Health Insurance
[Part 1]

Agenda for this Lecture

1. What is insurance for?
2. Reviewing some key concepts
3. Justification of insurance + insurance premiums.

What is Insurance For?

What is the Primary Purpose of **Auto** Insurance?

PointSolutions Question
Session ID: econ436f23

A. A way to guarantee that you can drive where you need to go.

B. A way to make car maintenance affordable.

C. Protect insured customers against large costs from unexpected vehicle accidents.

D. Some combination of A, B, and/or C tie for the primary purpose of Auto Insurance.

What is the Primary Purpose of **Health** Insurance?

PointSolutions Question
Session ID: econ436f23

A. A way to guarantee that you can access healthcare services.

B. A way to make health care affordable.

C. Protect insured customers against large costs from unexpected illness/accidents.

D. Some combination of A, B, and/or C tie for the primary purpose of Health Insurance.

What is the Primary Purpose of **Health** Insurance?

In *most* cases, the primary purpose of insurance is to protect from large, unexpected costs:

Auto → car crashes

Home/Rent → natural and unnatural disasters (tornado, burst water vein, theft)

Life → funeral expenses / lost income due to death

Disability → lost income due to inability to work.

However, health insurance fills this *and* other functions within the healthcare system.

A Quick Aside on Some Key Econ Concepts

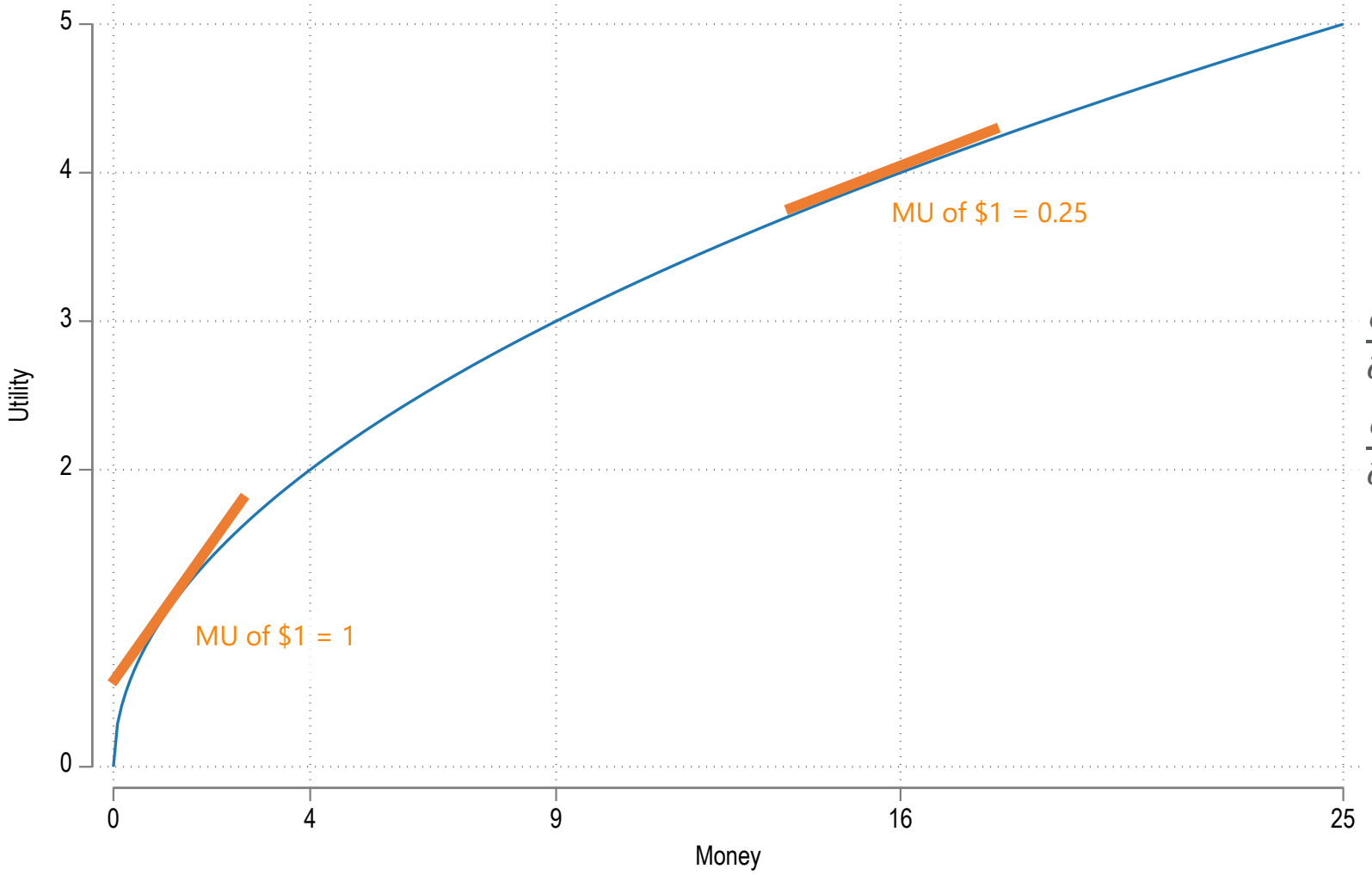
Some Quick Intro Econ Review (Diminishing Returns)

Individuals are assumed to experience **diminishing returns**.

Broke college student wins $10,000 → BIG increase in utility.

Jeff Bezos wins $10,000 → little increase in utility.

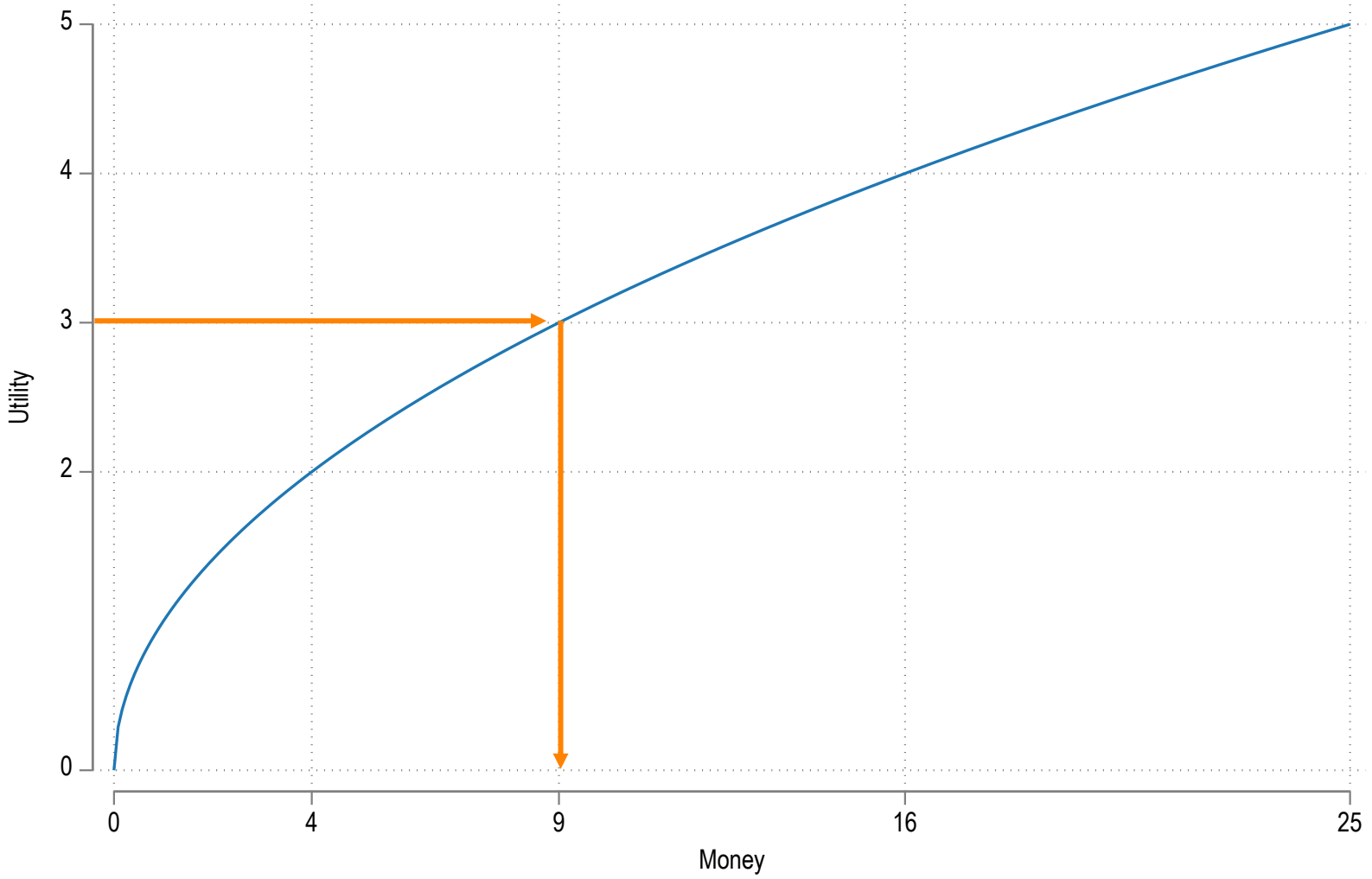
Quick Intro Econ Review (Diminishing Returns)



$\frac{\partial utility}{\partial money} > 0$ (money ↑ utility)

$\frac{\partial^2 utility}{\partial money^2} < 0$ (but at a decreasing rate)

Implications of Diminishing Returns



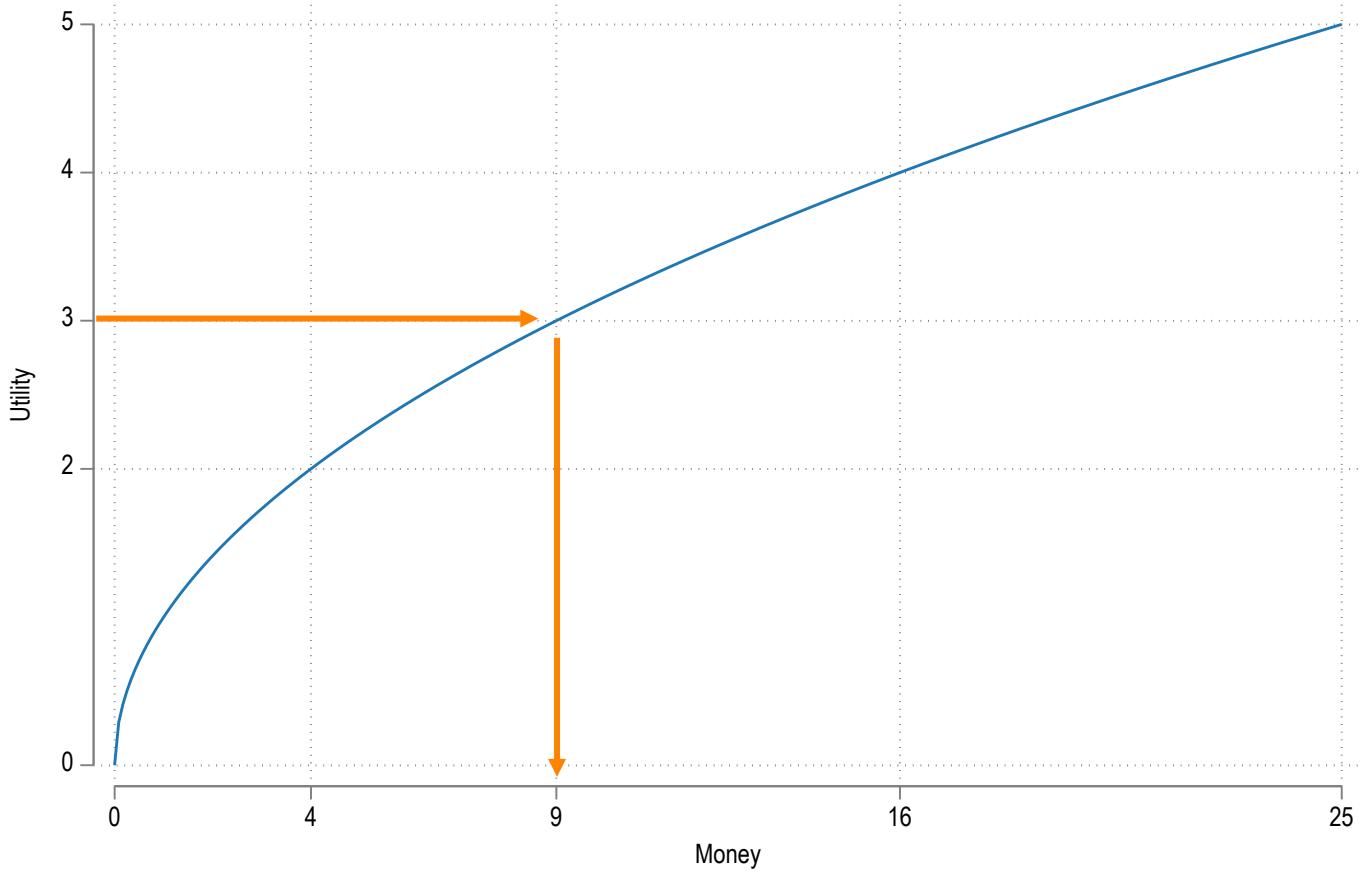
Suppose this person has a 50% chance of getting \$4 and a 50% chance of getting \$16. $[u = \sqrt{m}\,]$

$$EU = \left(\sqrt{4} \times 0.5\right) + \left(\sqrt{16} \times 0.5\right) = 3$$

This is the same utility as have \$9 for sure (see arrows on graph).

This is called the **certainty equivalent** the guaranteed amount of money that would make someone indifferent to a risky bet.

Implications of Diminishing Returns



Mathematically, if $u = \sqrt{m}$ and the expected utility of the risky scenario equals 3, then solving for the certainty equivalent is:

$$3 = \sqrt{CE} \Rightarrow 3^2 = \left(\sqrt{CE}\right)^2 \Rightarrow CE = 9$$

Note that the expected **value** from the scenario in the previous slide was \$10 (50% return of \$4 or 50% return of \$16).

If your **certainty equivalent < expected value** ⇒ you are **risk averse.**

Since diminishing returns always implies CE<EV, **diminishing returns ⇒ risk aversion**

Quick Knowledge Check

PointSolutions Question
Session ID: econ436f23

Suppose Amelia faces a risk scenario: there is a 50% chance she gets $4 and a 50% chance she gets $100. Her utility function is:

$$u = \sqrt{m}$$

What is Amelia's certainty equivalent?

A. $16
B. $25
C. $36
D. $49
E. $52
F. Really not sure

Quick Knowledge Check

PointSolutions Question
Session ID: econ436f23

Suppose Amelia faces a risk scenario: there is a 50% chance she gets $4 and a 50% chance she gets $100. Her utility function is:

$$u = \sqrt{m}$$

Is Amelia risk averse?

A. Yes
B. No
C. Not enough information to say.
D. Not sure

Justification of Insurance + Insurance Premiums

Risk Aversion Justifies the Presence of Insurance

An implication of diminishing returns / risk aversion is that **consumers would like to have the same income no matter what happens**.

Scenario A (bad scenario): $90

Scenario B (good scenario): $110

Marginal utility of income is **higher** in Scenario A than Scenario B.

Thus, it is utility-improving to shift money from Scenario B to Scenario A if possible.

This is effectively what insurance does (or *should* do) via premiums/claims.

Insurance Company Behavior

Insurers (and all profit-maximizing companies) are assumed to be **risk-neutral**. In other words, they make decisions based on the best expected **value**.

Practically speaking, insurance companies make lots of bets.

A few bets are have big losses (i.e., claims >>>> premiums)

But most bets give small wins (i.e., claims < premiums).

Actuarially Fair Premiums

If insurance is **actuarially fair**, then premiums = **expected** claims.

Suppose an insurer has a customer who pays $2,000 in annual premiums.

This customer has a 5% chance of incurring $40,000 in expenses and a 0% chance of incurring $0 in expenses.

Premiums = $2,000
Expected claims = 5% × $40,000 = $2,000

Thus, this insurance policy is actuarially fair.

Insurance Company Profits

A simple model of expected insurance company profits:

$$\mathbf{E}(\pi) = \underbrace{premiums}_{\text{Revenue}} - \underbrace{\boldsymbol{E}(claims)}_{\text{Expected Expenses}}$$

With actuarially fair insurance, $\boldsymbol{E}(\pi) = 0$

In reality, there are also administrative expenses. Most insurance companies report a "loss ratio":

$$Loss\ Ratio = \frac{Claims\ paid + admin\ expenses}{premiums}$$

Illustration of Premiums

Suppose Amelia starts with \$100, but there is a 50% chance she loses \$96. Her utility function is: $u = \sqrt{m}$. Suppose that an insurance company is offering an actuarially fair premium to remove (or compensate) this risk

AFP $= 50\% \times \$96 = \$48$

Risky utility $= 50\% \times \sqrt{100 - 96} + 50\% \times \sqrt{100}$
$= 50\% \times 2 + 50\% \times 10 = \mathbf{6}$

Insured utility $= (50\% \times \sqrt{100 - 96 - 48 + 96}) + (50\% \times \sqrt{100 - 48})$
$= 50\% \times \sqrt{52} + 50\% \times \sqrt{52}$
$\approx \mathbf{7.2}$

Thus, insured is much better. In fact, **actuarially fair premiums ensure the maximum possible utility** for the consumer, given the risks.

Economic Intuition Question

PointSolutions Question
Session ID: econ436f23

Is it possible for insurance that is actuarially unfair (i.e., where premiums > expected risks and $\boldsymbol{E}(\pi) > 0$) to lead to a **Pareto-Improving outcome** when compared to a no-insurance scenario?

A. Yes
B. No

Maximum Premium

Returning to the example on the previous slide (50% chance of $96 loss, risky utility of 6).

What is the **most** Amelia would be willing to pay in premiums (p)?

Insured utility with premium (p)

$$\text{Insured utility} = \left(50\% \times \sqrt{100 - 96 - p + 96}\right) + \left(50\% \times \sqrt{100 - p}\right) = 6$$

E(u) in risky scenario

$$\Rightarrow \left(50\% \times \sqrt{100 - p}\right) + \left(50\% \times \sqrt{100 - p}\right) = 6$$

$$\Rightarrow \sqrt{100 - p} = 6 \quad \text{(combining terms)}$$

$$\Rightarrow 100 - p = 36 \quad \text{(squaring both sides)}$$

$$\Rightarrow p = 64$$

Thus, Amelia would be **indifferent** between being uninsured and paying a premium of $64.

Maximum Premium

Returning to the example on the previous slide (50% chance of $96 loss, risky utility of 6).

What is the **most** Amelia would be willing to pay in premiums (p)?

A much faster way of calculating the maximum premium:

$$m_{good} - p = CE$$

Where m_{good} is the money in the good state, p is the premium, and CE is the certainty equivalent.

For this example:

$$100 - p = 36 \quad \Rightarrow \quad p = 64$$

What Premiums Are Pareto Improving (relative to uninsured state)?

Any premium p that is:

$$AFP \leq p \leq m_{good} - CE$$

Is Pareto-improving.

If $p = AFP$, insurance company indifferent ($\boldsymbol{E}(\pi) = 0$) and consumers better off.

If $p = m_{good} - CE$, insurance company better off ($\boldsymbol{E}(\pi) > 0$) and consumers indifferent.

If $AFP < p < m_{good} - CE$, the both better off.

Concluding Remarks

This lecture has covered **perfect insurance** for a general insurance product.

(**Perfect insurance** is when ALL risk is covered by insurance claim).

Next lecture: diving into the specifics of health insurance (and how it isn't perfect insurance + some other quirks).

Health Insurance
[Part 2]

Agenda for this Lecture

1. Imperfect Insurance
2. Cost-Sharing and Economic Theory
3. Moral Hazard
4. Choosing Insurance Plans

Imperfect Insurance

Imperfect Insurance

Imperfect insurance is when insured individuals still bear some cost of adverse events.

Most insurance is imperfect insurance.

Typical Insurance Imperfections

(a/k/a "Cost-Sharing")

Deductibles: an amount paid by the covered (insured) person before the insurer pays.

Copay: a *fixed* amount that covered individuals pay for an (otherwise insured) service.

Coinsurance: a *percentage* amount that covered individuals pay for an (otherwise insured) service.

Out-of-Pocket Maximum: the most an individual will have to pay for insured services.

Cost-Sharing: Examples

Deductible: $2,000

Copay: $50 per physician visit

Coinsurance: 20% for all other spending

OoP Max: $4,000

$0 spending to date + $100 doctor's office visit ⇒ pay $100. (Haven't met deductible.)

$2,500 spending to date + $100 doctor's office visit ⇒ pay $50. (Met deductible, but still has copay.)

$3,000 spending to date + $2,000 ER visit ⇒ pay $400. (Met deductible, but still has 20% copay and $2000 × 20% = $400.)

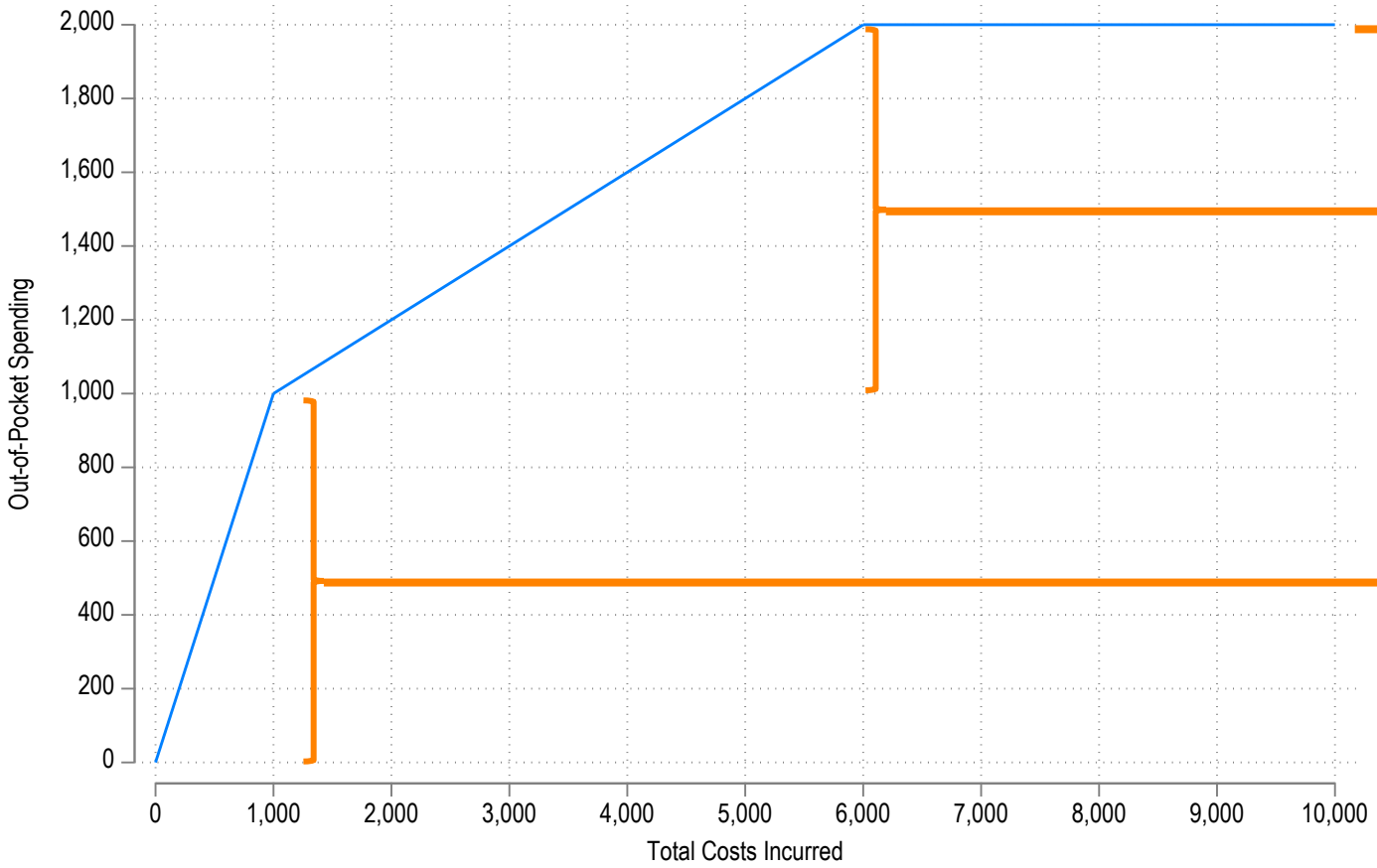
$4,000 spending to date + $500 physical therapy ⇒ pay $0. (Exceeded out-of-pocket max.)

Cost-Sharing: Examples

Deductible: $1,000

Coinsurance: 20%

OoP Max: $2,000



Pay 0% after out-of-pocket max.

Pay 20% of costs after deductible but before out-of-pocket max.

Pay all costs until hit deductible.

Deciphering Medical Costs

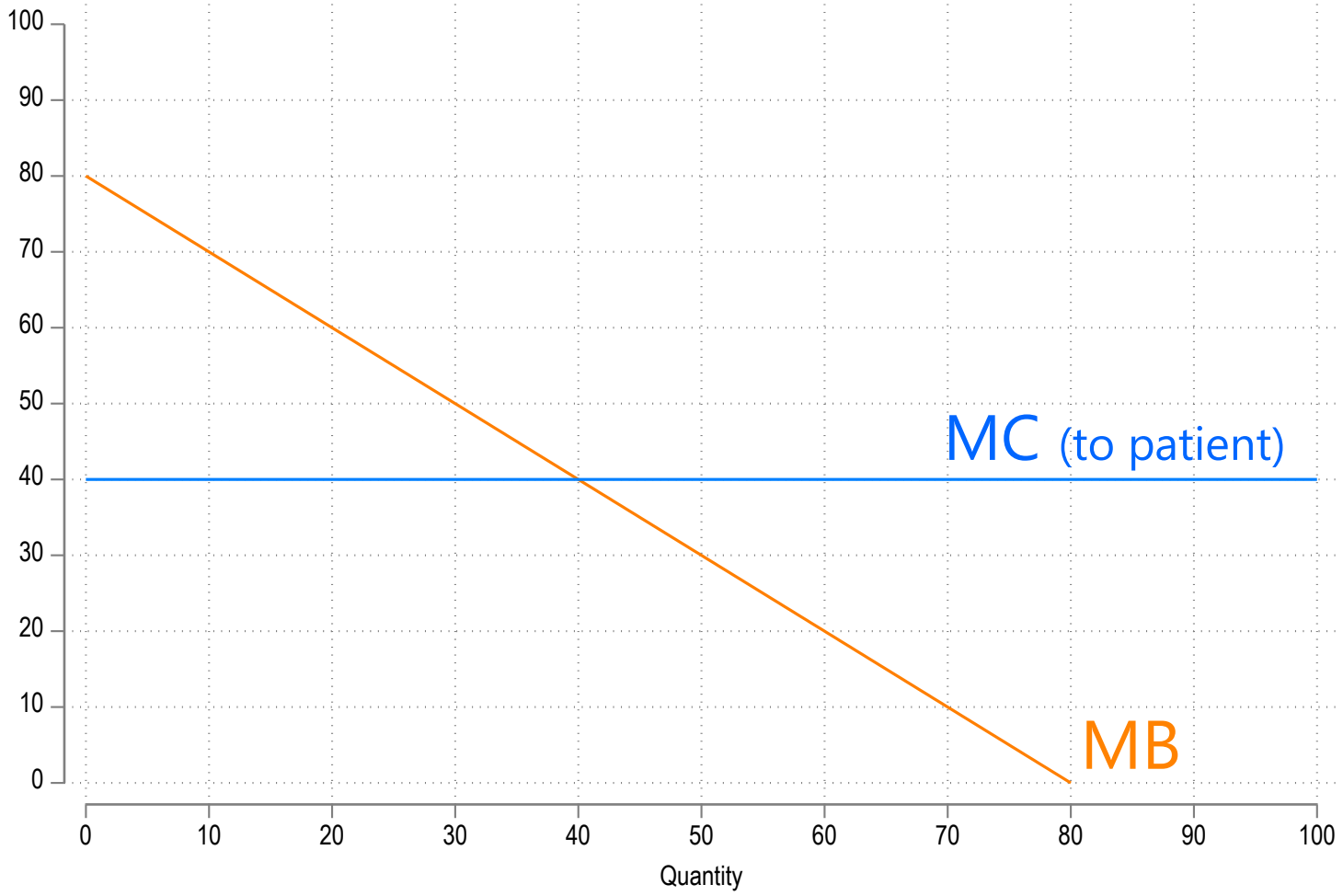
PointSolutions Question
Session ID: econ436f23

Your insurance plan has a copay of $100 for all preventative-care physician visits and a coinsurance rate of 10% for everything else. If you've already met your deductible but are nowhere close to your out-of-pocket maximum, what could you expect to actually pay for an ER bill that is $2,000?

