

Lecture 13: Social Insurance

November 28, 2017

Overview

Course Administration

Ripped From Headlines

Why Should We Care?

What is Insurance?

Why Social Insurance?

Additional Reasons for Government Intervention

How Much Consumption to Smooth?

Moral Hazard Problem of Insurance

In Sum

Course Administration

1. Consider Marvin Phaup's spring course "Issues in Federal Budgeting" which builds on this class
2. Problem sets
 - PS 12 is posted
 - PS 10 answers are posted
 - Will post answers to PS 12 on Friday afternoon (?)
3. All grades should be to date on the google xls by the time of the exam
4. Review session is December 3, 3 to 5, Phillips 416
5. Next class is cumulative Exam 2
6. Evaluations
 - mine at the end of class
 - online one for Trachtenberg coming soon

Ripped from the Headlines

The End!

Why Should We Care About Social Insurance?

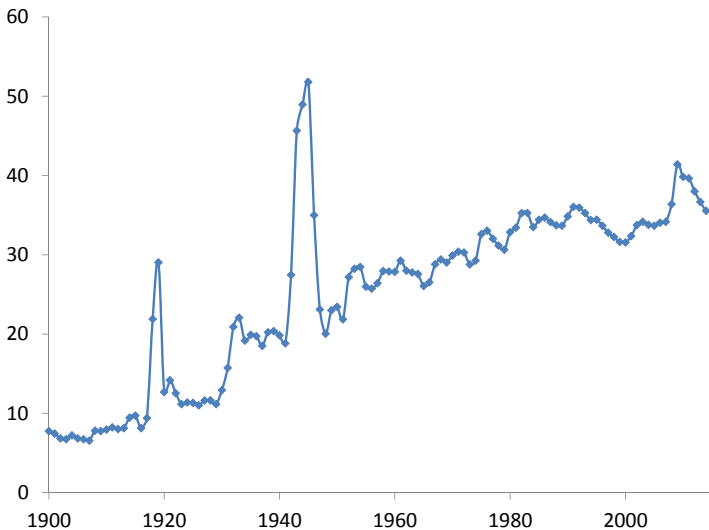
Social Insurance as a Government Responsibility

- Until the 1900s, governments spent primarily on war
- Taxes were predominantly trade and excise

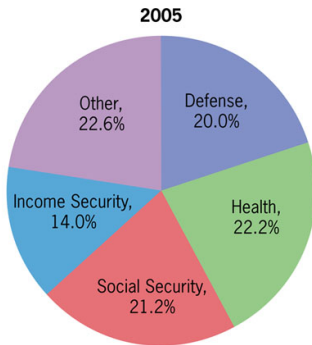
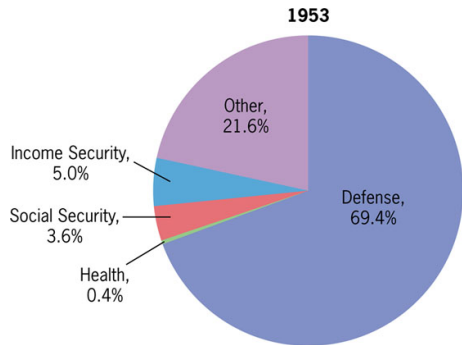
Social Insurance as a Government Responsibility

- Until the 1900s, governments spent primarily on war
- Taxes were predominantly trade and excise
- In the past century, governments began to spend on social welfare programs
- Before, this was a matter of private provision

Government Spending as a Share of GDP Has Increased Dramatically Over Last Century



This is US, But Same is True for Much of the World



You May Work on Social Insurance



- Amy (MPP '16) was dismissive of the relevance of social insurance
- Then she went to work for DC Department of Environment
- Considered whether DC should opt in to National Flood Insurance Program
- Now cares deeply about actuarially fair premiums

What is Social Insurance and Why Do Individuals Value It?

What is Insurance?

A product where

- You worry about a future **state of the world**
- You pay **premiums** before the future state of the world occurs
- Then things happen – the state of the world is revealed
- If bad things happen, you get benefits
- If good things happen, you get nothing

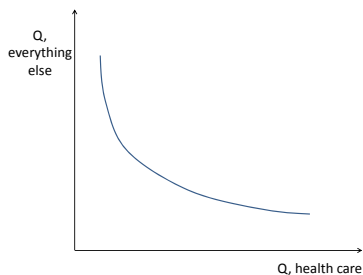
What Types of Insurance Do You Buy?

