The Demand for Health

University of Alabama

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Last Class

- We learned about how we might be able to model the production of health through use of the standard Neoclassical Production Function.
- We discussed "Flat-of-the-Curve" Medicine and two studies that argue that we are not at the flat-of-the-curve in the U.S.
- Now we will move in the direction of understanding a individual agent's demand for health.

How to Model Demand for Health

The model has four parts:

1. Utility: Happiness derived from consumption of health and consumption of "home goods."

2. Budget Constraint: The consumer can only afford so much. Additionally, the consumer must exhaust all of her income.

3. Time Constraint: The consumer is constraint by time, in that she has a limited amount to devote to labor, leisure, and investment.

4. Production Function: The consumer turns health inputs into health outputs.

Recall the Health Production Function

- People use inputs to produce health

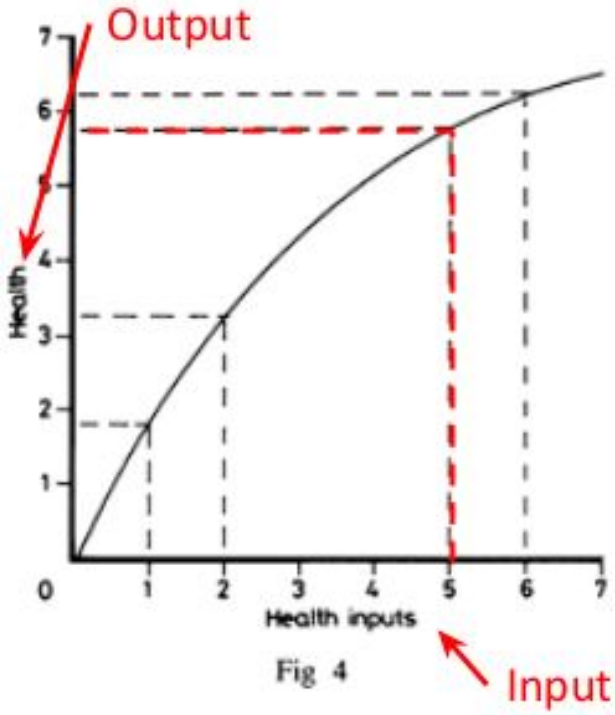


Fig 4

- Inputs could be exercise, medical care
- Inputs go into a health "factory" to produce health.
- Production Function shows how much output comes from each input, "All Else Equal"

Technological Progress

- If technology increases…

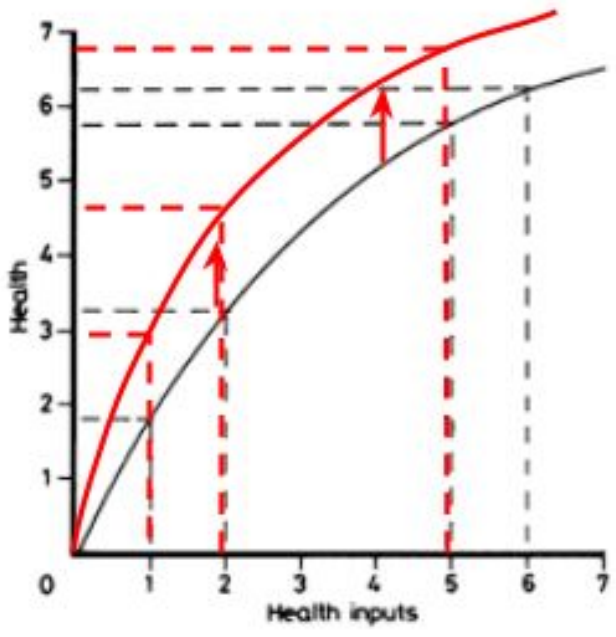


Fig 4

- Each health input leads to MORE health output
- Ex:
  - Before, 5 units of health input led to just under 6 units of health output
  - Now, 5 units of health input lead to almost 7 units of health output

Utility

- Consumers gain utility, or happiness from the consumption of goods or services.
- Indifference curves show how much of one good a consumer is willing to give up in order to gain an additional unit of another good.
- Recall that the Marginal Rate of Substitution, or the MRS, is a mathematical tool that captures this tradeoff.
- The MRS is the negative slope of the indifference curve

Assumptions of Indifference Curves

1. **Completeness and Rankability**
   - Consumers can compare bundles of goods and rank them
2. **Local-Nonsatiation**
   - More is better than less
3. **Transitivity**
   - Imposes a logical consistency on rankings
4. **Convexity**
   - Averages are preferred to extremes

