Week 2: Demand for Health

HPM 6503
Spring 2026
Nada Boualam, PhD

Week 2: Outline

- AI Policy

1. Review of the PPF
   - Constraint shifters
   - Opportunity cost on the graph

2. Consumer choices:
   - Preferences & utility
   - Budget Constraints
   - Equilibrium

3. Demand for Health & Medical care
   - From Utility to Demand
   - Definitions
   - Demand shifters

4. Elasticities
   - Within price
   - Cross price

AI Policy

- First problem set will be assigned after class
- You are welcome to use by generative AI tool to study, but it is not recommended to use it to answer the problem sets. Generative AI is a tool - that can be wrong - not a replacement for your own thinking. If you do not study for the problem sets, you will most likely be underprepared for the exams.
    - If you are caught using generative AI to answer problem sets, it will be treated as a violation of academic integrity, and referred to the office of student conduct.

PPF Review

When poll is active respond at:

- **PollEv.com/nadaboualam947**
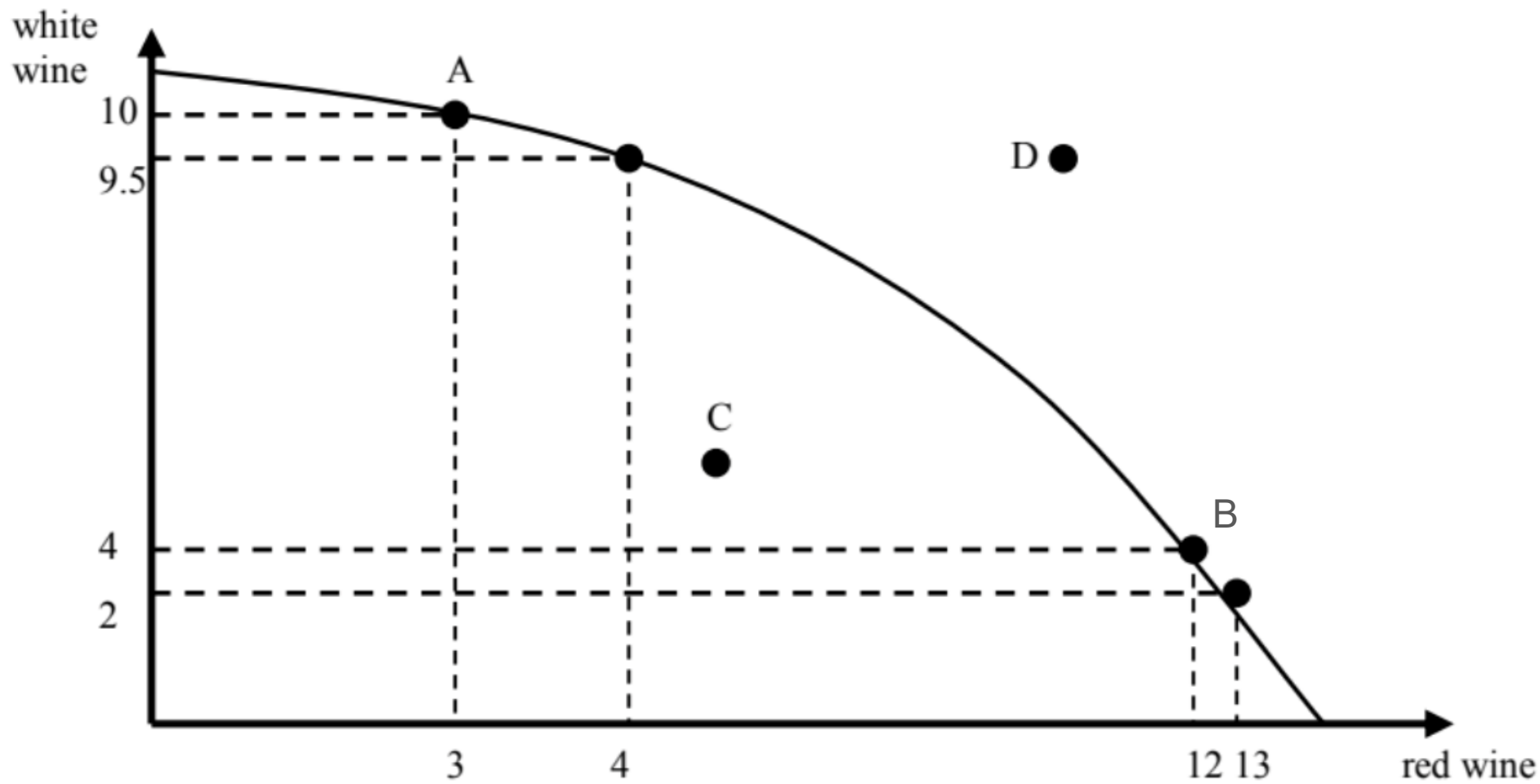- Send **nadaboualam947** and your message to **22333**

1. PPF: Production Possibility Frontier - Review

PPF tells us:

- What we can produce with our resources
- How opportunity cost of goods changes
- What is efficient / inefficient for us to choose
- What is impossible for us to choose

Opportunity cost: how much unit B do I have to give up to get 1 more unit A?

→ Slope of the PPF

Demand for Medical Care

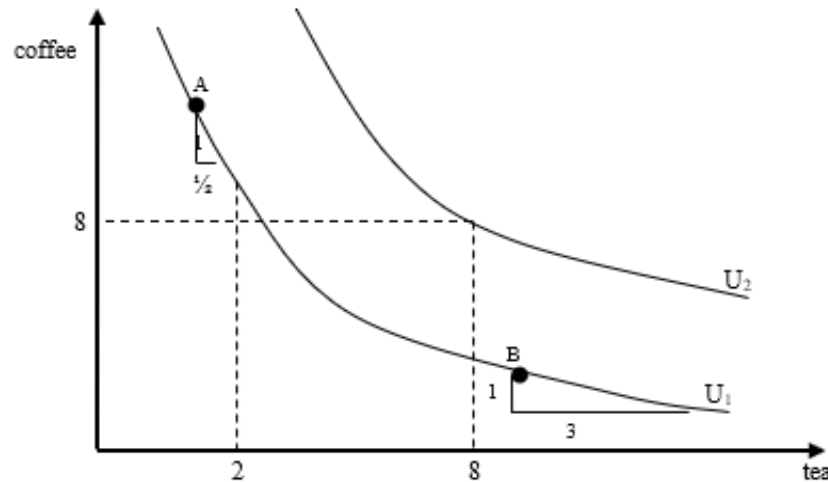# Utility - Definition, uses

Definition

Utility: welfare, happiness, satisfaction, well-being → **ranking of preferences**

Recall from last week:

- Decision-making <u>at the margin</u>: would an **extra** unit of this good increase my utility?
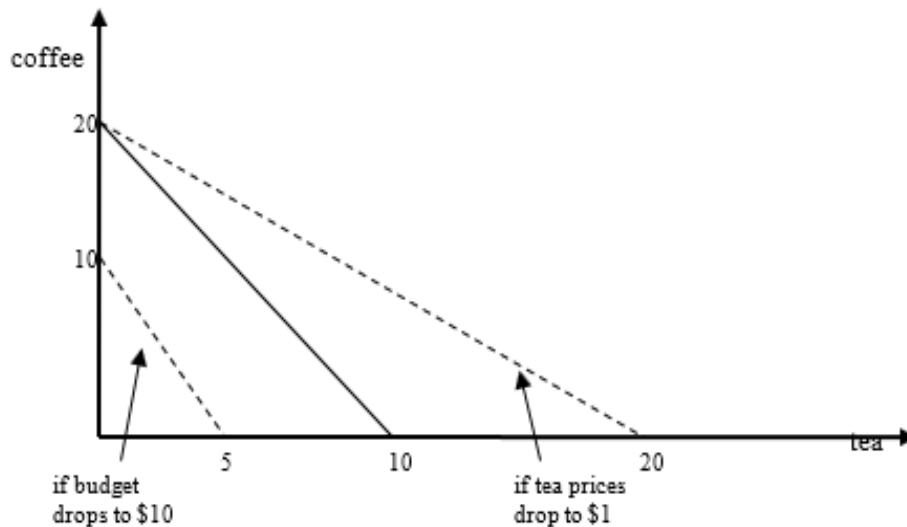- <u>Rational consumers</u> **maximize** their utility

