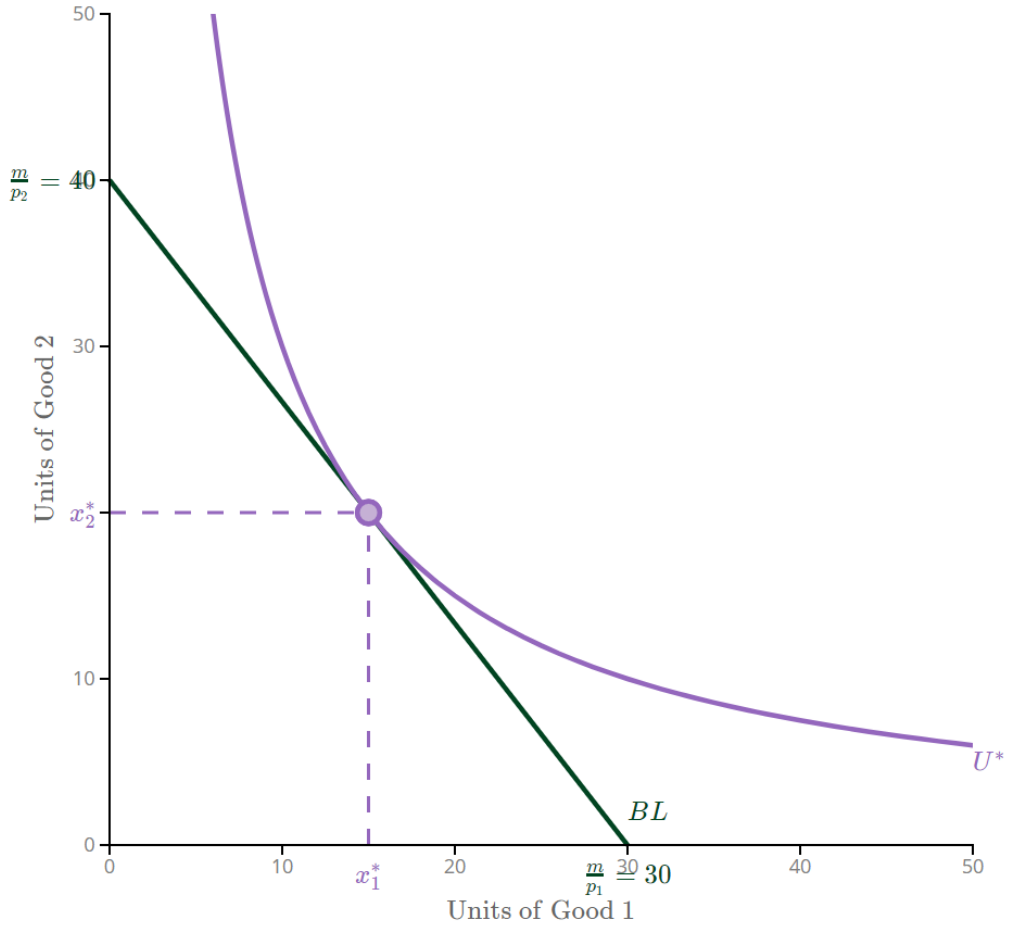
What point in the opportunity set yields highest utility?

Interior solution

- Most commonly drawn situation
- Highest attainable indifference curve is at tangency with budget constraint
  - Slopes are equal, so $\text{MRS}_{AB} = P_A / P_B$
  - Marginal benefit of one more ounce of asparagus (MRS) = marginal cost (relative price)
- In terms of marginal utilities:

$$-MRS_{AB} = MU_A / MU_B = P_A / P_B, \text{ so } \frac{MU_A}{P_A} = \frac{MU_B}{P_B}$$