Health Indifference Curves

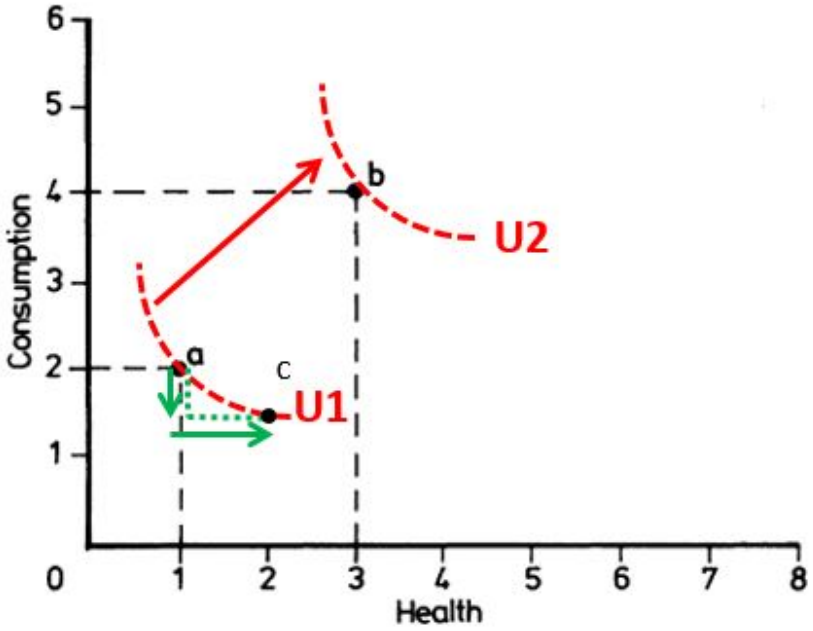
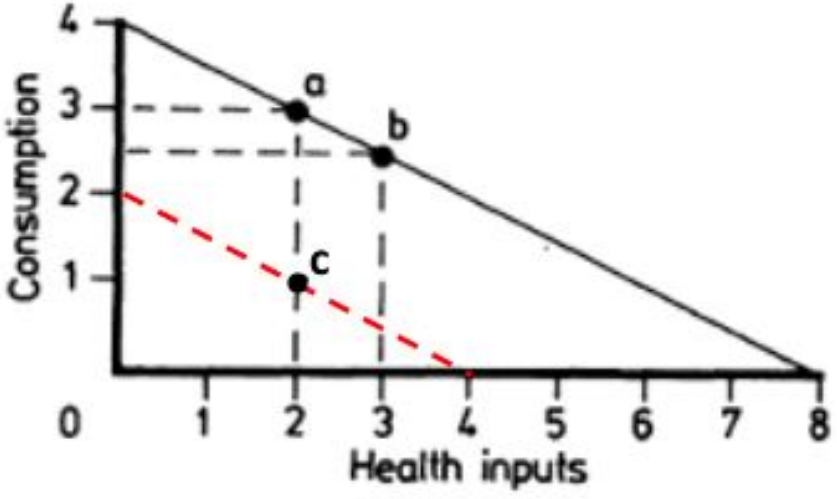


Fig 1

- Indifference curves are convex
- Indifference curves that are “far out” are better
- As health increases and consumption decreases, value increased health less than increased consumption

Budget Constraint

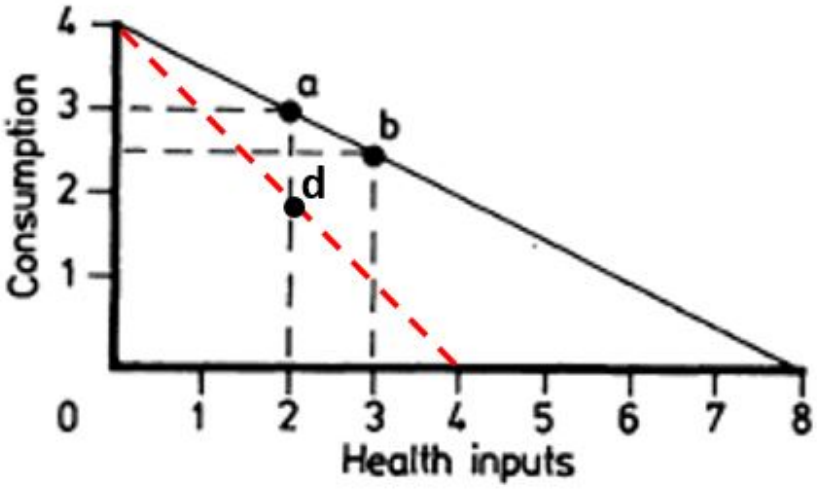
- Shows combinations of goods consumer can afford



- For example, consumer has $200
  - Health inputs cost $25 each and consumption bundles cost $50 each
  - Point (a): 2*$25 + 3*$50 = $200
- What if only $100?
  - Point (c): 2*$25 + 1*$50=$100