From Utility to Demand

Indifference Curves: shows alternative bundles of goods from which the individual derives equal levels of utility → the consumer is indifferent
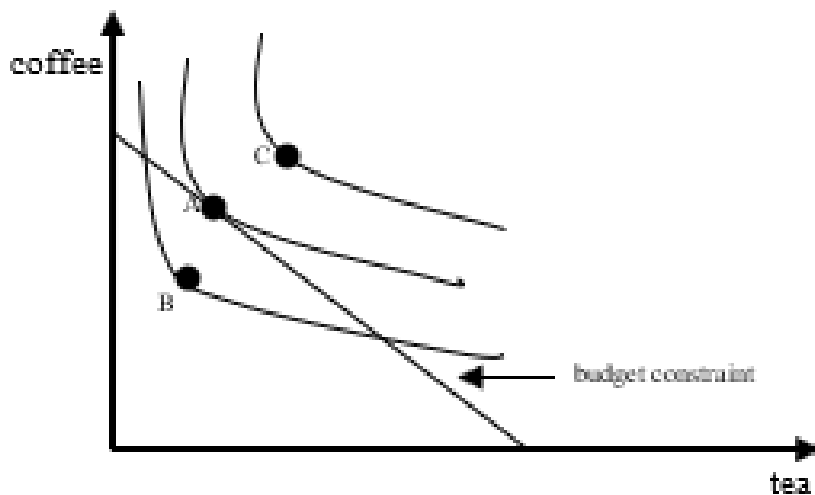
From Utility to Demand

Budget constraints: indicate the bundles of goods a consumer can afford given their income

From Utility to Demand

Consumer Equilibrium: Consumer's job is to get the most happiness (utility) they can, given their budget

Demand: Which bundle of goods maximizes utility subject to the budget constraint?

Diminishing Marginal Returns

Now Add: The Law of Diminishing Marginal Returns of X on Y

The rate at which your utility increases from getting X over Y will diminish the more of X you already have

Economic Definition of Medical Care

Definition

Medical Care: Goods & services that maintain, improve, or restore a person's physical or mental well-being

How is medical care measured?

- Services are heterogeneous → no singular unit
- Default measure is spending on medical care
- Quality is not uniform

Demand for Health & Health Care

1. Demand for medical care is a derived demand. People consume healthcare to improve or maintain their health. **Utility is derived from health**, not health care.
2. Law of diminishing <u>marginal utility</u>: the marginal utility of health improvements diminishes in magnitude as health status increases
3. Law of diminishing <u>marginal productivity</u>: The marginal impact on health of increased spending for medical care diminishes as the level of spending increases.
4. Non-healthcare spending externalities: additional spending on non-medical interventions may have a greater impact on health than additional spending on medical care

Grossman Model: Demand for care is a derived demand

People demand health, not health care. Health is a durable capital good that individuals invest in over their lifetime.
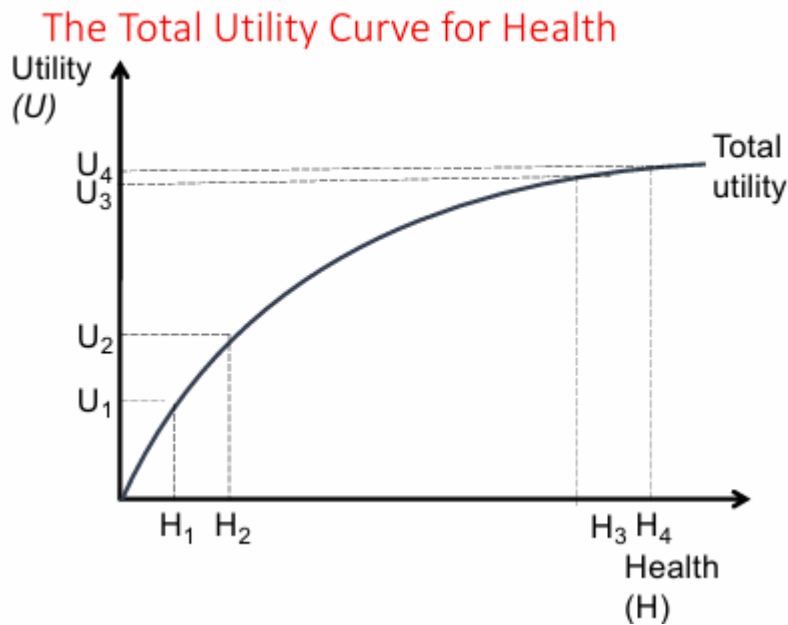
Health serves 2 purposes:

1. **Consumption value**
2. **Investment value**

Health depreciation: Health stock depreciates over time at an increasing rate (with age). This drives the need for ongoing investment in health maintenance.

- Higher wages → greater demand for health (more earnings to protect)
- Higher education → greater demand for health (more productive use of healthy time)
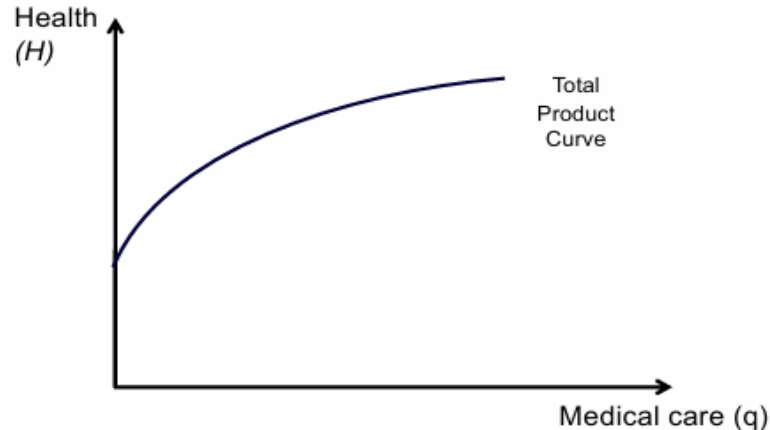
Law of diminishing marginal utility (of health)

Law of diminishing marginal utility: each additional improvement in health generates an ever smaller increase in utility.

The Total Utility Curve for Health

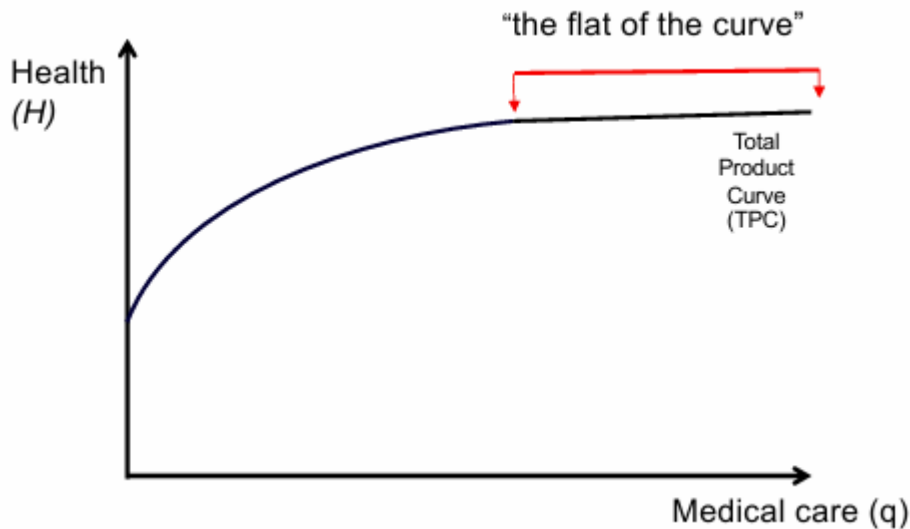# Law of diminishing marginal productivity (of health)

Law of diminishing marginal productivity: health increases at a decreasing rate when additional units of health care are consumed, holding all other inputs in the health production process constant.