A. $0
B. $100
C. $200
D. $2,000

Cost-Sharing + Economic Theory

What Does a Deductible Do?
(According to Economic Theory)

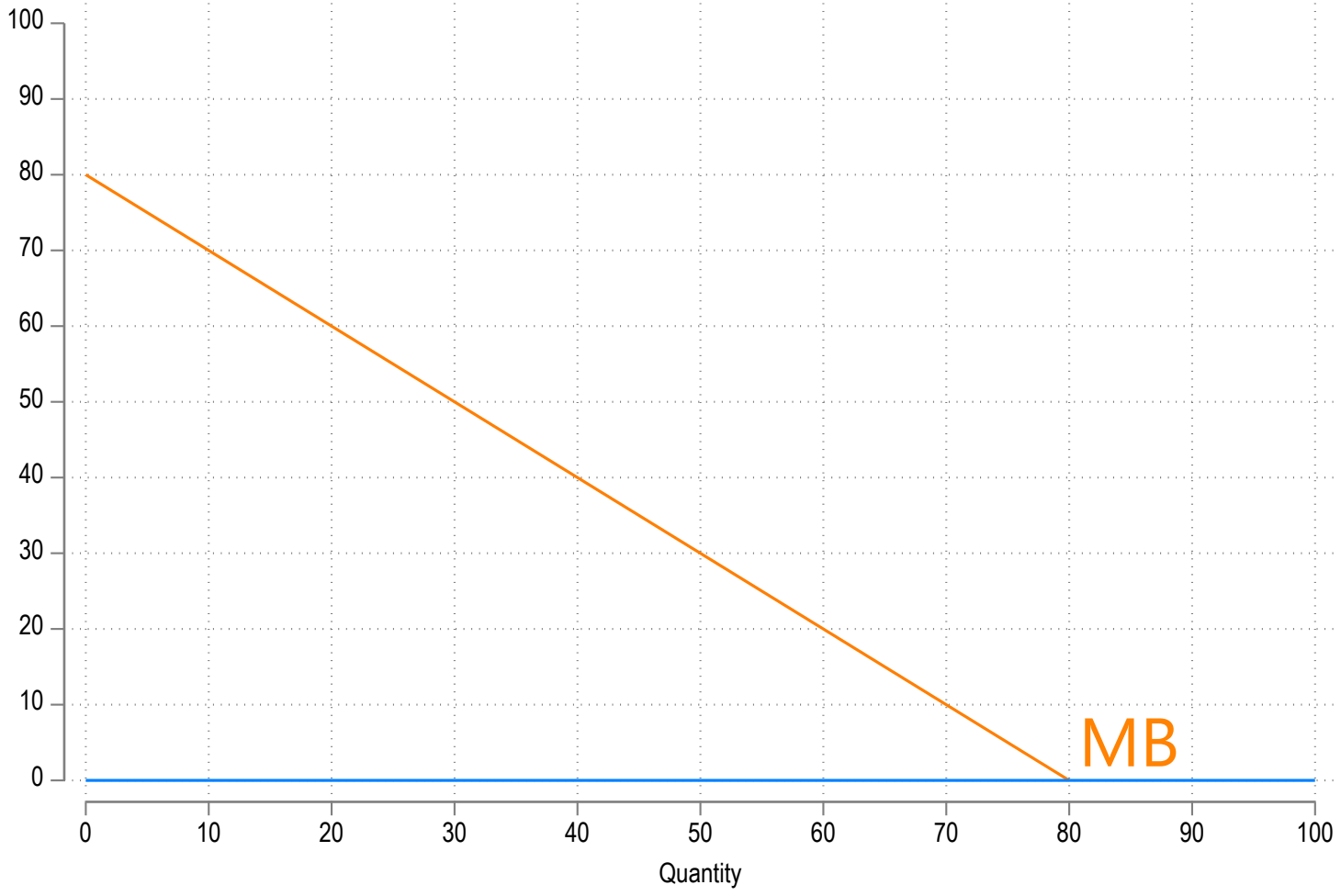


Base Case: No insurance.

Patient pays 100% of cost: consumes until MB=MC

(q=40)

What Does a Deductible Do?
(According to Economic Theory)



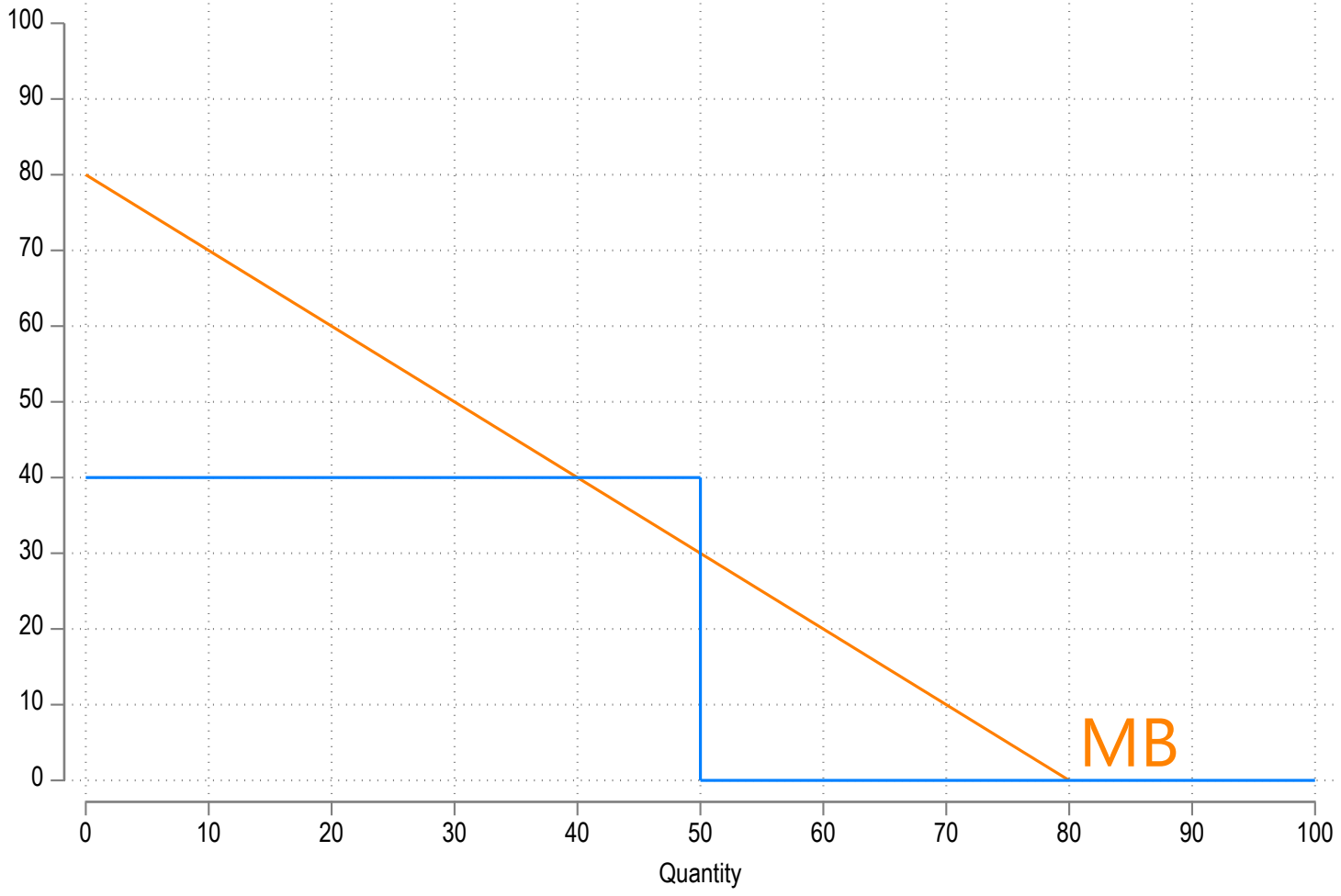
(To patient)

Idealized Case: Full/perfect insurance.

Patient pays 0% of cost: consumes until MB=MC.

(q=80)

What Does a Deductible Do?
(According to Economic Theory)



(To patient)

Deductible Case (Still Kind of Idealized):

No insurance until spending of $2,000 ($40 × 50)

Then full insurance after (i.e., 0% coinsurance).

How much does the patient consume?

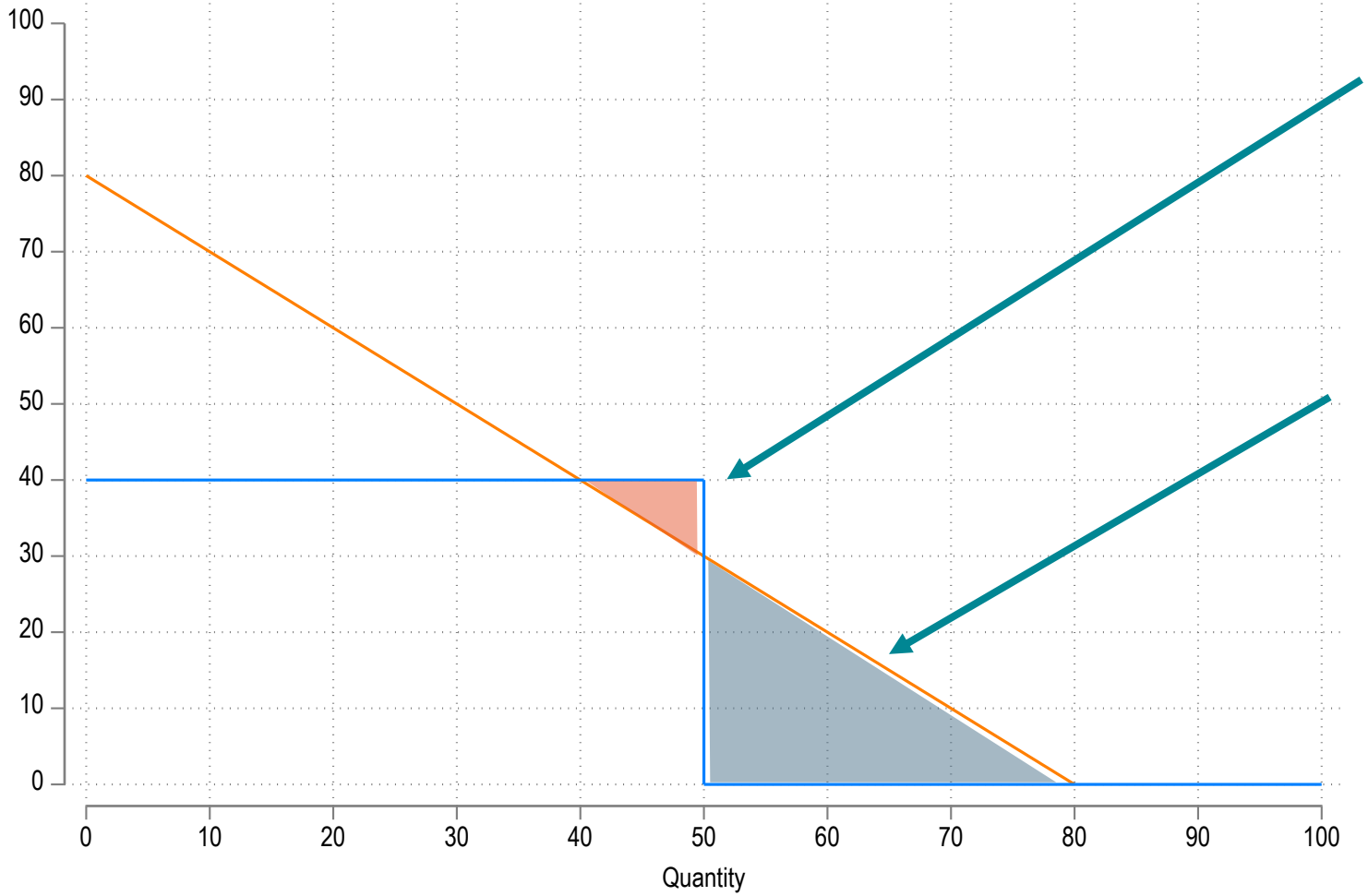
What Does a Deductible Do?

PointSolutions Question
Session ID: econ436f23

How much does that patient consume in the previous slide?

A. 0
B. 40
C. 80
D. 100

What Does a Deductible Do?
(According to Economic Theory)



Negative utility from consuming when MB<MC

(-10 × 10 × 0.5 = -50)

Positive utility from consuming when MB>MC

(30 × 30 × 0.5 = 450)

Since 450-50>0 ⇒ consume until q = 80.

What Does a Deductible Do?

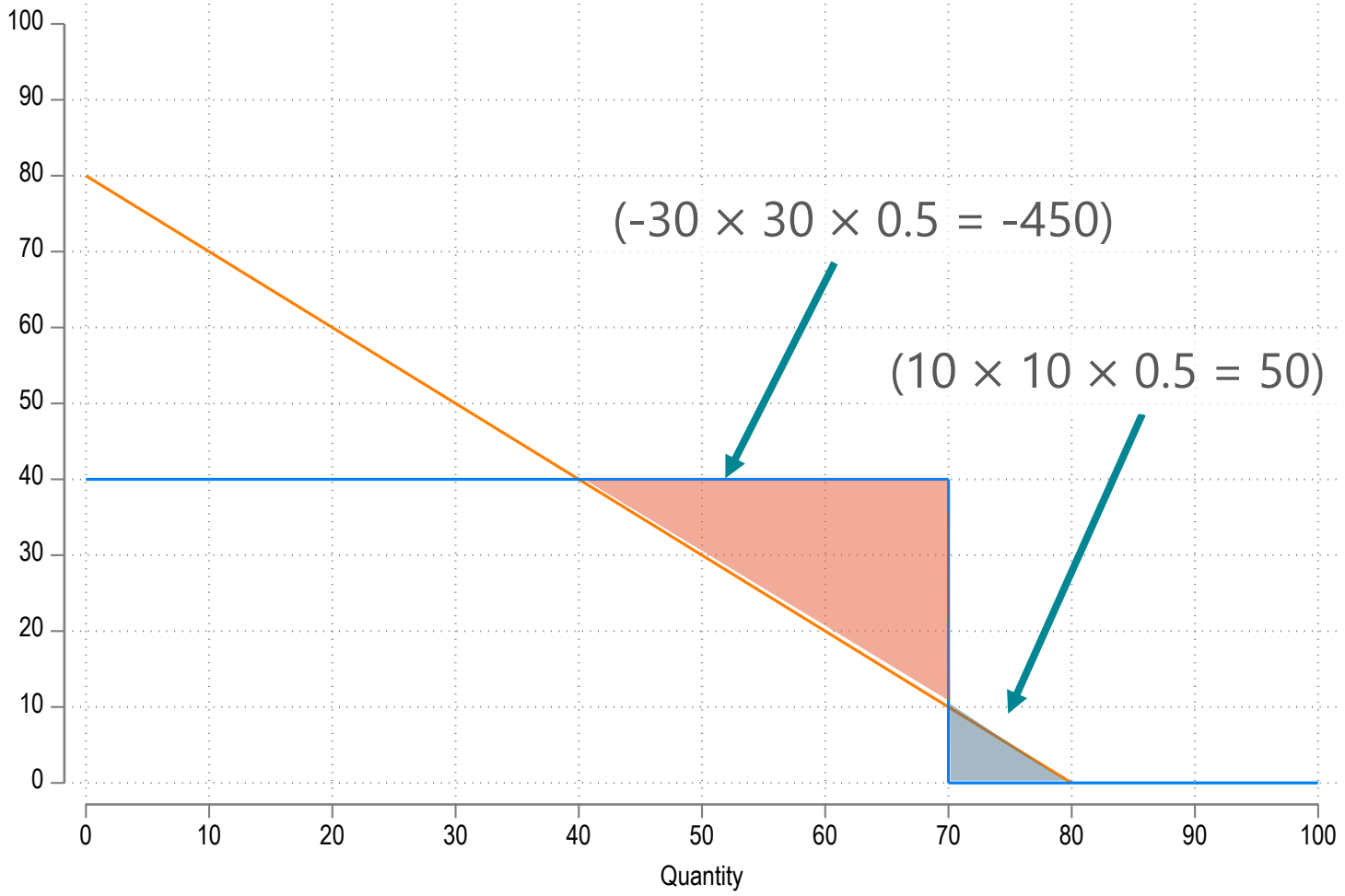
(As Predicted By Economic Theory)

Conceptual take-away: if the deductible is sufficiently small, then behavior is unchanged from fully-insured state.

(But it does help the insurer recoup costs)

Practically speaking: economic theory predicts that individuals with more health issues shouldn't change their behavior in response to modest deductibles.

But What About Large Deductibles?



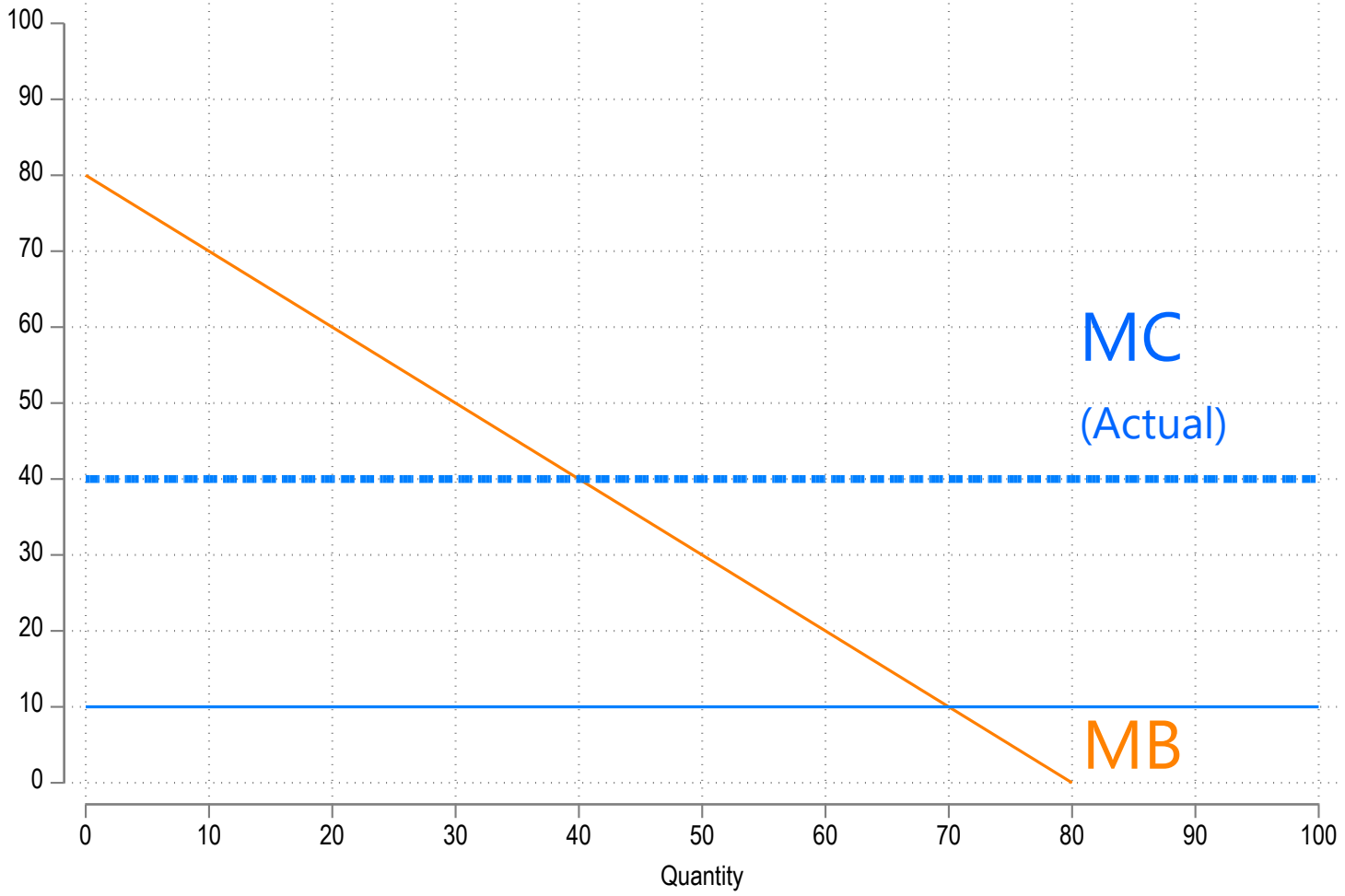
Suppose deductible = $2,800 (when q=70)

Then, it is no longer utility-maximizing to 'endure' the MB<MC period of the deductible.

q=40 ⇒ Same as 'no insurance' state.

Individuals heavily incentivized to find another plan if risk-averse.

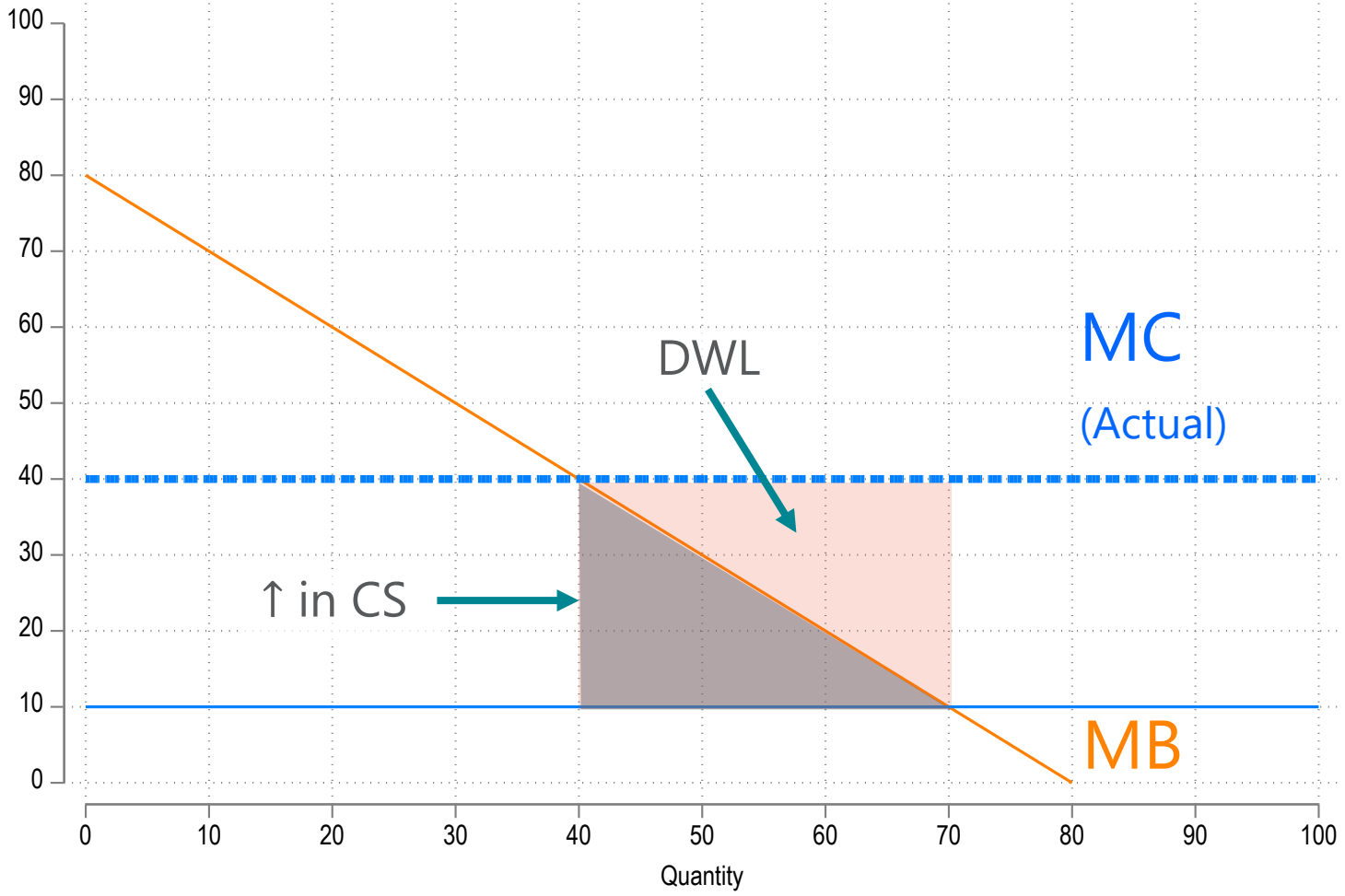
What Does **Coinsurance** Do?
(According to Economic Theory)



Coinsurance (in this case, of 25%), simply reduces MC to patient.

However, it does not reduce overall MC (patient + insurer)

What Does **Coinsurance** Do?
(According to Economic Theory)



Coinsurance increases quantity consumed (relative to no insurance)…

But decreases producer surplus more, leading to DWL.

However, coinsurance decreases DWL relative to full/perfect insurance.

Moral Hazard

Moral Hazard

A simple definition: when individuals change their behavior because they are protected from the consequences.

Ex ante moral hazard—increasing the likelihood of an insurable event.

- Driving less safely because you have car insurance.
- Exercising less because you'll be able to compensate with medical care later in life.

(Economists are typically less concerned about this type)

Moral Hazard

A simple definition: when individuals change their behavior because they are protected from the consequences.

Ex post moral hazard—increasing the cost of an insured event that has already occurred.

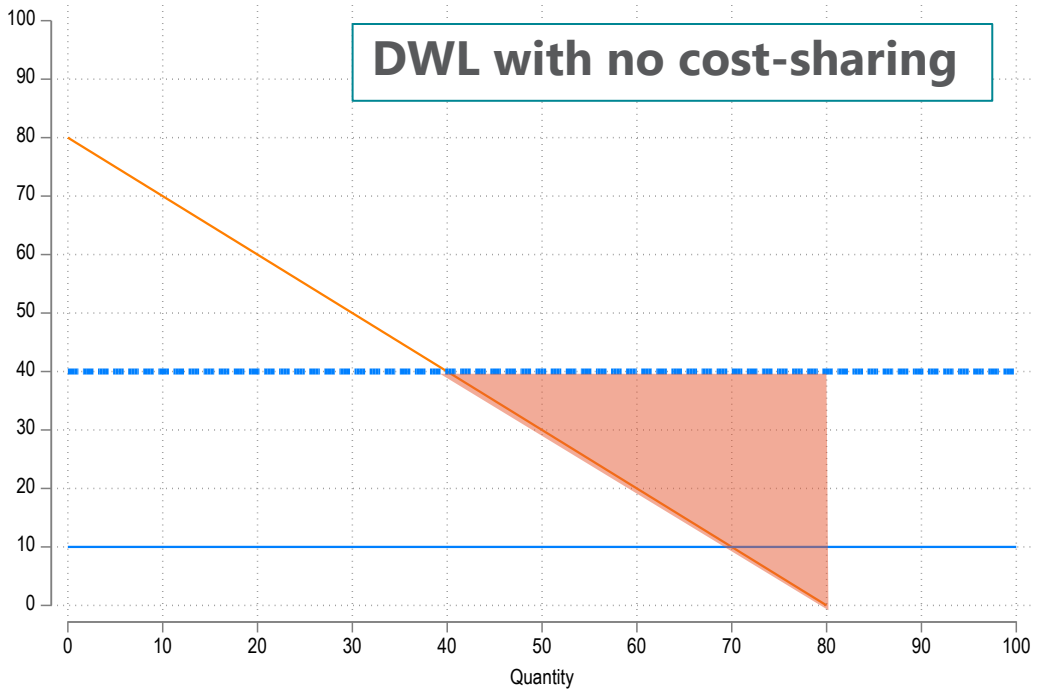
- Getting additional tests ordered because insurance is paying for it anyway.