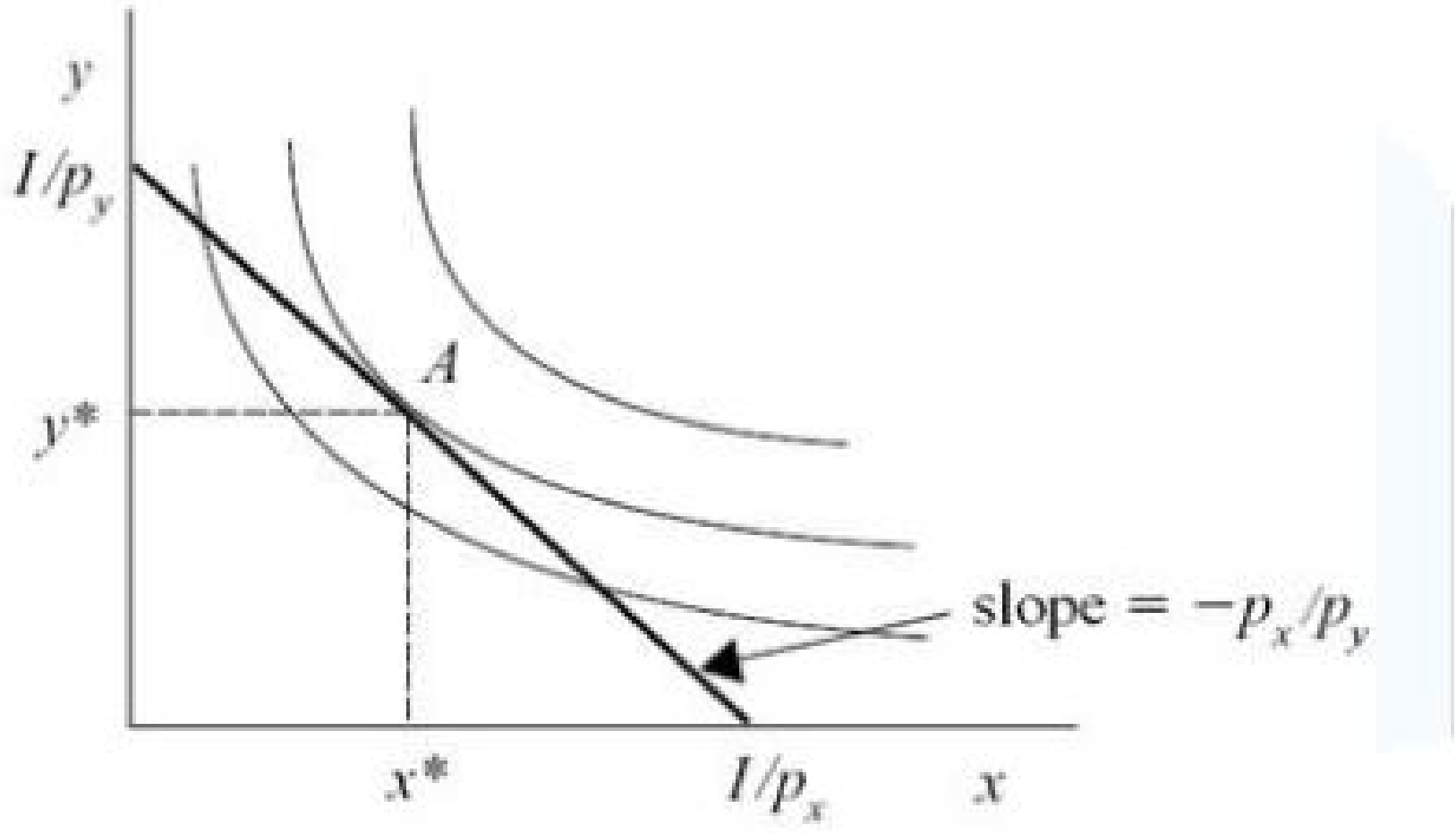
Budget Constraint

- Shows combinations of goods consumer can afford



- For example, consumer has $200
  - Health inputs cost $25 each and consumption bundles cost $50 each
- What if health inputs increase to $50?
  - Budget line swings
  - Point (d): 2*$25 + 1*$50=$100

