

1. Multiple choice (10%)

Adverse Selection 1-2

1. What is the key feature of adverse selection in health insurance markets?

- a) Insurers cannot observe patients' behaviors after purchasing insurance
- b) High-risk individuals are more likely to buy insurance than low-risk individuals ☒
- c) Insurance companies offer identical premiums to all customers
- d) Moral hazard leads to higher claims

2. Which of the following best explains why adverse selection can lead to market failure?

- a) Insurance companies will insure everyone at fair premiums
- b) Low-risk individuals subsidize high-risk individuals
- c) Only high-risk individuals remain in the market, driving up premiums and pushing out low-risk ones ☒
- d) Premiums reflect expected health costs accurately

Moral hazard 1-3

6. What does moral hazard refer to in health insurance?

- a) People hiding their health status from insurers
- b) People increasing their use of healthcare because they don't bear the full cost ☒
- c) Insurance companies refusing to pay claims
- d) Risk-based premiums for unhealthy behavior

7. Which of the following is an example of ex-post moral hazard?

- a) Quitting smoking after getting insurance
- b) Visiting the doctor more often because visits are fully covered ☒
- c) Choosing a more expensive insurance plan
- d) Declining employer-sponsored insurance

9. Why does moral hazard raise concerns in insurance markets?

- a) It makes it harder to identify high-risk individuals
- b) It causes overuse of low-value healthcare services ☒
- c) It increases the bargaining power of providers
- d) It leads to more competition between insurers

2. Childhood investments in health (30%)

- a) Explain the following equations from the article “Childhood Circumstances and Adult Outcomes: Act II” by Almond, Currie and Duque:

$$h = A \left[\gamma (I_1 + \mu_{1g})^\phi + (1 - \gamma) (I_2 + \mu_{2g})^\phi \right]^{1/\phi}$$

$$Y = p_C C + p_I I_1 + p_I I_2 / (1 + r)$$

$$U = (1 - \alpha) \log C + \alpha \log h$$

health production. Depends on shocks and investments, in first and second periods. Inputs can be complements or substitutes, depending on phi.

budget constraint. Spend income on consumption or child investments.

utility. Some substitutability between inputs.

- b) The parameter ϕ governs the extent to which investments in period 1 and 2 are substitutes or complements. The two special cases considered in the paper are perfect substitutes and perfect complements. For the case of perfect substitutes, the optimal second-period investment response to a first-period shock μ_{1g} is given by:

$$\frac{\delta I_2^*}{\delta \mu_{1g}} = -\frac{(1 - \alpha)\gamma}{(1 - \gamma)} < 0$$

Explain the intuition behind the sign of the derivative and what it implies for optimal second-period investments in response to a positive shock and to a negative shock.

substitutes: response opposite of shock, can compensate for it

- c) For the case of perfect complements, the optimal second-period investment response to a first-period shock μ_{1g} is given by:

$$\frac{\delta I_2^*}{\delta \mu_{1g}} = \frac{\gamma}{1 - \gamma} > 0$$

Explain the intuition behind the sign of the derivative and what it implies for optimal second-period investments in response to a positive shock and to a negative shock.

complements: response same sign as shock, cannot compensate for shock, inputs must be used in fixed ratios, so when one input is reduced, best to reduce the other.

- d) You observe in administrative data that 98% children whose mothers received food support when pregnant are alive at age 30, whereas only 94% of children whose mothers did not receive

food support are alive. Can we interpret this difference as the causal effect of food support? Why or why not?

No. Selection, there may be many other differences between those children. E.g. children whose mothers received food support may have had access to better health facilities.

- e) You learn that the food support program only had limited funding and was allocated based on a lottery. Does that alter your conclusions about the effect of the program?

Yes. If really a lottery, there should be no other differences, so can interpret the difference as the causal effect of food support.

- f) Based on this setup, what can we learn about the biological effect, as opposed to effects mediated through parental investment or environment?

Can learn that the biological effect is positive for health, but do not know how much without knowing whether the investments are substitutes or complements to the shock. The estimated effects captures combined impact of the shock and changed investments. If substitutes, understate the biological impact, if complements, overstate.

3. Reading empirical health economics papers (30%)

- a) Why is data on alcohol consumption during pregnancy and later outcomes not enough to learn about the effect of alcohol consumption on these outcomes? Explain the potential identification problem in using this kind of observational data.