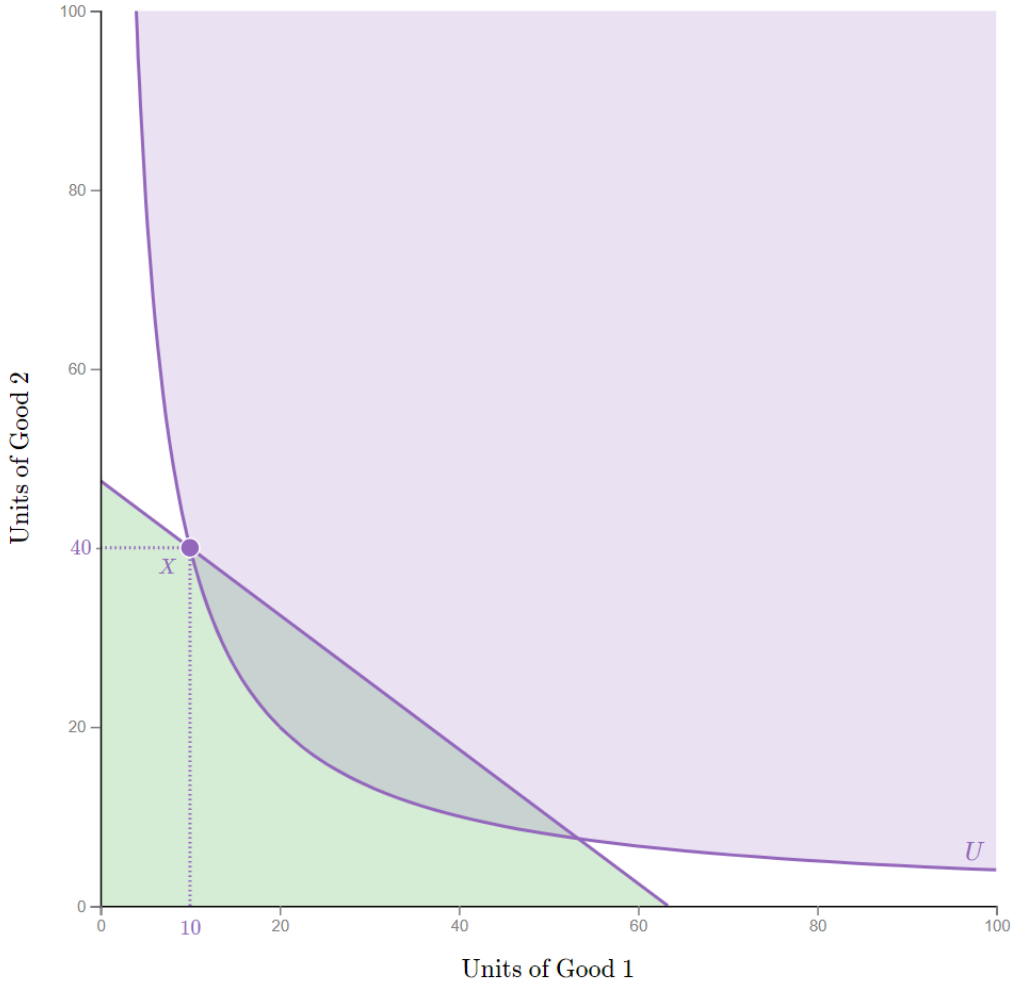
- Marginal utility per dollar is equal



https://www.econgraphs.org/graphs/micro/consumer_theory/utility_max?textbook=varian

Why is tangency optimal?

- Suppose consumer is at point *X*, consuming 10 of good 1 and 40 of good 2:
  - Purple region is bundles that are preferred to *X*
  - Green region is bundles that are cheaper than *X*
- Moving into the intersection of these regions is both better and cheaper, so consumer prefers them