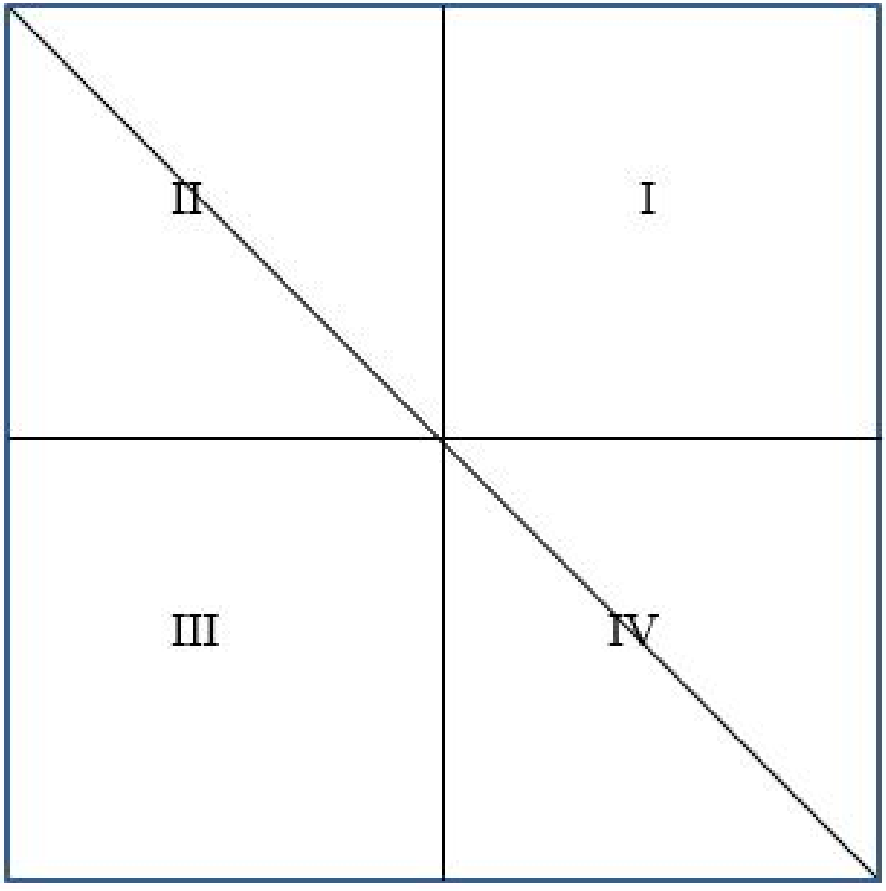
The Optimal Bundle



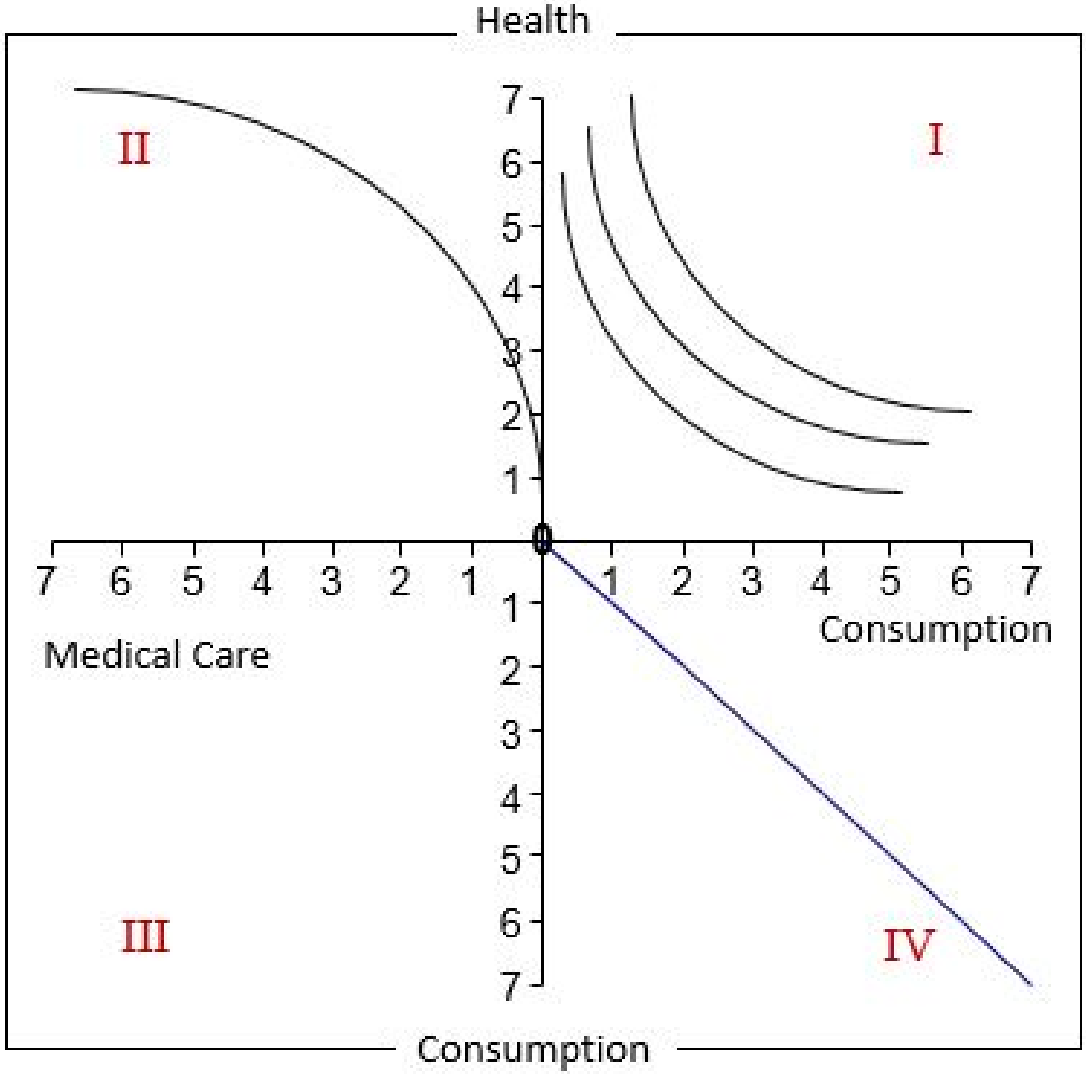
Putting Everything Together

- Wagstaff (1986): The Four Quadrant Model
- We can graphically depict the consumer's optimal choice of health consumption and consumption of other enjoyments of life, call them home goods.
- Understand that this is a graphical depiction of a constrained optimization problem with which you are all familiar: The Consumer's Utility Maximization Problem.
- The consumer seeks to maximize utility subject to some budget constraint and some health production process.