*Main issue: Selection, many other differences than only alcohol consumption.
Also data may not be representative and have biased replies.*

- b) The paper “Alcohol Availability, Prenatal Conditions, and Long-Term Economic Outcomes” by J. Peter Nilsson studies effect of alcohol consumption during pregnancy on long-term outcomes of the first and second generation. The abstract of the paper is:

“This study examines how a policy that sharply increased alcohol availability during 8.5 months affected the labor productivity of those exposed to it in utero. Compared to the surrounding cohorts, the prenatally exposed children have substantially worse labor market and educational outcomes and lower cognitive and noncognitive ability. Effects on earnings are found throughout the distribution but are largest below the median. Males are more affected than females, consistent with growing evidence that boys are less resilient to early environmental insults. The long-term effects seem primarily driven by changes in prenatal health rather than changes in the childhood environment.”

Based on the abstract, what can you say about the author's identification strategy? (The way the author isolates the effect of alcohol consumption.)

Policy that increased alcohol availability. Compare children in utero in this period with children in utero before and after. Assume increased alcohol availability the reason for any differences.

- c) The paper studies a case in Sweden in the late 1960s that temporarily increased access to strong beer in certain regions. Table 5, reproduced below, gives the estimates of the impact on education. What is the estimated effect on share of high school graduates? Are there any gender differences?

TABLE 5 THE IMPACT ON EDUCATION

<i>Subsamples:</i>	All	Men	Women
A. Dependent variable:	Years of Schooling:		
<i>Exposed from 1st half of pregnancy</i>	-0.309*** (0.089)	-0.516*** (0.167)	-0.209* (0.121)
<i>Adj R-squared</i>	0.85	0.78	0.73
<i>Mean of dependent variable:</i>	11.78	11.52	12.05
B. Dependent variable:	Share of High School graduates:		
<i>Exposed from 1st half of pregnancy</i>	-0.063*** (0.016)	-0.098*** (0.023)	-0.033 (0.025)
<i>Adj R-squared</i>	0.57	0.40	0.36
<i>Mean of dependent variable:</i>	0.834	0.821	0.849
C. Dependent variable:	Share Graduated from Higher Education		
<i>Exposed from 1st half of pregnancy</i>	-0.032* (0.018)	-0.062** (0.028)	-0.030 (0.023)
<i>Adj R-squared</i>	0.79	0.69	0.65
<i>Mean of dependent variable:</i>	0.193	0.138	0.251
Year by month of birth dummies	Yes	Yes	Yes
Region of birth dummies	Yes	Yes	Yes
Mother under age 21 dummy	Yes	Yes	Yes

Notes: Each column and panel represents a separate regression. N= 4,104 The dependent variable is years of schooling, fraction with higher education or fraction who have completed high school. The unit of observation is all first born children alive in 2000 either by mothers aged ≥ 21 or below in a given year, quarter and region. "*Exposed from 1st half of pregnancy*" is a dummy equal to 1 if the child was born by a mother under age 21 and exposed to the experiment while *in utero* from early until late pregnancy (see section 4 for details). All regressions include year-by-month of birth, region of birth, mother under age 21 at delivery dummies and the appropriate interaction terms between these variables (see Equation 4). All regressions are weighted by the cell size used to calculate the dependent variable. Heteroscedasticity robust standard errors are reported in parenthesis.

-0.063. Almost three times higher for men

- d) What is said in the abstract about the investment response (ref. the Almond, Currie and Duque framework) to this negative in utero shock?