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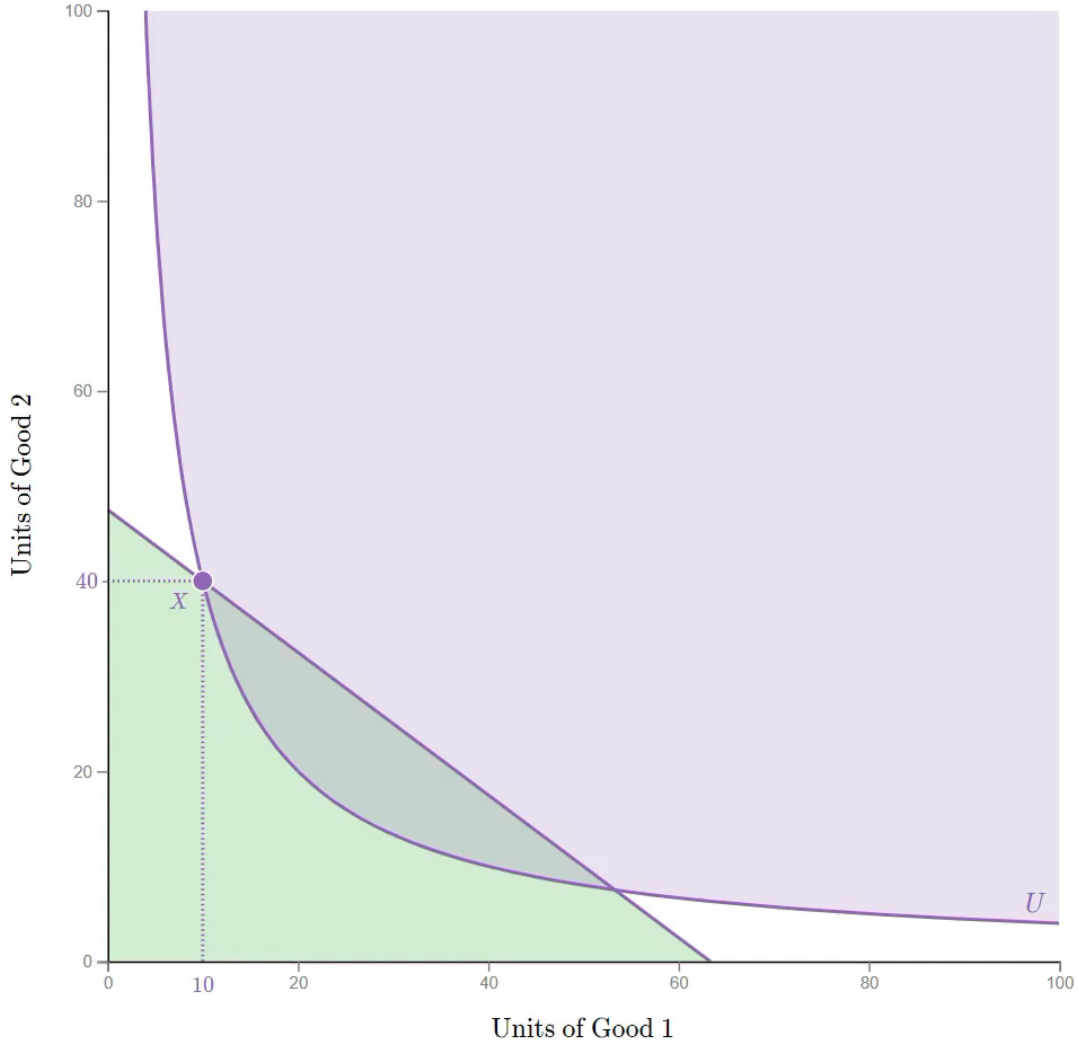
Moving to optimal consumption

- As we move down to the right, the area that is both affordable and preferred shrinks until it vanishes at the point of tangency
- This is the point of **consumer equilibrium** with an **interior solution**



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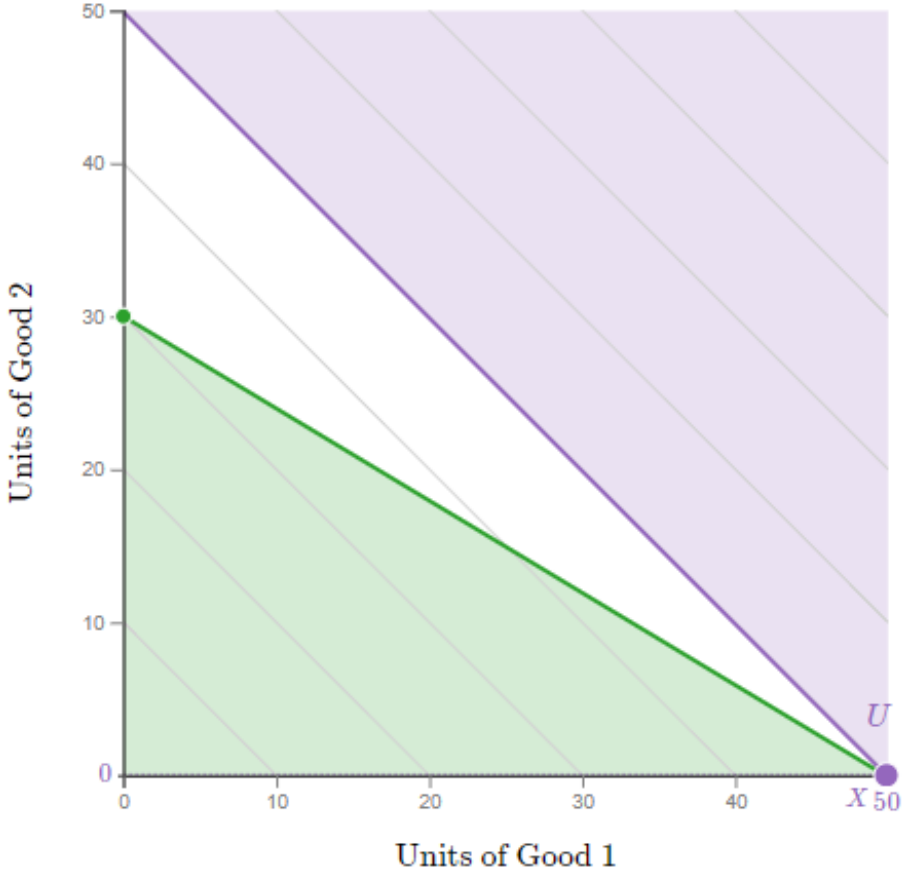
Corner solution

