Social Insurance
(Chapter-12)
Part-1
Social Insurance
Background

• Dramatic change in the composition of government spending in the U.S. over time
Social Insurance

Background

• **Social insurance programs:** Government interventions in the provision of insurance against adverse events.
  
  – Social security: provides insurance against earnings loss due to death or retirement.
  
  – Unemployment insurance: provides insurance against job loss.
  
  – Disability insurance: provides insurance against career-ending disability.
  
  – Workers’ compensation: provides insurance against on-the-job accidents.
  
  – Medicare: provides insurance against medical expenditures at an old age.
Social Insurance

Background

• Social insurance programs have several common features:
  – Workers participate by ‘buying’ insurance through payroll taxes or through mandatory contributions. Such contributions make them eligible if some measurable event occurs.
  – Eligibility is not means-tested: eligibility does not depend on one’s level of current income or assets.
Social Insurance

Background

• Social insurance programs in general
• The potential failures in the private provision of insurance that warrant government intervention
• In following chapters, specific insurance programs
Social Insurance

Significance of Insurance

• What is insurance?
  – Individuals pay money to an insurer called **insurance premiums**.
  – The insurer, in return, promises to make some payment to the insured party or to others providing the services to the insured party when a particular event or a series of events occur.

• Some examples:
  – Health insurance, auto insurance, life insurance, casualty and property insurance.
Social Insurance
Significance of Insurance

• Why do individuals prefer insurance?
  – Diminishing marginal utility implies that individuals prefer two years of average consumption to one year of excessive consumption.
  • The change in utility from an increase in consumption from $30,000 to $50,000 is smaller than a decline in consumption from $30,000 to $10,000.
  – Therefore, individuals prefer consumption smoothing: they want to translate consumption from periods when it is high to periods when it is low.
  – When there is uncertainty, people want to smooth their consumption over possible outcomes.
Social Insurance
Significance of Insurance

• Expected Utility Model
  – The weighted sum of utilities across states of the world, where the weights are the probabilities of each state occurring.

\[
EU = (1-p) \times U(\text{consumption with no adverse event}) + p \times U(\text{consumption with adverse event})
\]

  – The individual will choose the option that provides the highest expected utility.
Social Insurance
Significance of Insurance

• Expected Utility Model
  – Example: Assume that there is 1% chance that Sam will be hit by a car next year.
  – If he gets hit by a car, he will have zero consumption, since he will spend all of his income ($30,000) on medical expenditures
  – If he does not get hit by a car, he will have a consumption of $30,000.
Social Insurance
Significance of Insurance

• Expected Utility Model
  – Example: Assume that Sam’s utility function is \( U(C) = C^{0.5} \) where \( C \) is Sam’s consumption level.
  – Sam has three options:
    • No insurance
    • Full insurance for which he needs to pay $300 annually, but covers the entire medical expenses.
    • Partial insurance for which he needs to pay $150 annually and covers half of the medical expenses.
  – **Actuarially fair premium**: Insurance premium that is set equal to the insurer’s expected payout.
  – What should Sam do?
Social Insurance
Significance of Insurance

• Expected Utility Model

<table>
<thead>
<tr>
<th>TABLE 12-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Expected Utility Model</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If Sam . . .</th>
<th>And Sam is . . .</th>
<th>Consumption (C)</th>
<th>Utility $\sqrt{C}$</th>
<th>Expected Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doesn't buy insurance</td>
<td>Not hit by a car ($p = 99%)$</td>
<td>$30,000$</td>
<td>$173.2$</td>
<td>$0.99 \times 173.2 + 0.01 \times 0 = 171.5$</td>
</tr>
<tr>
<td></td>
<td>Hit by a car ($p = 1%)$</td>
<td>$0$</td>
<td>$0$</td>
<td>$0$</td>
</tr>
<tr>
<td>Buys full insurance (for $300$)</td>
<td>Not hit by a car ($p = 99%)$</td>
<td>$29,700$</td>
<td>$172.34$</td>
<td>$0.99 \times 172.34 + 0.01 \times 172.34 = 172.34$</td>
</tr>
<tr>
<td></td>
<td>Hit by a car ($p = 1%)$</td>
<td>$29,700$</td>
<td>$172.34$</td>
<td>$172.34$</td>
</tr>
<tr>
<td>Buys partial insurance (for $150$)</td>
<td>Not hit by a car ($p = 99%)$</td>
<td>$29,850$</td>
<td>$172.77$</td>
<td>$0.99 \times 172.77 + 0.01 \times 121.86 = 172.26$</td>
</tr>
<tr>
<td></td>
<td>Hit by a car ($p = 1%)$</td>
<td>$14,850$</td>
<td>$121.86$</td>
<td>$121.86$</td>
</tr>
</tbody>
</table>
Social Insurance

Significance of Insurance

• Expected Utility Model
  – Full insurance is optimal when the premium is actuarially fair.

  – Risk aversion: The extent to which individuals are willing to bear risk.
  – The more risk-averse individual is, the higher he will be willing to pay for insurance.
Social Insurance
Why social insurance?