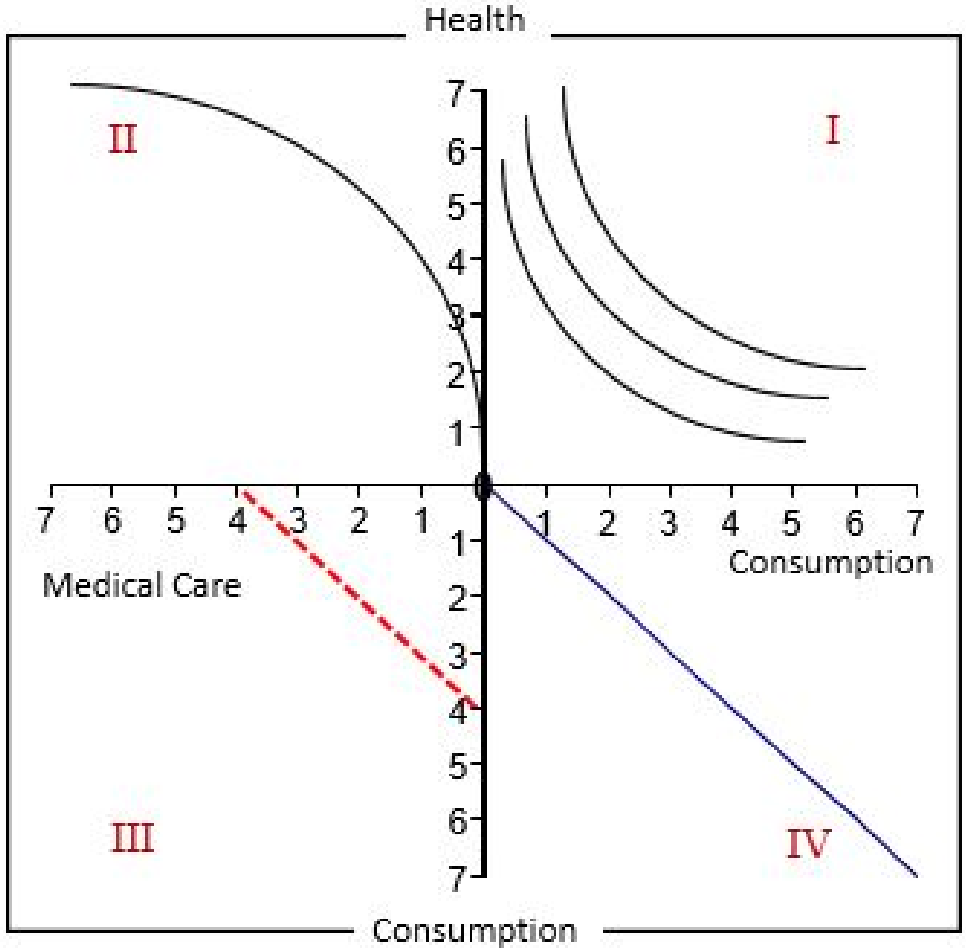
Putting Everything Together



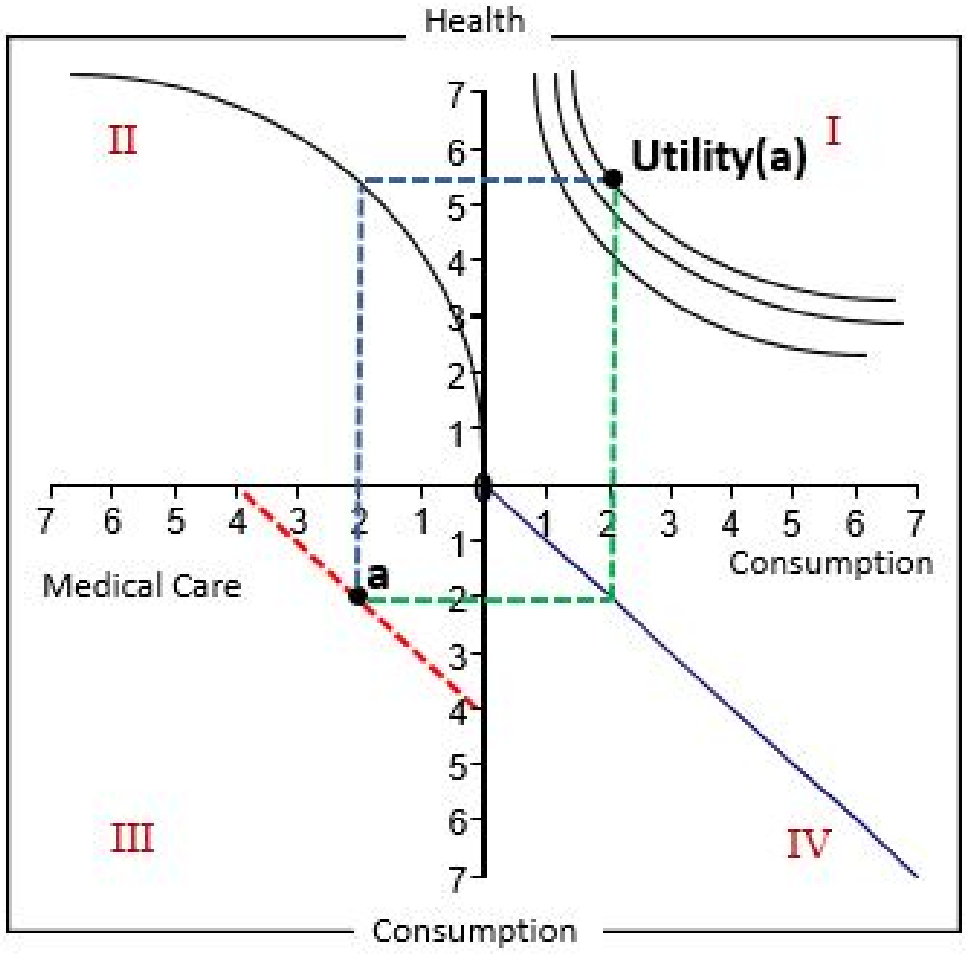
- **Quadrant I:** Indifference map. Shows the combinations of health and other goods providing same level of utility.
- **Quadrant II:** Production function for health. Relates inputs (medical care) to output (good health).
- **Quadrant III:** Budget Constraint. Shows how much of each good the consumer can purchase with available income.
- **Quadrant IV:** 45 degree line. Enables one to read consumption off the vertical axis in quadrant III with the horizontal axis in quadrant I.