- Indifference curve flatter than budget line at vertical axis → consume no X
- Indifference curve steeper than budget line at horizontal axis → consume no Y (shown here for perfect substitutes)
- **Corner solutions** are common, but not very interesting
  - There are more goods that I *don't* consume than that I *do* consume
- **Interior solutions** more relevant for theory of demand because we are interested in those who *do* consume good



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Effects of change in income

How is consumer equilibrium affected by an increase in income?

Focusing on *one* good

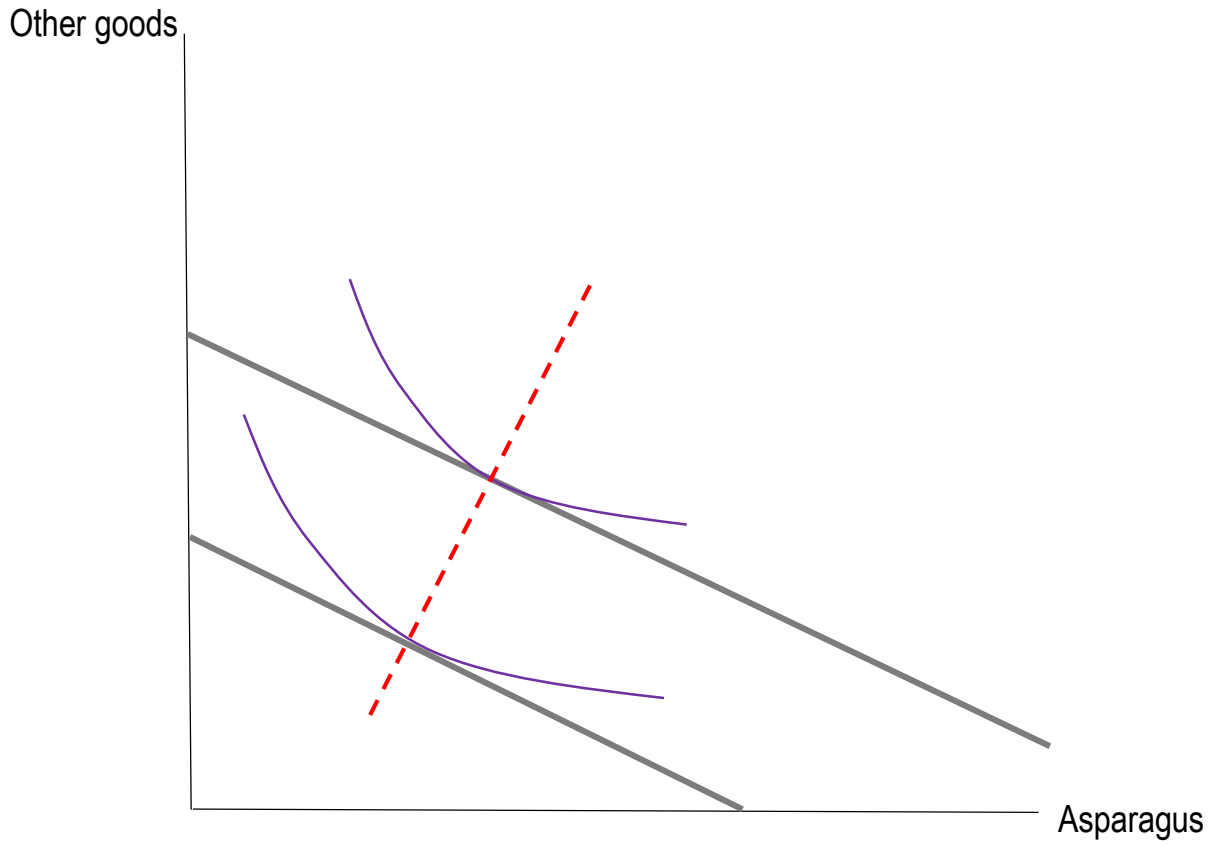
- We usually focus on consumption of a **single good** in constructing demand curves
- We put the chosen good on the horizontal axis (Good 1 or X) and we treat the vertical axis as a **composite of "all other goods"**
  - In actual application, we would construct an "index number" of consumption of all of these commodities
  - The price of the composite good is normalized to be one
- Total **"real" income** is the vertical intercept of constraint: amount of other goods that can be consumed if no X is bought