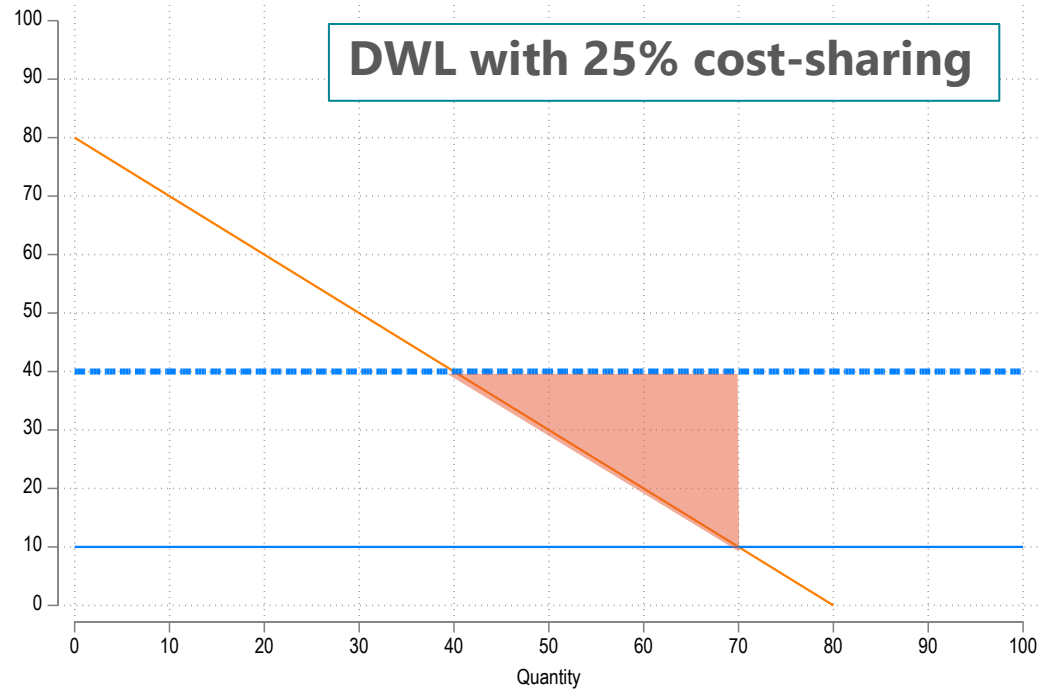
(Economists are more concerned about this type)

(Also note: if I say just ‘moral hazard,’ this is the type I’m talking about.)

Moral Hazard and Cost-Sharing

Proponents of cost-sharing argue that it reduces the amount of (ex-post) moral hazard in healthcare markets, decreasing inefficiency and healthcare cost.





Moral Hazard and Cost-Sharing

Some estimates of loss due to moral hazard: $98B to $305B (in 2023 dollars).

Other economists argue that ideal co-insurance rate is ~45%. (Quite a bit higher than typical coinsurance rates are now).

Feldman, Roger, and Bryan Dowd. "A New Estimate of the Welfare Loss of Excess Health Insurance." *The American Economic Review* 81, no. 1 (1991): 297–301. http://www.jstor.org/stable/2006802.

Manning, W. G., & Marquis, M. S. (1996). Health insurance: the tradeoff between risk pooling and moral hazard. *Journal of Health Economics*, *15*(5), 609–639. https://doi.org/10.1016/s0167-6296(96)00497-3

Moral Hazard and Cost-Sharing

Estimates of the cost of moral hazard look at:

1. Reductions in patient spending in response to higher cost-sharing.

2. Assume that the decreases in spending occur when:

   $MB < MC_{Co\text{-}ins.} < MC_{Insurer+Patient.}$

In other words, there is (to some degree) an assumption that cost-sharing isn't dissuading patients from high-value care… is that true?

What Does Cost-Sharing Do? **(Empirical Evidence)**

Setting: Very large tech firm that switched from low cost-sharing plan to a high cost-sharing plan.

TABLE II
HEALTH PLAN CHARACTERISTICS

	PPO	HDHP[a]
Premium	$0	$0
Health savings account (HSA)	No	Yes
HSA subsidy	–	[$3,000–$4,000][b]
Max. HSA contribution	–	$6,250[c]
Deductible	$0[d]	[$3,000–$4,000][b]
Coinsurance (IN)	0%	10%
Coinsurance (OUT)	20%	30%
Out-of-pocket max.	$0[d]	[$6,000–$7,000][b]

Low-cost-sharing plan

High-cost-sharing plan

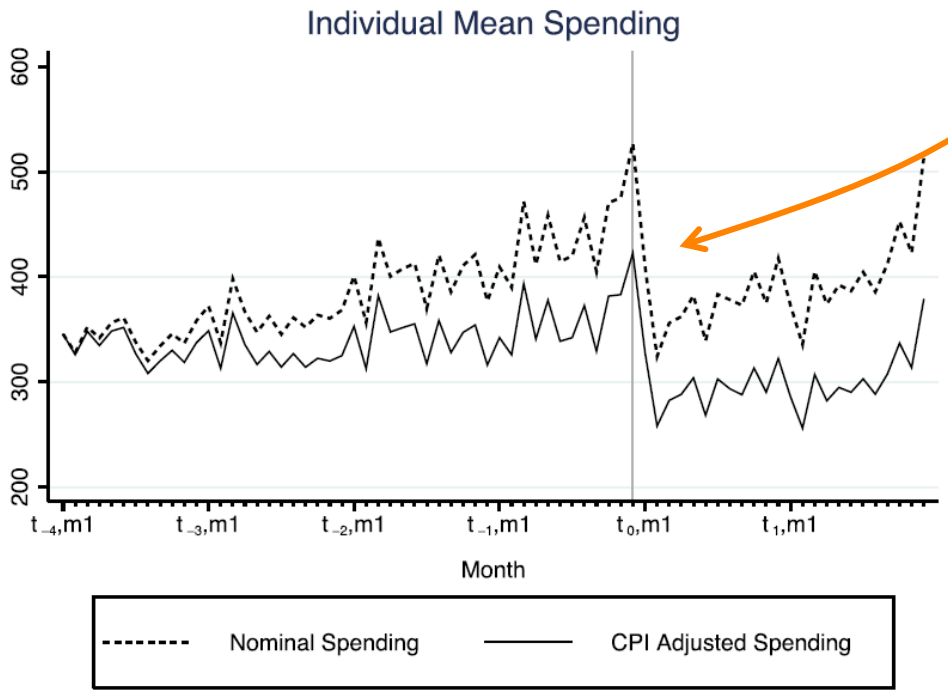
Zarek C. Brot-Goldberg, Amitabh Chandra, Benjamin R. Handel, Jonathan T. Kolstad, What does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics, *The Quarterly Journal of Economics*, Volume 132, Issue 3, August 2017, Pages 1261–1318, https://doi.org/10.1093/qje/qjx013

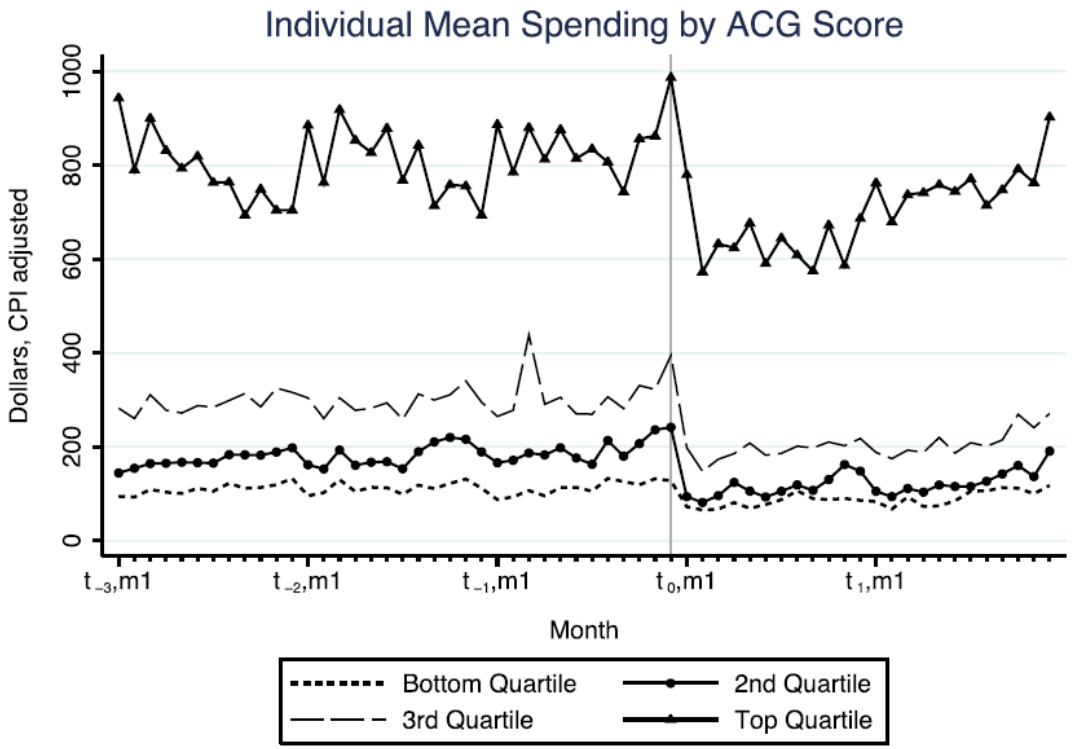
What Does Cost-Sharing Do?

(Empirical Evidence from Brot-Goldberg et al, 2017)

Findings: Immediate reduction in spending (not necessarily surprising, given coinsurance was also added.)

However, the largest reductions were for the sickest patients **(!!!)**





What Does Cost-Sharing Do?

Reductions in cost could be coming from several areas:

1. Buying from lower-priced providers / price-shopping (**good!**)

2. Substituting to equivalent therapies, such as generic drugs (**good!**)

3. Just…consuming less care.
   - If ↓ low-value → **good!**
   - If ↓ high-value → **…not good**

What Does Cost-Sharing Do?

(Empirical Evidence from Brot-Goldberg et al, 2017)

Cost reductions come from decreased **quantity** (rather than lower prices / price shopping).

Large decreases in **high-value care**

- 7.5% in preventative care and even more (12.2%) if already have a condition
- 29.7% in physical therapy and 5.4% in mental health.
- 18.0-48.0% decrease in drugs that prevent adverse conditions.

TABLE VII

SPENDING IMPACT DECOMPOSITION: POTENTIALLY HIGH-VALUE CARE

Medical care	% Tot. spend	$\Delta TS_{t+1,t}$	$\Delta PPI_{t+1,t}$	$\Delta PS_{t+1,t}$	$\Delta Q_{t+1,t}$	$\Delta QS_{t+1,t}$
Preventive care, general	8.2%[a]	−0.3%	6.4%	2.1%	−7.5%	−1.3%
		4.1%	−1.6%	9.2%	−0.4%	−3.1%
Preventive care, w/prior diag.	14.5%[a]	−10.6%	2.0%	1.0%	−12.2%	−1.4%
		3.0%	2.4%	−0.7%	0.1%	1.2%
Preventive care, diabetics	0.04%[a]	−1.4%	−2.0%	−0.5%	−1.6%	2.7%
		15.9%	−1.9%	2.9%	12.5%	2.4%
Mental health	14.11%[a]	−2.9%	−1.0%	0.0%	−5.4%	3.5%
		16.2%	−1.3%	0.0%	14.8%	2.7%
Physical therapy	12.68%[a]	−23.8%	0.3%	7.1%	−29.7%	−1.5%
		13.5%	0.8%	3.1%	8.5%	0.9%
Drugs	**% Tot. spend**	$\Delta TS_{t+1,t}$	$\Delta PPI_{t+1,t}$		$\Delta Q_{t+1,t}$	$\Delta QS_{t+1,t}$
Diabetes drugs	3.0%[b]	−44.5%	6.7%		−48.0%	−3.2%
		29.1%	14.8%		12.6%	1.7%
Statins (for cholesterol)	1.7%[b]	−47.2%	−34.3%		−19.6%	6.7%
		14.6%	16.8%		−1.8%	−0.4%
Antidepressants	5.5%[b]	−48.7%	−37.4%		−18.0%	6.7%
		12.0%	0.4%		11.6%	0.0%
Hypertension drugs	1.3%[b]	−27.9%	−4.9%		−24.2%	1.2%
		16.3%	3.2%		12.7%	0.4%

Changing Direction a *Bit*: **Consuming Healthcare with Cost-Sharing**

PointSolutions Question
Session ID: econ436f23

Suppose you have the following health insurance plan:

- $1,000 deductible
- 20% coinsurance
- $2,000 out-of-pocket max

Also assume that you have a drug that you must take. It costs $100/month.

In February, after you've already paid $200 against your deductible, you get sick and are wanting to see a doctor. You expect it'd give you $90 of benefit to do so, but the bill would be $100.

Should you go to the doctor?

A. Yes

B. No

Consuming Healthcare with Cost-Sharing

Without physician visit:

	Prescription	Physician	Cumulative
January	100	0	100
February	100	0	200
March	100	0	300
April	100	0	400
May	100	0	500
June	100	0	600
July	100	0	700
August	100	0	800
September	100	0	900
October	100	0	1,000
November	20	0	1,020
December	20	0	1,040

With physician visit:

	Prescription	Physician	Total
January	100	0	100
February	100	100	300
March	100	0	400
April	100	0	500
May	100	0	600
June	100	0	700
July	100	0	800
August	100	0	900
September	100	0	1,000
October	20	0	1,020
November	20	0	1,040
December	20	0	1,060

Consuming Healthcare with Cost-Sharing

Because the physician visit 'shifts' other spending into coinsurance coverage, it only adds $20 to cumulative spending.

This is called the **shadow price**—i.e., the marginal amount that consuming an additional service increases overall spending.

This differs from the **spot price** ($100), which is what is paid right then.

Utility-maximizing consumers *should* make decisions on the shadow price… but that's not the case in practice.

Consuming Healthcare with Cost-Sharing (Again)

PointSolutions Question
Session ID: econ436f23

Suppose you have the following health insurance plan:

- $1,000 deductible
- 20% coinsurance
- $2,000 out-of-pocket max

Also, you're anticipating the delivery of your second child in June, which will result in medical bills of at least $6,000 and likely more.

In March, your doctor recommends you start a 6-month course of medication that gives a small chance of ending some chronic pain you've been having. However, it is very expensive—at $500/month. Should you agree to take the medication? (Assume no side effects or non-cost downside.)

A. Yes

B. No

C. Not enough information to say.

Summary Thoughts on Moral Hazard and Cost-Sharing:

1. In economic theory, *ex-post* moral hazard leads to deadweight loss (due to overconsumption).

2. These losses add up to billions of dollars…*but are still probably not as problematic as prices*.

3. Cost-sharing reduces healthcare spending…but it might be reducing spending where MB>MC.

4. Cost-sharing is confusing and may lead to people making suboptimal decisions.

Choosing Health Insurance Plans

Health Savings Accounts

Special savings account that must be combined with a high-deductible health plan.

Contributions are tax-deductible

Tax-free withdrawals for qualified medical expenses (penalties if used for non-medical reasons)

Can withdraw without penalty after age 65

- If not for medical expense, then still taxes (just like an IRA/401(k)).
- If for medical expense, then not taxed.

Insurance Networks

Insurance plans have certain providers that they've negotiated favorable rates with. These providers are referred to as **in-network** providers.

Other providers are referred to as **out-of-network.**

If plans have similar deductibles, coinsurance, etc., but one plan has lower premiums, then probably has a **narrower network** (fewer in-network providers).

Features of Real-Life Plans

Copays and coinsurance varies both by:

1. Type of care
2. In-network vs. out-of-network.

"PPO" plans typically have lower cost-sharing (more co-pays, lower coinsurance) than High-Deductible Health Plans ("HDHP")

2024 Health Plan Comparison of Member Costs — State and Higher Education

PPO services in this table ARE NOT subject to a deductible. CDHP/HSA services in this table ARE subject to a deductible and coinsurance with the exception of in-network preventive care and maintenance medications.

HEALTH PLAN OPTION	PREMIER PPO		STANDARD PPO		CDHP/HSA	
COVERED SERVICES	IN-NETWORK [1]	OUT-OF-NETWORK [1]	IN-NETWORK [1]	OUT-OF-NETWORK [1]	IN-NETWORK [1]	OUT-OF-NETWORK [1]
PREVENTIVE CARE — OFFICE VISITS						
• Well-baby, well-child visits as recommended • Adult annual physical exam • Annual well-woman exam • Immunizations as recommended • Annual hearing and non-refractive vision screening • Screenings including Pap smears, labs, nutritional guidance, tobacco cessation counseling and other services as recommended	No charge	$45	No charge	$50	No charge	40%
OUTPATIENT SERVICES — SERVICES SUBJECT TO A COINSURANCE MAY BE EXTRA						
Primary Care Office Visit • Family practice, general practice, internal medicine, OB/GYN and pediatrics • Provider-based telehealth • Nurse practitioners, physician assistants and nurse midwives (licensed health care facility only) working under the supervision of a primary care provider • Including surgery in office setting and initial maternity visit	$25	$45	$30	$50	20%	40%
Specialist Office Visit • Including surgery in office setting • Provider-based telehealth • Nurse practitioners, physician assistants and nurse midwives (licensed health care facility only) working under the supervision of a specialist	$45	$70	$50	$75	20%	40%
Behavioral Health and Substance Use [2] • Including virtual visits	$25	$45	$30	$50	20%	40%
Telehealth Carrier Programs (MDLive/Teledoc)	$15	N/A	$15	N/A	20%	N/A
Allergy Injection Without an Office Visit • Allergy serum has additional member cost	100% covered	100% covered up to MAC	100% covered	100% covered up to MAC	20%	40%
Chiropractic and Acupuncture • Limit of 50 visits of each per year	Visits 1-20: $25 Visits 21-50: $45	Visits 1-20: $45 Visits 21-50: $70	Visits 1-20: $30 Visits 21-50: $50	Visits 1-20: $50 Visits 21-50: $75	20%	40%
Convenience Clinic	$25	$45	$30	$50	20%	40%
Urgent Care Facility	$45	$70	$50	$75	20%	40%
PHARMACY						
30-Day Supply	$7 generic; $40 preferred brand; $90 non-preferred	copay plus amount exceeding MAC	$14 generic; $50 preferred brand; $100 non-preferred	copay plus amount exceeding MAC	20%	40% plus amount exceeding MAC
90-Day Supply (90-day network pharmacy or mail order)	$14 generic; $80 preferred brand; $180 non-preferred	N/A - no network	$28 generic; $100 preferred brand; $200 non-preferred	N/A - no network	20%	N/A - no network
Maintenance Medications (90-day supply of certain maintenance medications from 90-day network pharmacy or mail order) [3]	$7 generic; $40 preferred brand; $160 non-preferred	N/A - no network	$14 generic; $50 preferred brand; $180 non-preferred	N/A - no network	10% without first having to meet deductible	N/A - no network
Specialty Medication Tier 1 (generics; 30-day supply from a specialty network pharmacy)	20%; min $100; max $200	N/A - no network	20%; min $100; max $200	N/A - no network	20%	N/A - no network
Specialty Medication Tier 2 (all brands; 30-day supply from a specialty network pharmacy)	30%; min $200; max $400		30%; min $200; max $400			

Features of Real-Life Plans

Deductibles are obviously higher for HDHP, but sometimes out-of-pocket maximums are lower.

Why would you want to choose higher cost-sharing and/or a narrower network? **Lower premiums**:

	Narrow	Wide
Premier	$ 412	$ 562
Standard	$ 265	$ 415
HDHP	$ 185	$ 335

2024 Health Plan Comparison of Member Costs — State and Higher Education

PPO services in this table ARE subject to a deductible unless noted with a [5]. CDHP/HSA services in this table ARE subject to a deductible and coinsurance with the exception of in-network preventive care.

HEALTH PLAN OPTION	PREMIER PPO		STANDARD PPO		CDHP/HSA	
COVERED SERVICES	IN-NETWORK [1]	OUT-OF-NETWORK [1]	IN-NETWORK [1]	OUT-OF-NETWORK [1]	IN-NETWORK [1]	OUT-OF-NETWORK [1]
PREVENTIVE CARE – OUTPATIENT FACILITIES						
• Recommended screenings such as colonoscopy, mammogram, colorectal, lung imaging and bone density scans	No charge [5]	40%	No charge [5]	40%	No charge	40%
OTHER SERVICES						
Hospital/Facility Services [4] • Inpatient care [7]; outpatient surgery [7] • Inpatient behavioral health and substance use [2] [6]	15%	40%	20%	40%	20%	40%
• Emergency room services [7]	15%		20%		20%	
Maternity • Global billing for labor and delivery and routine services beyond the initial office visit	15%	40%	20%	40%	20%	40%
Home Care [4] • Home health; home infusion therapy	15%	40%	20%	40%	20%	40%
Rehabilitation and Therapy Services • Inpatient and skilled nursing facility [4] • Outpatient PT/ST/OT/ABA [5]; Other therapy	15%	40%	20%	40%	20%	40%
X-Ray, Lab and Diagnostics (not including advanced X-rays, scans and imaging) [5]	15%		20%		20%	40%
Advanced X-Ray, Scans and Imaging • Including MRI, MRA, MRS, CT, CTA, PET and nuclear cardiac imaging studies [4]	15%	40%	20%	40%	20%	40%
Pathology and Radiology Reading, Interpretation and Results [5]	15%		20%		20%	
Ambulance (medically necessary, air and ground)	15%		20%		20%	
Equipment and Supplies [4] • Durable medical equipment and external prosthetics • Other supplies (i.e., ostomy, bandages, dressings)	15%	40%	20%	40%	20%	40%
Allergy Serum	15%	40%	20%	40%	20%	40%
Also Covered	Certain limited Dental benefits, Hospice Care and Out-of-Country Charges are also covered. See Member Handbook for coverage details.					
DEDUCTIBLE — ONLY ELIGIBLE EXPENSES COUNT TOWARD THE DEDUCTIBLE						
Employee Only	$750	$1,500	$1,300	$2,600	$1,700	$3,400
Employee + Child(ren)	$1,125	$2,250	$1,950	$3,900	$3,400	$6,800
Employee + Spouse	$1,500	$3,000	$2,600	$5,200	$3,400	$6,800
Employee + Spouse + Child(ren)	$1,875	$3,750	$3,250	$6,500	$3,400	$6,800
OUT-OF-POCKET MAXIMUM – MEDICAL AND PHARMACY COMBINED – ELIGIBLE EXPENSES, INCLUDING DEDUCTIBLE, COUNT TOWARD THE OUT-OF-POCKET MAXIMUM						
Employee Only	$3,600	$7,200	$4,400	$8,800	$2,800	$5,600
Employee + Child(ren)	$5,400	$10,800	$6,600	$13,200	$5,600	$11,200
Employee + Spouse	$7,200	$14,400	$8,800	$17,600	$5,600	$11,200
Employee + Spouse + Child(ren)	$9,000	$18,000	$11,000	$22,000	$5,600	$11,200
CDHP STATE HEALTH SAVINGS ACCOUNT (HSA) CONTRIBUTION						
For individuals who enroll in the CDHP	N/A		N/A		$500 for employee only; $1,000 for other coverage levels	

Choosing Health Insurance is Very Difficult

To do so 'correctly' requires a degree of future health expenditure forecasting + knowledge of health plan options that is generally impractical even for highly-educated consumers.

One example from Handel (2013):

- One insurance plan the plan became *strictly dominated* for certain employees (in other words, premiums + OOP costs were higher under that plan no matter what compared to an alternative).
- Despite this, only 11% switched from this plan to the better one.

Handel, Benjamin R. 2013. "Adverse Selection and Inertia in Health Insurance Markets: When Nudging Hurts." *American Economic Review*, 103 (7): 2643-82.

Choosing Health Insurance is Very Difficult

Rules of thumb (that I use, at least):

1. Make sure your plan has your “emergency-room” hospital(s) + your “I’ve contracted a rare and serious disease” hospital(s) in network.

2. Make sure the out-of-pocket maximum is something that won’t bankrupt you.

3. Among the remaining choices, choose the plan that gives you the lowest spending (including premiums.)

Preview of Things to Come

- Adverse Selection
- Death Spirals
- Lots of Institutional Details About U.S. Healthcare

Health Insurance
[Part 3: Adverse Selection]

Agenda for this Lecture

1. Adverse Selection

(It’s a big topic)

Are You Willing to Buy Insurance?

(Pick your answer + the type of card you have)

PointSolutions Question
Session ID: econ436f23

Suppose you **know** your annual medical expenses will be:

♥ = $10

♦ = $50

♣ = $1,000

♠ = $5,000

Price = **E**(claims)*1.01 = $1,515

A. No (♥)
B. No (♦)
C. No (♣)
D. No (♠)
E. Yes (♥)
F. Yes (♦)
G. Yes (♣)
H. Yes (♠)

Are You Willing to Buy Insurance?

(Pick your answer + the type of card you have)

PointSolutions Question
Session ID: econ436f23

Suppose you **anticipate** your annual medical expenses will be:

♥ = ($0×99%)+($1,000×1%) = $10

♦ = ($0×95%)+($1,000×5%) = $50

♣ = ($0×90%)+($10,000×10%)=$1,000

♠ = ($0×80%)+($25,000×20%)=$5,000

Price = **E**(claims)*1.01 ≈ $1,530

A. No (♥)
B. No (♦)
C. No (♣)
D. No (♠)
E. Yes (♥)
F. Yes (♦)
G. Yes (♣)
H. Yes (♠)

Results of Our Game

When individuals **knew** their medical expenditures for sure (no risk), market _____

When individuals **anticipated** their medical expenditures for sure (no risk), market _____

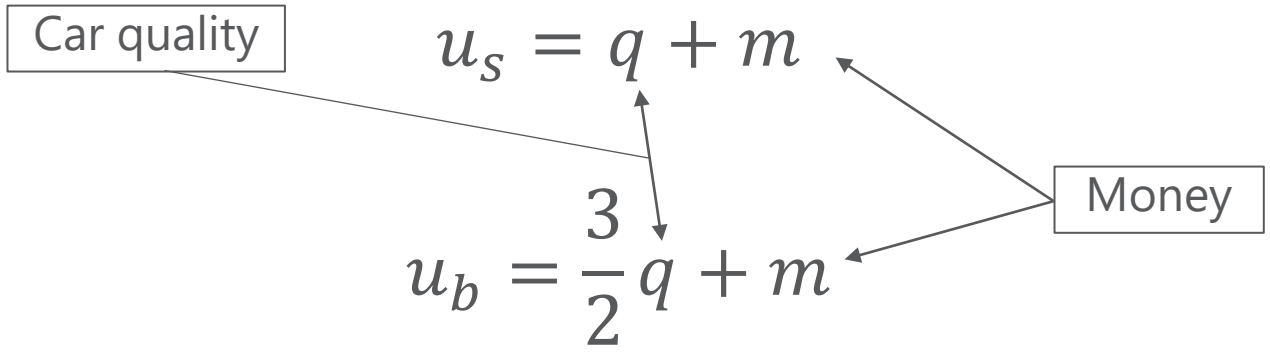
Adverse Selection

Adverse selection: when low-quality goods, products, and/or contracts are oversupplied due to *asymmetric information*.

Specifically, this occurs when a buyer or seller has more information than the other and the more-informed party uses this advantage to either (1) avoid an unfavorable transaction or (2) enter into a favorable one.

Canonical Example: "The Market for Lemons"
(Akerlof, 1970)

Consider a potential transaction between a used car between a seller (s) and a buyer (b). Their utilities are as follows:



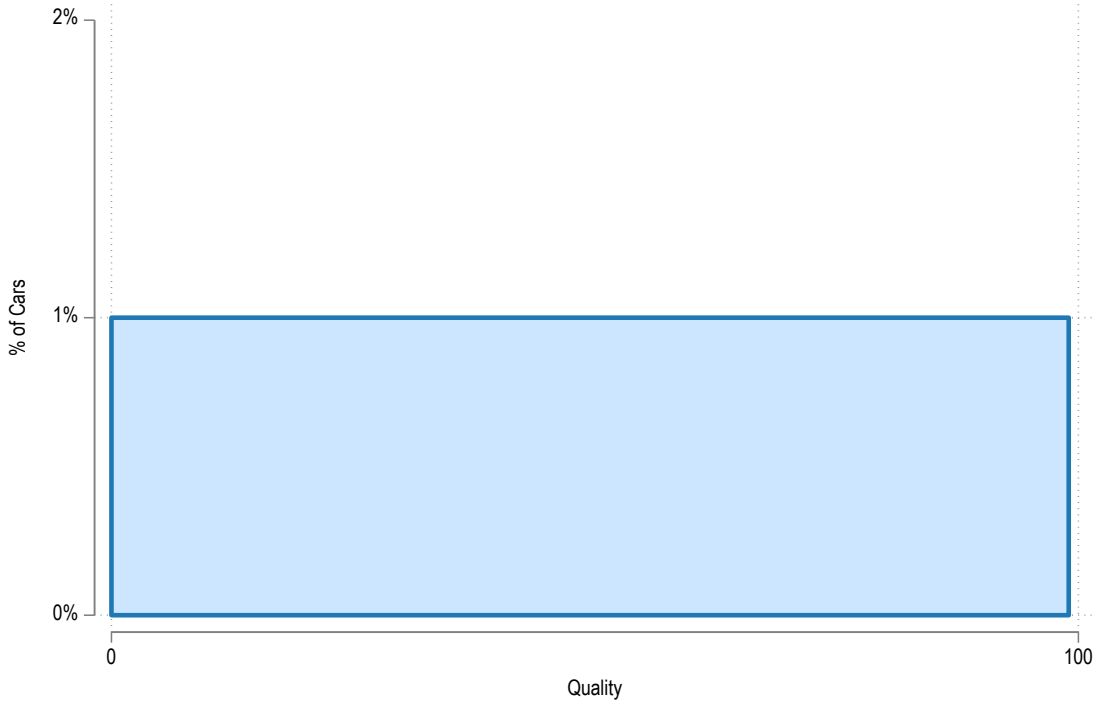
(Note: in this example, all parties are risk-neutral.)