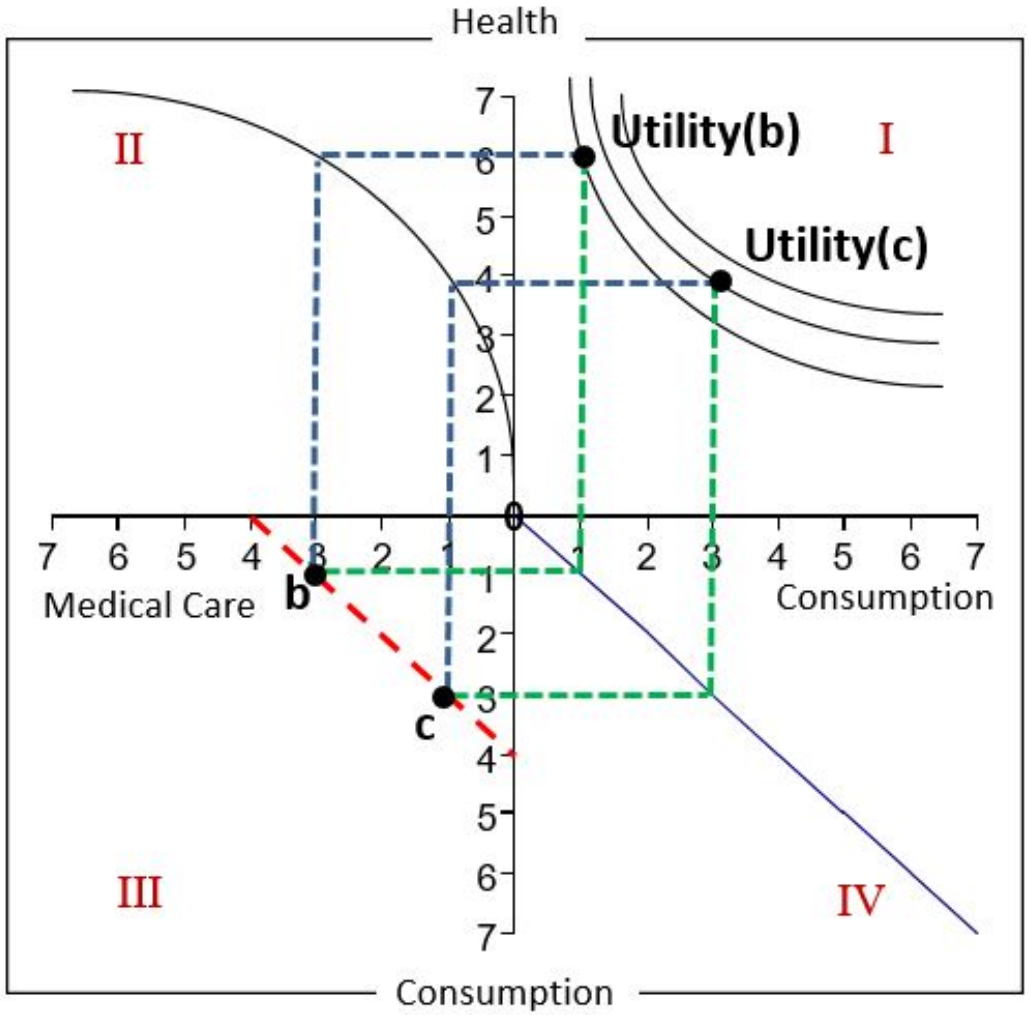
- Assume a consumer has $200 per month in income.
- This income is spent on medical care (MC) and the consumption of a composite good (C). Both goods cost $50 per unit.