Effects of increase in income

- Increase in income leads to parallel outward shift in budget constraint
- Consumer can buy more of Good 1 *and* more of all other goods (on vertical axis)
- Consumer equilibrium will shift outward as well
  - Depends on shape of indifference curves
  - Might increase consumption of both goods, or maybe only one

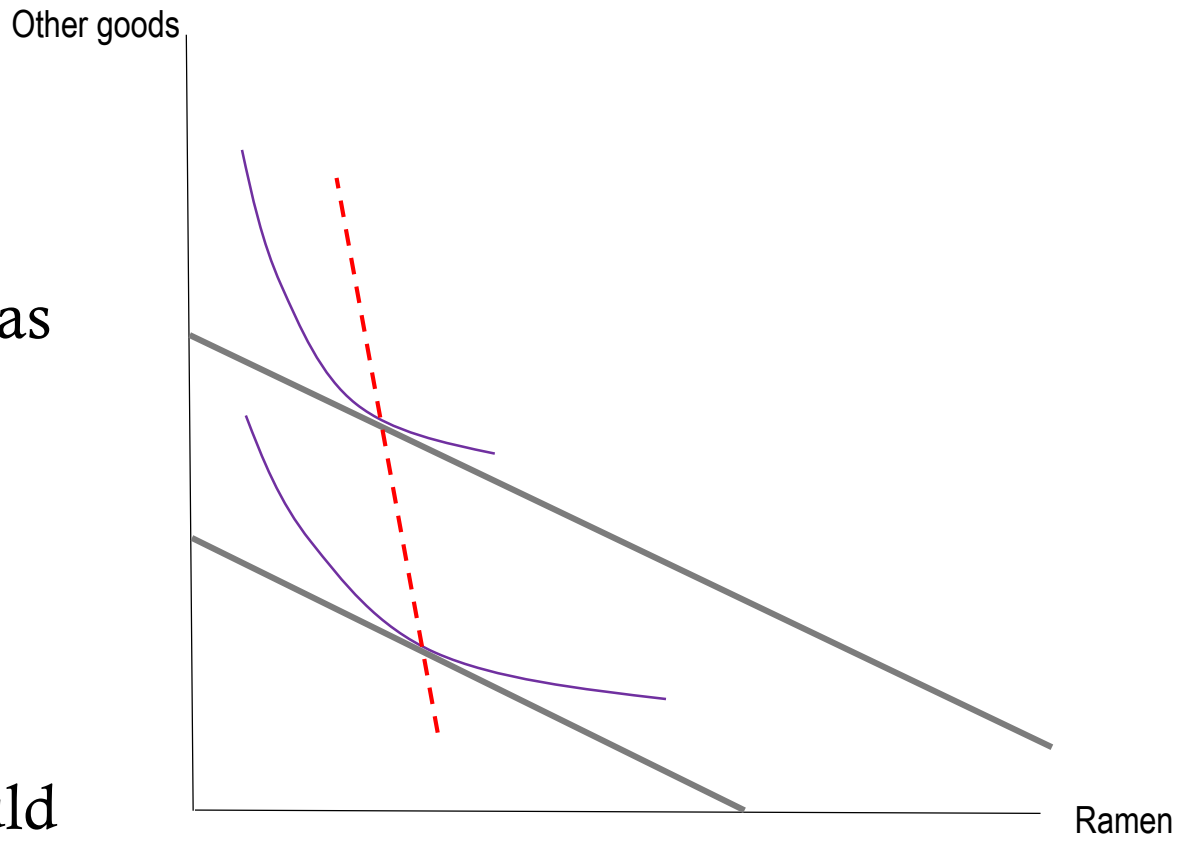
Effect of an increase in income

- Initial situation is lower budget line
- Increasing income **moves line parallel to the right**
  - Consumer can buy more of either or both goods
- In this case, she buys more asparagus *and* more of other goods
- Orange "**income expansion path**" shows consumer equilibrium at all levels of income



Normal vs. inferior goods

- Could consumption of good 1 go *down* when income rises?
  - Yes, these are "**inferior goods**"
  - Indifference curves are asymmetric: equilibrium moves to the northwest as the budget constraint shifts outward
  - Income-expansion path would slope up to the left
- What kinds of goods would be inferior?
  - Maybe cheap products that you would stop buying at higher income (ramen?)