What Types of Insurance Do You Buy?

- Health insurance
- Life insurance
- Auto insurance
- Renters' insurance

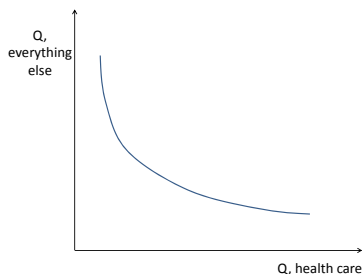
Why Do People Value Insurance?

How do you see diminishing MU in the picture?



Why Do People Value Insurance?

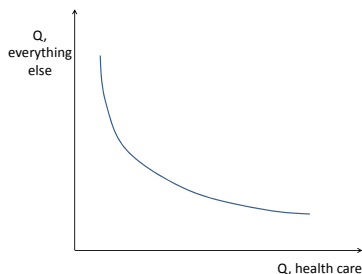
How do you see diminishing MU in the picture?



- If you have diminishing marginal utility, you prefer to smooth your consumption
- Compare
 - 1 car today and 1 car tomorrow
 - 2 cars today or tomorrow, and 0 cars on the other day

Why Do People Value Insurance?

How do you see diminishing MU in the picture?



- If you have diminishing marginal utility, you prefer to smooth your consumption
- Compare
 - 1 car today and 1 car tomorrow
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We say that consumers value **consumption smoothing**.

How To Describe Utility in All States of the World

- Suppose it is either sunny or snowing
- If sunny
 - It is sunny p of the time, $0 \leq p \leq 1$
 - Your utility is a
- If snowing
 - It snows $(1 - p)$ of the time
 - Your utility is b
- How can we write your utility in one equation?

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- How can we write your utility in one equation?
$$E(U) = pa + (1 - p)b$$

Insurance Framework

- 2 future states of the world
 - good
 - bad
- You pay premiums to get help in the bad state of the world

Insurance Framework, More Detail

- First pay premiums mb , where $0 \leq m \leq 1$
- Then you learn the future
 1. Bad state occurs
 - occurs with probability p
 - $0 \leq p \leq 1$
 - receive benefits b
 2. Good state occurs
 - occurs with probability $(1 - p)$
 - you get nothing from the insurer
- In total, you get

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 - receive benefits b
 2. Good state occurs
 - occurs with probability $(1 - p)$
 - you get nothing from the insurer
- In total, you get $(p)b + (1 - p)0 - mb$

Calculating Insurer Payout

- Before the good or bad state is realized insurer receives premiums: mb

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 - you lose premiums mb
 - on net: $b - mb$

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 - occurs with probability p

What the Insurer Gets

Insurer gets

$$E(\text{earnings in good state}) + E(\text{earnings in bad state}) =$$

What the Insurer Gets

Insurer gets

$$\begin{array}{rcl} E(\text{earnings in good state}) & + & E(\text{earnings in bad state}) = \\ (1 - p)(mb) & + & p(mb) - p(b) = \end{array}$$

What the Insurer Gets

Insurer gets

$$\begin{aligned} E(\text{earnings in good state}) &+ E(\text{earnings in bad state}) = \\ (1-p)(mb) &+ p(mb) - p(b) = \\ &mb - pb \end{aligned}$$

How Much Should Insurer Charge?

- Assume no administrative costs and no profits
- **Actuarially fair premium** defined as premium such that total premiums collected = total benefits paid out
- Total premiums collected = mb
- Total premiums paid out = pb
- Then actuarially fair premium is m such that $mb = pb$

Example with Many People

Which is How Insurance Should Work

- Suppose a 1% chance of an accident, or $p = 0.01$
- Suppose the payout is \$30,000
- Expected cost is $30,000(0.01) = 300$
- Insurer can break even by collecting \$300 from 100 people, and paying \$30,000 once

Example to Show Value of Insurance

- You might get hit by a car
 - With probability $p = 0.99$ you don't get hit
 - With probability $p = 0.01$ you get hit
- Usually you work and earn \$30,000
- If you get hit, you can't work and earn \$0

Value of Insurance

What is Expected Utility?

