Moral Hazard, Part 1

Health Economics
Fall 2018

- Previous section – outlined the benefits of insurance – smooth consumption and improve welfare
- Model: given loss L, receive q in return from insurance
  - Useful model for homeowners or car insurance
  - Not so for medical care
- Medical insurance tends NOT to be structured this way
  - Policy holder decides when to enter market
  - Insurance changes prices for the product

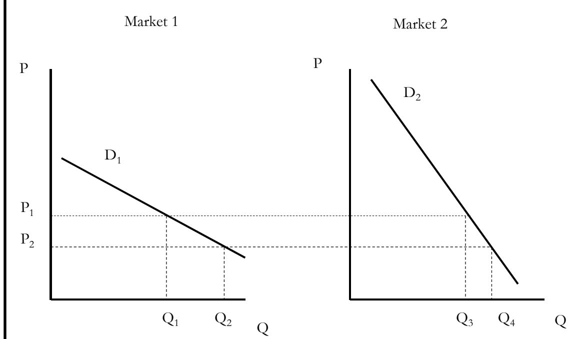
- Therefore, insurance generates a wedge – what doctors receive and what they pay are sometimes very difference
- Insurance has reduced the cost of care to the consumer, and hence, consumer should increase use
- "Moral hazard"

- 1st part – use demand curves to isolate how insurance alters demand for health care
- 2nd part – examine some estimates of the price elasticity of demand
- Along the way, we will point out how difficult it is to get this estimate and how we have had to rely on the rare experiment in this context

Some tools of the trade

- Price elasticity of demand
  - $\xi_d = \%\Delta Q/\%\Delta P$
- Examples:
  - $\xi_d = -0.3$, 10% ↑ price, 3% ↓ in demand
  - $\xi_d = -1.75$, 10% ↑ price, 17.5% ↓ in demand
- When looking at demand curves on the same scale, the steeper demand curve, the lower elasticity of demand (absolute value)

5



6

- Notice that for the same change in price, Market 1 has a more pronounced change in demand
- $|\ \xi_1\ | > |\ \xi_2\ |$

7

Factors that determine elasticity of demand for medical care

- Services for more acute conditions should have lower elasticity of demand
  - You need care at that moment, cannot wait for treatment
  - Likewise – anything where you can substitute over time, produces a higher elasticity of demand
  - Emergency room visits low elast. of demand
  - What about preventive services? Dental care? X-rays?
- Availability of substitutes
  - When they are plentiful, greater elasticity of demand
  - what about psychoanalysis?
  - Generic drugs? AIDS drugs?

8

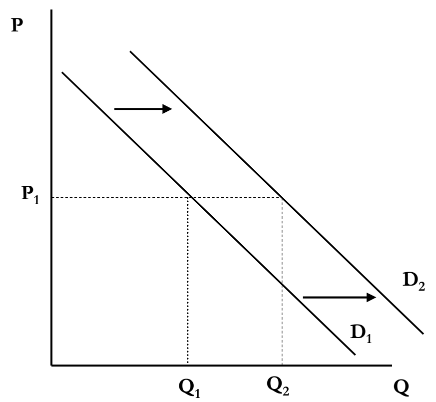
- Larger fraction of income, greater elast of demand
  - Have to think twice about cost
  - Long term care/assisted living is expensive, high elast of demand (and many substitutes, like informal care)

Demand for medical services

- Like any other good, medical services are consumed on a per unit basis
  - Doctor visits, Prescriptions, X-rays, etc.
  - Some 'units' are easier to measure
- Each has a price attached to it
- What is different for medical care is that often, the price paid by the patient is not the price of the good (insurance)

- The demand for medical services slopes down just like any other product
- The position of the demand curve can however change radically based on external conditions
- Example: demand for a particular drug is highly dependent on your current state of health

- Some factors that may shift the demand curve
  - Medical state
  - Socioeconomic status (income and education)
  - Price of other medical services
- Example: Compliments
  - As price falls for good 1, people are willing to demand more of good 2 at any price



