Economic Policy Analysis: Lecture 6
Social Insurance

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Outline

What is social insurance?

Social insurance is government provision of insurance for certain inherent risks in life.

e.g. unemployment, injury on the job, and disability

- ▶ why does government need to provide insurance?

- ▶ what is the optimal level and structure of social insurance?

Examples of SI Programs

- social security - insurance against income loss in retirement

- disability insurance - career ending disability

- unemployment insurance (unemployment)

- workers comp (on the job accidents)

Figure 1: Federal Public Spending in the US
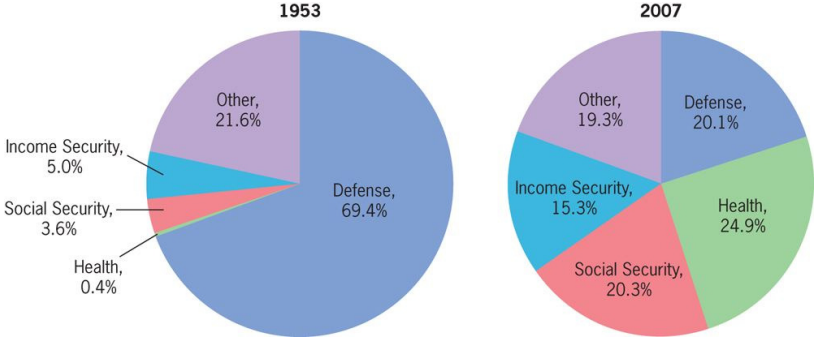
Features of SI Programs

1. participation is mandatory
2. eligibility and benefits depend on contributions by individual/employer
3. benefits are tied to an event
   - retirement
   - unemployment
   - injury
4. benefits are not tied to financial distress
   - not means-tested
   - everyone gets benefits, no matter how rich they are

Outline

Why social insurance?

- Private markets for risk clearly exist
    - e.g.: well functioning markets for life insurance, property & casualty insurance

- But there are problems with some markets for risk which may cause private insurance to fail

Simple Model of Insurance Decisions

- two states of the world: s & h

- you get disease with probability q

- your income is W, regardless of disease

- if you get disease you incur a medical cost δ

- you can buy insurance, with premium p

- insurance will pay you net payout b if you get disease

Expected utility

- your goal is to maximize your expected utility, where your choice variable is your income in each of the states
- Like a model with two goods
  - just like you maximize over your choice of the two goods, you maximize over your choice of expected utility in a state
  - function of probability that the state occurs

$$EU = (1 - q) * U[W - p] + q * U[W - \delta + b]$$

Actuarially Fair Insurance

- ▶ Perfect competition in the insurance market

  - ■ insurance companies must earn zero expected profits

$$E\Pi = (1 - q) * p - q * b = 0$$

Actuarially Fair Insurance

$$\Rightarrow b = (1 - q)/q * p$$

Optimal Insurance Decision

$$Max_p EU = (1-q) * log(W-p) + q * log(W - \delta + (1-q)/q * p)$$

FOC:

- $(1-q)/(W-p) + (q*(1-q)/q)/(W - \delta + (1-q)/q * p) = 0$

$$\rightarrow W - p = (W - \delta + (1-q)/q * p)$$

Optimal decision= full insurance

$$\Rightarrow p* = q\delta$$

$$
\begin{aligned}
EU &= log(W - q\delta) + log(W - \delta + (1-q)/q * q\delta) \\
&= log(W - q\delta) + log(W - q\delta)
\end{aligned}
$$

Optimal Insurance Decision

General Result

- ▶ Optimal to smooth consumption across states of the world
- ▶ With diminishing marginal utility: full insurance

Heterogeneity

Two types of individuals: healthy (h) and Jack-in-the-Box fan (s)

- $q_h < q_s$
- If types are perfectly observable:
    - Two different actuarially fair policies:

$$
\begin{aligned}
b &= (1 - q_s)/q_s * p \quad \text{for Jack-in-the-Box type} \\
b &= (1 - q_h)/q_h * p \quad \text{for healthy type}
\end{aligned}
$$

- Higher premium for Jack-in-the-Box type for a given b

Adverse Selection (1)

If types are not observable by the insurance company:

- Insurance company can try to keep two different prices
  - Two types are going to buy the "healthy" type policy
  - Negative profits for the firm

$$E\Pi = (1 - q_h) * p - q_h * \frac{(1 - q_h)}{q_h} * p = 0 \text{ for healthy type}$$

$$E\Pi = (1 - q_s) * p - q_s * \frac{(1 - q_h)}{q_h} * p < 0 \text{ for JiB type}$$

- Insurance companies go out of business

Adverse Selection (2): Pooling

If types are not observable by the insurance company:

- ▶ Insurance company can try to offer average price for both types
  - Average risk: $q_s > q_a > q_h$
  - Pb: healthy guys might not buy insurance at this price
  - Compare:

$$EU = (1 - q_h) * log(W - p) + q_h * log(W - \delta + \frac{(1 - q_a)}{q_a} * p) \quad \text{if insured}$$

$$EU = (1 - q_h) * log(W - p) + q_h * log(W - \delta) \quad \text{if uninsured}$$