Insurance Decision	State of the World	Consmpt.	$U = C^{1/2}$	$E(U)$
No insurance	Not hit by a car, $p = 0.99$	\$30,000	173.2	
	Hit by a car, $(1 - p) = 0.01$	\$0	0	

Value of Insurance

Again, What is Expected Utility?

Insurance Decision	State of the World	Consmpt.	$U = C^{1/2}$	$E(U)$
No insurance	Not hit by a car, $p = 0.99$	\$30,000	173.2	$(0.99)173.2 +$ $(0.01)0$ $= 171.5$
	Hit by a car, $(1 - p) = 0.01$	\$0	0	
Full insurance for \$300	Not hit	\$29,700	172.3	
	Hit	\$29,700	172.3	

Value of Insurance

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No insurance	Not hit by a car, $p = 0.99$	\$30,000	173.2	$(0.99)173.2 +$
	Hit by a car, $(1 - p) = 0.01$	\$0	0	$(0.01)0$ $= 171.5$
Full insurance for \$300	Not hit	\$29,700	172.3	$(0.99)172.3 +$
	Hit	\$29,700	172.3	$(0.01)172.3$ $= 172.33$
Partial insurance, \$150	Not hit	\$29,850	172.8	
	Hit	\$14,850	121.9	

Value of Insurance

With Actuarially Fair Premiums, People Always Want Insurance

Insurance Decision	State of the World	Consp.	$U = C^{1/2}$	$E(U)$
No insurance	Not hit by a car, $p = 0.99$	\$30,000	173.2	$(0.99)173.2 +$
	Hit by a car, $(1 - p) = 0.01$	\$0	0	$(0.01)0$ $= 171.5$
Full insurance for \$300	Not hit	\$29,700	172.3	$(0.99)172.3 +$
	Hit	\$29,700	172.3	$(0.01)172.3$ $= 172.33$
Partial insurance, \$150	Not hit	\$29,850	172.8	$(0.99)172.8 +$
	Hit	\$14,850	121.9	$(0.01)121.9$ $= 172.28$

What About Risk Aversion?

- We just learned that even if you don't worry about the future, you want insurance to smooth consumption
- If you are nervous about the future – “risk averse” – you want insurance even more

Why Have *Social* Insurance?

Asymmetric Information and Adverse Selection

Why Social Insurance Rather than Private Insurance?

- We just learned that people want insurance
- Why don't they just buy it privately?
- Asymmetric information causes problems of adverse selection
- Adverse selection may lead to market failure and suggests a role for government intervention.

Asymmetric Information

- When sellers and buyers not do have the same information
- Examples?

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- Examples?
- Nobel-prize winning example in economics: “Market for Lemons”
 - Suppose the quality of used cars is quite variable
 - Sellers know the quality of their cars
 - Buyers can't figure out the quality of the seller's car
 - \implies market for used cars is too small, and prices are too low

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 - Or, there is a market failure

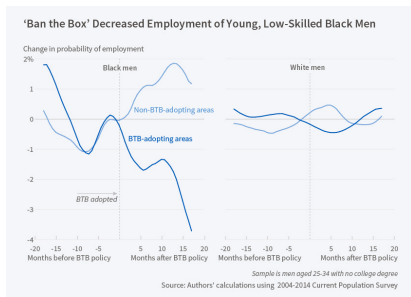
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Asymmetric information can cause market failure.

Asymmetric Information May Hinder Employment

NBER Working Paper 22469, Doleac and Hansen



- Some states made it illegal to ask about prior convictions on job applications
- Increases information asymmetry between employer and employee
- Employers respond by “statistically discriminating”
- → market failure

An Example of How Asymmetric Information Causes Insurance Markets to Fail

- Each person earns \$30,000 per year and loses this income if he has an accident
- There are two types of guys: careful and careless
 - Careful people have accidents with $p = 0.005$
 - Careless people have accidents with $p = 0.05$
- 100 of each type
- Each person always knows if he is careless or careful

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- 100 of each type
- Each person always knows if he is careless or careful
- We'll assess three cases
 1. Insurer knows consumers' types
 2. Insurer does not know consumers' types, offers actuarially fair premiums
 3. Insurer does not know consumers' types, offers the average premium