13

Income elasticity of demand

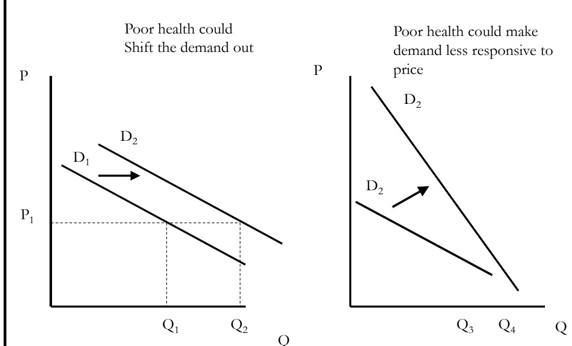
- ζ = % ΔQ/%ΔIncome
- ζ = 0.25
  - 10% increase in income, 2.5% increase in quantity demanded
- ζ = 1.5
  - 10% increase in income, 15% increase in quantity demanded
- Normal goods ζ >0
- Inferior goods ζ <0

14

Shifts in demand due to health state

- Demand for medical services is state-dependent
- When health is poor, demand may be greater
  - At any price, you demand more
- Change in health status could have two effects
  - Shift demand
  - Make less/more price responsive

15



16

- Suppose you are diagnosed w/ high cholesterol
- Predictor of heart disease
- Increased risk of death
- Standard treatment after diagnosis
  - Change diet
  - Increase exercise
- As cholesterol level rises, ability to control with behavior modification declines
- Therefore, demand for pharmaceutical solution should rise

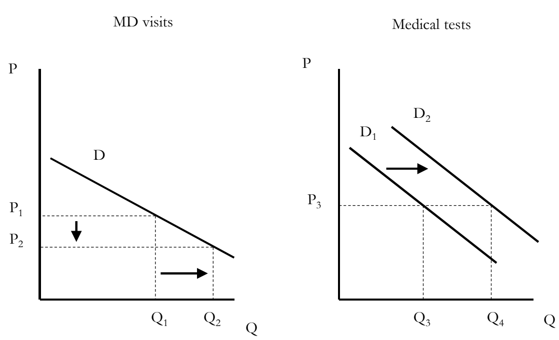
Shifts due to price of other medical goods

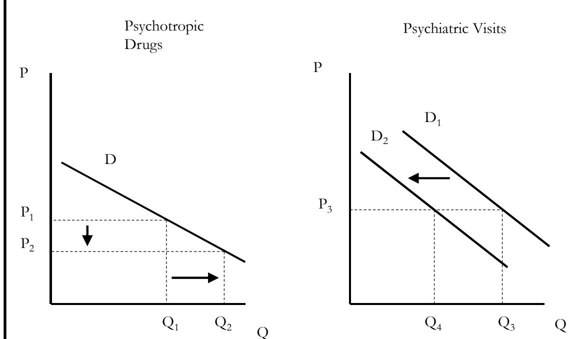
- Strong inter-relationship between different medical services. Some are substitutes, some are compliments

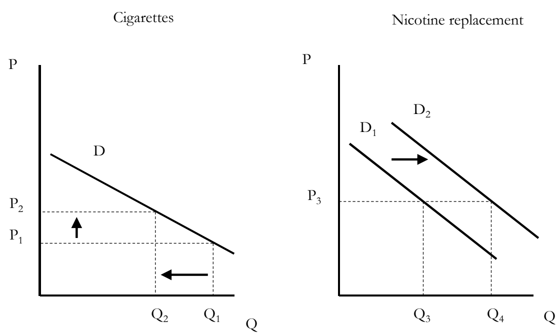
- Price of one procedure can therefore impact the demand for another

- Compliments: Doctors visits and medical tests

- Substitutes: Psychotropic drugs and psychiatric visits







21

Cost sharing in insurance

- Copayment
  - Usually fixed dollar amount per service
- Deductibles
  - Dollar amount you have to pay out of pocket (OOP) before insurance will start paying
- Coinsurance
  - Fixed percent paid by the policy holder for every dollar spent
- Stop loss
  - A point where if OOP expenditures exceed a particular value, coinsurance rates go to 0