Canonical Example: "The Market for Lemons"
(Akerlof, 1970)

Suppose that car quality is known by the seller before the transaction.

However, it is only learned by the buyer after the transaction.

Suppose there are 100 cars on the market, each with a (randomly determined) quality ranging from 0 to 100

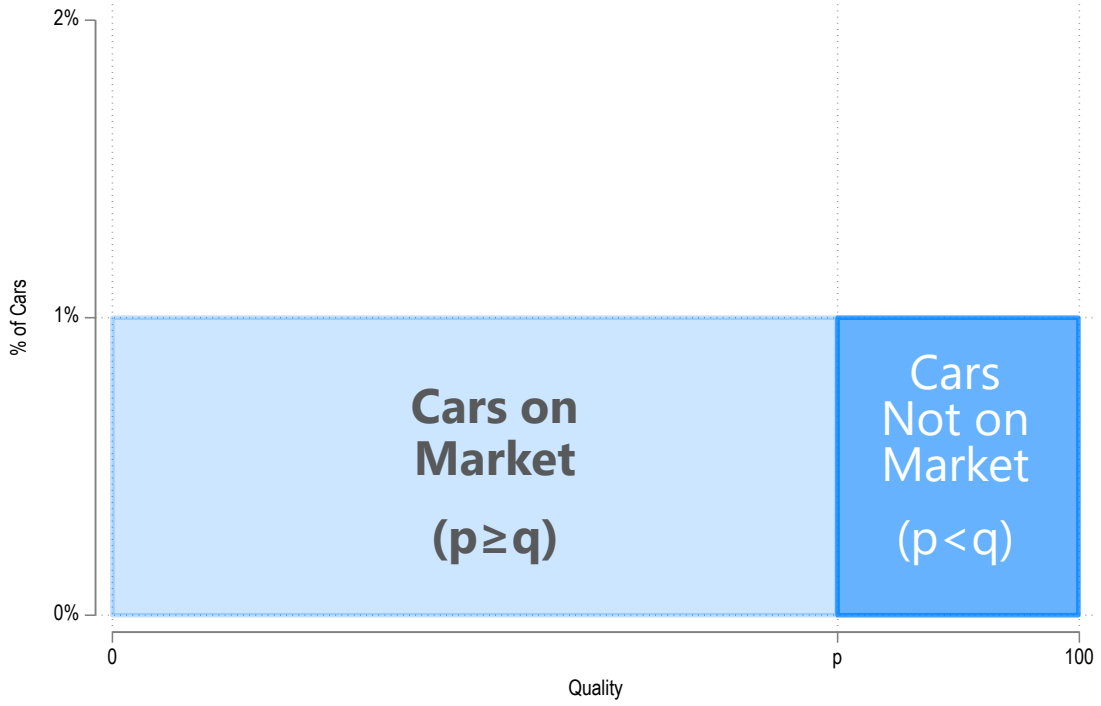


Canonical Example: "The Market for Lemons"
(Akerlof, 1970)

Recall: $u_s = q + m$

Sellers will only sell their cars if they get a price higher than the quality (which they know).

So, the only cars on the market will be those with 'quality' less than the market price (p)

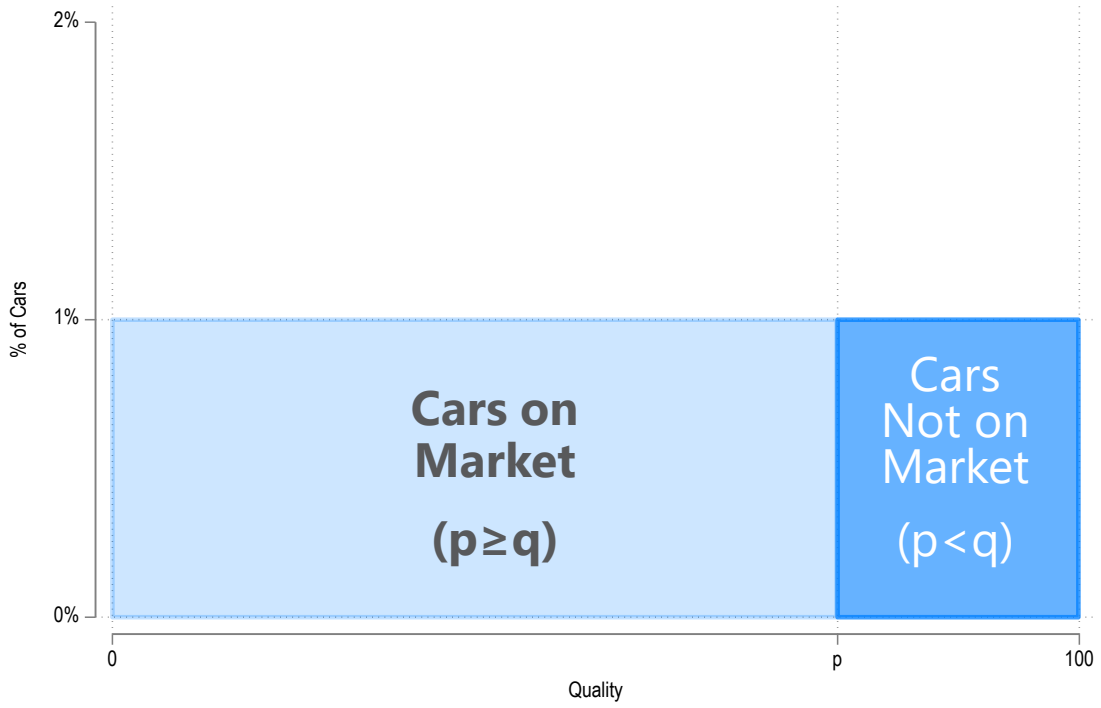


Canonical Example: "The Market for Lemons"
(Akerlof, 1970)

Recall: $u_b = \frac{3}{2}q + m$

Because buyers don't know the quality of cars prior to buying, they are making decisions based on expected value of quality, where they buy if:

$$\frac{3}{2}\boldsymbol{E}(q) \geq p$$



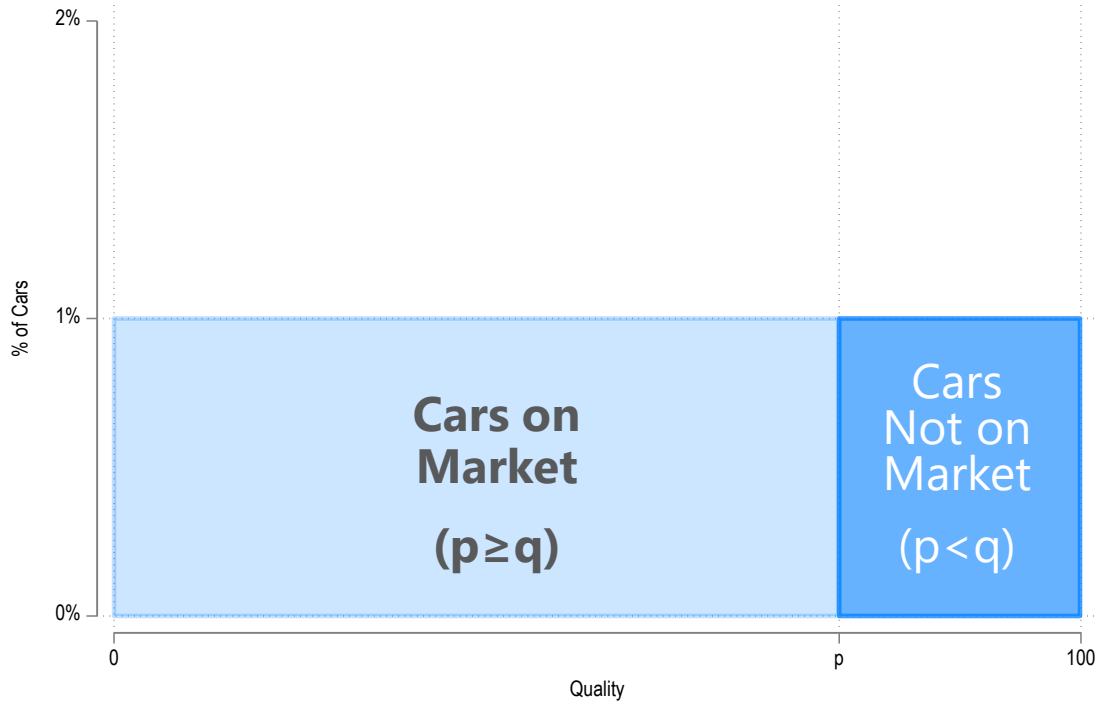
Canonical Example: "The Market for Lemons"
(Akerlof, 1970)

What is **E(q)** for the cars on the market? Well, quality (q) is evenly distributed from 0 to p, so:

$$\boldsymbol{E(q)} = \frac{0+p}{2} = \frac{1}{2}p$$

Plugging this into the buyer's equation, they buy if:

$$\frac{3}{2}\boldsymbol{E}(q) \geq p \quad \Rightarrow \quad \frac{3}{2} \times \frac{1}{2}p = \boxed{\frac{3}{4}p \geq p}$$



This statement is **never true**!

⇒ **NO ONE buys in this market.**

What Just Happened!?

1. If there were *perfect* information, sellers could've sold cars for somewhere between q and $\frac{3}{2}q$, which would've been a pareto-improvement.

2. But this was all ruined by asymmetric information (unobserved quality).

3. No one bought – complete market failure.

How to Avoid Market Collapse:

Option 1: The buyer and seller's valuation of goods must be sufficiently different.

Suppose $u_b = \frac{5}{2}q + m$

Then, they would buy the car if:

$$\frac{5}{4}p \geq p.$$

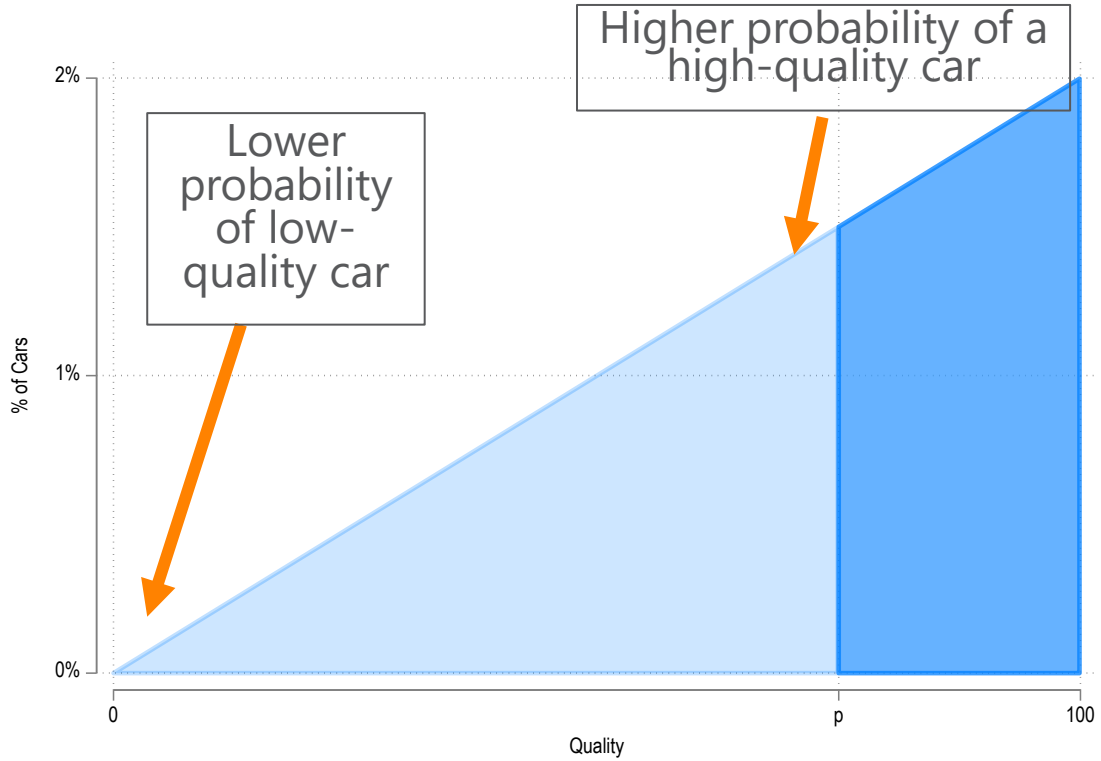
Since this is always true, pareto-improving trades are still made.

Alternatively, if $u_s = 0.5q + m$ (with same u_b as the original example), the buying condition would be:

$$\frac{3}{2}p \geq p$$

How to Avoid Market Collapse:

Option 2: The bad outcomes ("lemons") are somewhat rare.



$$\boldsymbol{E}(\boldsymbol{q}) = \frac{2}{3}p$$

Always True ⇒ They buy the cars.

Plugging this into the buyer's equation, they buy if:

$$\frac{3}{2}\boldsymbol{E}(q) = \frac{3}{2} \times \frac{2}{3}p = \boxed{p \geq p}$$

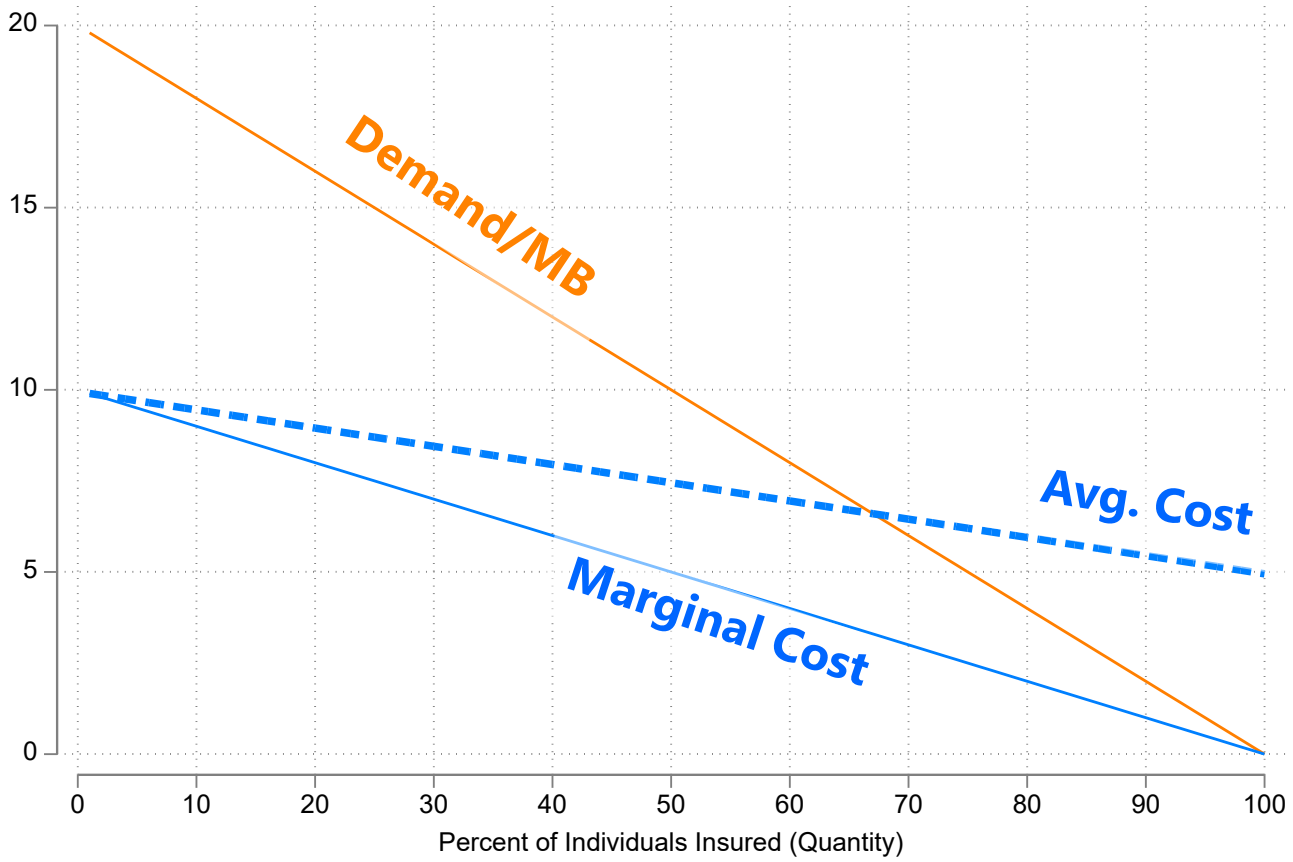
Bringing it Back to Health Insurance

In **health insurance markets**, it is the *buyers* (prospective patients) who have more information. Instead, *sellers* (insurers) must make decisions based on decisions based on expected costs.

To keep from unraveling, health insurance markets must (generally) have:

1. A large difference between buyer/seller valuations
2. A small number of extremely expensive patients relative to the number of inexpensive patients.

Adverse Selection in Graphs



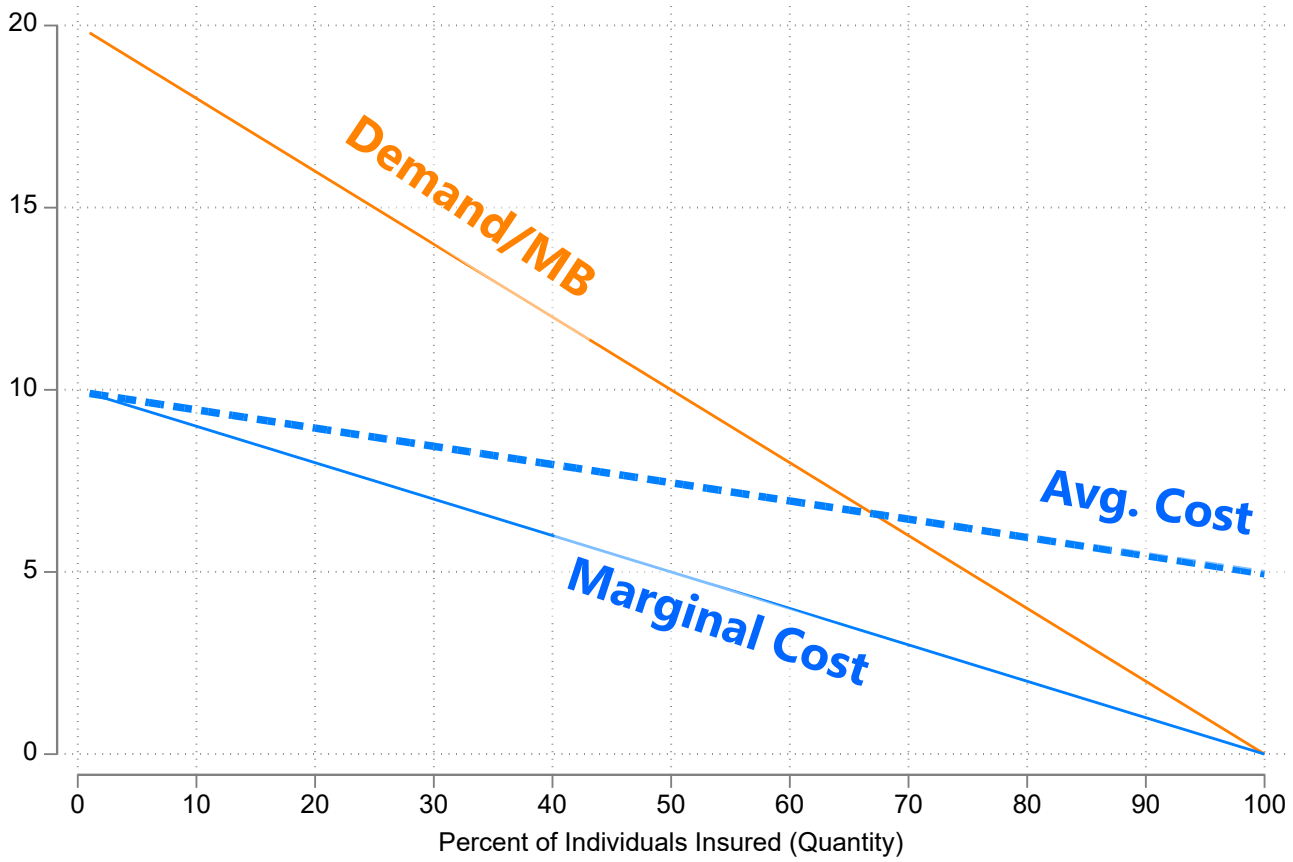
A few strange things about health insurance (and all adversely-selected markets):

<u>Strange Characteristic #1:</u>

The marginal cost curve is **downward sloping**.

Those with high WTP for insurance also likely will have higher costs (both driven by underlying health issues / preferences).

Adverse Selection in Graphs



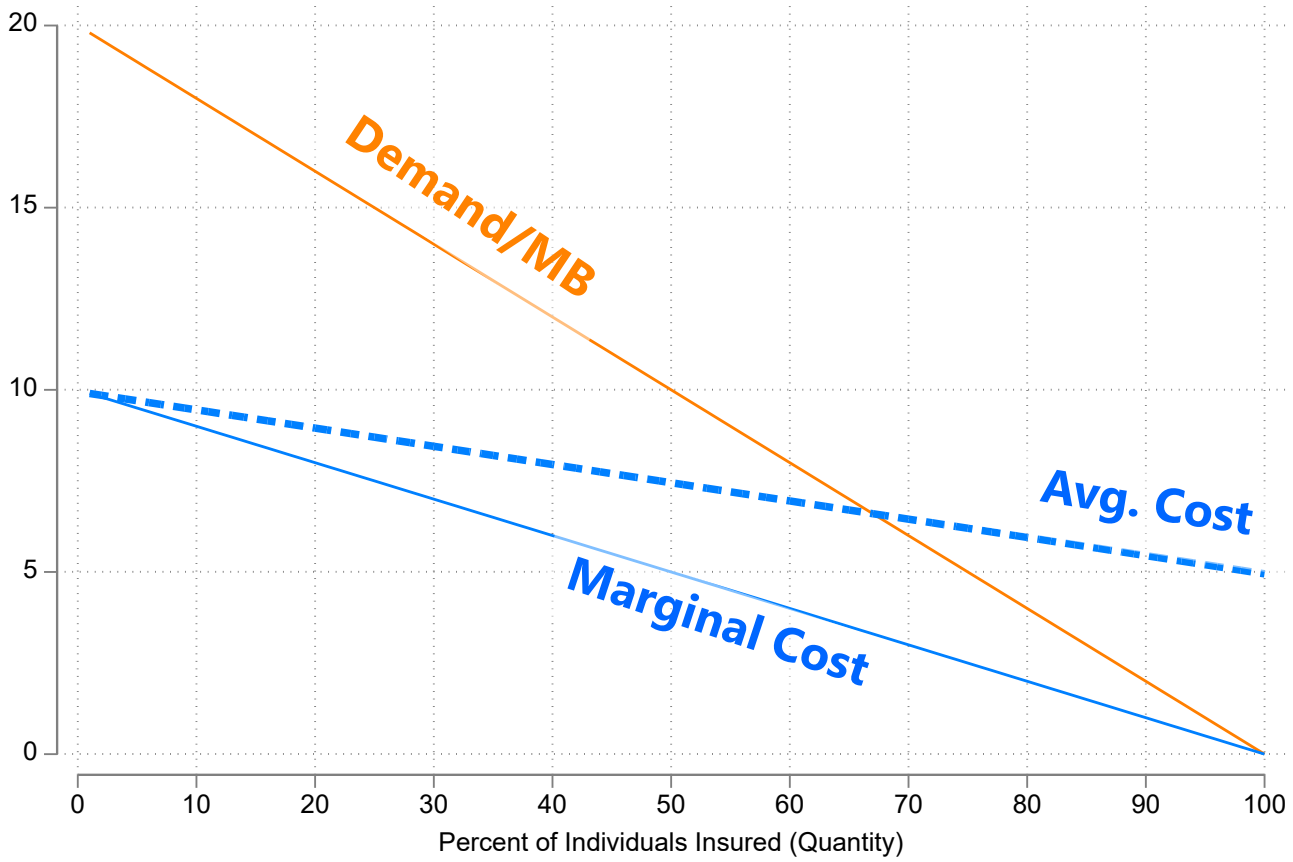
Strange Characteristic #2:

The marginal cost curve is typically always lower than the marginal benefit/demand curve (i.e., MC<MB, always…*at least in the idealized case*).

This is because potential patients (demand-side) are risk-averse, while the insurers (supply-side) are risk-neutral.

⇒ Accordingly, consumers value the risk protection at a higher amount than insurers are willing to sell it.

Adverse Selection in Graphs



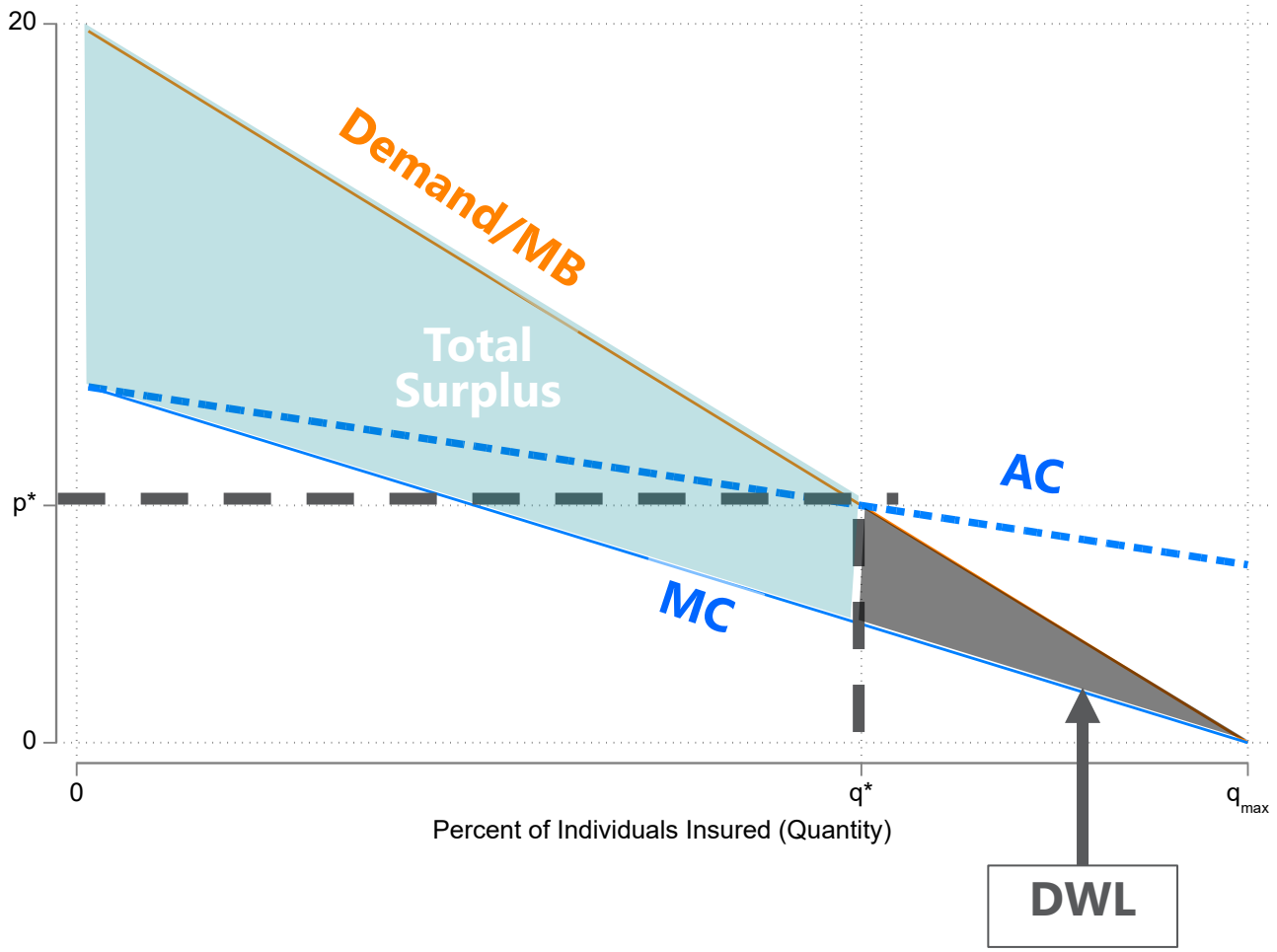
Strange Characteristic #3:

The intersection of demand and **average cost** determines the market equilibrium.