The Total Product Curve (TPC) for Medical Care

Health (H)

Total Product Curve

Medical care (q)

Law of diminishing marginal productivity (of health)

Most of US spending on healthcare corresponds to the flat of the curve. → higher spending, but same (or worse) health status than other countries

Law of diminishing marginal productivity (of health)

What affects the TPC?

- Education shifts up & rotates it upward
- Disease shifts down & rotate it upward
- Income shifts it up
- Technological advances either increase productivity or occur in the flat of the curve
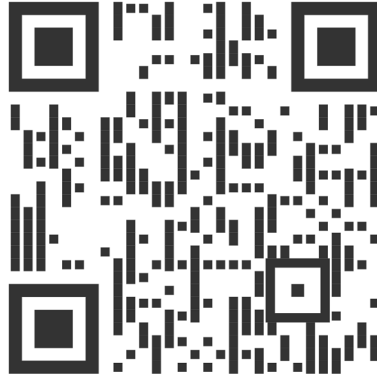- Other spending could shift TPC up or down (e.g. public health, preventive care, nutrition, exercise)

Production function of health

Health= f (Profile, Medical care, Lifestyle, Socioeconomic factors, Environment)
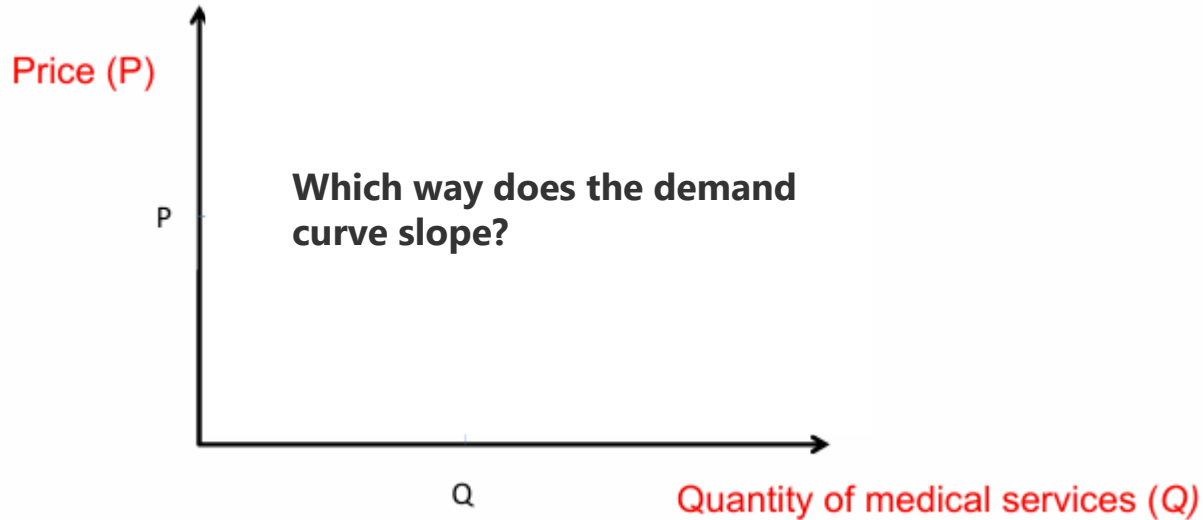
Definition

Social Determinants of Health: conditions in which people are born, grow, live, work and age, and people's access to power, money and resources
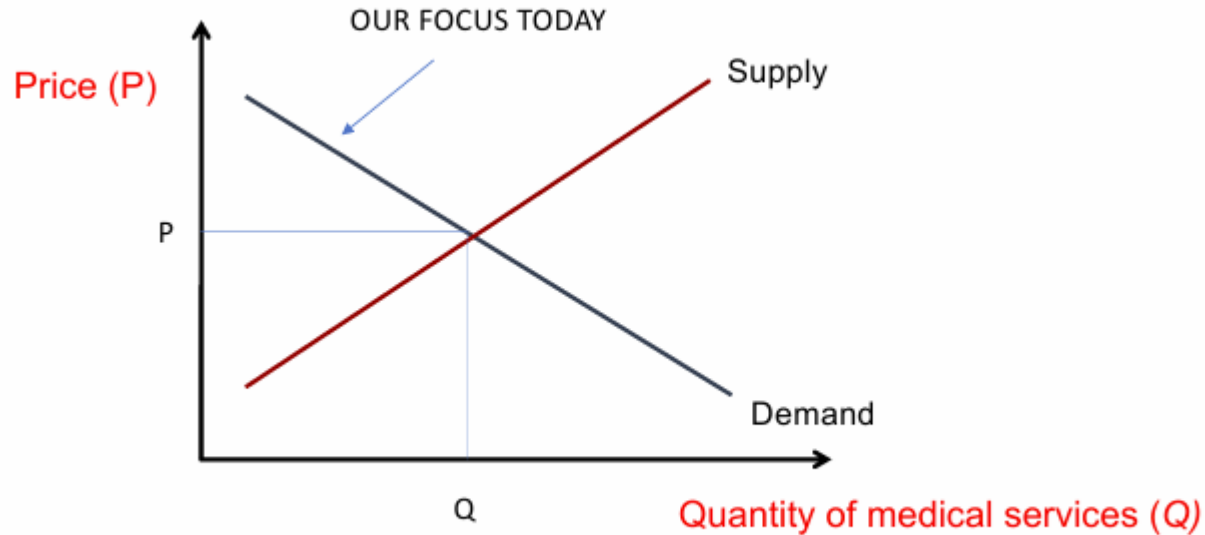
Recap, Questions, & Break

Attendance Form Health Econ

The Demand Curve for Medical Services

Price (P)

P

Which way does the demand curve slope?

Q

Quantity of medical services (Q)
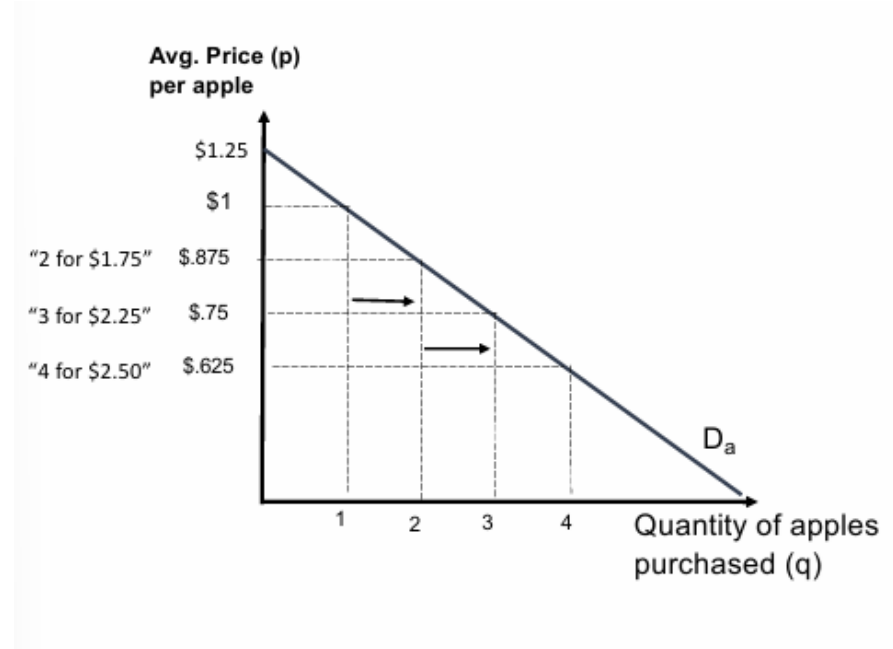
The Demand Curve for Medical Services