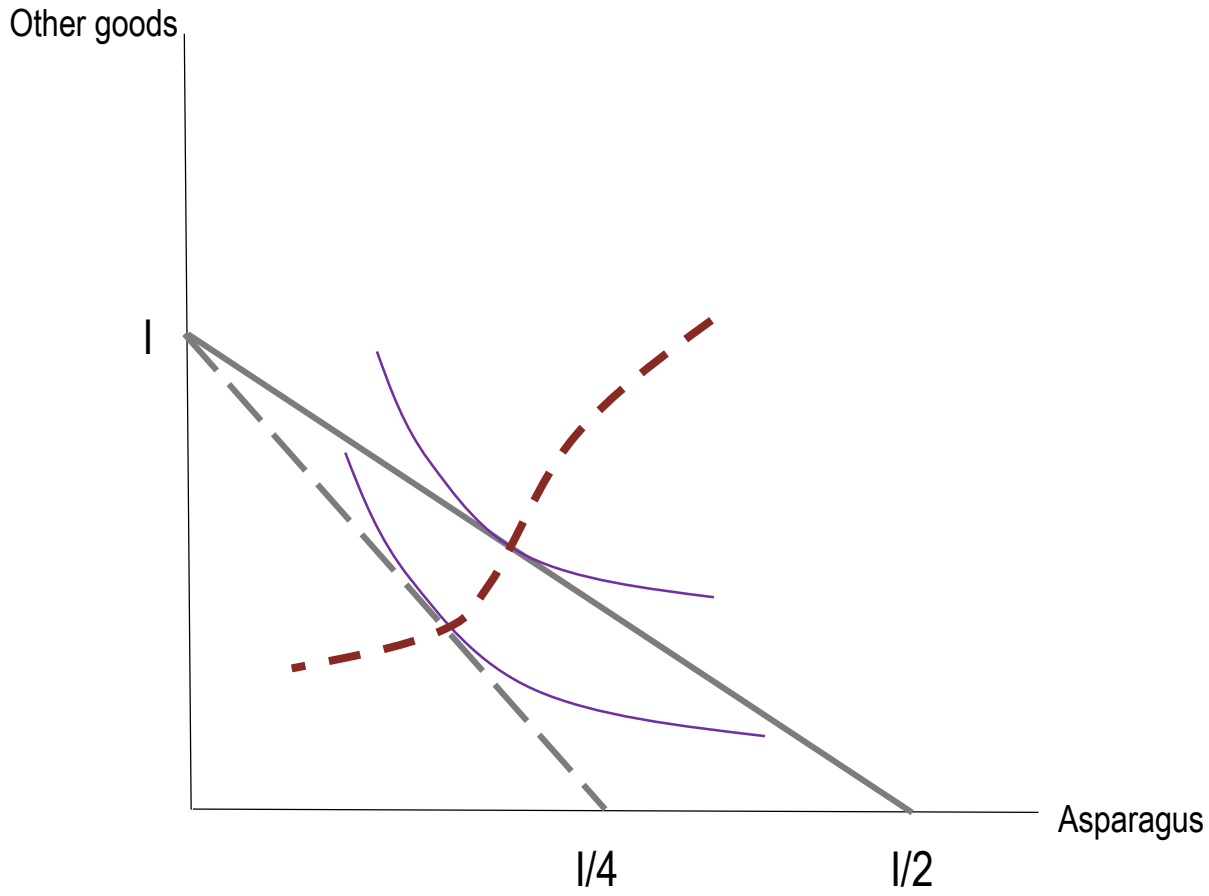


Effects of change in price

How does consumer equilibrium change when price changes?