Insurers can't price discriminate based on true MC (since they either don't observe it due to private information or are not allowed by law).

Thus, the must set one price based on their average (expected) claims paid.

Adverse Selection: Textbook/Base Case



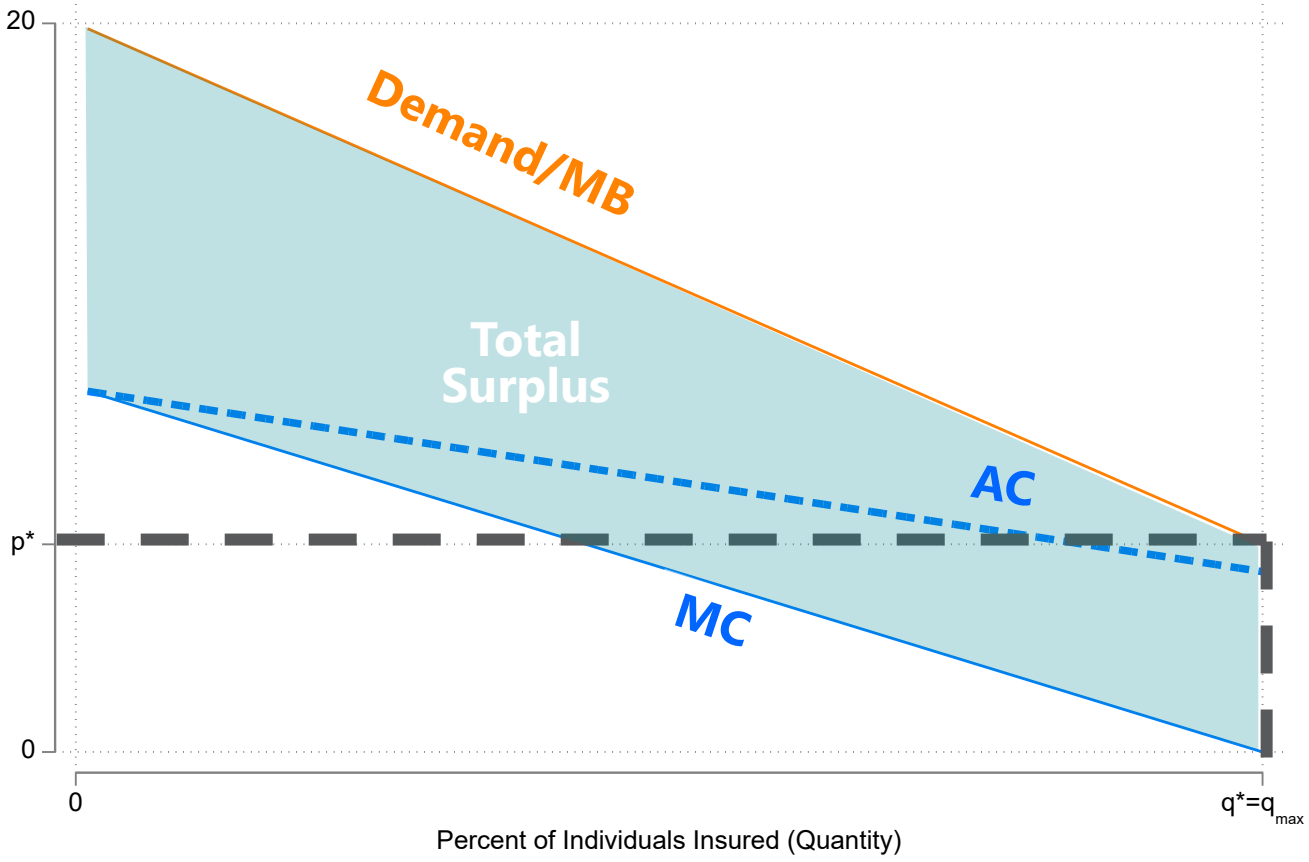
Total Surplus = $(MB - MC) \times q^*$

However, utility-maximizing quantity (q_{max})is when MB=MC. Thus,

DWL = $(MB - MC) \times (q_{max} - q^*)$

The presence of DWL is indicative of market failure (in this case, asymmetric information / adverse selection)

Adverse Selection w/ No Efficiency Loss

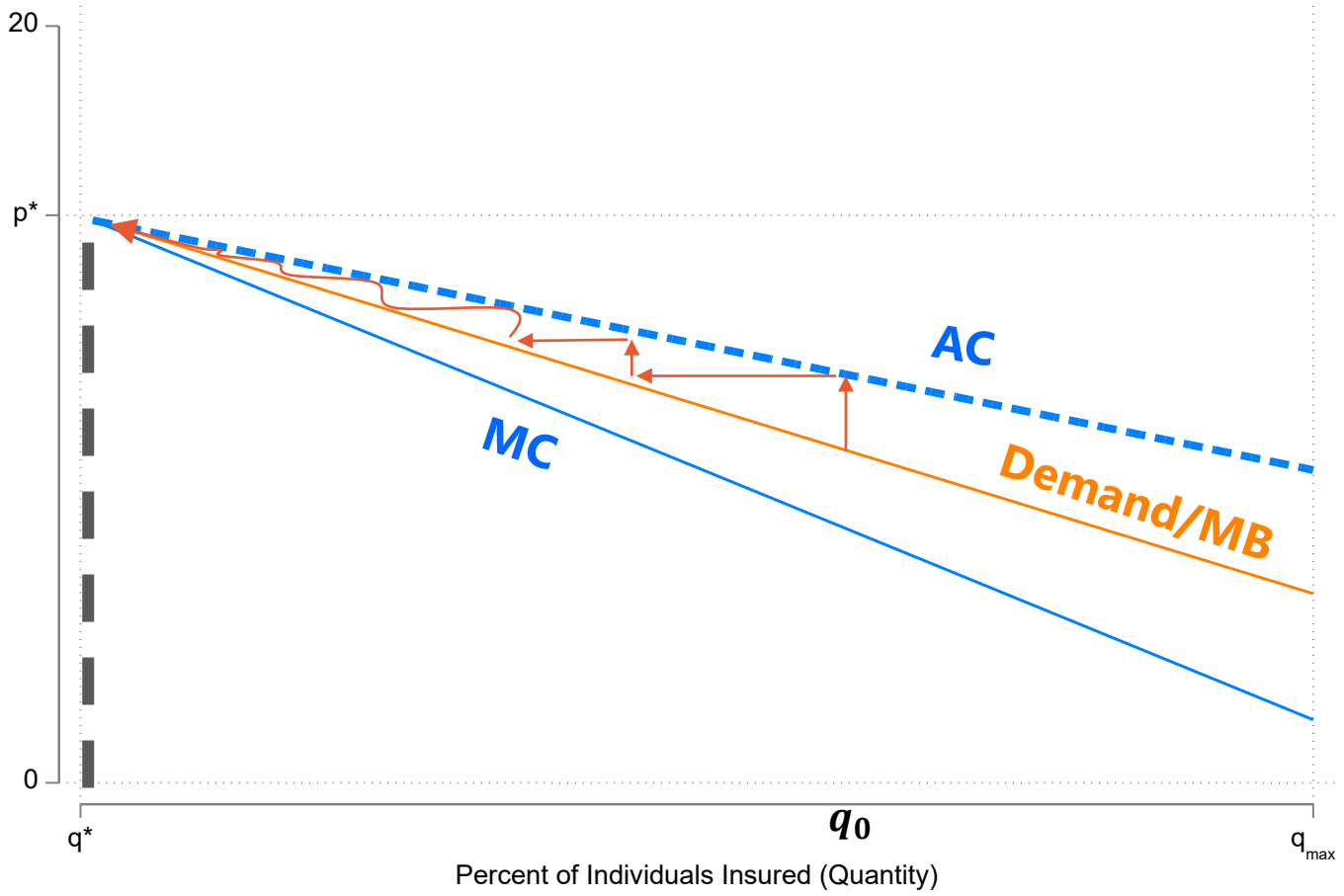


If MB>AC for <u>all</u> consumers in the market (i.e., there is a large difference in buyer/seller valuation)…

…then all will be insured.

⇒ **DWL = 0**

Adverse Selection w/ Unraveling



However if demand is always less than Average Cost…

Consider a market that beings at q_0 …

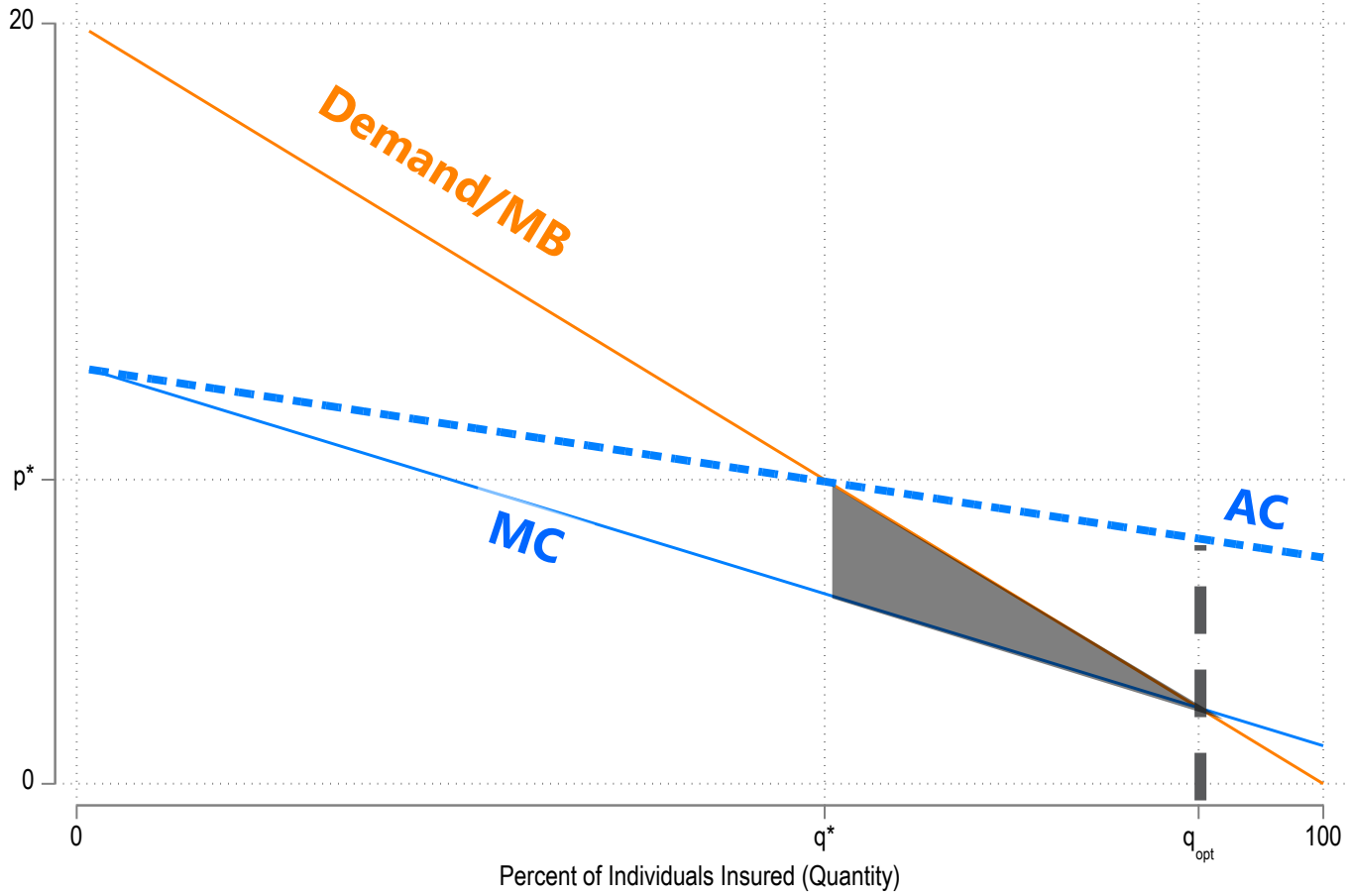
For a given price, premiums won't cover cost, so in the next year, insurer raises prices high enough to at least break-even…

…This drives away lower-cost (and lower WTP patients), causing the insurer to lose money again…

…So they raise prices further, driving away more low-cost patients…

…And the cycle continues until *there is insurance for no one*. This is the so-called **Death Spiral.**

Adverse Selection: Closer to Realistic



In the textbook case, MC<MB (always) due to risk-aversion.

However, in the real-world, insurers have administrative expenses ⇒ shift MC curve upward.

This means that full insurance may no longer be optimal…

However, DWL still occurs.

Adverse Selection **Policy Solutions**

There are two common policy solutions to deal with adverse selection:

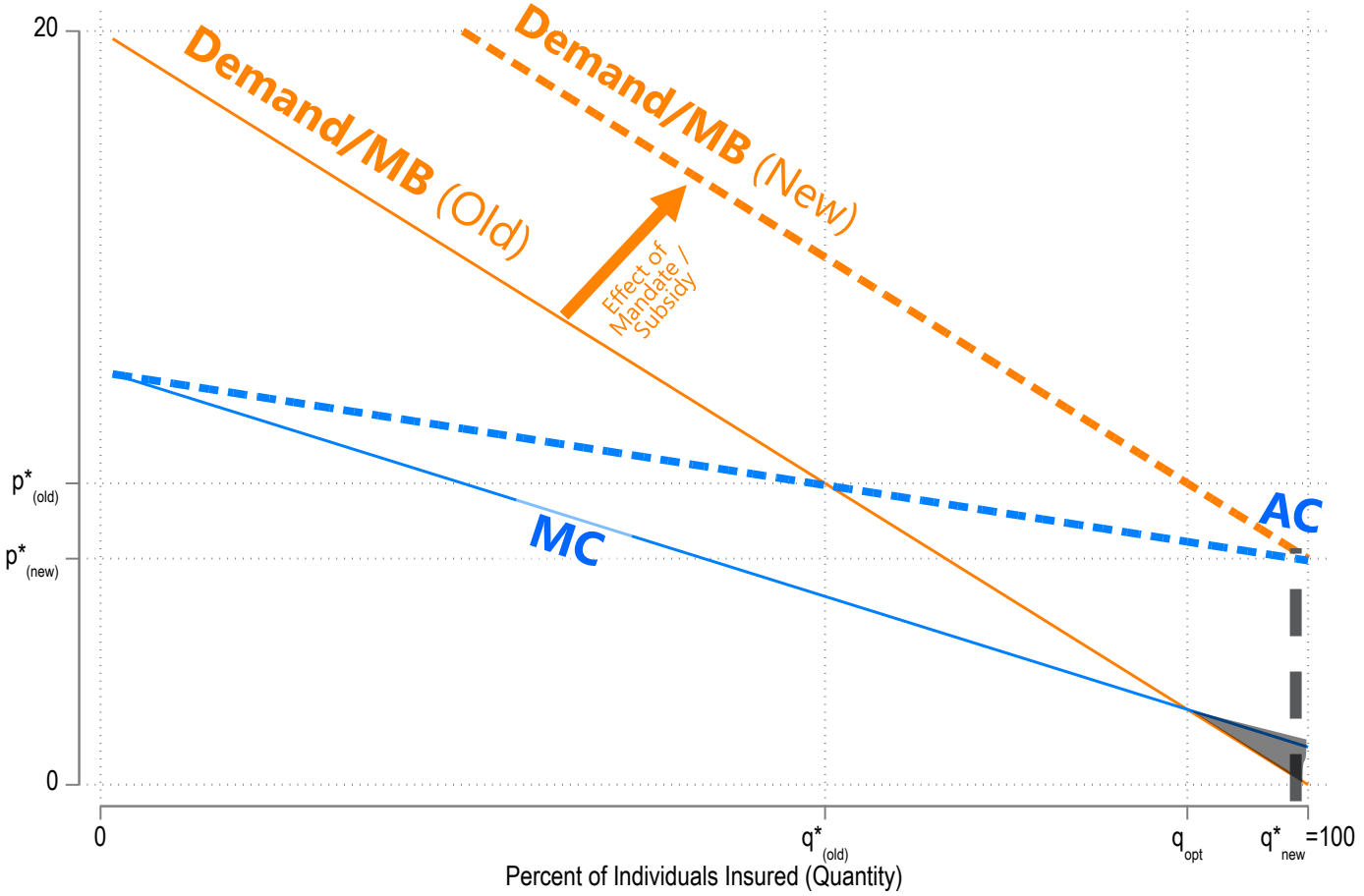
1. Subsidizing health insurance

2. Making health insurance compulsory (i.e., penalizing individuals if they *don't* get health insurance).

These are basically the same thing from an economic perspective:

Subsidizing good ⇔ Penalty for NOT buying good.

Adverse Selection: Mandate/Subsidy



Suppose the government introduces a full-insurance mandate, with a sufficiently large penalty to ensure compliance.

In case where real-world admin expenses make MC>MB for some individuals → mandate introduces DWL.

Whether 'good' policy (from an efficiency standpoint) depends on if DWL from *over-insurance* (where $q_{opt} < q^*_{new}$) is less than DWL from *under-insurance* (where $q^*_{old} < q_{opt}$).

Adverse Selection **Numerical Example**

Suppose the MB/demand for insurance is given by:

$$MB = 200 - q$$

Further, the insurer faces the following costs:

$$MC = 140 - \frac{q}{2}$$

$$AC = 140 - \frac{q}{4}$$

Always same intercept as MC, but half the slope

Where q is the quantity of insured individuals in **percentage terms**, so that $q = 100$ means 100% of the market is insured.

Step #1

Find the **optimal** quantity in this market (set $MB = MC$)

$$200 - q = 140 - \frac{q}{2}$$

$$\Rightarrow 60 = \frac{1}{2}q$$

$$\Rightarrow \quad 120 = q_{opt}$$

But since you can't have 120% of market insured, $q_{opt} = 100$ (full insurance.)

Adverse Selection **Numerical Example** (continued)

Suppose the MB/demand for insurance is given by:

$$MB = 200 - q$$

Further, the insurer faces the following costs:

$$MC = 140 - \frac{q}{2}$$

$$AC = 140 - \frac{q}{4}$$

Where q is the quantity of insured individuals in **percentage terms**, so that $q = 100$ means 100% of the market is insured.

Step #2

Find the **equilibrium** quantity in this market (set $MB = AC$)

$$200 - q = 140 - \frac{q}{4}$$

$$\Rightarrow 60 = \frac{3}{4}q$$

$$\Rightarrow \ 80 = q^*$$

Thus, the equilibrium quantity is 80% insurance.

Turning Point Question

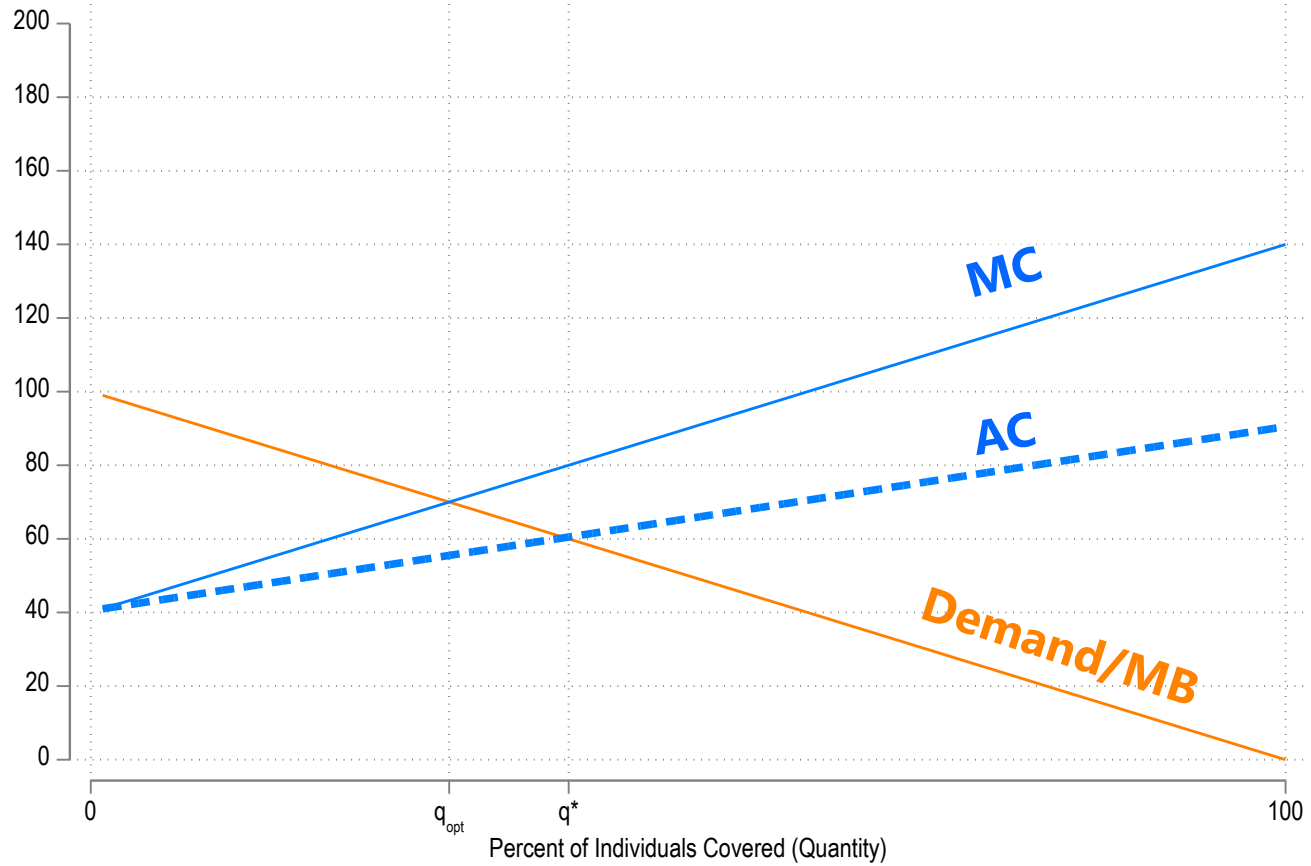
PointSolutions Question
Session ID: econ436f23

In the previous question, is a compulsory insurance mandate likely to be optimal from an efficiency standpoint?

A. Yes
B. No

Not All Selection is Adverse

Advantageous selection: when high-quality goods, products, and/or contracts are **over**supplied due to *asymmetric information*.



Advantageous Selection: Examples

WHAT DO WORKPLACE WELLNESS PROGRAMS DO? EVIDENCE FROM THE ILLINOIS WORKPLACE WELLNESS STUDY*

DAMON JONES
DAVID MOLITOR
JULIAN REIF

Workplace wellness programs cover over 50 million U.S. workers and are intended to reduce medical spending, increase productivity, and improve well-being. Yet limited evidence exists to support these claims. We designed and implemented a comprehensive workplace wellness program for a large employer and randomly assigned program eligibility and financial incentives at the individual level for nearly 5,000 employees. We find strong patterns of selection: during the year prior to the intervention, program participants had lower medical expenditures and healthier behaviors than nonparticipants. The program persistently increased health screening rates, but we do not find significant causal effects of treatment on total medical expenditures, other health behaviors, employee productivity, or self-reported health status after more than two years. Our 95% confidence intervals rule out 84% of previous estimates on medical spending and absenteeism. *JEL* Codes: I1, M5, J3.

Preview of Things to Come

- Lots of Institutional Details About the U.S. Healthcare Insurance Environment.

Health Insurance in the United States

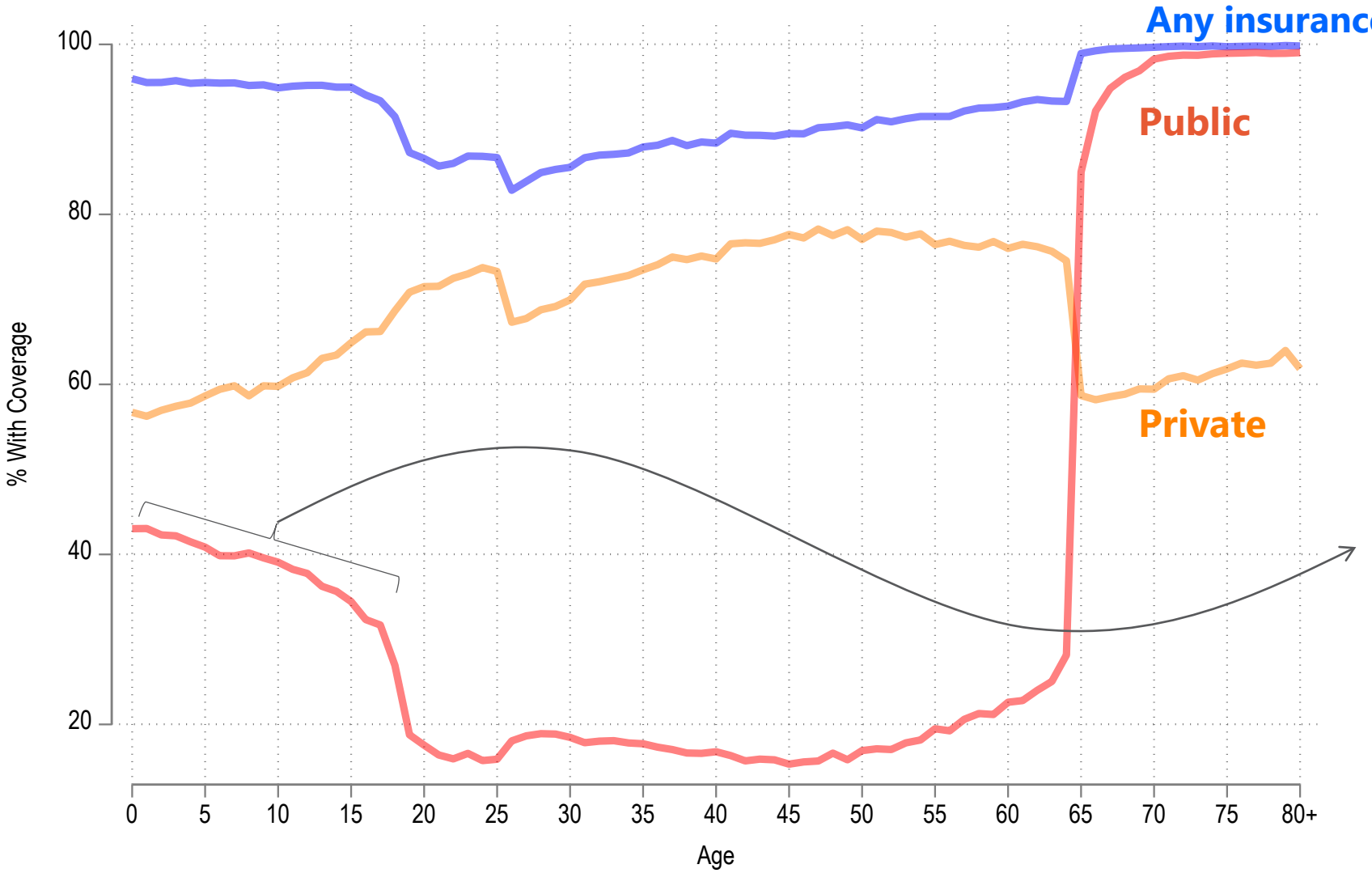
Notes:

- We're finishing up this lecture today—I have a 2 extra printed slides for this if you want them.
- Slides for the next lecture are also up front.
- Homework has been uploaded (it actually was last week)

Agenda for this Lecture

1. How Are People Insured as they Age?
2. Private Insurance
3. Public Insurance

How Are People Insured as the Age?