Basics of Demand Curve

This demand curve reflects the **Marginal Benefit (MB)** to an individual consumer from purchasing different amounts (q) of apples

MB = ΔTB / ΔQ
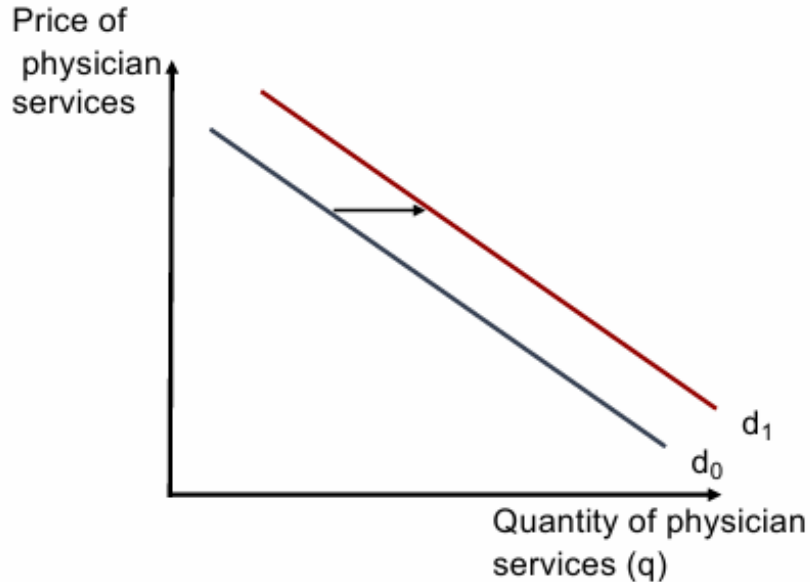MB = how much more are you paying for the additional apple?

Demand is a function of:
1. Consumer preferences
2. Substitution effects

Economic variables that impact demand
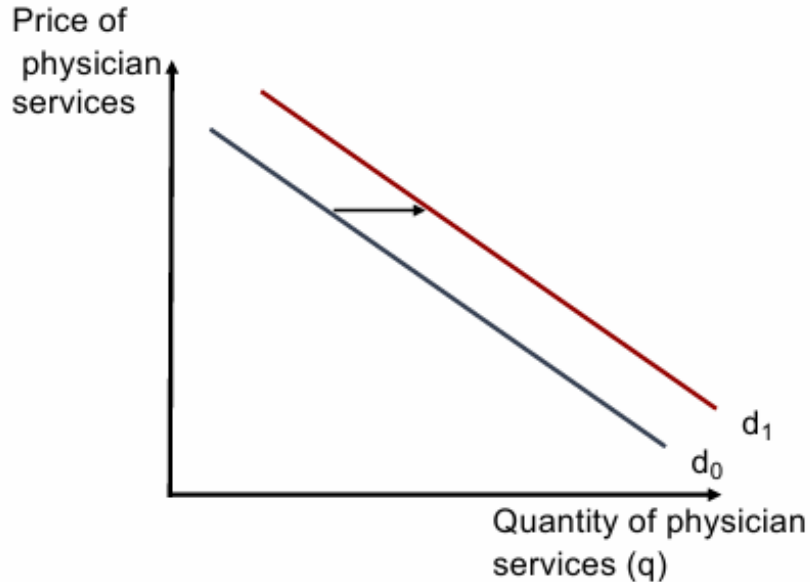
1. Income

2. Time, transportation, costs of seeking care

3. Price of other goods
   - Complements
   - Substitutes

Economic variables that impact demand

1. Income

Price of physician services (y-axis), Quantity of physician services (q) (x-axis), d_0, d_1

2. Time, transportation, costs of seeking care

3. Price of other goods
   - Complements
   - Substitutes

Non-Economic Variables that Impact Demand

Gender

Race

Age

Education

Lifestyle

Advertising

Health Status

Quality of care (perceived)

Quiz: what happens to demand for spicy food when someone gets an ulcer?

Demand Shifters

1. income: ↑ income =>

2. prices of other goods: ↑ price =>   substitute (coke & Pepsi)

      complement

3. individual preferences (tastes)
    - new report says apples kill

    - ulcers develop   spicy food

Impact of Health Insurance on Demand for Medical Care

- Insurance impacts the prices consumers face

Per capita out-of-pocket expenditures, 1970-2022

— OOP spending per capita   — Constant 2022 dollars

Note: A constant dollar is an inflation adjusted value used to compare dollar values from one period to another.

Source: KFF analysis of National Health Expenditure (NHE) data • Get the data • PNG

Peterson-KFF
Health System Tracker

How insurance changes market dynamics

Stage I: Market prices are established.

Private insurers negotiate/agree upon payment rates with providers. Most public programs set their own rates.

Stage II: Utilization levels are established.

Utilization is determined by individual-specific factors including prices faced by consumer (given market price levels, cost-sharing provisions) and other factors (e.g., health status, perceptions of quality)

Moral Hazard

Moral Hazard: a situation in which a party is incentivized to risk causing harm because another party is obligated to remedy the consequences of the harm caused

Consumers alter their behavior **because** they have insurance. They may:

1. Engage in riskier behavior: **ex-ante** moral hazard
2. Be less price sensitive: **ex-post** moral hazard

Moral Hazard

Examples of ex-ante vs. ex-post moral hazard?

→ Leads to increased utilization, choice of higher-priced providers

Rand Experiment: Effects of Cost Sharing on Demand

Cost-sharing scenarios:

1. No insurance
2. Insurance with 100% coverage
3. Copays: a fixed amount for services that is independent of the market price or actual costs of services
4. Coinsurance: fixed percentage share the individual is responsible for
5. Deductible: fixed amount that the consumer must pay out-of-pocket (per calendar year) before coverage kicks in.

