Outline

1. Health Insurance & Care
2. Rise in Spending & Impact on Health
3. Adverse selection: theory & empirics
Health Insurance

- Different from other examples of social insurance
  - triangle relationship between customer, insurer and provider
  - co-existence of private and public initiative
  - relation between health care and health outcomes
  - some similar issues as with social security

- Health is an important field because of enormous size and rapid growth
  - 1950: 4% of GDP devoted to health care in US
  - 2003: 15% of GDP devoted to health care in US
  - 2075: 38% of GDP devoted to health care in US

- Health economics is field in itself. We will focus on public sector interventions
Health Care Spending in OECD Nations in 2002

Source: Gruber (2007)
UK vs. US

- UK: publicly funded health care system (NHS)
  - largest employer in UK
  - insures most types of care
  - private health care for top-ups, only taken by 8%

- Before ‘Obama-care’ US tended to have less public intervention than other developed countries
  - 50% compared to 75% on average elsewhere
  - medicare vs. medicaid
  - insurance provided by employers, large tax subsidy - financed with payroll tax
  - many types of care uninsured, many people uninsured
Rise in Health Spending: Reasons?

- General consensus: technological progress with more expensive methods (supply effect)
  - example: angioplasty: expensive but saves lives (of some patients...)

- Newhouse (1992): residual argument (a la growth accounting)
  - only 1/4 to 1/2 of rise in spending can be explained by other facts
    - demand effects: aging, increased income, subsidized by government, increased insurance
    - other supply effects: supplier induced demand (fee-for-service), malpractice

- Limited direct evidence for impact of technological change
Health Spending vs. Health Outcomes

- Is increase in health spending a problem?
  - optimal health share is likely to grow with income
  - voluntary choice to adopt (expensive) technological progress
  - BUT prices are distorted due to insurance

- Does health insurance / higher spending improve health?
  - margin vs. average
    - evidence for "flat of the curve" health care
    - extremely high average value of health improvements in the last decennia
  - young vs. old
    - substantial impact of Medicaid (Currie & Gruber 1996)
    - insignificant impact of Medicare (Card et al. 2008)
  - opportunity cost of each health policy (see RDD example)

- How to measure health improvements? Are health improvements of ‘First Order’ importance for insurance policies?
Opportunity Cost: An RDD Example

Source: Almond, Doyle, Kowalski and Williams (2009)
Opportunity Cost: An RDD Example

Source: Almond, Doyle, Kowalski and Williams (2009)
Market Failures and Government Interventions

1. Asymmetric Information:
   - heterogeneity of risk types $\rightarrow$ adverse selection in insurance market
   - price subsidies, insurance mandates, ...

2. Externalities/Internalities/Consumer myopia
   - tax subsidies for health insurance, government provided insurance
   - sin taxes (alcohol/cigarettes), fat tax, ...

3. Other reasons for government provision or regulation:
   1. Suppliers exploiting asymmetric info about desirable care (e.g., licensing of doctors, fixing physician salaries)
   2. Incomplete market: ex-ante risk uninsured, since we cannot contract before birth
   3. Equity concerns: health inequality may directly enter social welfare function (e.g., in US, white infant mortality rate is 6/1000; black is 14/1000)
Adverse Selection as a Motivation for SI

  - environment with asymmetric information: individuals know risk of becoming sick but insurer does not
  - market failure: underprovision of insurance (complete unravelling in extreme case)
  - government intervention: through mandated insurance can induce a Pareto improvement

- Renewed interest: negative correlation puzzle
  - theory predicts that high risk types buy more insurance coverage
  - empirically, the exact opposite is found in many insurance markets

- Most recently: estimate welfare cost of asymmetric information
  - structural vs. reduced-form approaches
  - strong assumptions on importance of preferences
Simple Demand and Supply of Insurance

- Based on Einav, Finkelstein & Cullen (2010)

- Consumers have the choice between contract $H$ and $L$. Contract $H$ provides more insurance coverage at additional premium $p$

- Assume unobserved heterogeneity $\zeta$ determines both the value and the cost of insurance.

- Additive model:

$$v \equiv v^H(\zeta) - v^L(\zeta) \equiv \pi(\zeta) + r(\zeta)$$

  - $\pi(\zeta)$ equals the insurer’s cost of providing insurance
  - $r(\zeta)$ captures the net-value of insurance
  - for CARA $\gamma$ and normal risk $x$: $\pi(\zeta) = Ex, \ r(\zeta) = \frac{\gamma}{2} \text{var}(x)$
Heterogeneity in Risks: Adverse Selection

- Buy contract $H$ iff $v(\zeta) \geq p$.
  
  $$ \text{Demand} : \quad D(p) = 1 - F_v(p) $$

- Cost of providing insurance depends on types buying insurance
  
  - Average Cost : $AC(p) = E(\pi | v(\zeta) \geq p)$
  - Marginal Cost : $MC(p) = E(\pi | v(\zeta) = p)$

- More risky types tend to value insurance more such that the cost of providing insurance is increasing in $p$
Adverse Selection

**Figure I**
Efficiency Cost of Adverse Selection
Welfare Cost of Adverse Selection

- Competing firms price at average cost; efficient to price at marginal cost

  Equilibrium price : \( p^c = AC(p^c) \)
  Efficient price : \( p^* = MC(p^*) \)

- Inefficiently high equilibrium price since \( AC(p) > MC(p) \)
  - individuals with willingness-to-pay higher than their cost do not buy insurance in equilibrium

- Welfare cost equals

  \[
  \Gamma = \int_{p^*}^{p^c} [p - MC(p)] d(D(p)) \quad (= \text{triangle CED})
  \]
Price Subsidies vs. Mandates

- Prices are too high due to adverse selection ⇒ government intervention?