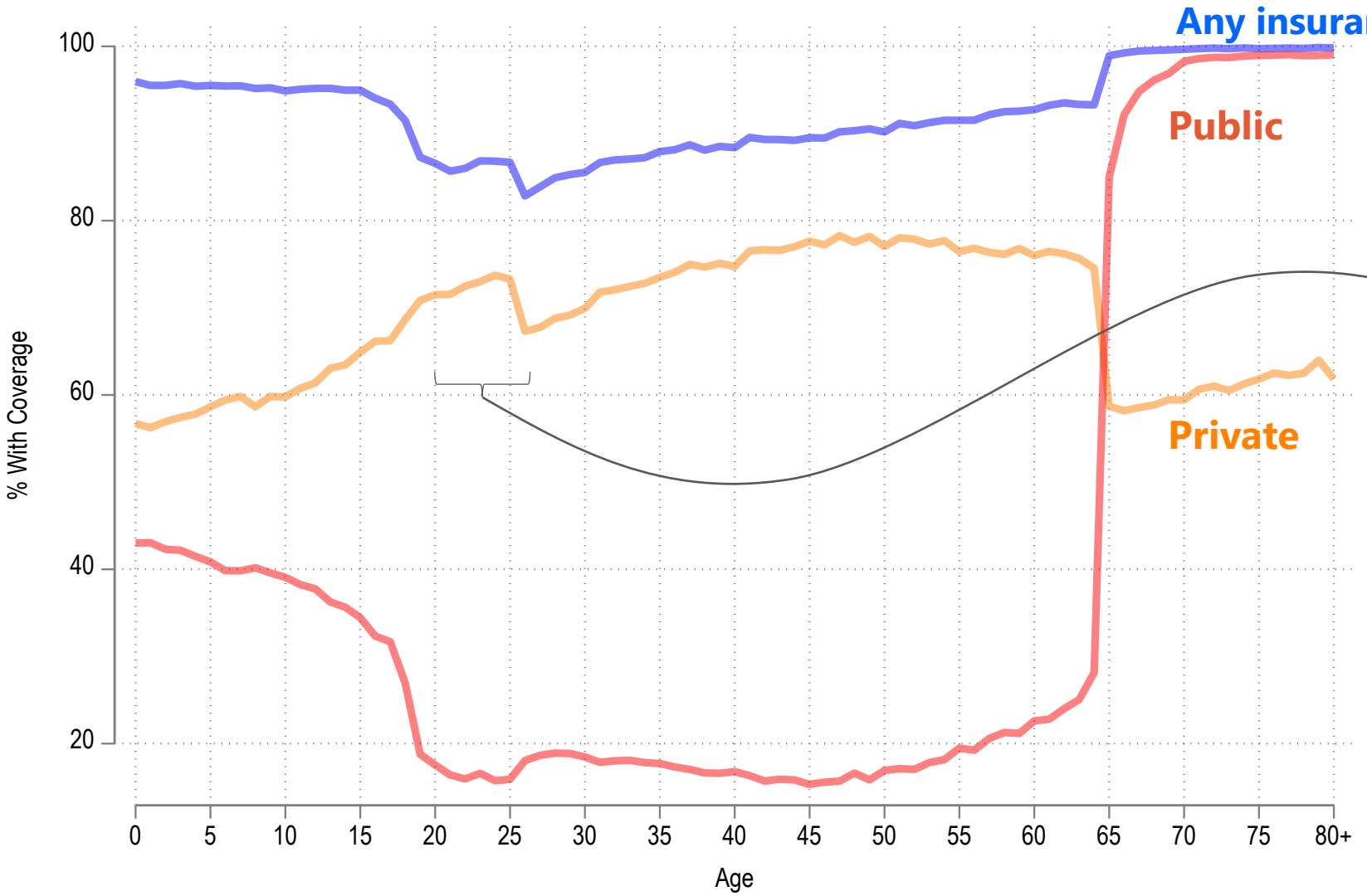


When Young:

Even middle-class children can be covered by Medicaid/CHIP, but eligibility fades with age (especially after 18).

Source: Author calculations for US-Born Individuals using the 2019 American Community Survey from IPUMS

How Are People Insured as the Age?

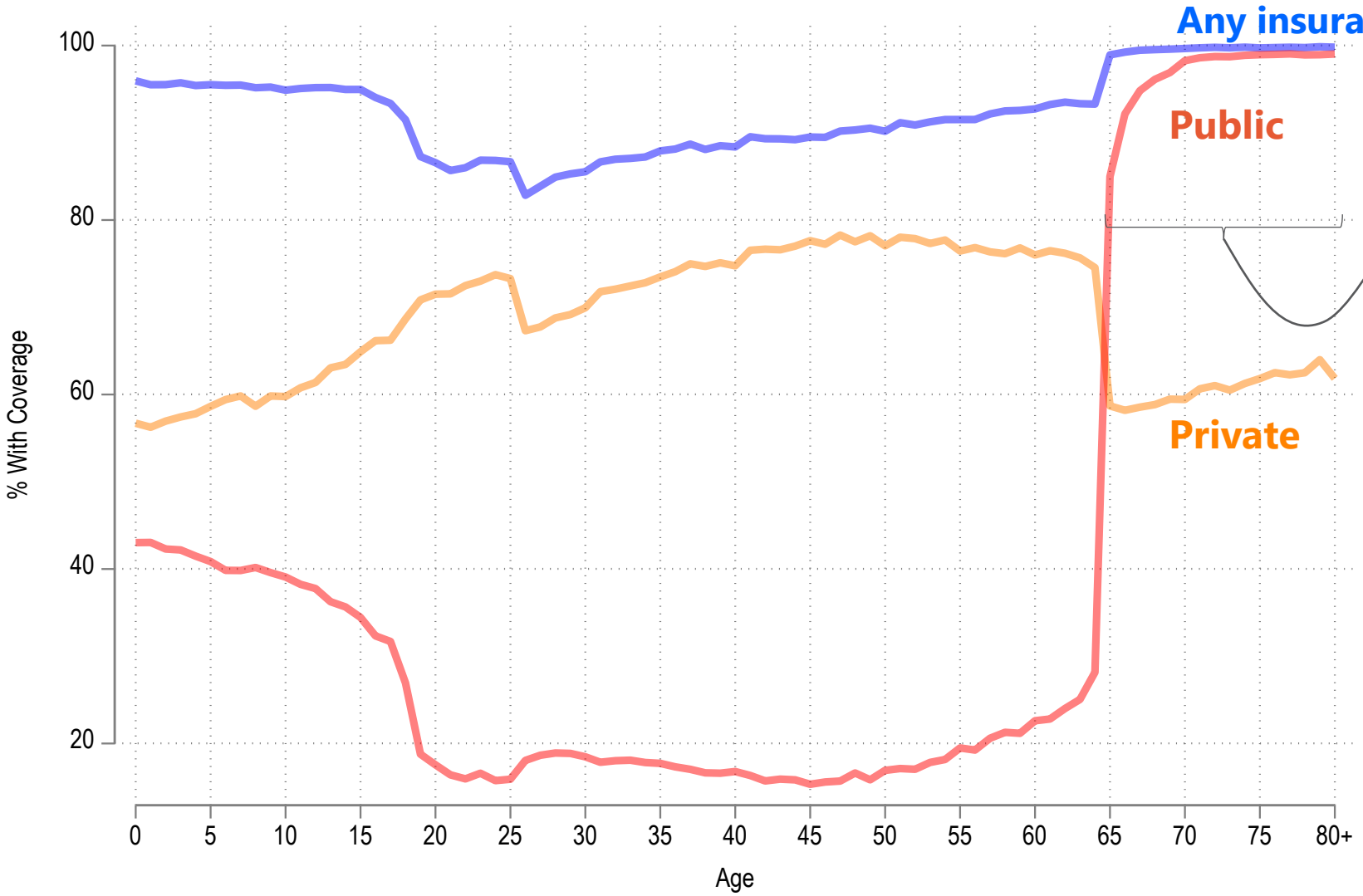


When Youngish:

Can remain on parent's health plan until 25

Source: Author calculations for US-Born Individuals using the 2019 American Community Survey from IPUMS

How Are People Insured as the Age?



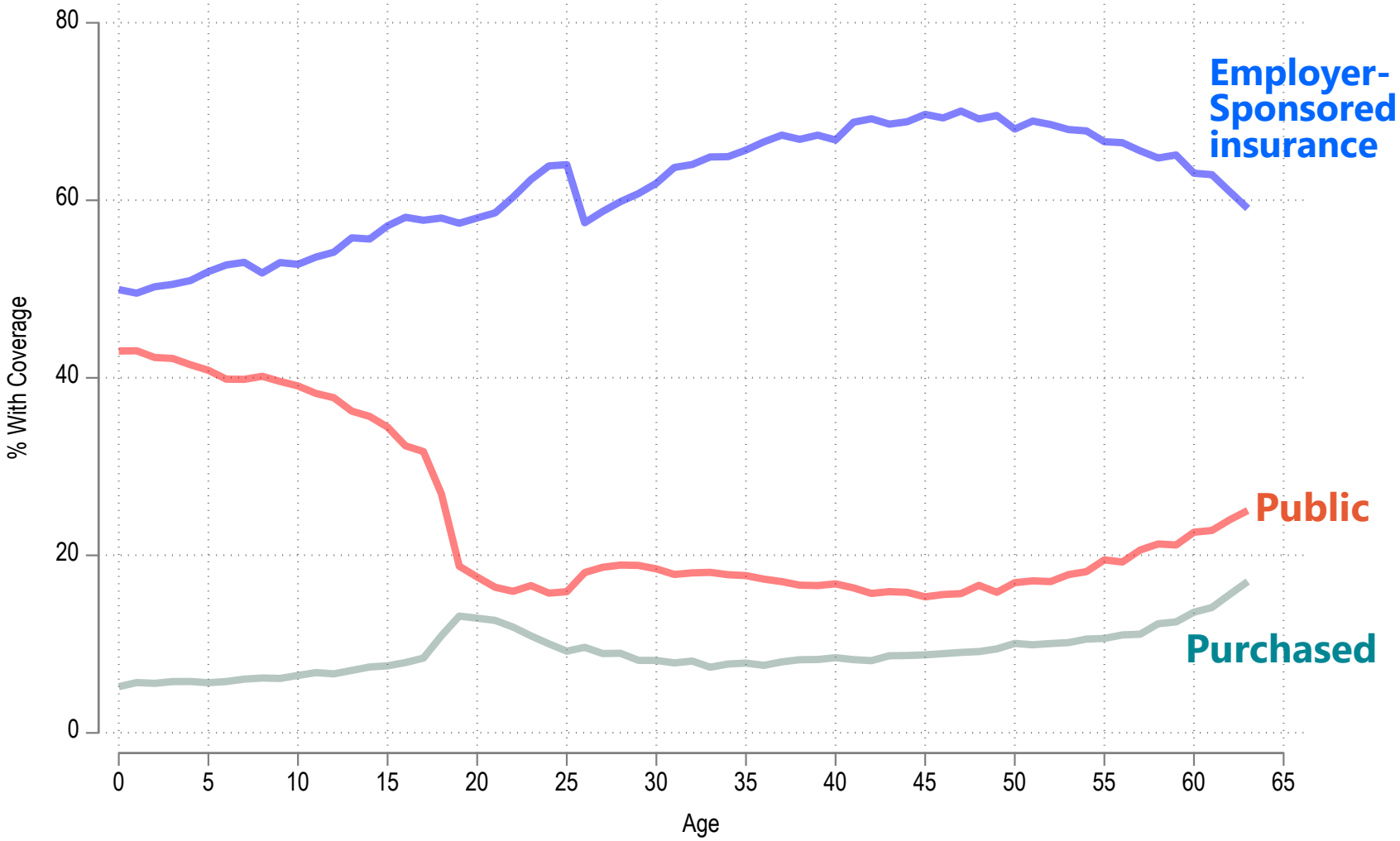
When Older:

Covered by Medicare

(Many buy private insurance to cover Medicare cost-sharing—this is called "Medigap")

Source: Author calculations for US-Born Individuals using the 2019 American Community Survey from IPUMS

How Are People Insured as the Age?



Roughly 61% of individuals aged 0-64 are covered primarily by an employer-sponsored health plan.

(65% for ages 26-64)

Source: Author calculations for US-Born Individuals using the 2019 American Community Survey from IPUMS

Private Insurance

Employer-Sponsored Health Insurance ("ESHI")

The United States' use of employers to provide health insurance is unique among peer countries…

…but why do we do it this way?

Because of **World War II**.

Employer-Sponsored Health Insurance: A Brief History

Stabilization Act of 1942: Put a cap (price ceiling) on wages to prevent wartime inflation.

⇒ Pushed employers to compete for workers with non-wage benefits (health insurance).

⇒ Employers successfully lobbied for health insurance to be **tax-deductible** for employer, but **tax-free** to employee.

The ESHI Subsidy

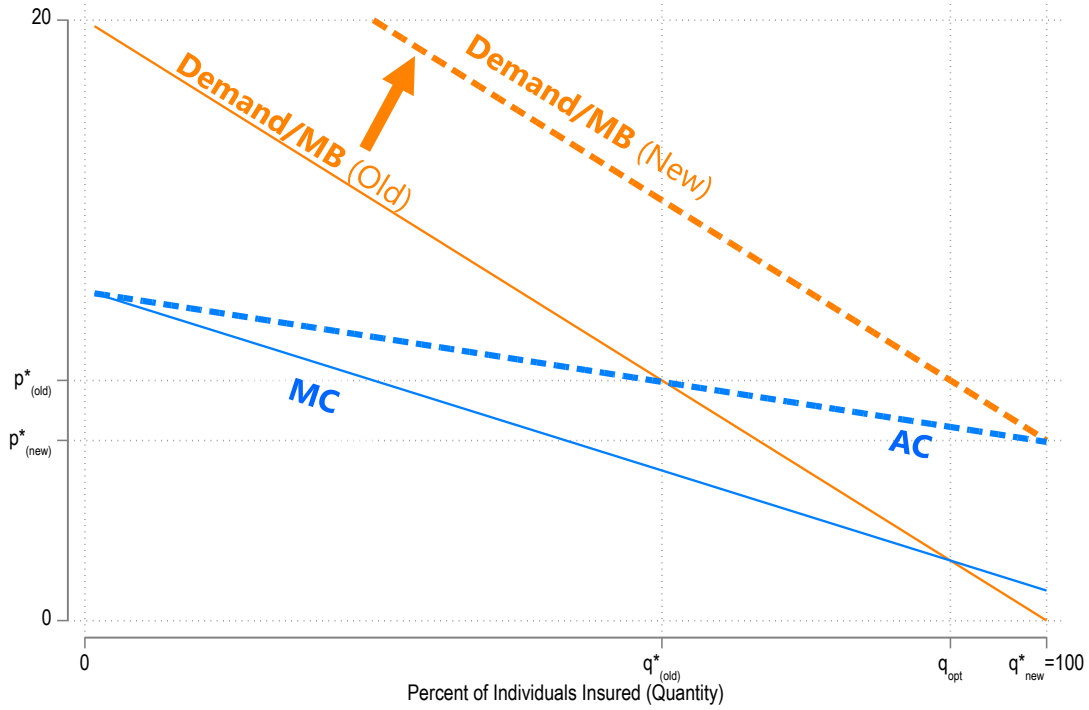
Back-of-the-envelope calculation of the subsidy's size (2021):

Employer Health Payments	$734B
Approx. Avg. Marginal Federal Rate	12.0%
Employee + Employer FICA	15.3%
Combined Tax Rate	27.3%
Estimated Subsidy	**~$200B**

Context: this is ~25% of total K-12 spending (local + state + federal).

The ESHI Subsidy: **The Good…**

The subsidy may offset under-insurance:



At least that's how a lump-sum subsidy is supposed to work…

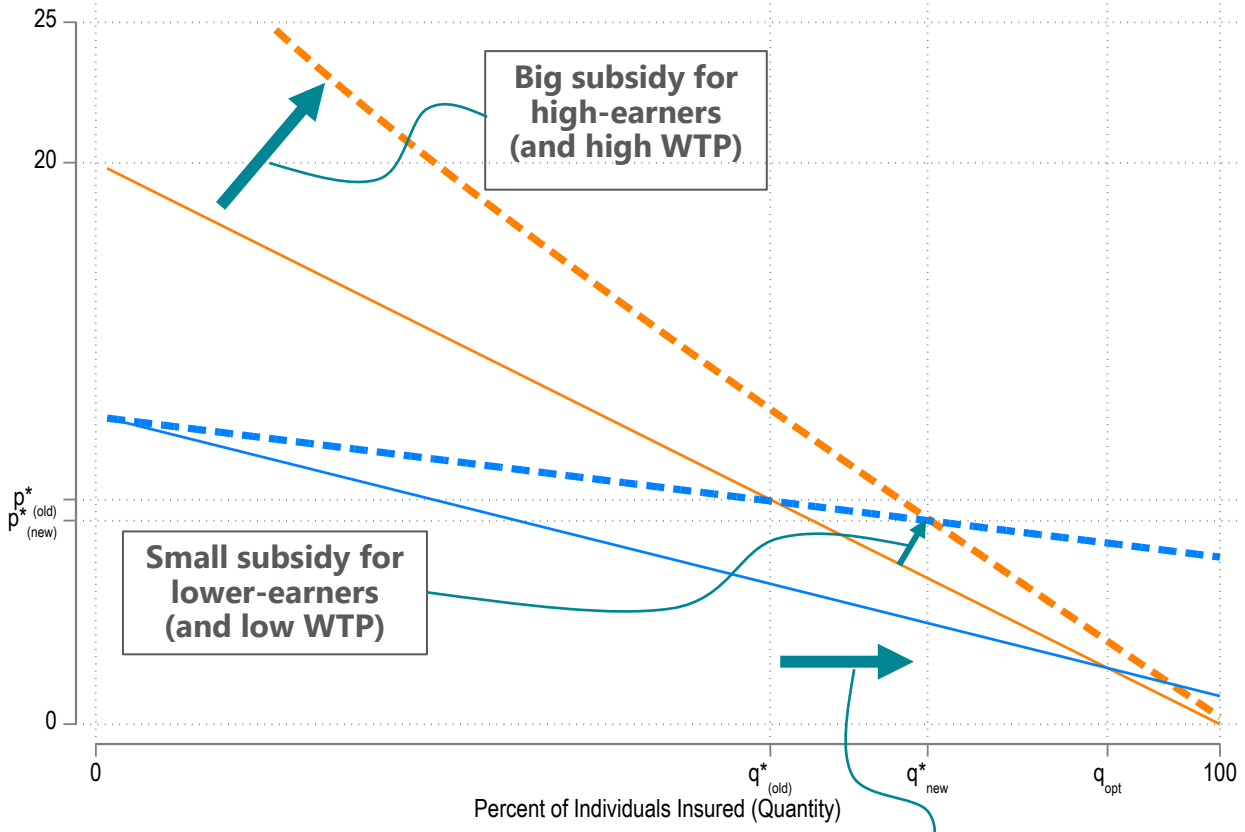
The ESHI Subsidy: **…and the Bad**

However, since it's tied to income, **richer people get larger subsidies** (since they have higher tax breaks).

Thus, the subsidy is likely *regressive* (i.e., it disproportionately benefits high-income individuals)

⇒ which is the opposite of stated tax policy goals

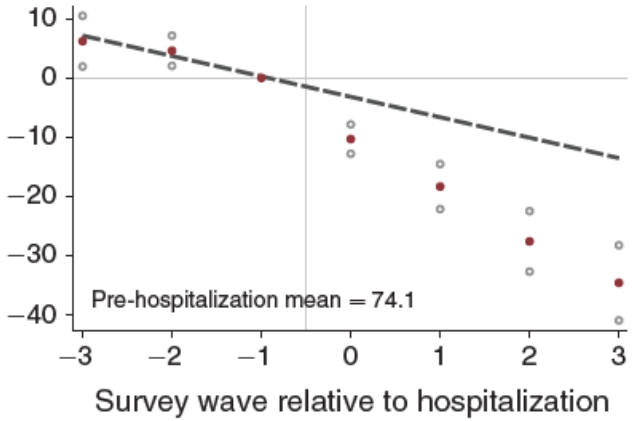
If higher incomes ⇒ higher WTP for insurance, the ESHI subsidy's true effect might be:



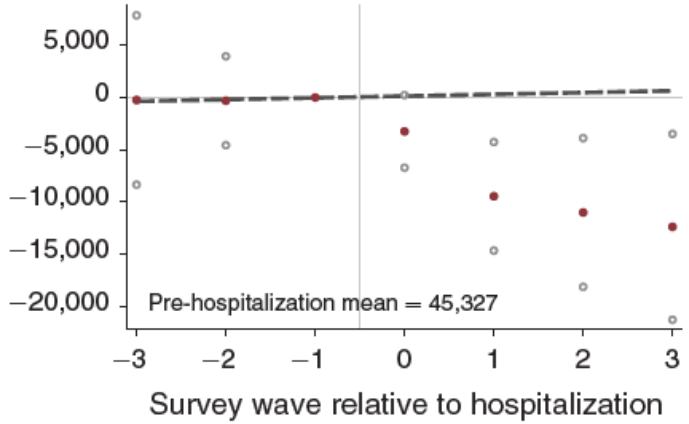
Small movement toward optimal outcome relative to amount spent.

A Quick Aside:
Economic Consequences of Hospitalization

Panel B. Working part- or full-time



Panel C. Respondent earnings



Among individuals who were hospitalized:

- 10 percentage-points less likely to be working (~13% decrease relative to pre-hospitalization mean).
- ~$8,100 decrease in earnings (~10% decrease relative to pre-hospitalization mean).

Dobkin, Carlos, Amy Finkelstein, Raymond Kluender, and Matthew J. Notowidigdo. 2018. "The Economic Consequences of Hospital Admissions." *American Economic Review*, 108 (2): 308-52.

A Critical Flaw with Employer-Sponsored Health Insurance

Serious health events:

1. Increase the need for health insurance;
2. But also decrease the likelihood of being employed.

⇒ **In other words, people with ESHI may lose insurance at the exact time that they need it.**

"Solution": Employers are required to make coverage available post-termination ("COBRA"), but not to subsidize it.

However, COBRA is extremely expensive: average annual premiums > $10k. Only about 1% of unemployed people covered by it.

Insurance Exchanges

The Affordable Care Act Exchanges allow individuals to purchase health insurance outside of an employer.

These are also subsidized:

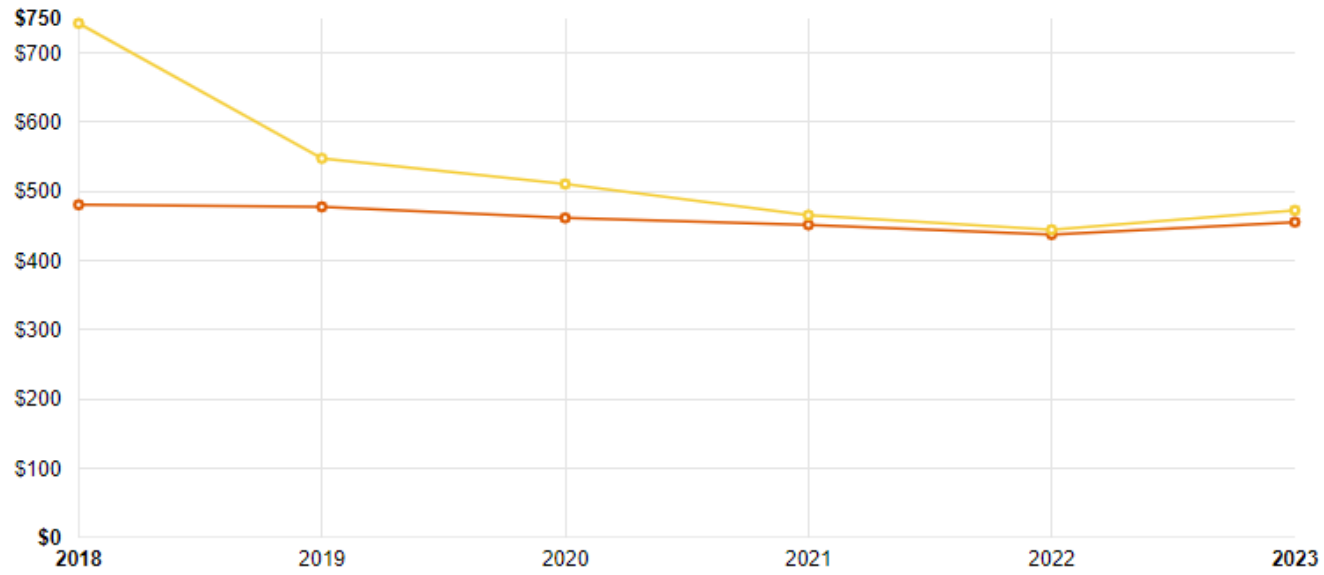
Table 2

Required Individual Contribution to Benchmark Plan Premium for 2024 Coverage Year

Household Income Range (expressed as % of FPL)	Required % of household income at start of range	Required % of household income at top of range
Less than 150%	0%	0%
150% - Less than 200%	0%	2%
200% - Less than 250%	2%	4%
250% - Less than 300%	4%	6%
300% - Less than 400%	6%	8.5%
400% and higher	8.5%	8.5%

https://www.kff.org/health-reform/issue-brief/explaining-health-care-reform-questions-about-health-insurance-subsidies/

Insurance Exchanges (continued)



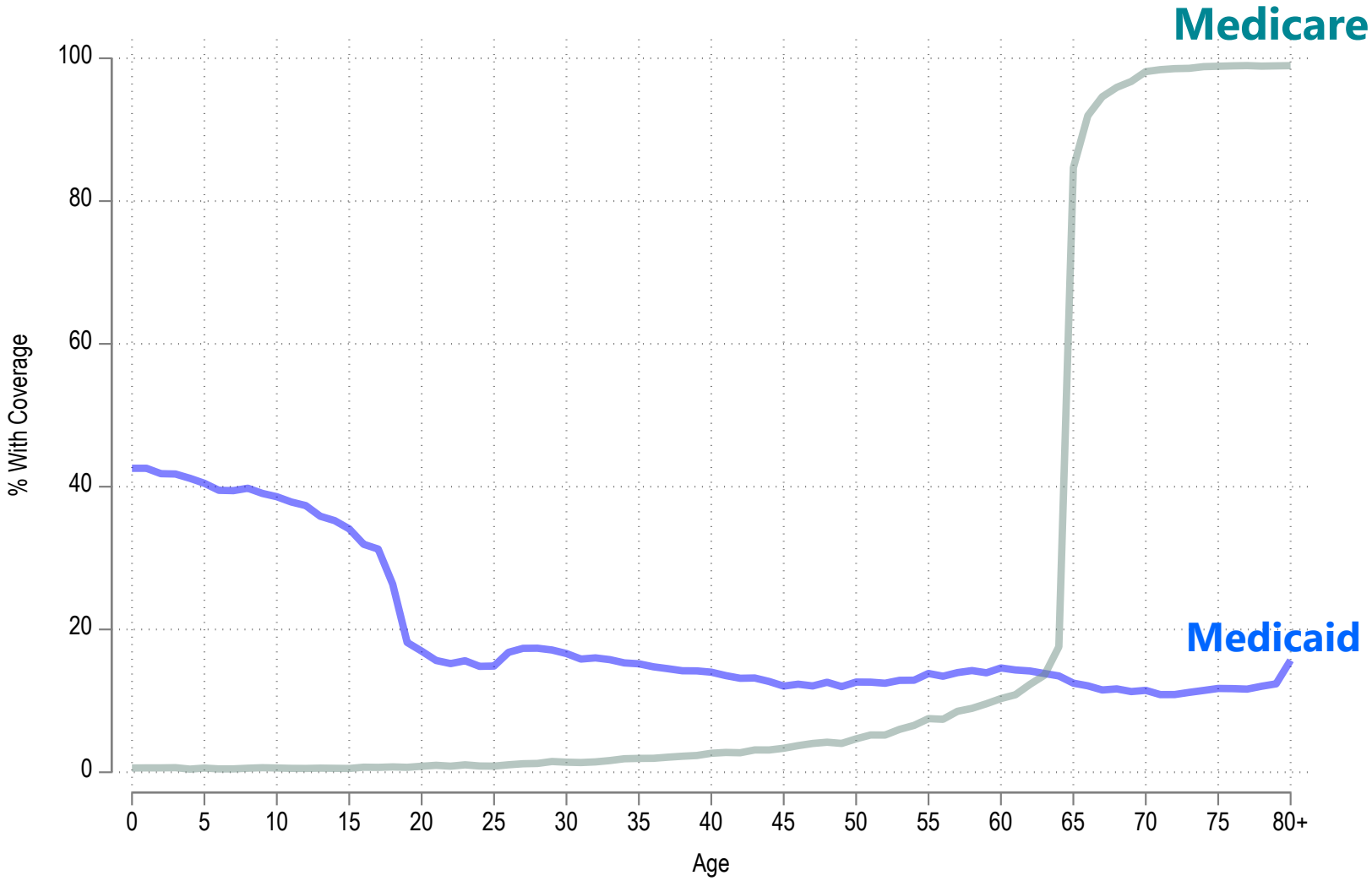
Exchange plans are typically less-generous than employer-provided plans. The "silver tier" plans only cover roughly 70% of expenses on average.