→ **Most US private insurance has deductible, copay AND coinsurance**
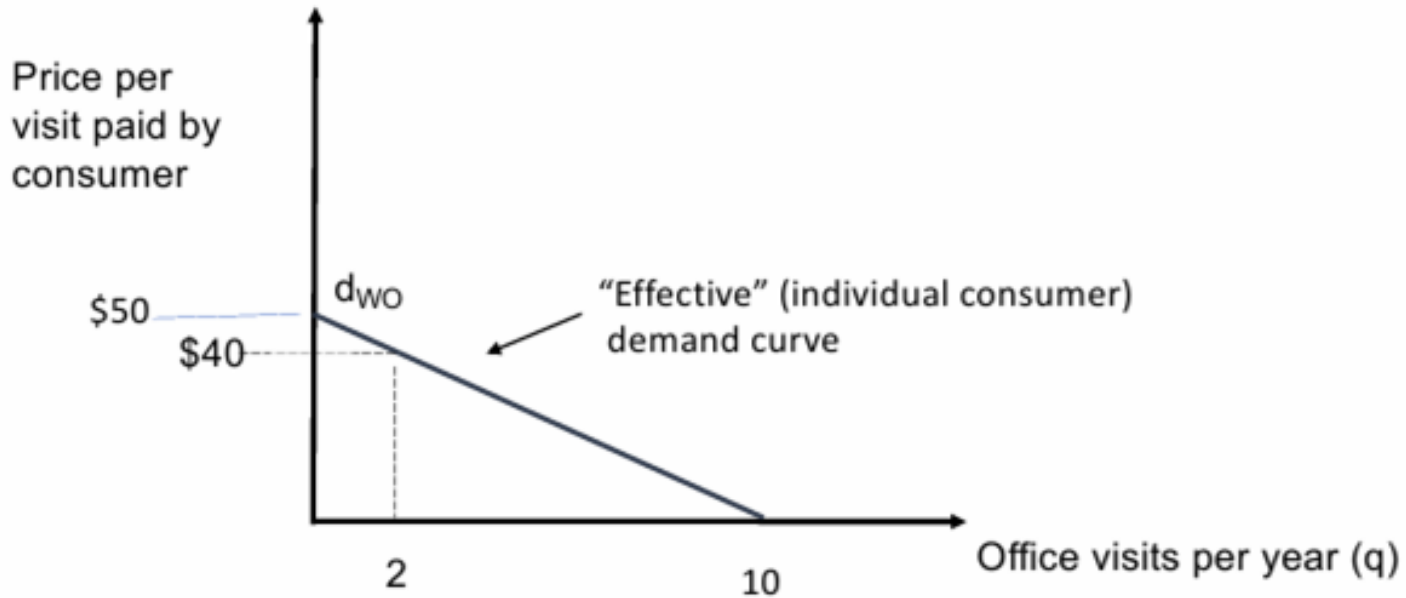
Definitions: Market vs. Effective Demand

"Market (nominal) demand" (gray curves): how many visits the market would see at different total prices paid to the provider (what the insurer + patient together pay). This assumes the same underlying behavior of the patient & is expressed in terms of the full price per visit.
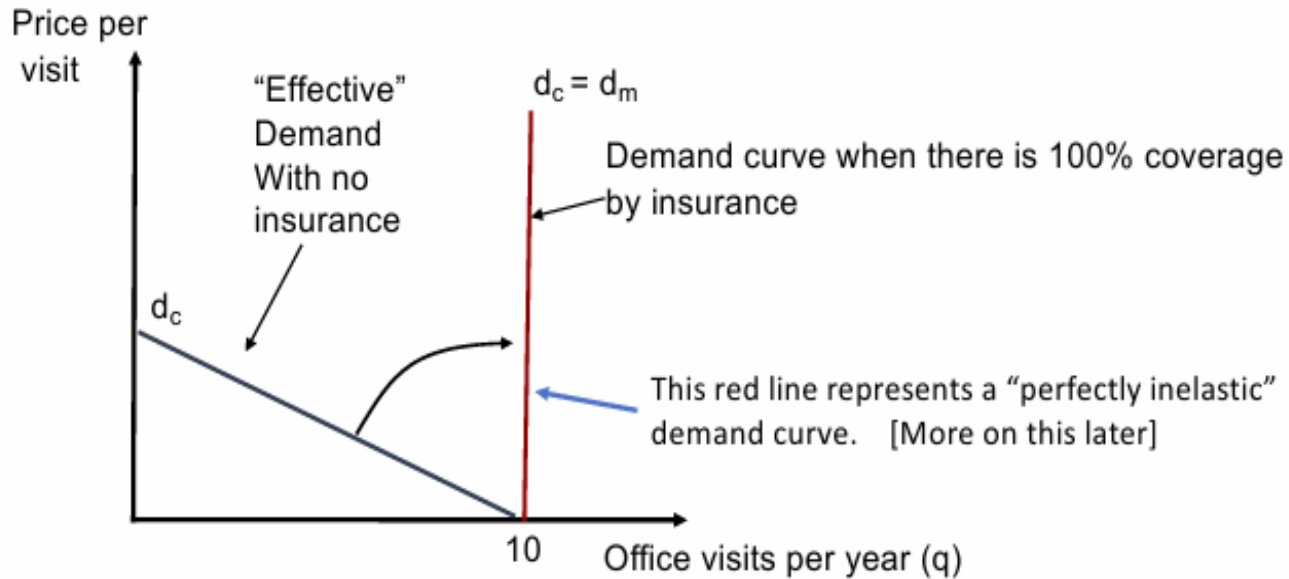
"Effective demand" (red curve): quantity of visits chosen as a function of the out-of-pocket price the patient actually pays.

→ **Without insurance, market demand = effective demand**

No insurance

100% coverage

Price per visit

"Effective" Demand With no insurance

$d_c = d_m$

Demand curve when there is 100% coverage by insurance

d_c

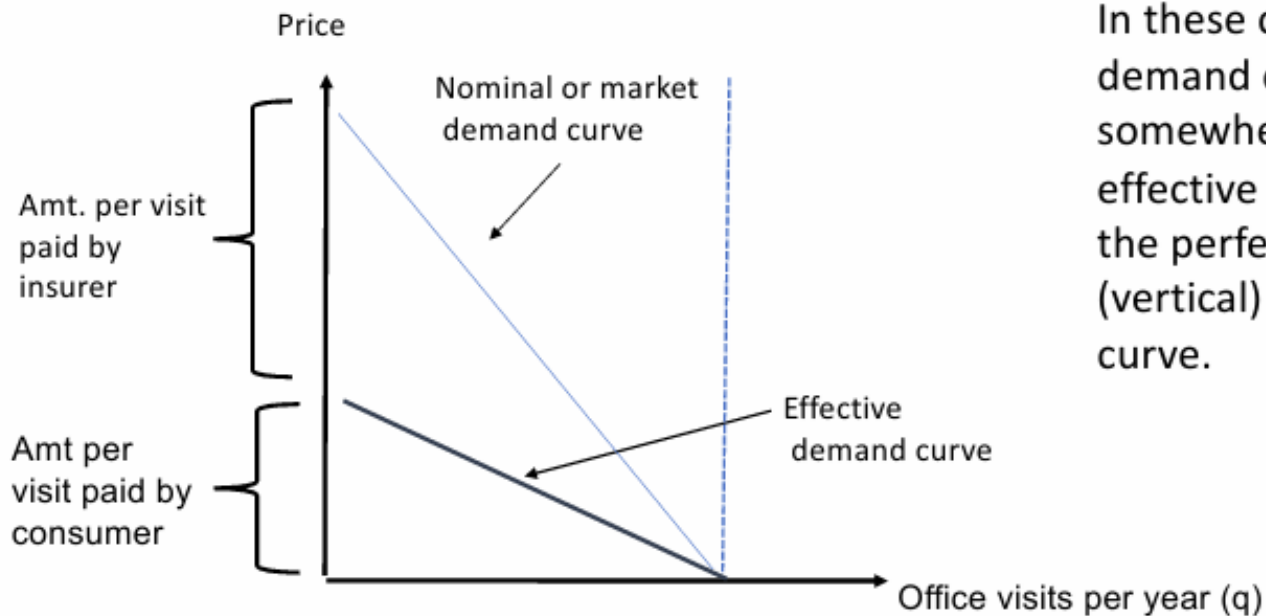This red line represents a "perfectly inelastic" demand curve. [More on this later]
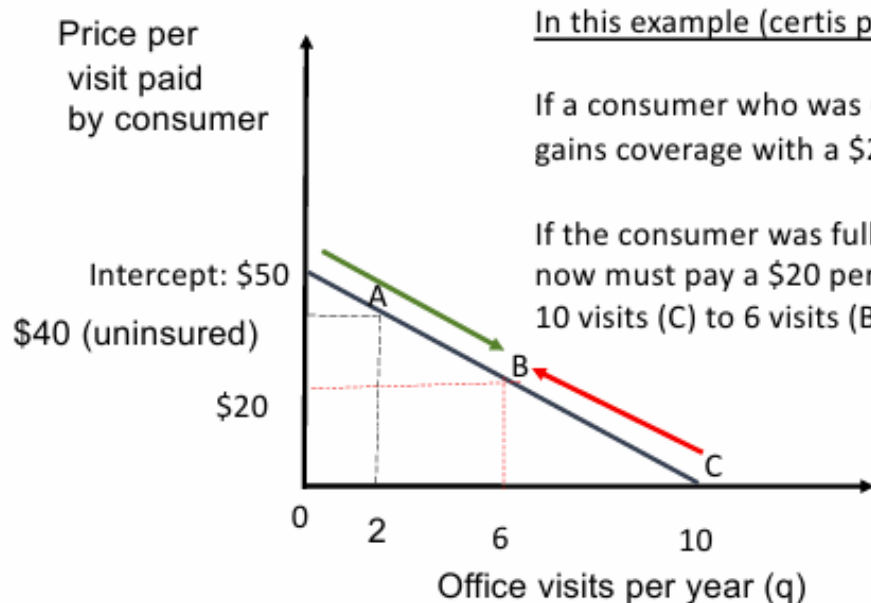
10