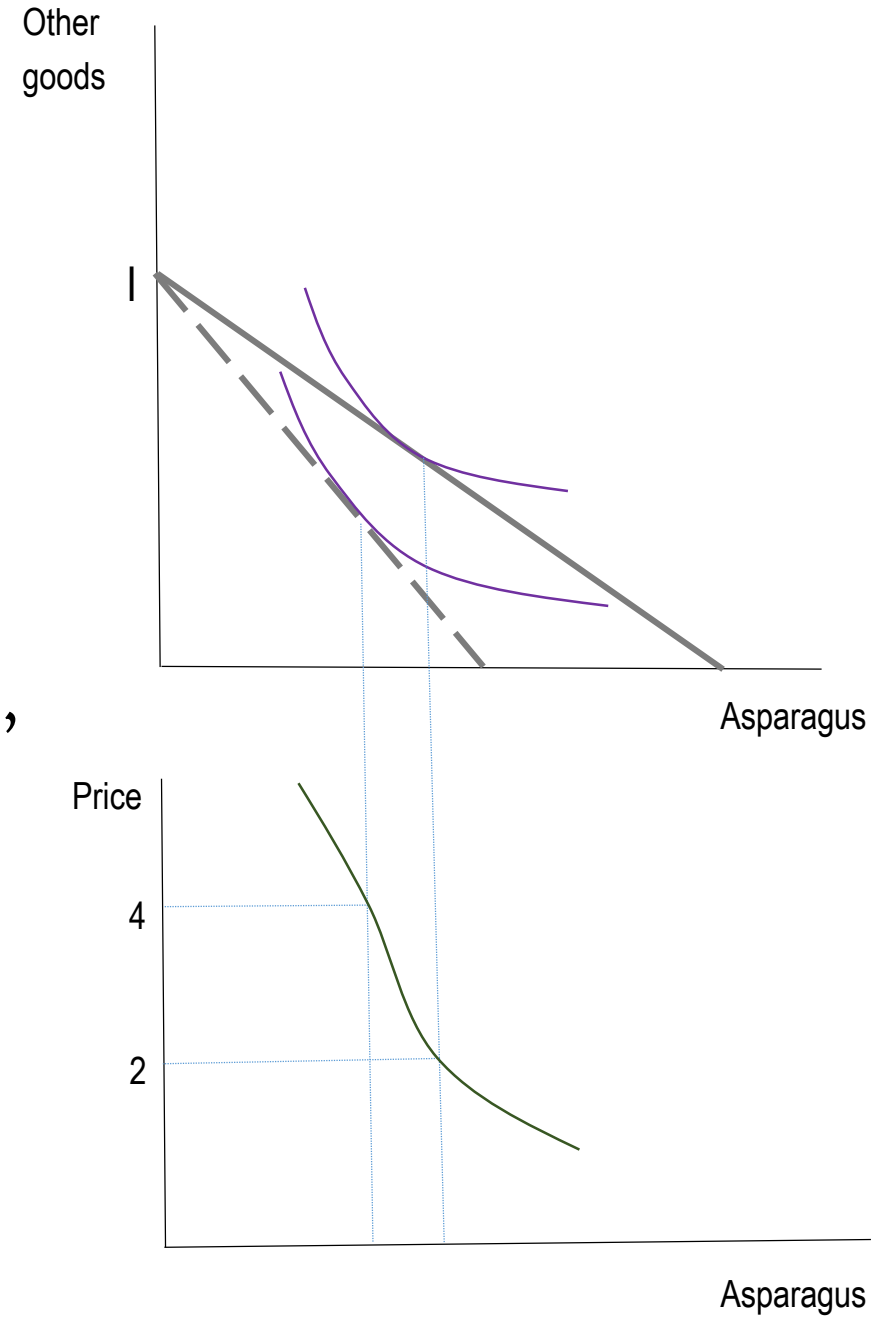
Increase in price of good

- Price of asparagus rises 2 → 4:
  - Can buy less asparagus *(I/4* vs. *I/2*), but same amount of "other goods" (*I*) with full income
- Horizontal intercept shifts left, but vertical intercept is same because price of "all other goods" on vertical axis is one
- Budget constraint (dashed) gets steeper: Slope is $-P_A$
- **Price-consumption path** is red curve