How Asymmetric Information Causes Markets to Fail

What are Total Premiums?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
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Full	Sep.	1,500	150			
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How Asymmetric Information Causes Markets to Fail

How Much Does the Insurer Pay Out?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500		
Full	Sep.	1,500	150	+(100)150		
				= 165,000		

How Asymmetric Information Causes Markets to Fail

Profits?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	
				= 165,000	= 165,000	

How Asymmetric Information Causes Markets to Fail

As Good as It Gets

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	

How Asymmetric Information Causes Markets to Fail

With Partial Information and Separate Pricing: Premiums?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	

Asym. Sep. 1500 150

How Asymmetric Information Causes Markets to Fail

With Partial Information and Separate Pricing: Benefits?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	
				(0)1500		
Asym.	Sep.	1500	150	+(200)150		
				= 30,000		

How Asymmetric Information Causes Markets to Fail

With Partial Information and Separate Pricing: Profits?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	
				(0)1500	(0.05)(100)(30000)	
Asym.	Sep.	1500	150	+(200)150	+(0.005)(100)(30000)	
				= 30,000	= 165,000	

How Asymmetric Information Causes Markets to Fail

Not a Long Run Solution

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	
				(0)1500	(0.05)(100)(30000)	
Asym.	Sep.	1500	150	+(200)150	+(0.005)(100)(30000)	-135,000
				= 30,000	= 165,000	

How Asymmetric Information Causes Markets to Fail

With Partial Information and Average Pricing: Premiums?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	

How Asymmetric Information Causes Markets to Fail

With Partial Information and Average Pricing: Benefits?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	

Asym.	Av.	825	825
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How Asymmetric Information Causes Markets to Fail

With Partial Information and Average Pricing: Profits?

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	
				(100)825		
Asym.	Av.	825	825	+(0)825		
				= 82,500		

How Asymmetric Information Causes Markets to Fail

Again, Not a Long Run Solution

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	
				(100)825	(0.05)(100)(30000)	
Asym.	Av.	825	825	+(0)825	+(0.005)(0)(30000)	
				= 82,500	= 150,000	

How Asymmetric Information Causes Markets to Fail

Info	P'ing	C'less prem.	C'ful prem.	Total Prem.	Ben. Paid	Net π
				(100)1500	(0.05)(100)(30000)	
Full	Sep.	1,500	150	+(100)150	+(0.005)(100)(30000)	0
				= 165,000	= 165,000	
				(100)825	(0.05)(100)(30000)	
Asym.	Av.	825	825	+(0)825	+(0.005)(0)(30000)	-67,500
				= 82,500	= 150,000	

Adverse Selection

- You may know more about your personal risk than the insurer
- Therefore you choose insurance with your personal risk in mind
- This selection choice of the risky into insurance is adverse selection
- \implies insurance market unravels

Dental “Insurance” and Adverse Selection

- How does dental insurance work?

Dental “Insurance” and Adverse Selection

- How does dental insurance work?
- Why doesn't it insure anything?
 - Cabral (2013) shows that people opt into insurance and then get treatment when insurance starts
 - Most dental care can wait (though perhaps painfully)
 - This is adverse selection in dental insurance
 - And why we don't have actual dental insurance, just pre-paid plans called “insurance”

Does Asymmetric Information Necessarily Lead to Market Failure?

- If people are very risk averse, they want to buy insurance even if it is actuarially unfair
- Then both the sick and the healthy buy the same insurance
 - **Pooling equilibrium**
 - No market failure

Does Asymmetric Information Necessarily Lead to Market Failure?

- If people are very risk averse, they want to buy insurance even if it is actuarially unfair
- Then both the sick and the healthy buy the same insurance
 - **Pooling equilibrium**
 - No market failure
- Suppose the insurance market offers different products at different prices
 - Expensive, better insurance should appeal to sick guys

Does Asymmetric Information Necessarily Lead to Market Failure?