Office visits per year (q)

Cost-sharing

In these cases, the market demand curve will be somewhere between the effective demand curve and the perfectly inelastic (vertical) market demand curve.

Cost-sharing: Copayments

Price per visit paid by consumer (y-axis)

Intercept: $50

$40 (uninsured)

$20

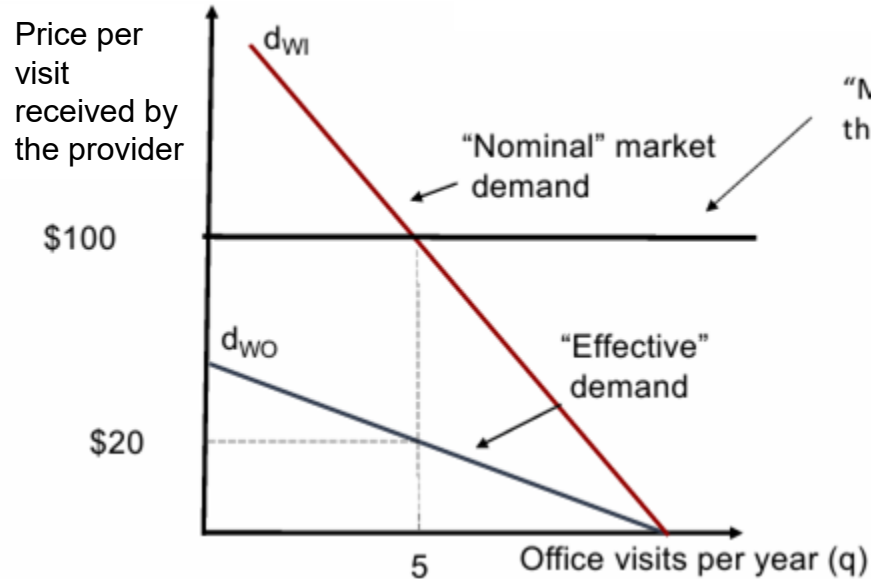**Office visits per year (q)** (x-axis): 0, 2, 6, 10

Points: A, B, C

In this example (certis paribus):

If a consumer who was uninsured and previously paid the full price of $40 per visit, gains coverage with a $20 copay, utilization increases from 2 visits (A) to 6 visits (B).
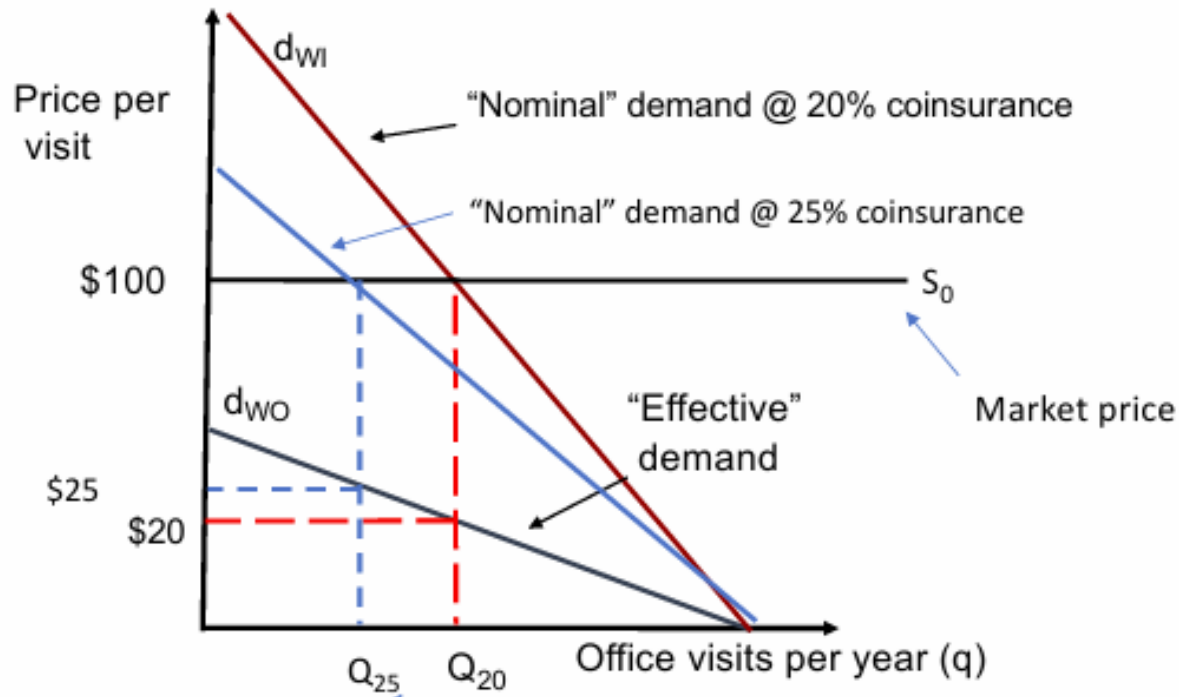
If the consumer was fully insured for physician visits (i.e., no copay) but now must pay a $20 per visit co-pay, utilization drops from 10 visits (C) to 6 visits (B).

Cost-sharing: Coinsurance

Price per visit received by the provider

d_{WI}

"Nominal" market demand

"Market" price negotiated between the insurer & physician practice

$100

d_{WO}

"Effective" demand

With a coinsurance requirement, the amount the consumer pays is determined by the coinsurance rate AND the price negotiated by the insurer & provider.