There were concerns about adverse selection pushing individual markets into a death spiral, but prices have stabilized and even decreased in some areas over the last several years

https://www.kff.org/health-reform/state-indicator/average-marketplace-premiums-by-metal-tier

Public Insurance

Public Insurance by Age



Medicare (Federal):

Covers those aged 65+, but also has coverage for the disabled (who have been out of work for two years)…or have end-stage kidney disease, among other things.

Medicaid (Fed + State):

Coverage depends on income, family size, age, pregnancy status, immigrant status…and often more!

Source: Author calculations for US-Born Individuals using the 2019 American Community Survey from IPUMS

The Many Parts of Medicare

Part A: Hospital Insurance

Part B: Outpatient and Physician Care

Part of "Traditional" or "Fee-for-Service" Medicare

(The U.S. government is the insurance company)

Part C: Provides an alternative to Parts A and B. Instead of paying healthcare providers directly, the government pays a per-person fee to insurance companies, who administer their own Medicare plan. Called "Medicare Advantage" ("MA")

Part D: Pays for enrollees' prescription drugs. (Paired with Parts A/B or Part C if the MA plan doesn't already cover them.)

How Much Does Traditional Medicare Cover?

Part A: Hospital Insurance

- $0 premium
- $1,600 deductible
- For hospital stays:
  - Days 1-60: $0/day
  - Days 61-90: $400/day
  - Days 91-150: $800/day
  - Days 150+: Patient pays 100%
- For SNF (Nursing Homes):
  - Days 1-20: $0
  - Days 21-100: $200
  - Days 101+: Patient Pays 100%

Part B: Outpatient/Physician

- $165/month premium*
- $226 deductible
- 20% coinsurance for most services.
- **No out-of-pocket maximum**

Take-away: Traditional Medicare isn't great insurance for covering catastrophic health events.

Medicare Advantage (Part C)

Government pays an **insurer** (e.g., Blue Cross, United Health Care, etc.) to cover a patient.

- Gov’t payment is constant (regardless of how much spending patient does)
- Payments are **risk-adjusted**: insurance company gets more to cover an 80-year-old diabetic than a 65-year-old with no known conditions.

The Advantage of Medicare Advantage

Could pay higher premium to get more stuff.

Benefits not covered by Traditional Medicare

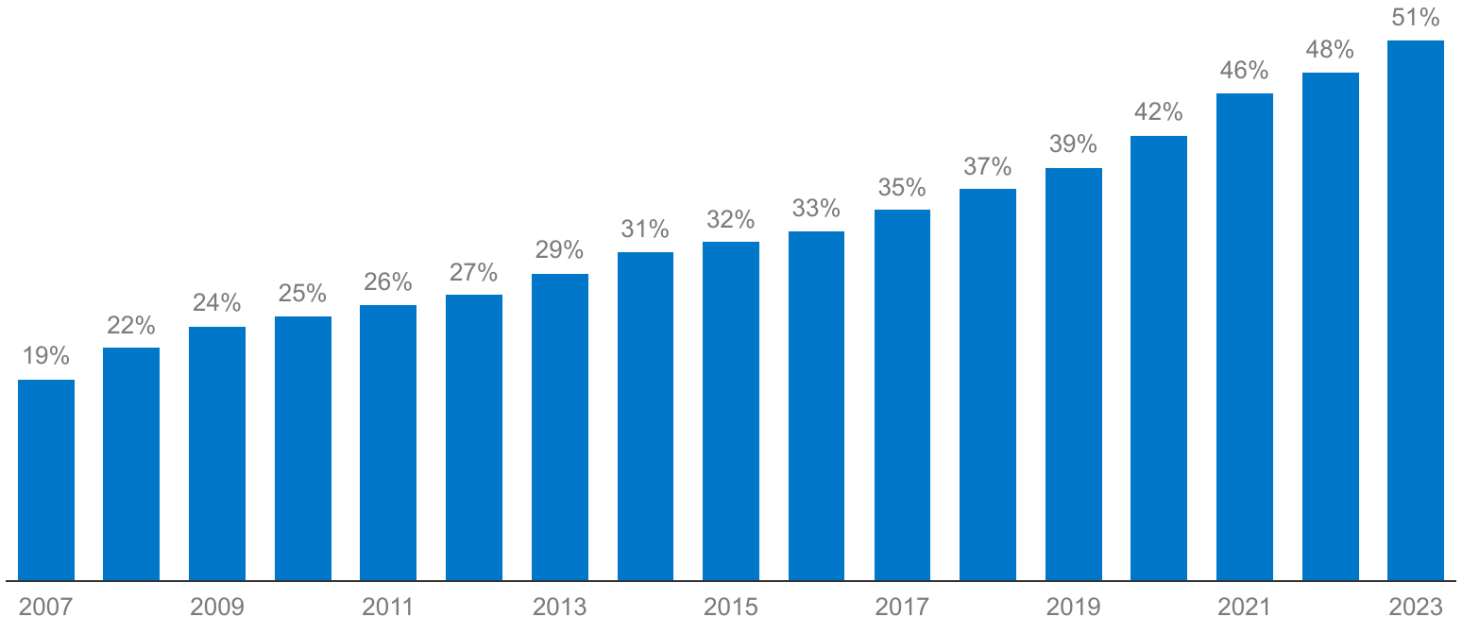
Out-of-pocket maximums

Lower cost-sharing

Medicare Advantage is Growing in Popularity

Figure 1

Total Medicare Advantage Enrollment, 2007-2023



NOTE: Enrollment data are from March of each year. Includes Medicare Advantage plans: HMOs, PPOs (local and regional), PFFS, and MSAs. About 60.0 million people are enrolled in Medicare Parts A and B in 2023.
SOURCE: KFF analysis of CMS Medicare Advantage Enrollment Files, 2010-2023; Medicare Chronic Conditions (CCW) Data Warehouse from 5 percent of beneficiaries, 2010-2016; CCW data from 20 percent of beneficiaries, 2017-2020; and Medicare Enrollment Dashboard 2021-2023.

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What's the Catch?

Medicare Advantage utilizes **managed care** where insurance companies use several tactics to reduce the *quantity* of spending:

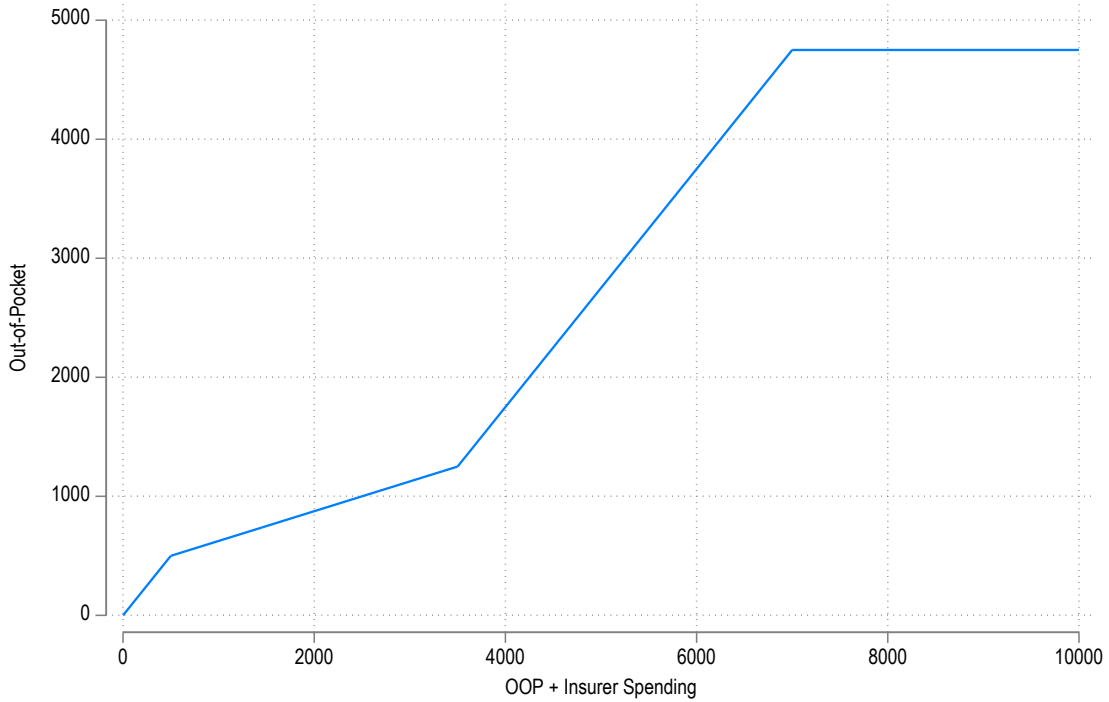
- Gatekeeping (primary care doctor must approve specialist/surgical care)
- Narrow networks (can only see certain providers)
- Monitoring/coverage denials (your doctor may approve your care, but the insurer rejects it).

Results (Curto et al, 2019):

- Patients in Medicare Advantage Plans spend 9%-30% less than comparable patients in Traditional Medicare.
- Reductions come from both "low-value" care (imaging/tests) and "high-value" care (preventative care/drugs).

Curto, Vilsa, Liran Einav, Amy Finkelstein, Jonathan Levin, and Jay Bhattacharya. 2019. "Health Care Spending and Utilization in Public and Private Medicare." *American Economic Journal: Applied Economics*, 11 (2): 302-32.

Medicare Part D



Medicare Parts A and B don't cover prescription drugs, and only some Medicare Advantage (Part C) Plans Do.

Affected individuals can use Part D plans to cover prescription drug costs.

There used to be a weird cost-sharing feature (the "Part D Donut Hole"), but that was ended by the Inflation Reduction Act of 2022.

Medigap

Supplemental insurance (privately provided) that can reduce cost-sharing burdens.

Paired with Traditional Medicare.

Medigap Benefit	Plan A	Plan B	Plan C	Plan D	Plan F*	Plan G*	Plan K	Plan L	Plan M	Plan N
Part A coinsurance and hospital costs up to an additional 365 days after Medicare benefits are used up	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Part B coinsurance or copayment	✓	✓	✓	✓	✓	✓	50%	75%	✓	✓***
Blood (first 3 pints)	✓	✓	✓	✓	✓	✓	50%	75%	✓	✓
Part A hospice care coinsurance or copayment	✓	✓	✓	✓	✓	✓	50%	75%	✓	✓
Skilled nursing facility care coinsurance	✗	✗	✓	✓	✓	✓	50%	75%	✓	✓
Part A deductible	✗	✓	✓	✓	✓	✓	50%	75%	50%	✓
Part B deductible	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗
Part B excess charge	✗	✗	✗	✗	✓	✓	✗	✗	✗	✗
Foreign travel exchange (up to plan limits)	✗	✗	80%	80%	80%	80%	✗	✗	80%	80%
Out-of-pocket limit**	N/A	N/A	N/A	N/A	N/A	N/A	$6,940 in 2023 ($7,060 in 2024)	$3,470 in 2023 ($3,530 in 2024)	N/A	N/A

Medicaid

Coverage for low-income individuals. Rules vary widely on a state-by-state basis.

Primary determinants are (1) income, (2) family size, (3) age, (4) parental / pregnancy status, (5) immigrant status.

Income + family size determine where an individual is in relation to the **Federal Poverty Line ("FPL")**

Family size	2022 income numbers
For individuals	$13,590
For a family of 2	$18,310
For a family of 3	$23,030
For a family of 4	$27,750
For a family of 5	$32,470
For a family of 6	$37,190
For a family of 7	$41,910
For a family of 8	$46,630
For a family of 9+	Add $4,720 for each extra person

Medicaid

Sample of income limits across select states (as a % of FPL):

	Age 0	Age 1-5	Age 6-18	Pregnant	Parents	Childless Adults	Immig. Children	Immig. Pregnant
U.S. (Median)	195%	148%	142%	200%	138%	138%	35 of 51	26 of 51
California	208%	142%	133%	213%	138%	138%	Yes	Yes
Florida	211%	145%	138%	196%	28%	0%	Yes	No
Tennessee	195%	142%	133%	200%	82%	0%	No	No
Texas	203%	149%	138%	203%	16%	0%	Yes	No

States that did not participate in ACA Medicaid Expansion

https://www.kff.org/state-category/medicaid-chip/medicaidchip-eligibility-limits/

Medicaid + Children's Health Insurance Program ("CHIP")

Even if not eligible for Medicaid, children (and sometimes pregnant women) can obtain heavily-subsidized insurance through CHIP:

	CHIP	Prenatal Care
United States	255%	213%
California	266%	322%
Florida	215%	-
Tennessee	255%	255%
Texas	206%	207%

https://www.kff.org/state-category/medicaid-chip/medicaidchip-eligibility-limits/

Medicaid + Medicare

If Medicare-eligible individuals have sufficiently few assets (typically <$5,000, excluding home, car, personal effects), then they may be eligible for two specific Medicaid features:

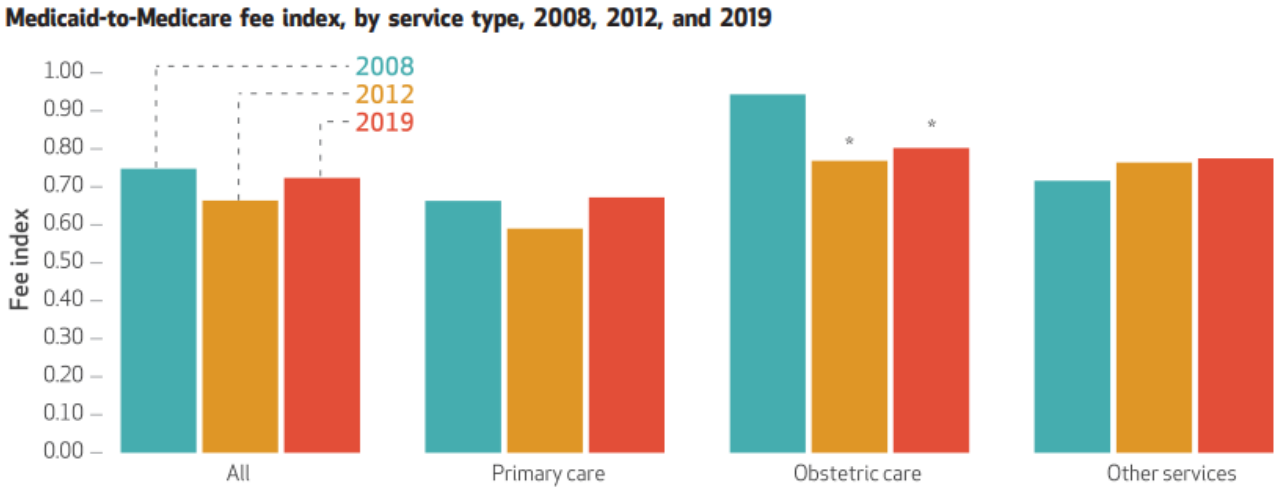
- **Reduced cost-sharing**: while Medicare pays most of medical bills, Medicaid covers the coinsurance/copay, etc.
- **Long-term care (nursing homes)**: Medicare only pays for first 100 days in nursing facility. Medicaid covers remainder if sufficiently low assets (50% of LTC is paid via Medicaid)

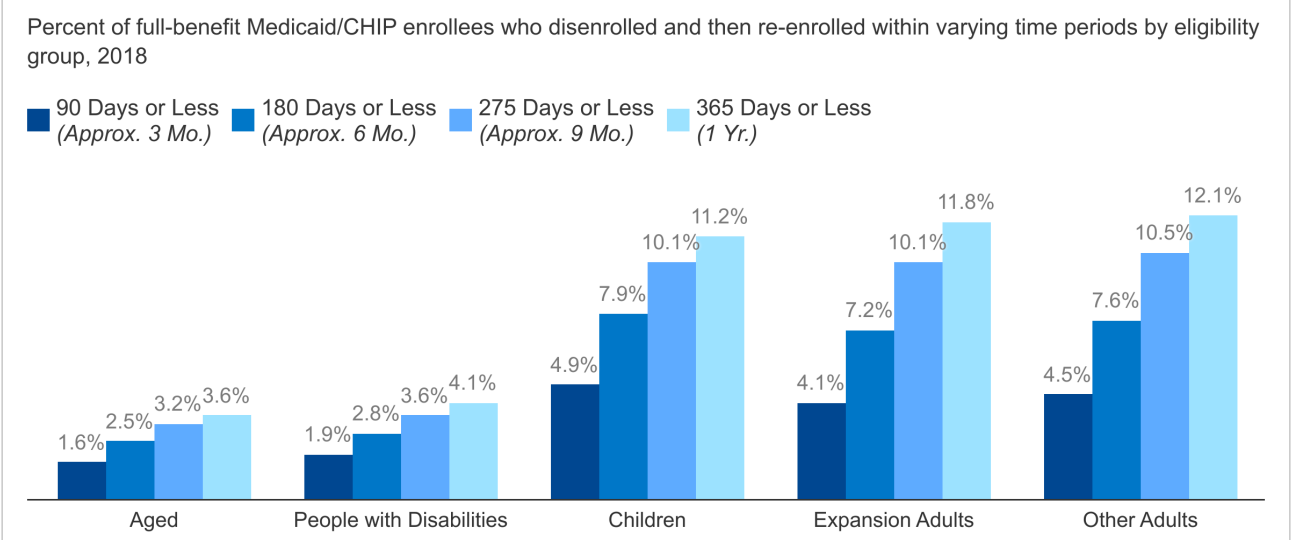
https://www.kff.org/state-category/medicaid-chip/medicaid-eligibility-for-seniors-people-with-disabilities-and-the-medically-needy/

Medicaid Cost Control

Medicaid controls costs in three primary ways:

1. Paying substantially less than even Medicare
2. Utilizing managed care (41 states)
3. Administrative burdens
   - Application hassle (27% of uninsured in 2021 are actually Medicaid/CHIP-eligible
   - Automatic disenrollments





Payments: https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2020.00611
Eligible but Uninsured: https://www.kff.org/uninsured/issue-brief/a-closer-look-at-the-remaining-uninsured-population-eligible-for-medicaid-and-chip/
Disenrollments/Churn: https://www.kff.org/medicaid/issue-brief/medicaid-enrollment-churn-and-implications-for-continuous-coverage-policies/

Main Points About Insurance

1. Insurance is primarily to provide **risk protection**, but health insurance also fills a key role in providing access.

2. Risk aversion justifies the presence of insurance (premiums above the actuarially fair benchmark can still improve consumer welfare).

3. Health insurance is full of cost-sharing provisions (this makes it imperfect/incomplete insurance).

4. Economic theory predicts that modest cost-sharing should either (1) not affect consumer behavior (deductibles) or (2) should reduce DWL from moral hazard.

5. Empirical evidence suggests this may not be the case (consumers **do** respond to deductibles and cut both high- and low-value care).

6. Choosing health insurance is complicated, and consumers tend to make mistakes when doing it.

Main Points About Insurance (cont.)

7. Adverse selection can lead to a market unraveling.

8. Even if it doesn't, adverse selection typically results in DWL, which can be alleviated by (properly targeted) subsidies or (properly enforced) mandates.

9. The U.S. health insurance system is an odd mix of public and private systems that stem from happenstance and reactive patches.

Prescription Drugs + Pharmaceuticals

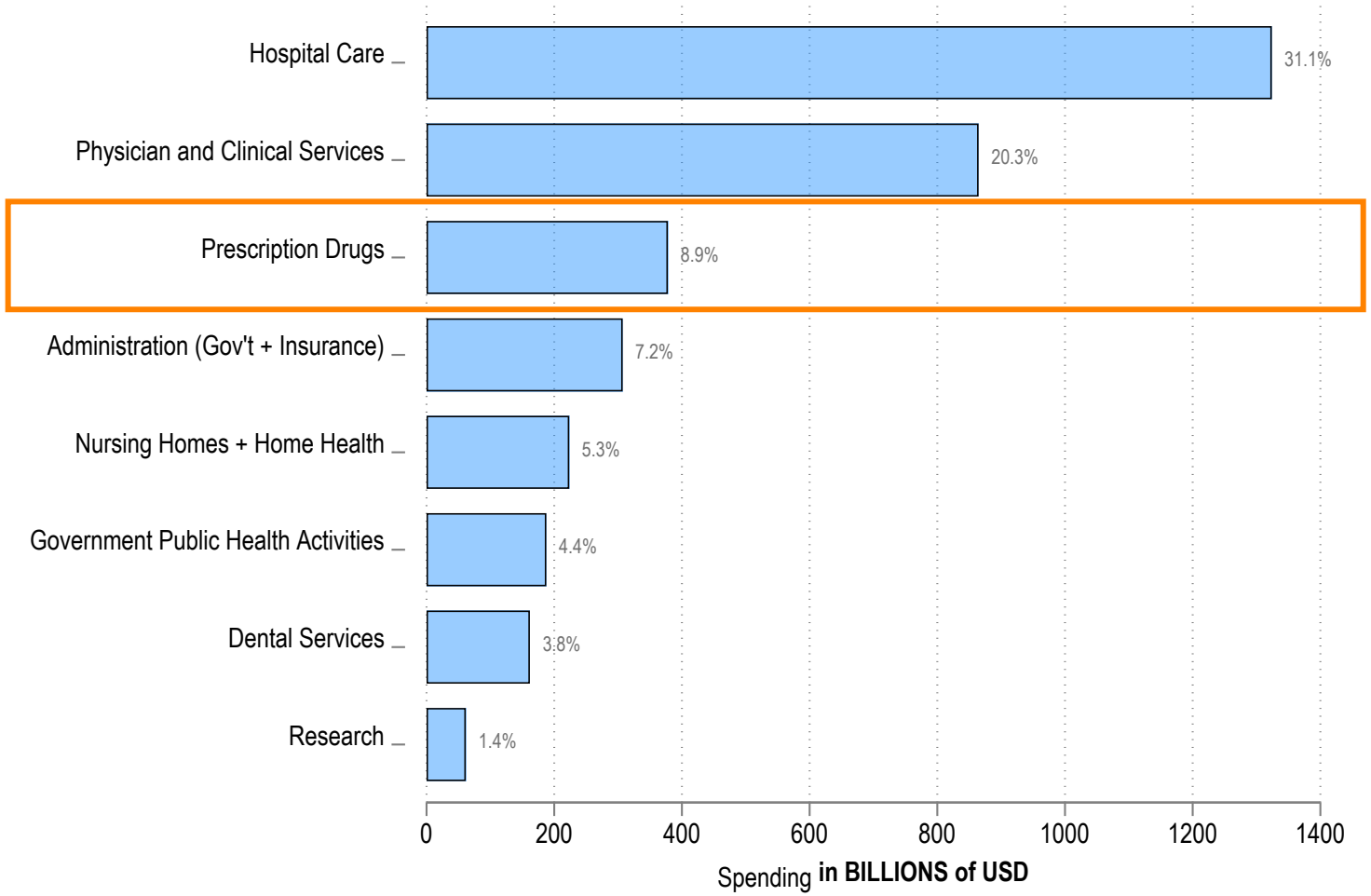
Agenda for this Lecture

1. Drug Life Cycle
2. Patents
3. Pricing, Incentives, and Advertising
4. Recent Policy Initiatives

Life Cycle of a Drug

Where is the Money Going!?

(A Reminder)

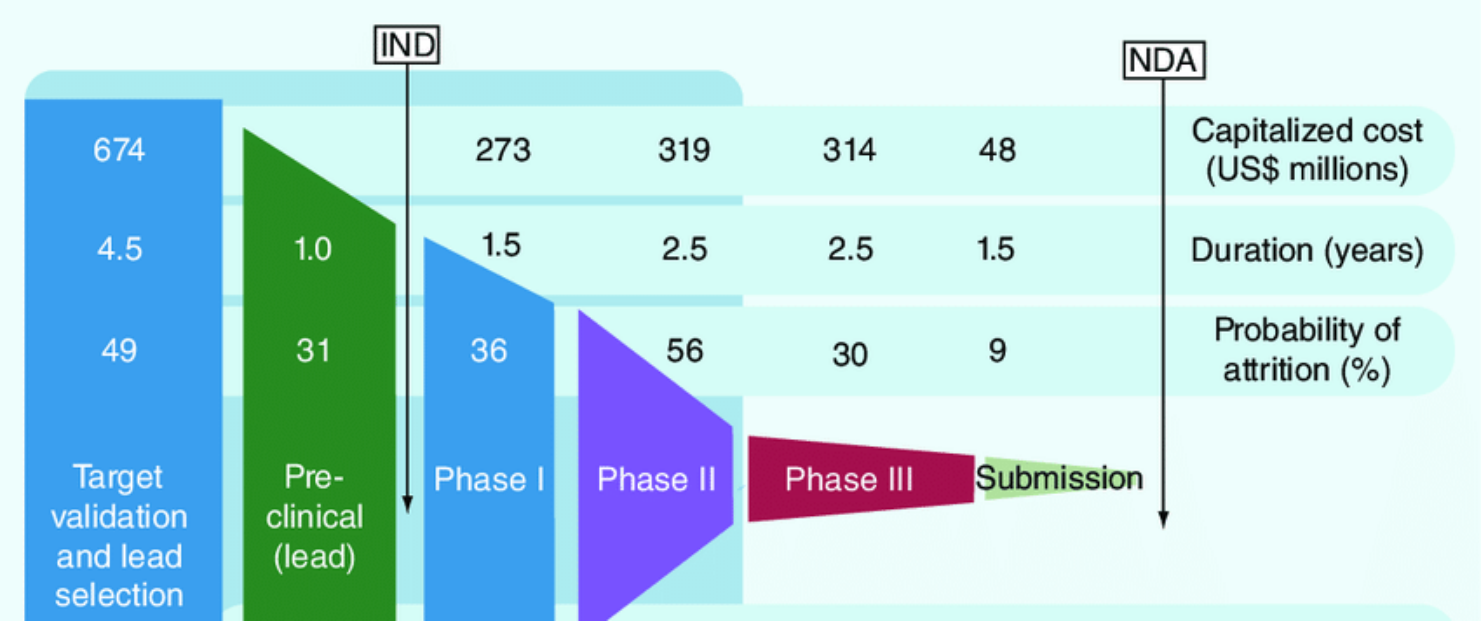


Prescription drugs accounted for 8.9% of spending in 2021.

May be closer to 13% when accounting for drugs administered by healthcare providers (in physician + clinical services spending).

Source; 2021 National Health Expenditure Data from CMS

The Life Cycle of a Drug



Target validation: finding a condition and a compound that *might* treat it.

Preclinical: non-human testing.

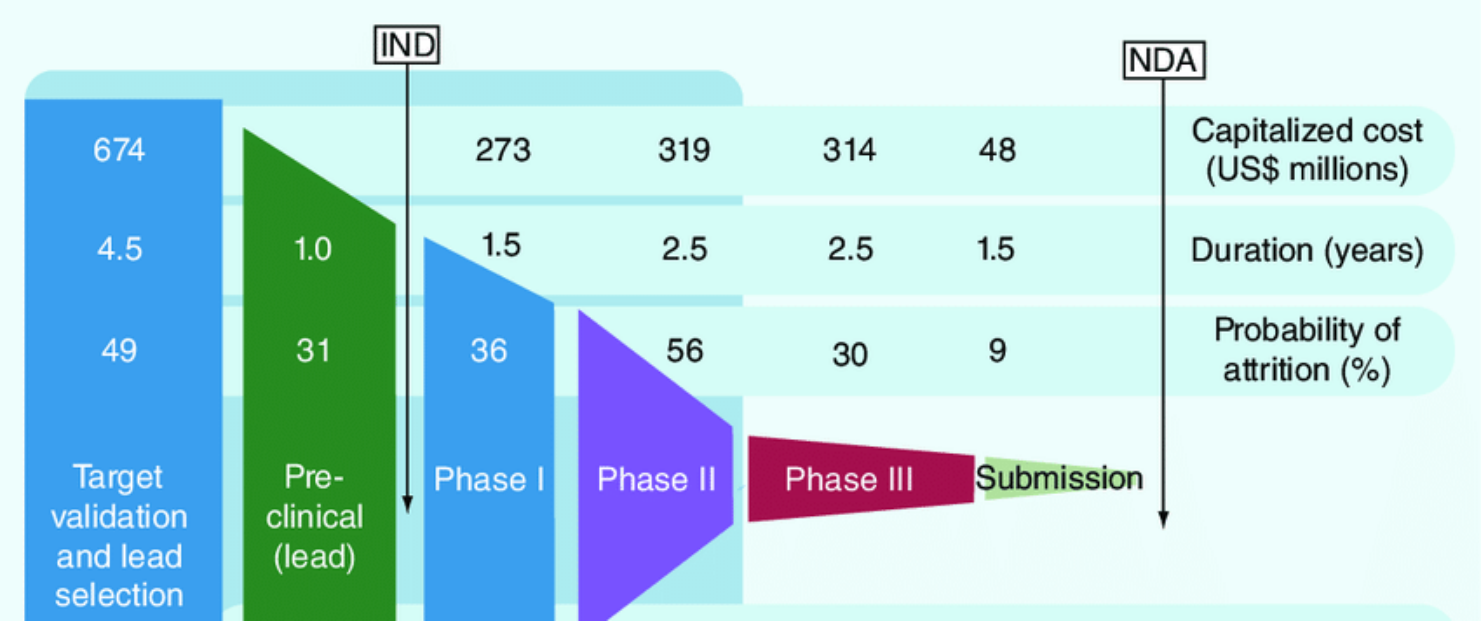
Phase 1: find if drug shows any evidence of working in people; calibrating dosage. Typically < 100 individuals.