- ▶ Depending on q_a, q_h, utility function, healthy guys might be better off not buying insurance at all

Adverse Selection

Adverse selection $=$ market failure

- Insurance market can completely disappear
- Fundamental pb$=$ assymetric info $\rightarrow$ Single price for heterogeneous goods
- Possible solution: preference revealing mechanism $\Rightarrow$ two different policies at two different prices
  - Expensive full coverage at non healthy guy market odds
  - Cheap partial coverage at healthy guy market odds
- Example: HMO vs PPO
- Self selection cannot bring back full efficiency here (full insurance for healthy guys)

Externalities

Insurance may have some external effects

- Flu shots $\rightarrow$ if you do not insure, I get sick
- Room for public intervention

Economies of Scale / Market Power

- If administrative costs, or market power for firms in the insurance market
  - Prices higher than actuarially fair prices
  - Less than full insurance
- Administrative costs in the US:
  - 12% of premiums on average in private HI market
  - 3.2% for Medicare/Medicaid
- Large pools more efficient $\rightarrow$ mandating insurance can lead to efficiency gains

Paternalism

- People might not be fully rational
  - Myopic
  - Inattentive, etc.
- People might end up underinsuring themselves

Figure 2: Distribution of 401(k) Contributions Rates for Participants (Madrian & Shea 2001)
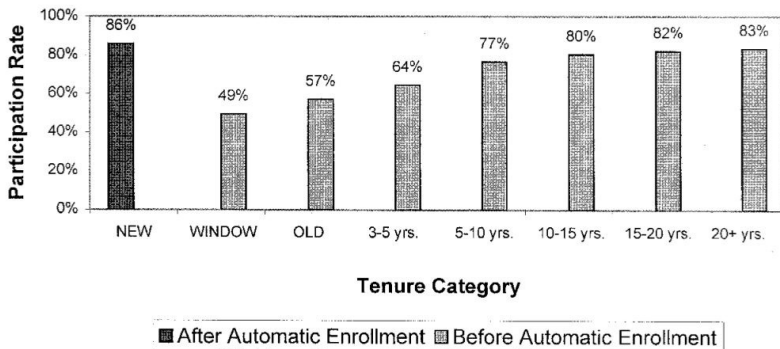
Tenure Category

After Automatic Enrollment   Before Automatic Enrollment

Outline

Why not full SI?

- Insuring adverse events may also encourage inefficient behaviors;
  Moral Hazard
  - UI leads people to search less for a job
  - HI leads people to overconsume medical goods
  - DI leads people to report more fake injuries...etc
- Because of asymetric information, moral hazard is a big cost to SI
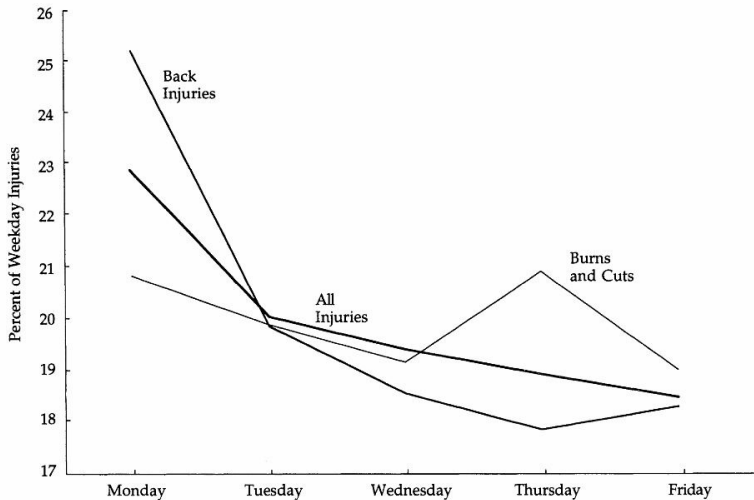
Figure 3: Monday Effect in Workers Comp

Figure 1. Distribution of Weekday Injuries.

General Formula for Social Insurance

- Contrary to externalities, market failures arising because of asymetric info lead to fundamental trade-off for economic policies
  - Reducing market failure ineffiency increases moral hazard inefficiency
  - Hi leads people to overconsume medical goods
- General formula (Chetty 2005):
  - Balances consumption-smoothing benefits and moral hazard effects
  - Consumption smoothing benefits depend on consumption drop when shock occurs and risk aversion