• The private insurance market will fail due to the following conditions:
  – Asymmetric Information
  – Externalities
  – Administrative costs
  – Redistribution
  – Paternalism
Social Insurance

Why social insurance?

• **Asymmetric information:** The difference in information that is available to sellers and to purchasers in a market.
  – Example: used cars
  – Sellers have more information about their cars, which they might misreel, than buyers.
  – As a result, the demand for used cars is low and sellers on average receive less than what their cars are worth.
Social Insurance
Why social insurance?

• Asymmetric information
  – In the insurance market, the information asymmetry is reversed: insurance buyers know more about their risks than the insurance seller does.
  – If this is the case, the insurer will be unwilling to sell insurance or charge more than socially optimal to cover the cost of uncertainty.
Social Insurance
Why social insurance?

• **Asymmetric information**
  – Example: Assume that there are two types of individuals, each with 100 persons
    • Careless who does not pay much attention when crossing the street. The probability of getting hit by a car is 5%
    • Careful: the probability of getting hit by a car is 0.5%
    • The cost of getting hit by a car is still $30,000.
Social Insurance
Why social insurance?

• **Asymmetric information**
  – Example: Examine the situation under three scenarios:
    • Full information
    • Asymmetric information with fair pricing
    • Asymmetric information with average pricing
Social Insurance

Why social insurance?

• Asymmetric information

<table>
<thead>
<tr>
<th>TABLE 12-2</th>
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</thead>
</table>

**Insurance Pricing with Separate Groups of Consumers**

<table>
<thead>
<tr>
<th>Information</th>
<th>Pricing Approach</th>
<th>Premium per Careless (100 people)</th>
<th>Premium per Careful (100 people)</th>
<th>Total Premiums Paid</th>
<th>Total Benefits Paid Out</th>
<th>Net Profits to Insurers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>Separate</td>
<td>$1,500</td>
<td>$150</td>
<td>$165,000 (100 × $1,500 + 100 × $150)</td>
<td>$165,000</td>
<td>0</td>
</tr>
<tr>
<td>Asymmetric</td>
<td>Separate</td>
<td>$1,500</td>
<td>$150</td>
<td>$30,000 (0 × $1,500 + 200 × $150)</td>
<td>$165,000</td>
<td>−$135,000</td>
</tr>
<tr>
<td>Asymmetric</td>
<td>Average</td>
<td>$825</td>
<td>$825</td>
<td>$82,500 (100 × $825 + 0 × $825)</td>
<td>$150,000</td>
<td>−$67,500</td>
</tr>
</tbody>
</table>
Social Insurance

Why social insurance?

• **Adverse selection:** The fact that insured individuals know more about their risk level than does the insurer might cause those most likely to have adverse outcome to select insurance, leading insurers to lose money if they offer insurance.
Social Insurance

Why social insurance?

• Does asymmetry necessarily lead to market failure?
  – If some individuals are more risk-averse than others, they might be willing to pay more than the actuarially fair premium.
  – For instance, with the average pricing in the previous example, careful individuals, if risk-averse enough, might purchase insurance.
Social Insurance
Why social insurance?

• Does asymmetry necessarily lead to market failure?
  – **Pooling equilibrium**: A market equilibrium in which all types of people buy full insurance even though it is not fairly priced to all individuals.
Social Insurance

Why social insurance?

• Does asymmetry necessarily lead to market failure?
  – Even if there is no pooling equilibrium, the insurance company may address adverse selection by offering separate products at separate prices.
  – Assume that the insurance company offered two options:
    • Full coverage for $30,000 of medical costs at $1,500 premium
    • The coverage of up to $10,000 of medical expenses at a price of $50.
Social Insurance
Why social insurance?

• Does asymmetry necessarily lead to market failure?
  – It is quite likely that the careless individuals will not prefer the second option given their high accident risk.
  – If careless purchase the first option and the careful purchase the second, we have a **separating equilibrium** in which different types of people buy different kinds of insurance products designed to reveal their true types.
Social Insurance

Why social insurance?

• Does asymmetry necessarily lead to market failure?
  – However, separating equilibrium is not socially efficient, since the careful individuals are not getting their first choice: full coverage at the lower premium equal to the actuarially fair price.
Social Insurance
Why social insurance?

• **Externalities**
  – It is quite likely that the underinsured will impose negative externalities on the insured.
    • Example: car insurance

• **Administrative costs**
  – If the administrative costs of the private insurer, which are typically higher than that for public insurer, increase the premiums, some individuals might not get insurance.
Social Insurance

Why social insurance?

• **Redistribution**
  – Government may want to intervene in the insurance market to redistribute the cost of insurance among households with different income levels.

• **Paternalism**
  – Even if it is beneficial for the individual to buy insurance, they might not do so. By forcing individuals to buy insurance, government can correct this problem.
Social Insurance
How does government intervene?

• By forcing individuals to get insured. (auto insurance)
• By providing the insurance itself. (medicare)
• By providing subsidies to individuals to get private insurance.