$20

5

Office visits per year (q)

Cost-sharing: Coinsurance

Price per visit

d_{WI}

"Nominal" demand @ 20% coinsurance

"Nominal" demand @ 25% coinsurance

$100

S_0

d_{WO}

"Effective" demand

Market price

$25

$20

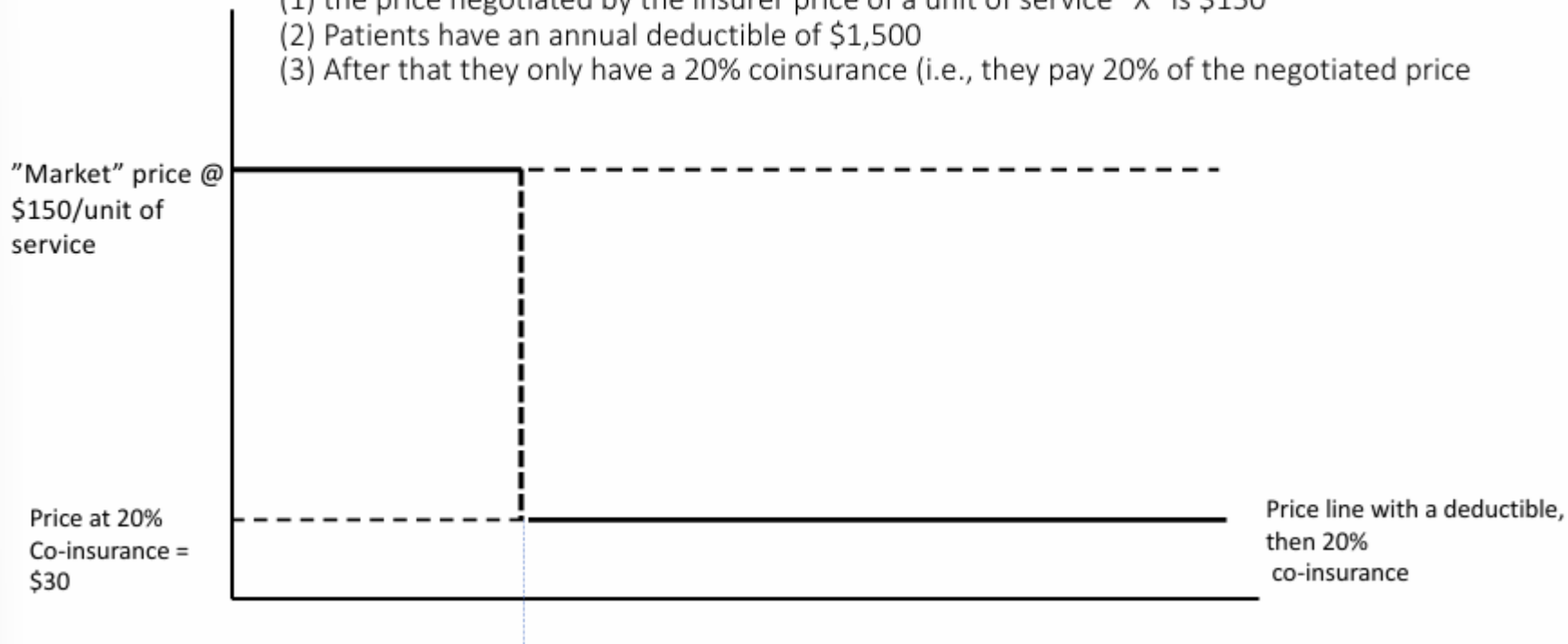Q_{25} Q_{20}

Office visits per year (q)

Assuming a given market price, changes in the coinsurance rate will result in a change the amount per visit the consumer pays and therefore the quantity of care demanded

Cost-sharing: Deductible

The assumptions for this illustration:
(1) the price negotiated by the insurer price of a unit of service "X" is $150
(2) Patients have an annual deductible of $1,500
(3) After that they only have a 20% coinsurance (i.e., they pay 20% of the negotiated price

"Market" price @
$150/unit of
service

Price at 20%
Co-insurance =
$30

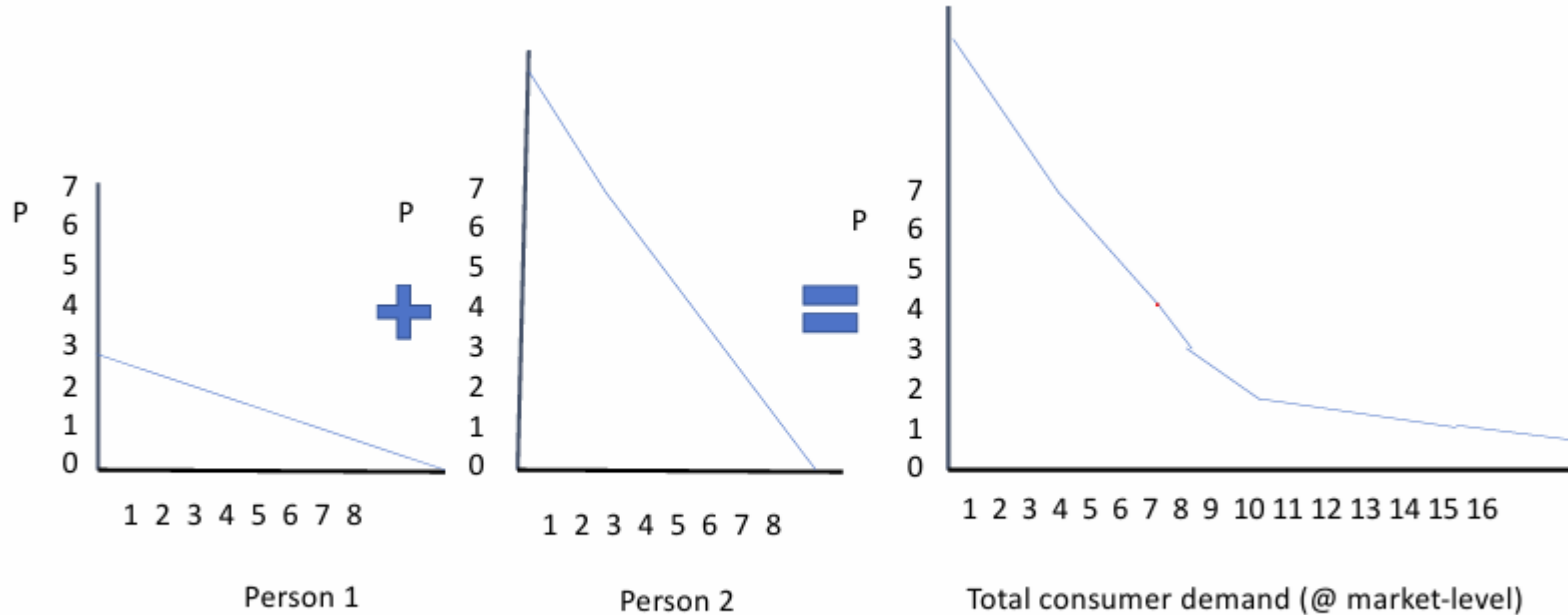Price line with a deductible,
then 20%
co-insurance

Closing the loop: RAND

Rand Health Insurance Study: large randomized control trial (RCT) study conducted in the 1970s. Looked at service-centered cost-sharing, rather than on premium-sharing requirements.

Main findings:

1. Higher cost-sharing → lower utilization
2. Higher impact on initiation of care, not level of care once treatment started
3. Larger impacts on low SES, persons with disabilities
4. Decrease use of low value and high value care

Aggregate demand = Σ individual demand curves

Person 1   Person 2   Total consumer demand (@ market-level)

And the market demand curve shifts to the right or the left if number of consumers increases/decreases
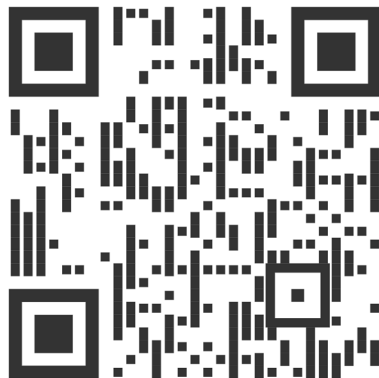
Last thoughts & Break

The widespread presence of health insurance in the US has:

- ↑ the affordability of medical care for many
- ↑ the demand for & utilization of medical care

•But… Because we have not been able to effectively contain prices, it has contributed to the **rapid growth in prices and medical care spending** over time and therefore has created problems of affordability

Elasticities

Attendance Form Health Econ

Elasticities

Demand-side elasticities measure the responsiveness of quantity demanded (i.e., how much it changes) due to a change in an independent factor.

- % change in one variable brought about by a 1 percentage change in some other variable.