Phase 2: Increasing size of trial (100-300) to better understand efficacy, dosage, and side effects.

Phase 3: Much larger trial (>1,000 people). Compare efficacy to existing drugs. Ensure that it is safe.

Zurdo, Jesus. (2013). Developability assessment as an early de-risking tool for biopharmaceutical development. Pharmaceutical Bioprocessing. 1. 29-50. 10.4155/pbp.13.3.

The Life Cycle of a Drug



Cost and time vary wildly, but often-cited figures:

Cost: $1-$2 billion

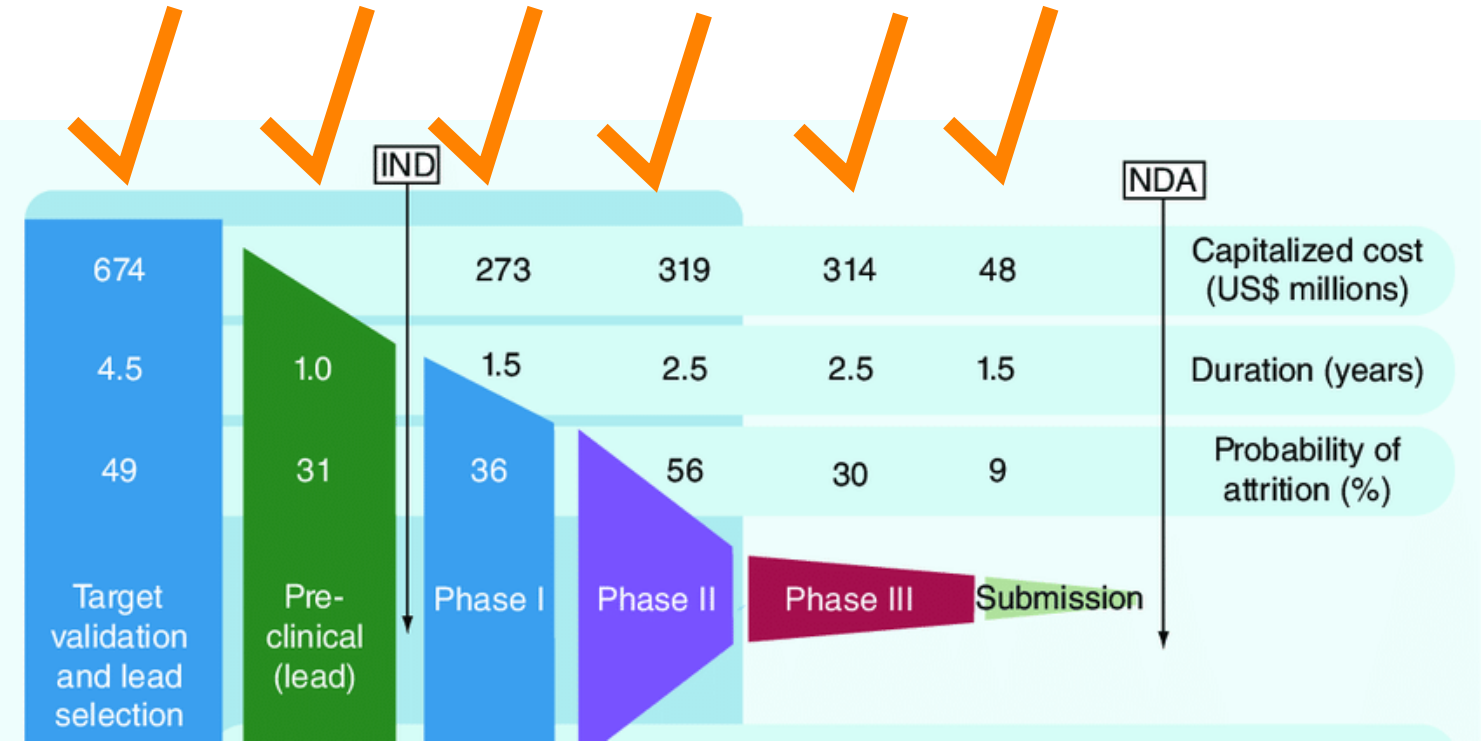
Time: 10-15 years

Why?

- Basic research (trial and error)
- Recruitment of clinical trial subjects
- Necessary follow-up to test efficacy ("end points")
- Red tape + FDA evaluation

Zurdo, Jesus. (2013). Developability assessment as an early de-risking tool for biopharmaceutical development. Pharmaceutical Bioprocessing. 1. 29-50. 10.4155/pbp.13.3.

The Life Cycle of a Drug: Exceptions



What about the COVID-19 vaccines?

- Basic research already done pre-pandemic. ("spike protein" identified in 2003).
- Quick genome sequencing (and lots of $$$) allowed pre-clinical trials to be completed quickly.
- Immense number of cases (low recruitment cost) + relatively fast disease process (quick endpoints) + known safety of vaccines in general + lack of red tape (operation warp speed).

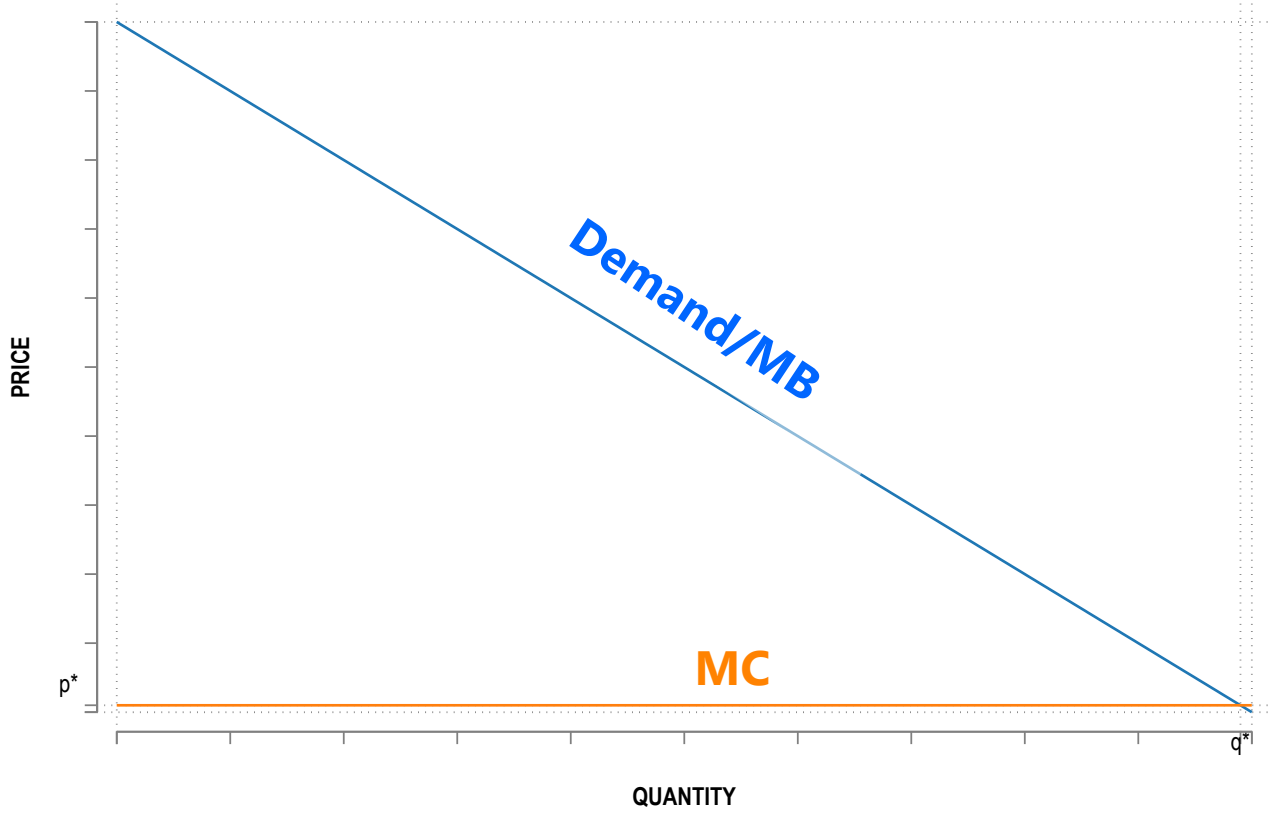
Zurdo, Jesus. (2013). Developability assessment as an early de-risking tool for biopharmaceutical development. Pharmaceutical Bioprocessing. 1. 29-50. 10.4155/pbp.13.3.

Post-Development Drug Cost

The first pill costs $1B+ dollars to make.

The second pill… may cost about four cents.

In a competitive market…



Patents and Ensuring Innovation

Ensuring Innovation

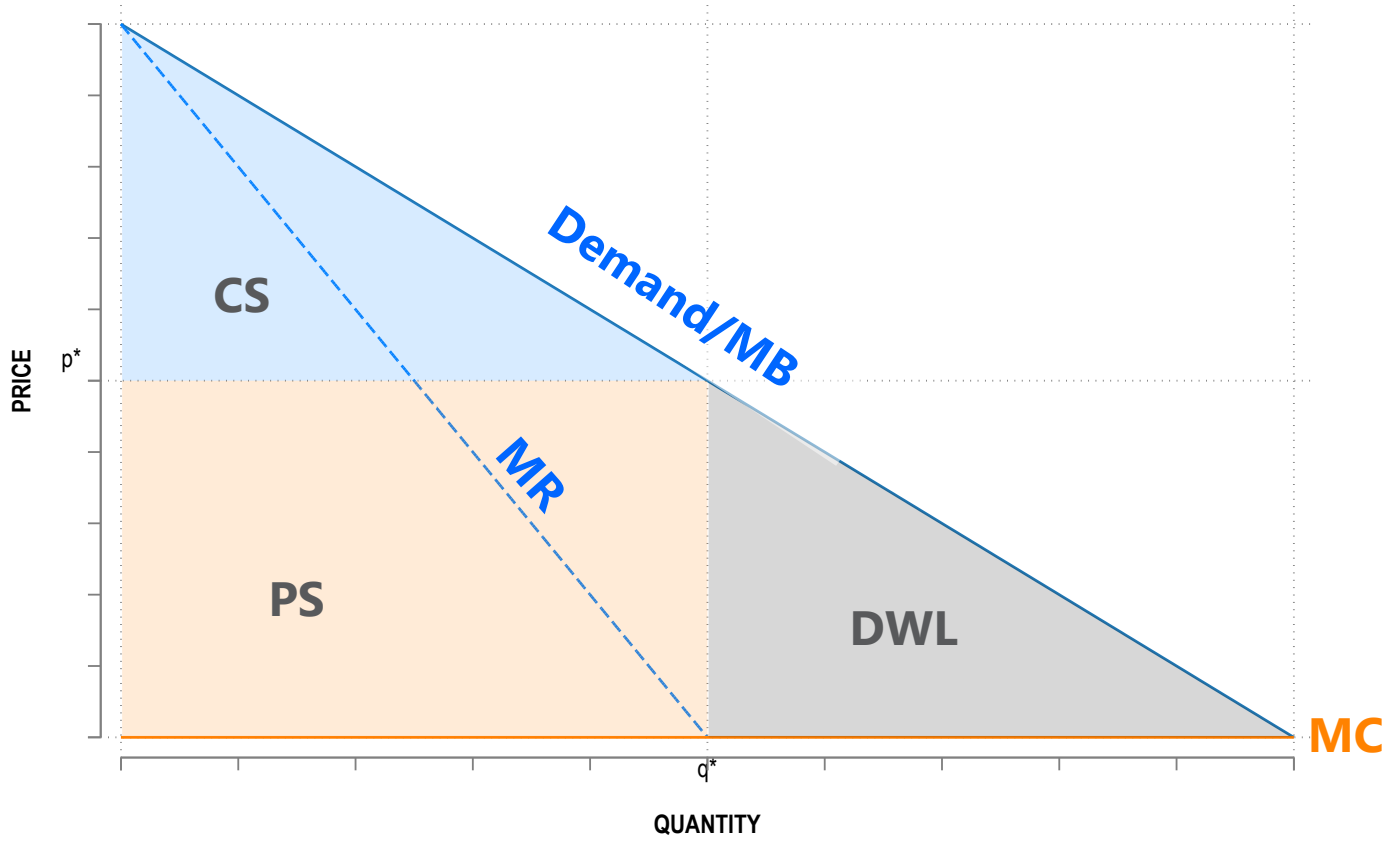
In the **very short run:** forcing drug-makers to sell at low costs would massively increase consumer surplus.

In the **longer run** price would be **WAY** below average costs ⇒ **firms would exit the market.**

The current solution: **grant a temporary monopoly** (via patents).

Ensuring Innovation

This comes at a cost (DWL), but there is TS>0 and CS>0 (which is better than the no-entry case).



Patents

Give exclusive right to use a given technology / innovation for a period of time.

- Government-sanctioned monopoly power.
- Last 20 years from filing date but may only be 10 years of monopoly profits by the time drug comes to market
- After patent expiration, *generic drugs*—which have the same active ingredients, dosage, strength, and safety—are allowed.
  - Generic drugs cost a fraction of what "Brand-name" drugs cost.
- …Or, at least, that's how it's *supposed* to work.

Patents (continued)

Patents can be issued for relatively narrow differences:

Example that is probably good for consumers: We have multiple COVID vaccines, even though they treat the same disease and, for some, using the same mechanism (ex. mRNA).

Patents (continued)

Patents can be issued for relatively narrow differences:

Examples that aren't unambiguously good:

- **Insulin**: discovered in 1923, but old versions are phased out with newer (incrementally improved but also patented) versions. Roughly 90% of privately insured patients are prescriber newest (and costliest) versions.[1]

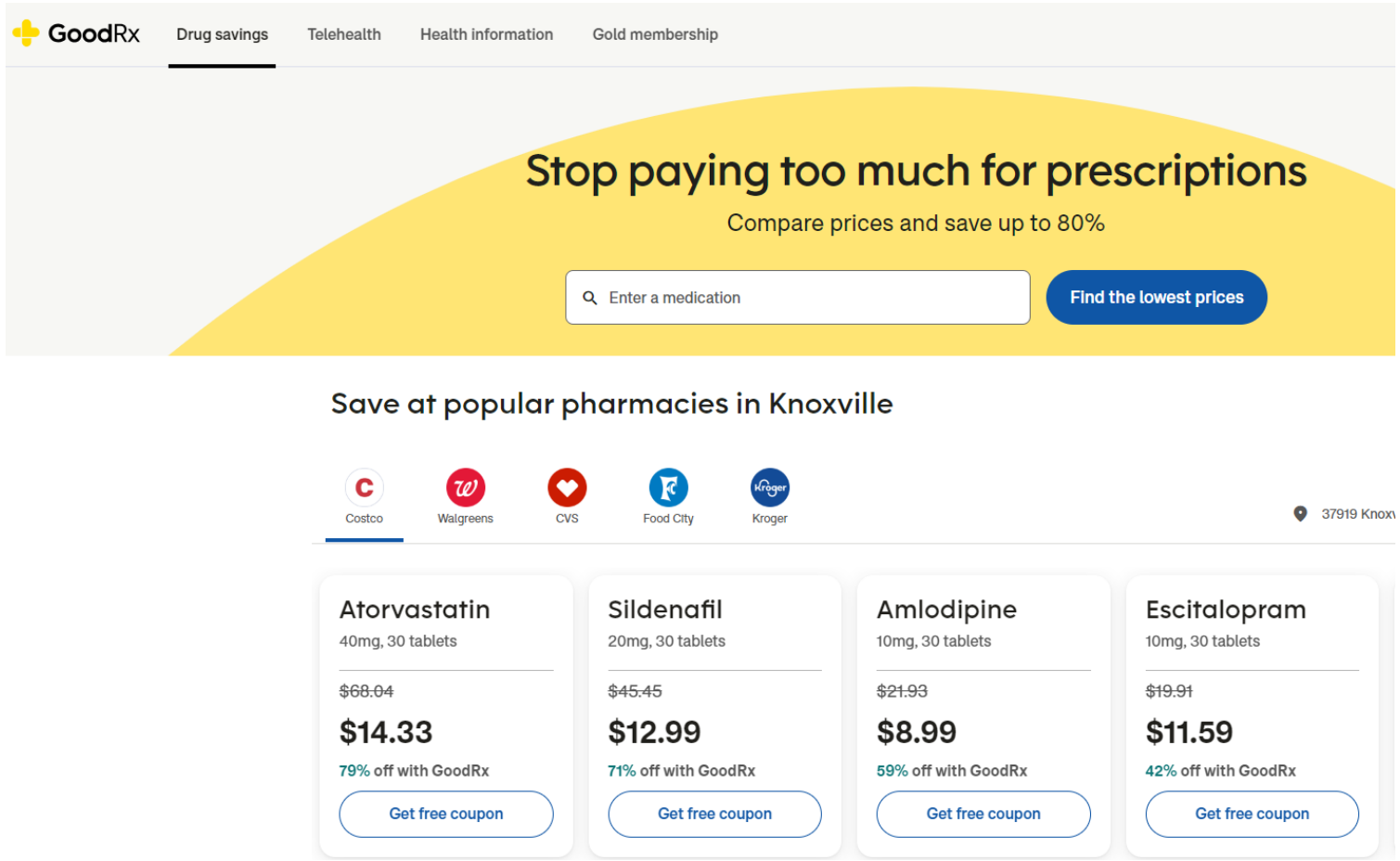
- **Reformulated Oxycontin:** made Oxy harder to crush-up and abuse… but also extended the patent (and led to an increase in heroine/fentanyl deaths via substitution).[2]

1) https://www.thelancet.com/journals/landia/article/PIIS2213-8587(17)30041-4/fulltext

2) Powell D, Pacula RL. THE EVOLVING CONSEQUENCES OF OXYCONTIN REFORMULATION ON DRUG OVERDOSES. Am J Health Econ. 2021 Winter;7(1):41-67. doi: 10.1086/711723. Epub 2020 Dec 22.

Drug Pricing, Incentives, and Advertising

Drug Coupons



Just like for other healthcare services:

Drug list price ≠ actual price

There are many coupons and other discount programs available—you should look for them / ask your pharmacist.

The Return of 3rd Degree Price Discrimination

PointSolutions
econ436f23

Coupons (and other discounts) are just a way to price discriminate.

Do you think this is good or bad for consumers?

A. Good
B. Bad

If consumers are being priced out -> 3rd degree price discrimination is good for consumer surplus.

Do Physicians Get Paid to Prescribe Certain Drugs?

For drugs that physicians (or their staff) *administer*, they do receive some fees.

- Immunizations
- Chemotherapy

Physician revenue from this is typically small and commensurate with the work to administer.

For drugs that you get from a pharmacy (“retail drugs”), receiving direct fees for prescribing is illegal.

Do Physicians Get Paid to Prescribe Certain Drugs?

However, *indirect* payments are not precluded.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DOLLARS FOR DOCTORS

Doctors Prescribe More of a Drug If They Receive Money from a Pharma Company Tied to It

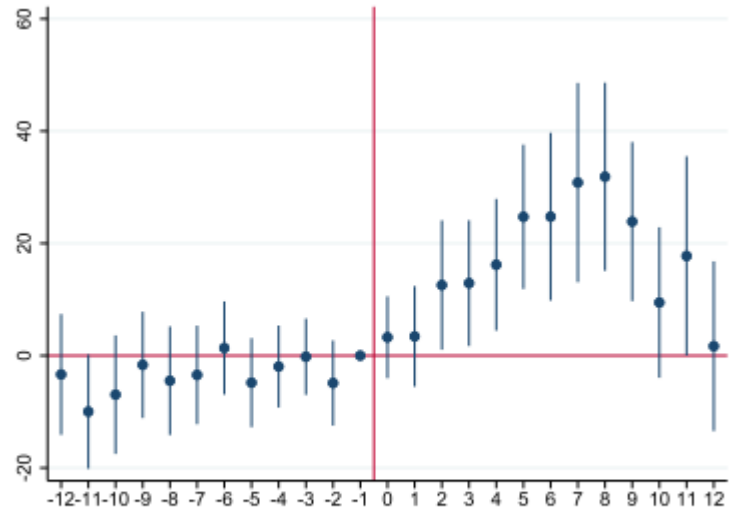
Pharmaceutical companies have paid doctors billions of dollars for consulting, promotional talks, meals and more. A new ProPublica analysis finds doctors who received payments linked to specific drugs prescribed more of those drugs.

by Hannah Fresques, Dec. 20, 2019, 12 p.m. EST

There are plausible non-sinister reasons for this:

E.g., physicians treats target patient population for drug >> pharma targets them for spending (even though physician might've prescribed anyway.

Do Physicians Get Paid to Prescribe Certain Drugs?



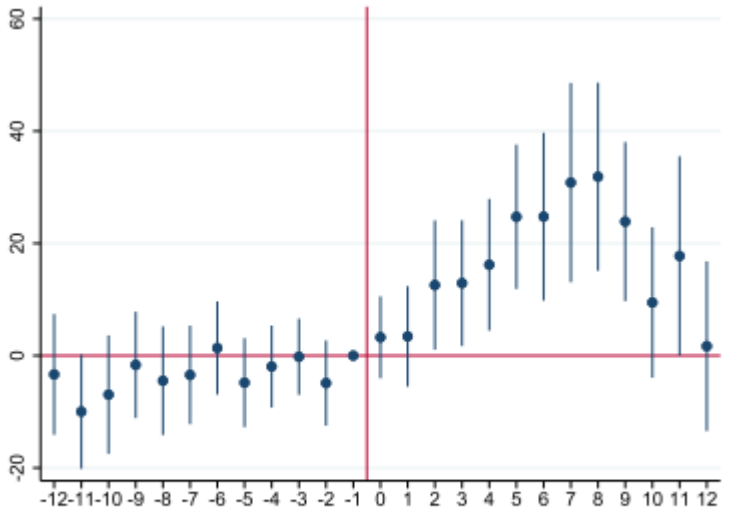
(c) Expenditure

Indirect payments increase physician prescriptions of the drug but fade to zero within twelve months. Effects are small (peaking at an extra ~$30/expenditure).

Carey, Colleen, Ethan MJ Lieber, and Sarah Miller. "Drug firms' payments and physicians' prescribing behavior in Medicare Part D." *Journal of Public Economics* 197 (2021): 104402.

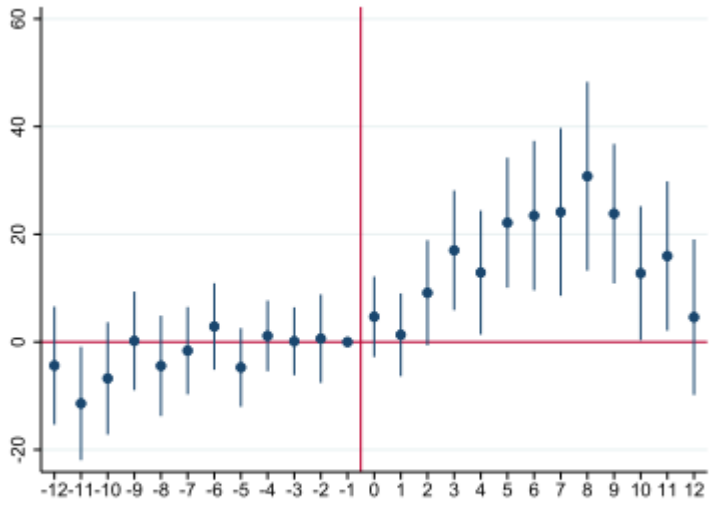
Do Physicians Get Paid to Prescribe Certain Drugs?

All Payments



(c) Expenditure

Small Payments



(c) Expenditure

Very small (<$20) payments have nearly the same effect: suggests that the mechanism is information transfer, not financial incentives.

Carey, Colleen, Ethan MJ Lieber, and Sarah Miller. "Drug firms' payments and physicians' prescribing behavior in Medicare Part D." *Journal of Public Economics* 197 (2021): 104402.

Direct-to-Consumer Marketing

The U.S. allows drug makers to advertise directly to consumers, which is unusual (illegal in many other countries).

Advertising could be **good** if it increases *awareness/utilization* of potentially underutilized drugs (where MB>MC). In other words, if it provides new and actionable information to patients.

Advertising could be **bad** if it increases *moral hazard* due to patient pressure (where MC>MB).

Direct-to-Consumer Marketing is not Uniformly Terrible

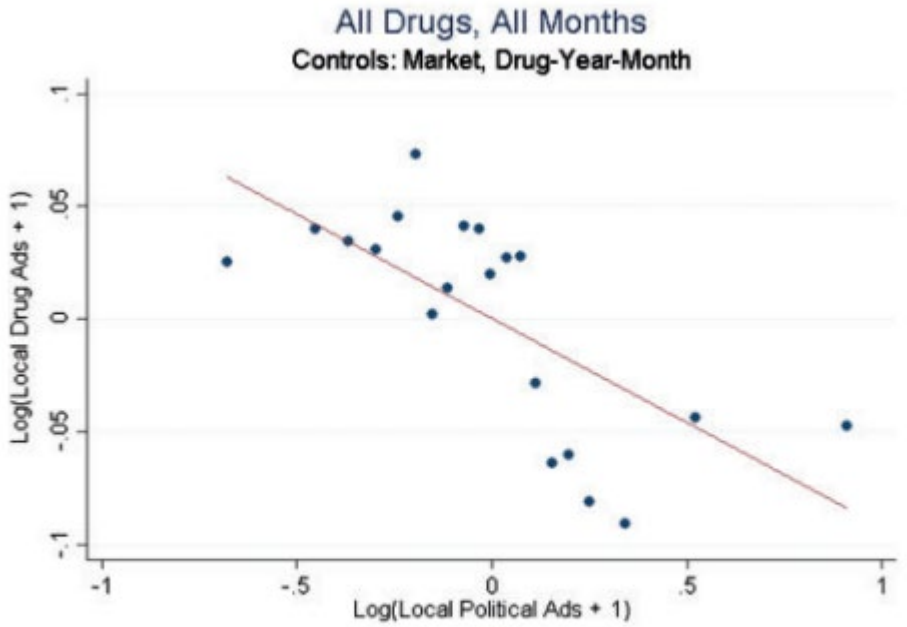


FIGURE 5

Political ads displace local drug ads, binned scatter plot.

Idea: use crowd-out from political ads to assess impact of DTCA.

Michael Sinkinson, Amanda Starc, Ask Your Doctor? Direct-to-Consumer Advertising of Pharmaceuticals, The Review of Economic Studies, Volume 86, Issue 2, March 2019, Pages 836–881, https://doi.org/10.1093/restud/rdy001

Direct-to-Consumer Marketing is not Uniformly Terrible

Advertising for Statins (cholesterol-lowering medication) is highly effective at getting new consumers to use the medication.

$6,631 of DCTA generated 1 QALY (*very* cost-effective intervention).

However, not all DCTA is as beneficial (or may even have negative impacts).

Michael Sinkinson, Amanda Starc, Ask Your Doctor? Direct-to-Consumer Advertising of Pharmaceuticals, The Review of Economic Studies, Volume 86, Issue 2, March 2019, Pages 836–881, https://doi.org/10.1093/restud/rdy001

Recent Policy Initiatives / Closing Thoughts

Drug Price Controls

The idea of price controls has become very popular for drugs.

- E.g., price caps for insulin.

- Use of government monopsony power to negotiate drug prices in Medicare Part D.

The fundamental trade-off: *do lower prices justify the inevitable decrease in R&D expenditure?*

Do lower prices justify the inevitable decrease in R&D expenditure?

The answer to this question depends on strategic response by drug-makers, who might shift to more profitable drug markets

- Side note: is focusing on the most profitable market always a good thing?

- It is worth noting that drug R&D isn't just done by drug manufacturers:
  - Much of COVID-19 vaccine research was done in academia.
  - If price controls reduce innovation by Pharma sector, could be offset by more public funding for research within academia.