22

- Type of cost sharing varies a lot by type of insurance system
  - Copayments
    - Popular in managed care
    - For prescription drugs
  - Co-insurance
    - Frequent in Fee-for-service type of arrangements
    - Hospital care and diagnostic tests
- In this class – will most frequently model the impact of coinsurance – a little easier to see the DWL

23

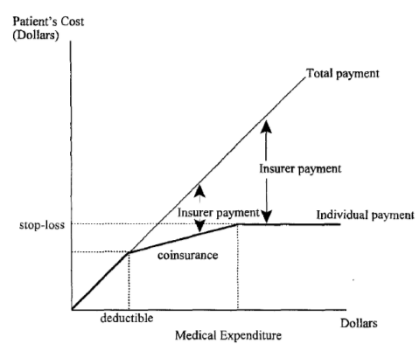


Figure 3. Cost sharing under indemnity insurance.

24

Notre Dame Insurance, PPO Plan

- $400 individual deductible
- 85% coinsurance rate (65% if out of network)
- Max out of pocket of $1950
- First $400 in medical spending, price=1
- After $400, price is $0.15
- After $10,733.33 price falls to $0
  - Let x be total spending
  - You pay 0.15 on every dollar over $400 plus the original $400
  - (x-400)*0.15+400=1950 and x=$10,733.33

25

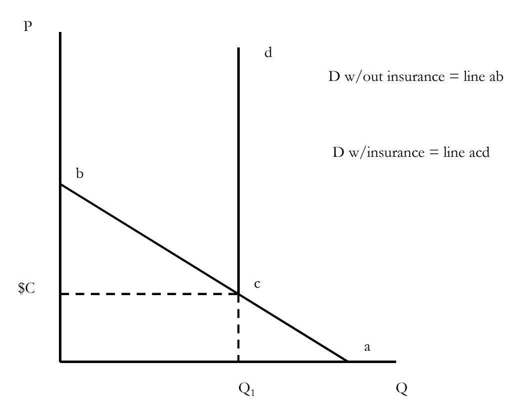
Copayments

- How do copayments impact demand?
- Example: suppose you pay a $10 copay for each prescription (Rx)
  - If the Rx is $50, you pay $10, insurance pays $40
- Note that
  - If P<$10, you pay the price
  - if P≥$10, you only pay $10
- What does this do to your demand

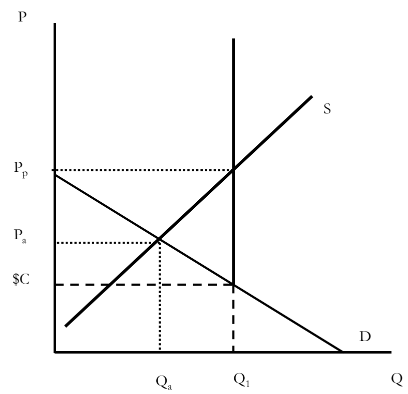
26

- Suppose there is a copayment rate of $C
- Without insurance, demand is line (ab)
- At a price of $C, people will demand Q_1
- With a copay of $C, any price in excess of $C generates out of pocket price of only $C, so demand is vertical at Q_1
- Demand with a copay is therefore line (acd)

27



28



29

Coinsurance

- P_m be price of medical care
- c is the coinsurance rate
- For next unit consumed by patient
  - consumer pays $P_m c$
  - Insurance pays $P_m(1-c)$
  - Provider receives P_m

30

How coinsurance changes demand

- $Q_d = f(P)$ where P is price paid by the consumer
- Coinsurance changes this. Now there is a wedge between what the provider gets and the patient pays
- Let
  - P_s the price received by suppliers (providers)
  - P_d the price paid by the demanders (patient)