- Price Subsidy: lower equilibrium price towards the efficient price
  - generate higher surplus, but pay subsidy \( s \) to all who buy insurance
  - MC of public funds \( \lambda \) is higher than 1

\[
\Delta W^{subsidy} = \int_{p^c - s}^{p^c} [p - MC(p)] d(D(p)) - \lambda s D(p^c - s)
\]

- Universal Mandate: force everyone to buy insurance
  - generate positive surplus for those with \( p > MC(p) \), but negative surplus for those with \( p < MC(p) \)
  - difficult to implement \( q^* \) when rationing is not efficient

\[
\Delta W^{mandate} = \Gamma - \text{triangle EGH}
\]
Welfare Analysis using Sufficient Statistics

- Sufficient to estimate demand curve and average cost curve
  - need information on available options, contract choices and the medical claims for given prices
  - need exogenous price variation as well

- Approach allows to calculate welfare loss due to inefficient pricing and gain from policy interventions

- Einav et al. (2010) analyze employer-provided health insurance
  - consider choice between high-deductible and low-deductible contract
  - exploit variation in the premium across business units
  - observe how many buy and how much they claim

  ⇒ efficiency cost is small (only 3% of total surplus), both price subsidy and mandate would decrease welfare!
Figure V
Efficiency Cost of Adverse Selection—Empirical Analog
**Adverse Selection: Pricing vs. Screening**

- **Akerlof (1970):**
  - presence of high risk types prices lower risk types out of the market
  - extreme unravelling: no one buys contract (except highest risk type) - even when everyone prefers to buy at actuarially fair price
  - measure of inefficiency:
    \[
    E (\pi | v (\zeta) \geq p) - E (\pi | v (\zeta) = p)
    \]

- **Rothschild and Stiglitz (1976):**
  - previous approach takes contracts as given
  - allow insurers to provide a menu of contracts specifying price and coverage
  - screen low risk types by providing less insurance at reduced premium
Positive Correlation Test

- Robust prediction of Adverse Selection Model:
  - high risk types will buy more insurance $\Rightarrow$ positive correlation, conditional on observables

- Empirical evidence started with Chiappori and Salanié (2000), finding no significant correlation in car industry, conditional on observables
  - other markets with insignificant correlation: life insurance (Cawley & Philipson 1999); health insurance (Cardon & Hendel 2001)
  - markets with negative correlation: long-term care insurance (Finkelstein & McGarry 2006), Medigap insurance (Fang, Keane and Silverman 2008)

- Empirically, heterogeneity in risks do not play the role we expected...
Heterogeneity in Preferences

- Current literature conjectures the importance of heterogeneous preferences
- Back to model \( v = \pi + r \) - assume normal heterogeneity
  - MC curve simplifies to
    \[
    MC(p(q)) = \mu_\pi + \frac{cov(\pi, v)}{var(v)} [p(q) - \mu_v]
    \]
  - MC curve flattens if the variance in preferences increases
  - MC curve is upward sloping if
    \[
    cov(\pi, v) = var(\pi) + cov(\pi, r) < 0
    \]
- Sufficient statistics approach: unnecessary to uncover the underlying heterogeneity
  - adverse selection if MC curve is decreasing
  - advantageous selection if MC curve is increasing
Advantageous Selection

**Figure II**
Efficiency Cost of Advantageous Selection
Heterogeneity in Preferences?

- While current empirical approaches attribute residual heterogeneity in demand to heterogeneous preferences, direct evidence is limited.

- Recent work questions stability of preferences for given individual across domains.

- Suggests importance of other drivers of the demand for insurance (risk perceptions, inertia, cognitive ability,...), possibly unrelated to the actual value of insurance.
Adverse Selection vs. Moral Hazard

- Insurance of medical care induces moral hazard
  - ex ante: less precautionary efforts
  - ex post: overconsumption of medical care

- Moral hazard predicts the same positive correlation.
  - insurers reduce insurance coverage to provide optimal incentives (either ex ante or ex post)
  - very different from reducing insurance coverage to screen good risk types

- How to distinguish from adverse selection?
  - no precautionary efforts (life insurance/annuities)
  - use experimental or quasi-experimental variation
  - use dynamic data

- Moral hazard and heterogeneous preferences may explain negative correlation-puzzle
  - people who are more risk-averse buy more insurance, but exert more effort as well
In Sum

- Health insurance is a particular type of Social Insurance (care provider, private vs. public, impact on health). Expenditures on health care are growing exponentially.

- Private information about health risks may cause adverse selection; underprovision of insurance would justify government interventions.

- However, empirical evidence suggests minor role of people’s risk as a determinant of their insurance choice.