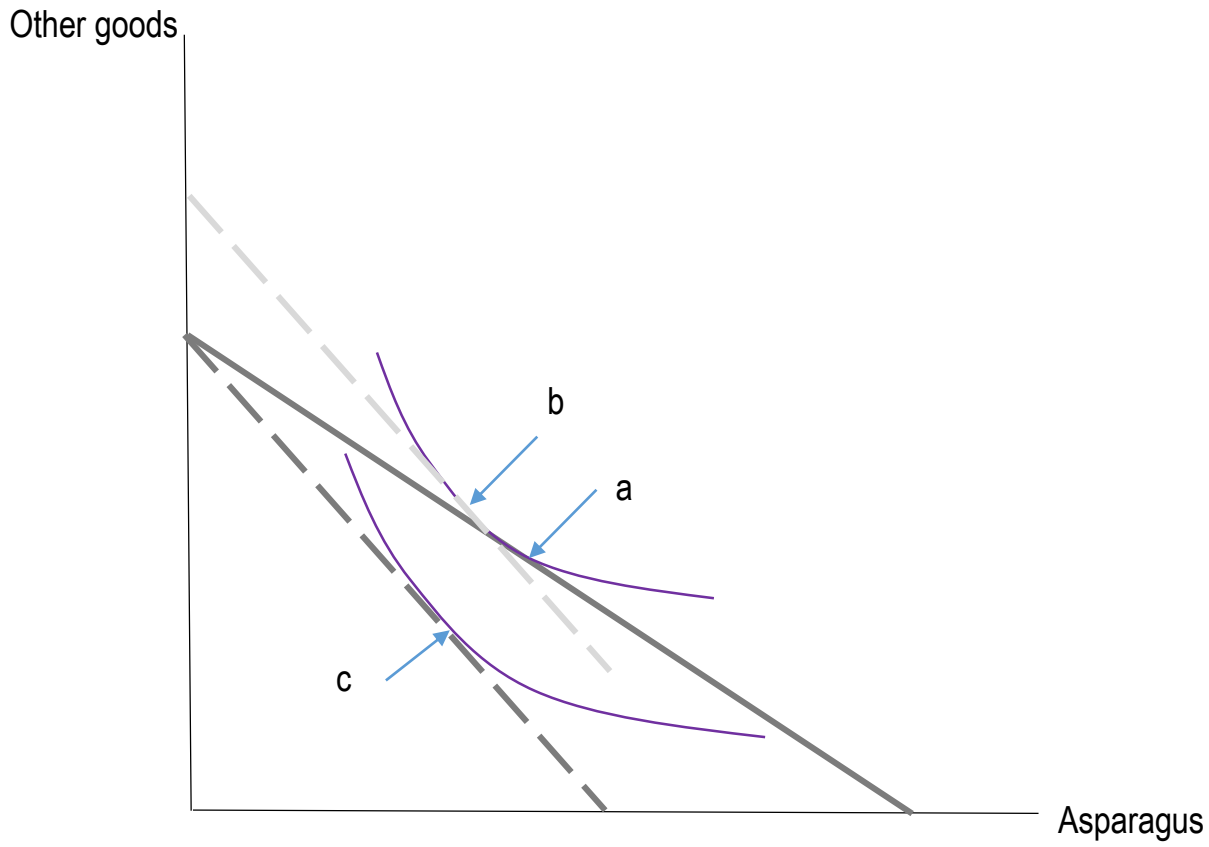
Price change and demand

- As P_A increases, less asparagus is consumed: **law of demand**
- If we plot the price against quantity demanded from the indifference curves, we get this consumer's **demand curve** for asparagus
- Lower diagram shows the two points from top graph on quantity/price axes



Income and substitution effects

- Total effect of price change: *a* → *c*
- Part of that (*a* → *b*) is pure **substitution effect** due to asparagus being more expensive relative to other goods
- Part (*b* → *c*) is pure **income effect** due to loss in spending power when asparagus is more costly
- Decomposition uses hypothetical budget line (gray) parallel to new one, but tangent to same indifference curve as old one



Signs of income and substitution effects

- Substitution effect is **always negative**
  - Increase in P_A makes budget line steeper and moves tangency up along indifference curve
- Income effect **can be negative or positive**
  - Increase in P_A works as fall in income
  - Is good normal or inferior?
- Normal good: effects of $P_A\uparrow$ are both negative
  - Demand curve surely slopes downward
- Inferior good: substitution effect is negative; income effect is positive
  - Could positive income effect ever dominate?
  - This would be called a "Giffen good" if it existed

Daily diversion: Elena!

What comes next?

- We have now developed the theory of consumer behavior underlying individual consumer's demand curve
- On Wednesday we aggregate across consumers to get the overall market demand curve
- Problem Set #3 is due Wednesday
- After that class, we move to the "supply side" of the market and consider firms' production and costs