- What will the consumer choose?



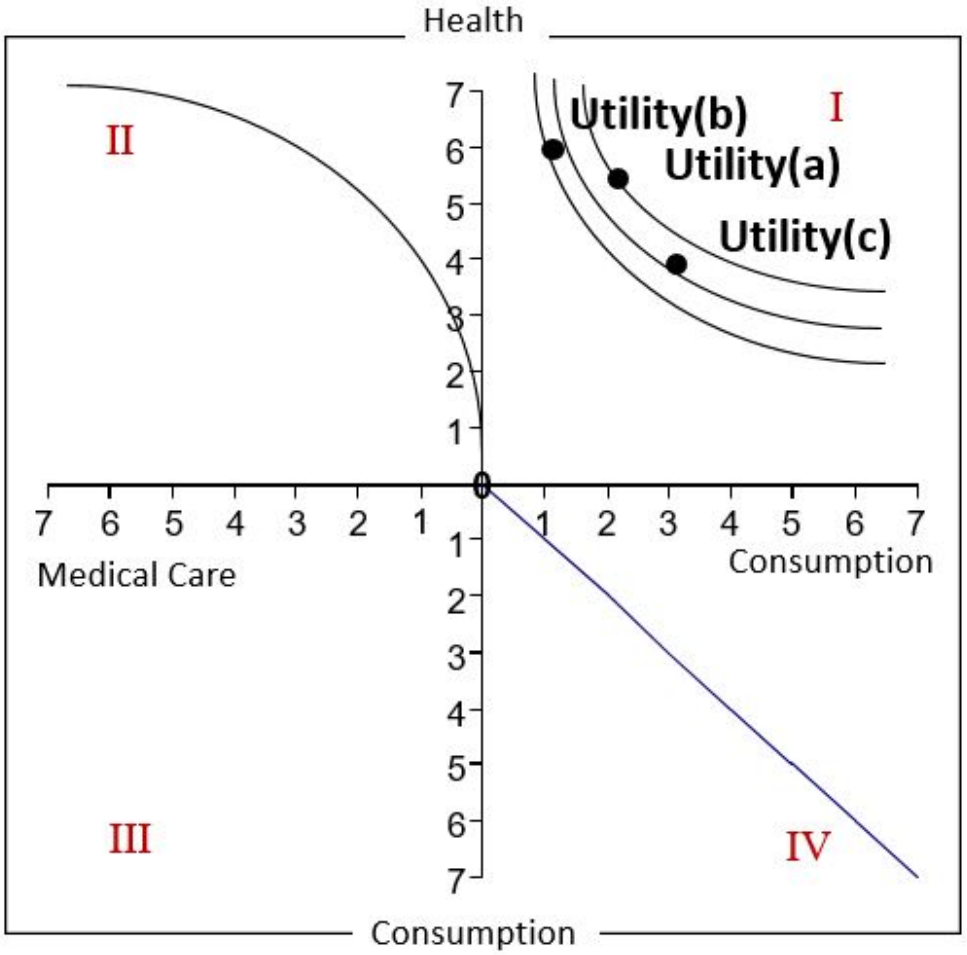
- Start with budget constraint (III)
  - Can buy 4 units of MC and 0 units of C
  - Or 0 units of MC and 4 units of C
  - … or 2 and 2