Three types of demand-side elasticities:

1. Own-price elasticities
2. Cross-price elasticities (associated with complements & substitutes)
3. Income elasticity of demand

Own Price Elasticity

The extent to which consumers alter their consumption of a good or service when the price of that good or service changes. $E \leq 0$

$$E_D = \frac{\%\Delta Q_D}{\%\Delta P_D}$$

- E_D is the own-price elasticity of demand
- $\%\Delta Q_D$ – percentage change in quantity demanded
- $\%\Delta P$ – percentage change in price

For a given percentage change in the price of a good/service, what will be the percentage change in the amount of that good/service that is demanded?

Own price elasticities - classifications

|E| > 1 → |%ΔP| < |%ΔQ| → Elastic demand

%Δ in quantity demanded is greater than the percentage change in the price

- |E| = ∞ → Perfectly elastic demand

|E| < 1 → |%ΔP| > |%ΔQ| → Inelastic demand

%Δ in quantity demanded is smaller than the percentage change in the price

- |E| = 0 → Perfectly inelastic demand

|E| = 1 → |%ΔP| = |%ΔQD| → Unit elastic demand

%Δ in quantity demanded is the same as the percentage change in the price

Cross-price elasticities

Defined as the percent change in the demand for good A for each one percent change in the price of good B.

$$E_{a,b} = \frac{\%\Delta Q_a}{\%\Delta P_b}$$

If E > 0 is positive, the goods are substitutes

If E < 0 is negative, the goods are complements.

Income elasticity of demand

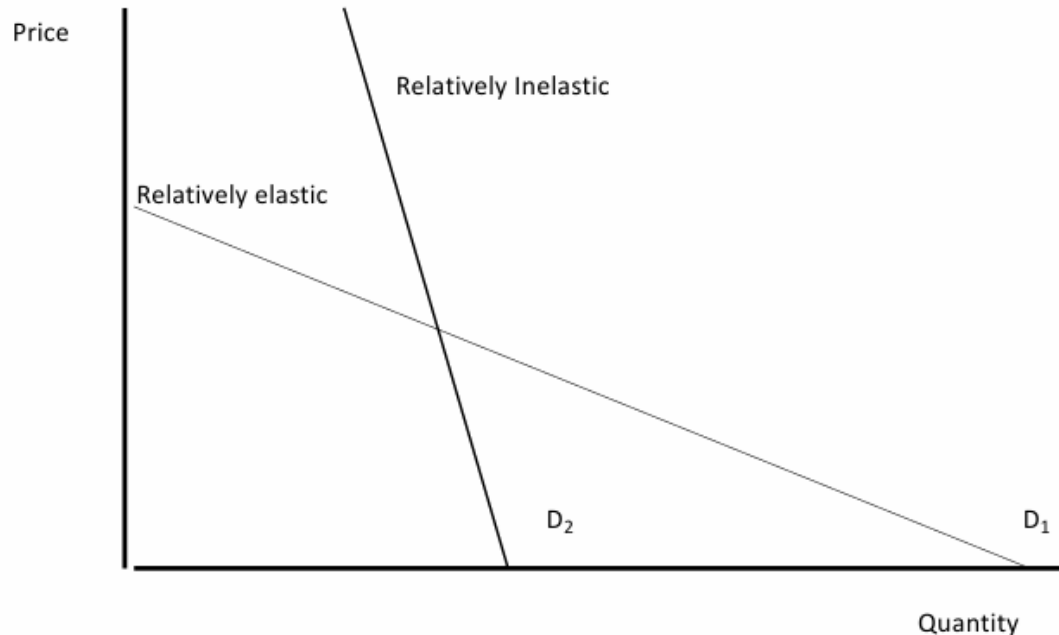Defined as the percent change in demand resulting in each one percent change in income.

$$E_d = \frac{\%\Delta Q_d}{\%\Delta Y}$$
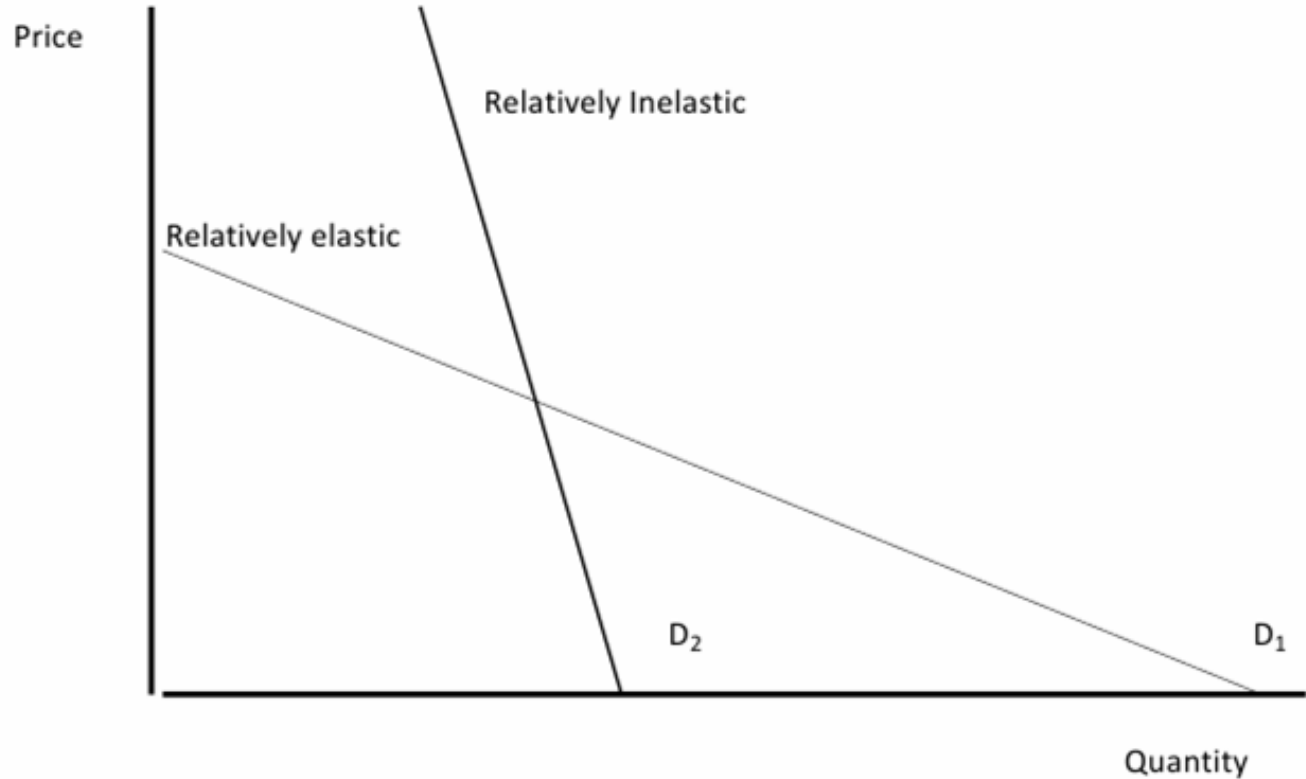
. If E<0, the good is an inferior good

If E>0, the good is a normal good

Recall: Economic variables that impact demand

Shape or slope of the curve indicates the responsiveness of demand to prices

Flatter curve → higher elasticity

Normal vs. Inferior Goods

Definition

Normal Good: as income increases, the consumer spends at least a portion of the increase in purchasing power on additional physician services.
→ Vs. **Inferior good:** demand declines when income rises

Normal vs. Inferior Goods

Normal Good: as income increases, the consumer spends at least a portion of the increase in purchasing power on additional physician services.
→ Vs. **Inferior good:** demand declines when income rises

Medical care is assumed to be a "normal" good.