- If people are very risk averse, they want to buy insurance even if it is actuarially unfair
- Then both the sick and the healthy buy the same insurance
 - **Pooling equilibrium**
 - No market failure
- Suppose the insurance market offers different products at different prices
 - Expensive, better insurance should appeal to sick guys
 - Cheaper, worse insurance should appeal to healthy guys
 - **Separating equilibrium**
 - But is a market failure if healthy guys want more coverage at lower, actuarially fair price

Fixing Problems of Adverse Selection

- Force people to buy insurance
- This allows healthy to subsidize sick
- Obviously quite unpopular

Additional Reasons for Government Intervention in Insurance Markets

Other Reasons for Government Intervention in Insurance Markets

- Externalities
- Administrative costs
- Redistribution
- Paternalism

Social Insurance vs. Self-Insurance: How Much Consumption Smoothing?

Social Insurance vs. Self-Insurance

- We've learned that market insurance may not be available
- So what can a person do instead?

Social Insurance vs. Self-Insurance

- We've learned that market insurance may not be available
- So what can a person do instead? self-insurance
 - Rainy day fund
 - Borrow from relatives
 - Get a home equity loan
 - Run up your credit card

Relationship Between Self-Insurance and Social Insurance

- The more generous the social insurance, what happens to self-insurance?

Relationship Between Self-Insurance and Social Insurance

- The more generous the social insurance, what happens to self-insurance?
- Self-insurance declines with more generous social insurance
- We can say that social insurance “crowds out” self-insurance
- Examples?

Relationship Between Self-Insurance and Social Insurance

- The more generous the social insurance, what happens to self-insurance?
- Self-insurance declines with more generous social insurance
- We can say that social insurance “crowds out” self-insurance
- Examples?
 - Lowered savings if you lose your job, given unemployment insurance
 - Lowered savings for old-age health claims, given Medicare

Social Insurance Most Valuable When

- Event is unpredictable
- Cost of event is high

Social Insurance Most Valuable When

- Event is unpredictable
- Cost of event is high

Self-insurance is good for predictable, low cost events (examples?).

Moral Hazard Problems Caused by Insurance

The Problem of Flood Insurance

Or, The Samaritan's Dilemma

- Disaster hits, perhaps a flood
- Government responds regardless of insured status
- Person in flood plain thinks “why should I buy insurance?”
- Appears to be sufficient information for flood insurance market
- This is a “moral hazard” problem

Moral Hazard

- Moral hazard problem \equiv adverse actions taken by individuals or producers in response to insurance against adverse outcomes
- For example, because you have health insurance, you are less careful of your fingers when chopping onions
- Other examples?

Moral Hazard

- Moral hazard problem \equiv adverse actions taken by individuals or producers in response to insurance against adverse outcomes
- For example, because you have health insurance, you are less careful of your fingers when chopping onions
- Other examples?
 - Many examples of workers' compensation (insurance for workplace injury) fraud
 - Getting more medical tests than you would otherwise because you are insured

What Determines Moral Hazard?

- Asymmetric information
 - For example, the insurer can't verify or disprove your claim of injury

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What Determines Moral Hazard?

- Asymmetric information
 - For example, the insurer can't verify or disprove your claim of injury
- Ease of changing behavior to establish adverse event
 - You can get in a car crash to get money for damages, but you probably don't want to get in a car crash
 - But you can pretend that you have a back or neck injury without causing any harm

Consequences of Moral Hazard

1. It modifies the production of the good being insured
 - too little labor is supplied when there is unemployment insurance or workers' compensation
 - too much health care is supplied with health insurance
2. More expenditures on social insurance means more tax raising; this comes at a cost of discouraging labor effort

In Sum, and The Right Role for Government

Social Insurance, In Sum

1. People value insurance because they prefer smooth consumption, all else equal
2. Private market may fail to provide insurance, possibly because of adverse selection
3. Social insurance is valuable to the extent that self-insurance is infeasible
4. Expanding insurance coverage comes at a cost of moral hazard in inducing adverse behavior

Social Insurance, In Sum

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Optimal insurance balances consumption smoothing benefits with moral hazard costs,

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4. Expanding insurance coverage comes at a cost of moral hazard in inducing adverse behavior

Optimal insurance balances consumption smoothing benefits with moral hazard costs, and should not completely insure individuals against adverse events.

Today: Social Insurance

- What is insurance?
- Why do people want insurance?
- Why might the government provide it?
- How much to insure?
- Moral hazard