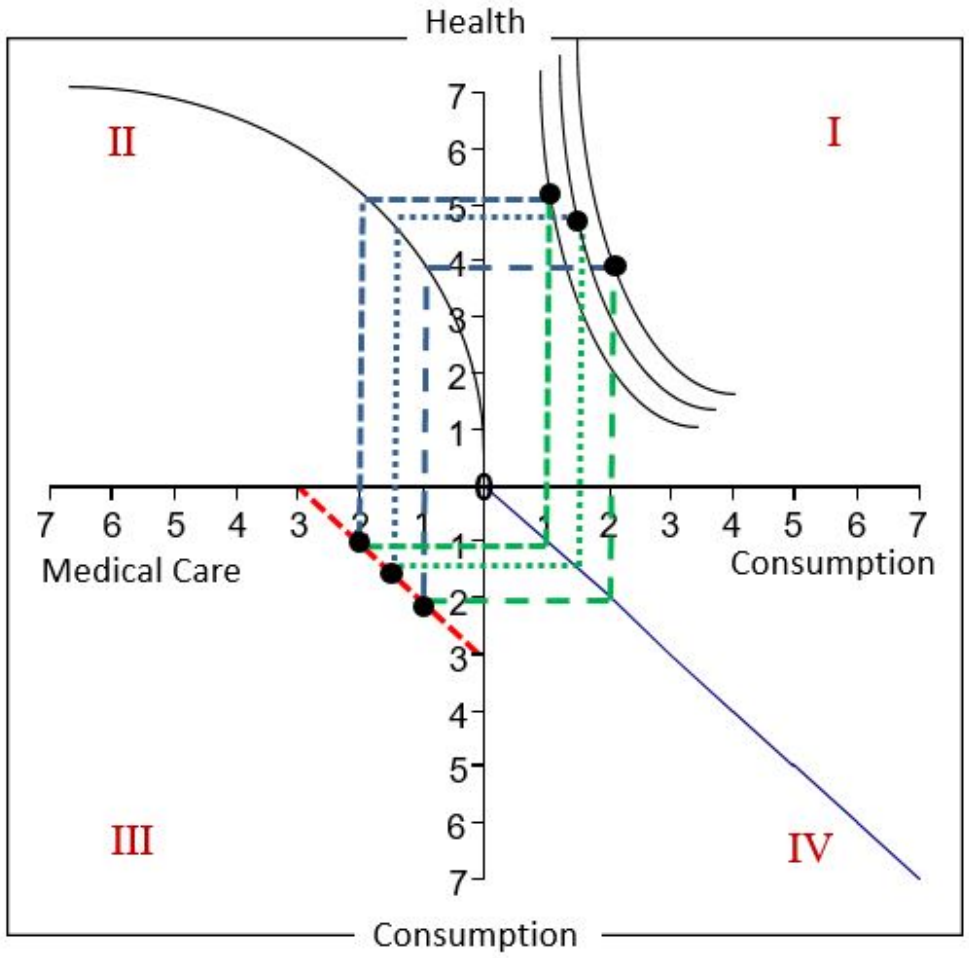
- Now pick an affordable bundle
- Ex: (2,2)
- Use Q II and Q IV to relate bundle to Utility in Q I
- Trace to Q IV then up to I for C
- Trace to Q II then over to I for MC and Health



- Now find Utility(b) and Utility (c)



- What can we say about what the consumer will do?
- Utility(a) > Utility(c) > Utility(b)
- Consumer buys 2 units MC and 2 units Consumption



- What if income decreases to $150?
- Show effects for buying 2, 1.5, and 1 units of consumption

Next Class

- We will more formally introduce the Model of Health Demand
- Grossman (1972)