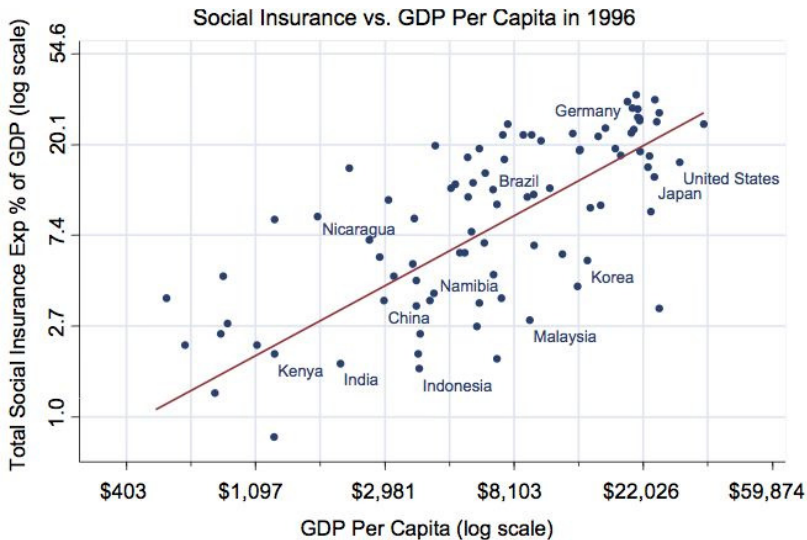Figure 4: Total Social Insurance Spending vs GDP per capita around the world (1996)
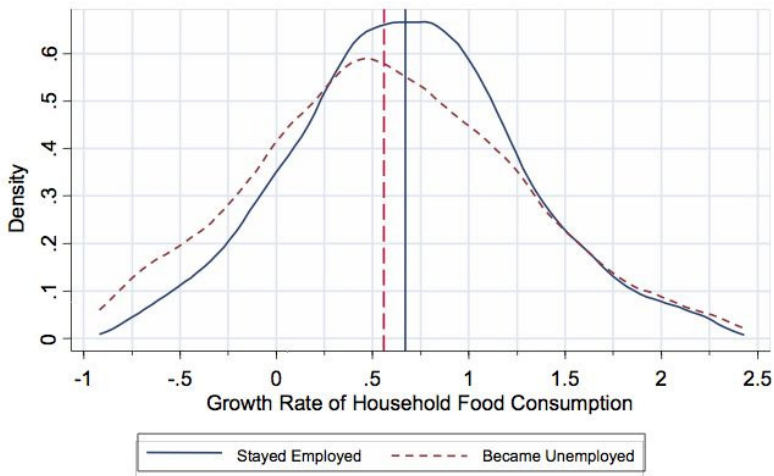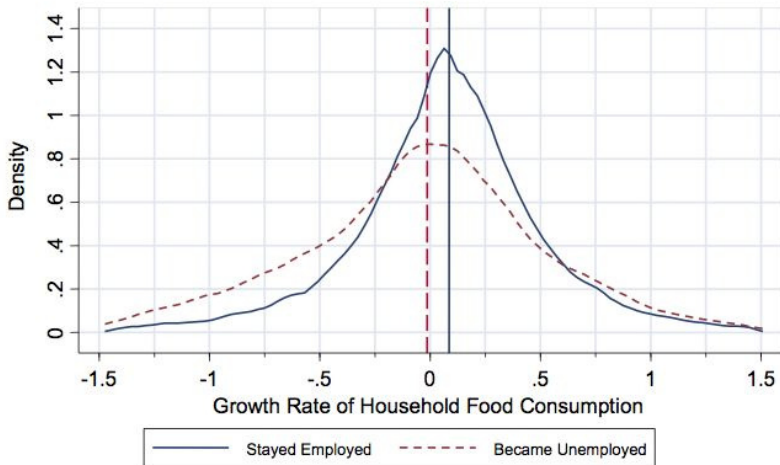

Social Insurance vs. GDP Per Capita in 1996

Effect of Unemployment on Food Consumption in Indonesia

Source: IFLS 1993-2000

Effect of Unemployment on Food Consumption in the US

Source: PSID 1980-1993

Figure 7: Consumption Drop Estimates

EFFECT OF UNEMPLOYMENT ON FOOD CONSUMPTION

Dependent variable: Food cons. growth rate (change in log food consumption)

	Full sample		Unemployed Exactly Once	
	US	Indonesia	US	Indonesia
Unemployed dummy	**-0.106**	**-0.078**	**-0.095**	**-0.098**
	(0.010)***	(0.022)***	(0.017)***	(0.038)**
Demographics	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Province/state dummies	Yes	Yes	Yes	Yes
Observations	50763	11284	7894	1231

Optimal Level of Social Insurance Around the World

- ► Unemployment leads to 10% consumption drop in both countries
- ► Surprising given U.S. has large UI system; Indonesia has none
- ► Some economists concluded that private insurance (via families, villages, etc.) is sufficient in developing economies
- ► $\Delta c/c$ could be small for two reasons:
  - Easy to insure fluctuations privately $\Rightarrow$ SI crowds out private insurance
  - Risk aversion very high: agents very averse to reducing consumption,so maintain smooth path by costly actions in unemployed state $\Rightarrow$ SI could have large welfare benefits.
  - Additional evidence that risk aversion is large: Households rely on costly smoothing methods in developing countries (Miguel 2005)
- ► But moral hazard effects could be also larger in developing countries