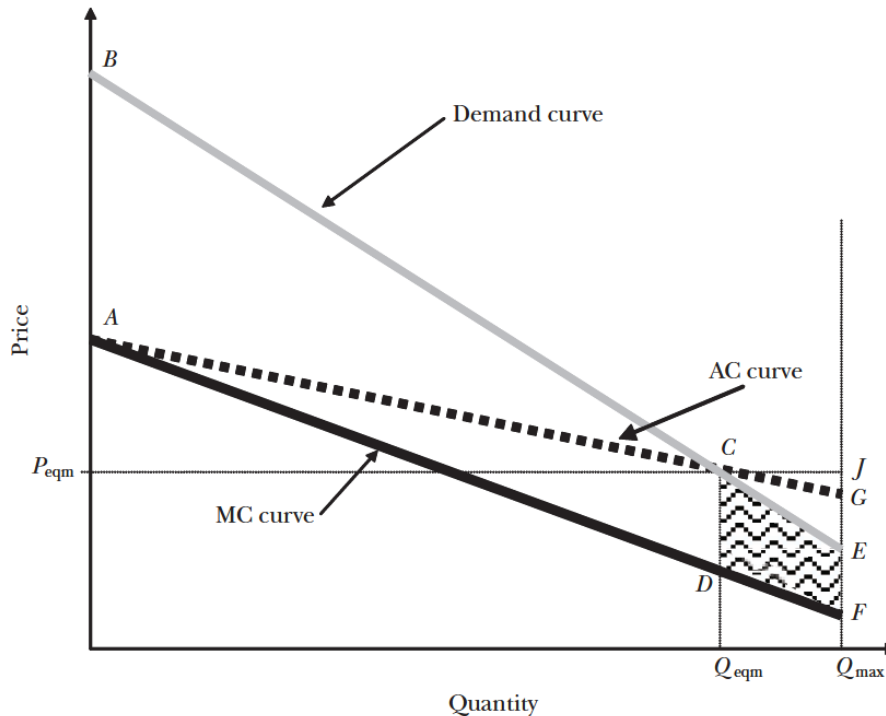
that it seems not to have been a factor

4. Adverse selection (30%)

In the article “Selection in insurance markets: Theory and empirics in pictures”, Einav and Finkelstein (2011) present a model of an insurance market with adverse selection, see their Figure 1 below. The model describes a market for a specific insurance contract, with a binary choice of whether to buy the contract or not.

Figure 1

Adverse Selection in the Textbook Setting



- Explain the shape of the demand curve and the two cost curves in the figure above.
Demand: cumulative willingness to pay for the contract. A risk-averse individual's willingness to pay for insurance is the sum of the expected cost and risk premium for that individual – this gives downward sloping marginal cost curve. Risk type / probability of loss is privately known.
Marginal cost: Determined by expected cost, those with the highest expected cost are willing to pay the most, then declining. Risk type also determines cost.
Average cost: Averaging over the marginal cost curve. The marginal buyer always has lower expected cost, therefore declining.
- What is the economically efficient allocation?
 Explain the market allocation and deadweight loss, if any, without asymmetric information and with asymmetric information.

Efficient allocation determined by intersection of demand and marginal cost. Everyone has willingness to pay $> mc$, so efficient to insure everyone, i.e. quantity = Q_{max} . Firms will bid price down to the mc curve.

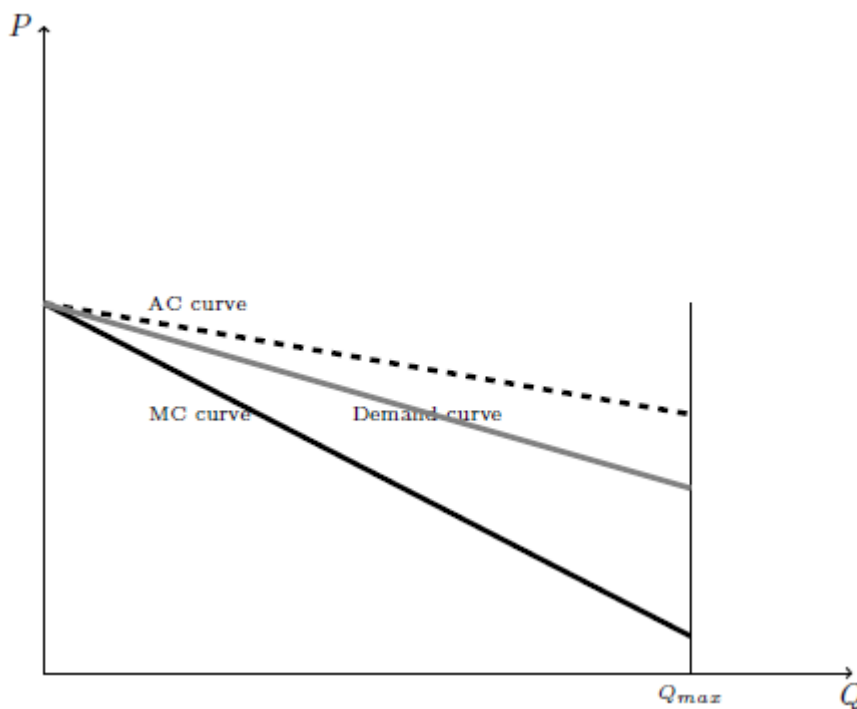
Without: Everyone gets different price, get to efficient allocation.

With: Because marginal cost is decreasing, marginal buyer has lower expected cost, AC curve is above the MC , and intersects demand at a lower quantity and higher price than the efficient allocation. Only one price, given by intersection of demand and AC . If higher, positive profits, if lower, negative profits. At that price, buying insurance is not worth it for individuals to the right of point C , so they will not buy insurance. deadweight loss is $CDFE$

- c) Why may mandatory insurance be desirable for policymakers in this setting?

Gets to the efficient allocation.

- d) What is the market outcome in the case depicted in the figure below?



Unraveling

- e) How can one empirically test for adverse selection in this framework?

Test for downward sloping marginal cost curve. Positive correlation between costs and degree of coverage. Here: with and without insurance, so to either side of Q_{eqm} . If positive correlation, suggests adverse selection. But this can also come from moral hazard.