31

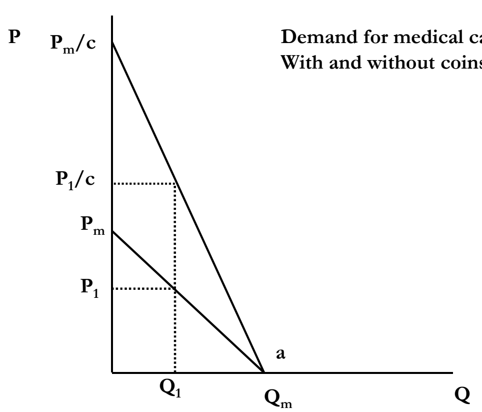
- In our supply and demand graph world, the price axis represents the transacted in the market
- Without coinsurance, let P_t be the transacted price
  - $P_t = P_d = P_s$
- With coinsurance, suppliers receive P_s but consumers only have to pay a fraction of that
  - $P_d = cP_t$
- so
  - $P_t = P_d / c = P_s$

32

- Because consumers only pay a fraction of the transacted price, they are willing to purchase more of the good at the posted transacted price
- Suppose c=25%
- Without insurance, they would purchase 5 visits a year at $100/visit
- Now, the transacted price can rise to $400/visit and they would still demand 5.
- Doctor is paid $400, consumer pays $100, same as before

- Consider graph on the next slide
- Without coinsurance
  - When $P_s = 0$, $Q_d = Q_m$
  - When $P_s = P_m$, $Q_d = 0$
- With coinsurance
  - $P_t = P_d/c = P_s$
  - When $P_s = 0$, P_d still $= 0$, $Q_d = Q_m$
    - (demand curve rotates at point a)
  - P_s would have to rise to P_m/c to eliminate demand
    - since if $P_s = P_m/c$, $P_d = P_s c = (P_m c)/c = P_m$

Demand for medical care
With and without coinsurance



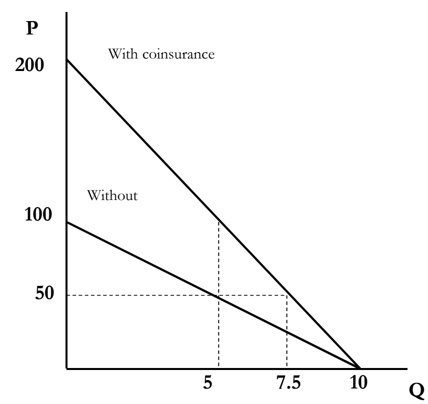
- Without insurance, at price P_1, patients would be willing to consume Q_1
- With insurance, in order for consumers to demand Q_1, the price received by sellers would have to rise to P_1/c
  - Doctor charges P_1/c
  - Consumer pays $(P_1/c)c = P_1$
  - Consumer is only concerned with the price after coinsurance

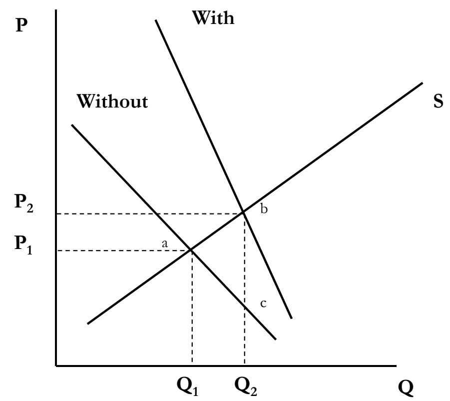
Example

- Demand curve without coinsurance
  - $P_d = 100 - 10Q$
- Coinsurance rate of c
  - With coinsurance, $P_t = P_d/c$
- Demand curve with coinsurance
  - $P_t = P_d/c = (100 - 10Q)/c$
  - $P_t = 100/c - 10Q/c$

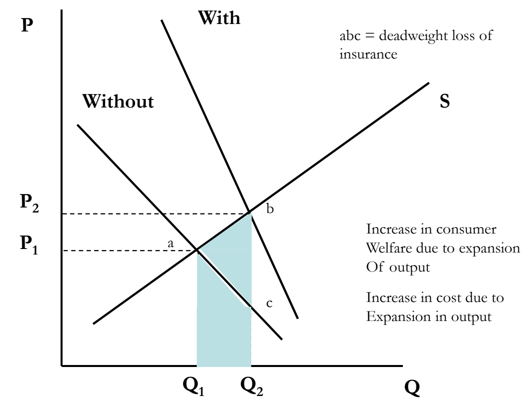
- $P = 100 - 10Q$
  - when $P_s = 0$, Q=10 and
  - when $P_s = 100$, Q=0
- Let c=50%
- $P_t = 100/c - 10Q/c = 200 - 20Q$
  - when P = 0, Q=10 and
  - when P = 200, consumers pay 100 and Q=0

- Note that if c=0, when P=\$50, Q=5
- With c = 0.5, P=\$50, Q=7.5





41



42

Deadweight loss of insurance

- With coinsurance
  - Output ↑ from Q_1 to Q_2
  - Price received by sellers ↑ from P_1 to P_2
- Recall what height of the demand curve represents
  - At Q_2 consumers value the last unit at P_3
  - Doctors get P_2
  - Patients only pay P_2c
- Now there is a wedge between what people value the last unit and what they pay

43

- Because of this wedge, there is use beyond a socially optimal level
- Consumers value the increased consumption at area Q_1acQ_2
- What it cost society to produce this extra output? Area Q_1abQ_2
- Clearly $Q_1acQ_2 < Q_1abQ_2$
- Area (abc) deadweight loss of insurance

44

Example

- $P_d = 40 - 2Q$
- $P_s = 4 + 4Q$
- c =0.25
  - Patients pick up 25%
  - Insurance picks up 75%
- Market solution without insurance
  - $P_d = P_s$
  - 40-2Q=4+4Q; 36=6Q
  - Q=6, P=28

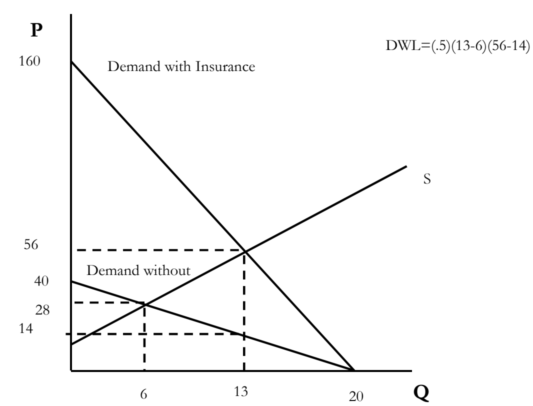
45

- Demand curve with insurance
  - $P_t = P_d/c = (40 - 2Q)/c$
  - $P_t = 40/c - 2Q/c = 40/.25 = 2Q/.25$
  - $P_t = 160 - 8Q$
- Market solution with insurance
  - Supply = Demand
  - 4 + 4Q = 160 – 8Q
  - 156 =12Q
  - Q = 13
  - P = 56

46

- What do consumers value the last unit consumed?
  - Q = 13
  - $P_d = 40 - 2Q = 40 - 2(13) = 14$
- DWL= triangle abc
- Area = (1/2)height x base
  - = (1/2)(56-14)(13 – 6)
  - = 147

47



48

The tradeoffs?
(Why people hate economists)

- Recall from expected utility section
  - Insurance increases welfare because it reduces uncertainty
  - Consumers are willing to pay a premium to reduce uncertainty
- But -- the structure of insurance is such that consumers do not pay the full dollar price of service, encouraging them to over use, which generates a deadweight loss
- There is an optimal co-insurance rate
  - Weight the benefits of spreading risk vs. cost of moral hazard

49

- Feldman and Dowd
  - Use 1980s data
  - $33 billion to $109 billion loss
  - 9 to 29% of health care spending (mid 80s levels)
  - 9 to 29% of health care spending in 2007 is $198 - $638 billion
- Optimal coinsurance rate?
  - Estimate puts it at about 33-45%
  - Far above current values (among those that have insurance)

50