Health Insurance, Moral Hazard, and Managed Care

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Motivation: Moral Hazard Problem

It is commonly believed that health insurance can lead to excessive treatment uptake:

- **Moral hazard**: occurs in situations where two parties with different incentives interact:
  - Each party maximizes their own expected payoff $\rightarrow$ they act in their own best interest
  - When one party does not bear the full cost of their actions, they do not have incentives to act optimally
  - Can lead to inefficient and undesirable outcomes
- **Ex:** Patients with health insurance may over-use health services since they face lower costs $\rightarrow$ inefficient if the total cost of these services exceeds the benefits

Motivation: Moral Hazard Problem

- **Demand management instruments** have been used to limit patients' demand for health care:
  - Commonly used instruments include *deductibles* and *copayments*
  - These instruments shift a portion of the treatment cost to the patient $\rightarrow$ When deciding whether to receive treatment, patients now consider the cost of that treatment
  - Their incentives are more closely aligned with the insurance providers' $\rightarrow$ avoids excessive demand for treatment
- These instruments can also expose patients to significant financial risk in cases where expensive treatments are necessary

Research Question

- It is widely believed that demand management does not solve the moral hazard problem $\rightarrow$ demand for treatment still excessive
- A more nuanced understanding of health insurance design is necessary:
  - Treatment not always excessive under demand management $\rightarrow$ need to characterize conditions in which it is
  - Other instruments, such as *supply management* instruments, may be more effective

Research Question

Does moral hazard always lead to excessive treatment? How do different insurance arrangements affect consumers' treatment decisions and welfare?

Basic Model

Consumer Preferences:

$$U(y - al) - bl$$

- l: illness severity
- $U(\cdot)$: concave function $\rightarrow$ consumers risk-averse to income fluctuations
- y: expenditure on other goods
- a, b: non-negative parameters, allow for 'special cases'

Special Cases:

1. Monetary Loss Model: $b = 0$ and $a > 0$
2. Utility Loss Model: $a = 0$ and $b > 0$

Evaluation of Model

1. **Monetary Loss Model**
   - Implies health losses fully represented by their monetary equivalent
   - Demand for treatment will be independent of income $\rightarrow$ unrealistic assumption for discretionary treatments

2. **Utility Loss Model**
   - Health losses directly reduce utility
   - Demand for treatment not independent of income $\rightarrow$ more realistic assumption supported by empirical evidence
   - Assumes illness does not affect income risk-aversion $\rightarrow$ difficult to test empirically

Ideal Insurance

- Consumer pays fixed premium P and receives treatment whenever the benefit I is above a fixed threshold, L. When treatment is withheld, consumer compensated with indemnity payment $t(I)$
- They become ill with probability λ
- There is no moral hazard:
  - I is observed $\rightarrow$ Illness and loss completely contractible
  - Payments and treatment decisions can be contingent on the severity of the illness

Ideal Insurance

The consumer's expected utility will be given by:

$$(1-\lambda)U(Y-P) + \lambda\left\{\int_0^L [U(Y-P-a\ell+t(\ell))-b\ell]f(\ell)d\ell+[1-F(L)]U(Y-P)\right\}.$$

The premium must cover the expected costs of treatment and the indemnity payments:

$$P \geq \lambda\left(\int_0^L t(\ell)f(\ell)\,d\ell + [1-F(L)]C\right).$$

Ideal Insurance

Optimal Contract: Maximizes consumer's expected utility subject to the premium constraint $\rightarrow$ yields optimal **treatment threshold**, **indemnity payments**, and **premium**:

$$U'(Y - P^*)aL^* + bL^* = U'(Y - P^*)C;$$

- Utility of treatment exactly equal to cost of treatment, measured in utility
- Indemnity payments exactly compensate for monetary losses from untreated illness
- Premium exactly covers expected costs
- Fewer patients receive treatment when the cost is higher

Demand Management

- Consumer pays fixed premium P up front and copayment D for treatment $\rightarrow$ demand treatment whenever the benefits exceed the utility cost of the copayment
- They become ill with probability λ
- Moral hazard may be an issue here:
  - Insurance company does not directly observe illness $\rightarrow$ illness and loss no longer contractible
  - Treatment decision delegated to consumer
  - Since a portion of the total cost is shifted to the insurer, consumers may demand treatment when the cost exceeds the benefit

Demand Management

The consumer's expected utility will be given by:

$$(1-\lambda)U(Y-P)$$
$$+\lambda\left(\int_0^L [U(Y-P-a\ell)-b\ell]f(\ell)d\ell+[1-F(L)]U(Y-P-D)\right).$$

Consumers demand treatment whenever the benefits exceed the utility cost of copayment $\rightarrow$ occurs when illness severity exceeds threshold L

$$U(Y-P-aL)-bL=U(Y-P-D).$$

The premium must cover the expected liability of the insurance company:

$$P=\lambda[1-F(L)](C-D).$$

Demand Management

Optimal Contract: Maximizes consumer's expected utility subject to the consumer's constraint and the premium constraint $\rightarrow$ yields optimal **copayment**, **premium**, and **treatment thresholds**:

$$-\Bigg((1-\lambda)U'(Y-P)+\lambda\int_0^L U'(Y-P-a\ell)f(\ell)\,d\ell + \lambda[1-F(L)]U'(Y-P-D)\Bigg)\frac{dP}{dD}=\lambda[1-F(L)]U'(Y-P-D),$$

- Expected utility cost of a marginally higher copayment (resulting from income risk) = corresponding benefit of a lower premium
- Optimal copayment depends on consumer's risk aversion and on price-elasticity of demand for treatment $\rightarrow$ depends on the curvature of the utility function
- Consumers do not demand treatment for less severe illnesses

Does Moral Hazard Affect Treatment?

The authors compare the treatment threshold L under:

1. Ideal Insurance $\rightarrow$ no moral hazard exists; used to identify the optimal threshold
2. Demand Management $\rightarrow$ moral hazard is now a concern; consumers may choose a different treatment threshold

This can be used to identify whether treatment is excessive or deficient under moral hazard.

Does Moral Hazard Affect Treatment?

When probability of illness (λ) is small:

1. **Monetary Loss Model:** $b = 0$ and $a > 0$
   - Illness equivalent to a loss of monetary income
   - The threshold L is lower under demand management
     $\rightarrow$ Moral hazard leads to excessive treatment

2. **Utility Loss Model:** $a = 0$ and $b > 0$
   - Illness results in an additive utility loss
   - The threshold is lower than ideal when the price elasticity of demand is low
     $\rightarrow$ moral hazard leads to excessive treatment
   - The threshold is higher than ideal when the price elasticity of demand is sufficiently high
     $\rightarrow$ moral hazards leads to deficient treatment

Strengths and Weaknesses

Strengths:

1. **Theoretical Contribution:** The authors show that established beliefs about moral hazard are incorrect under certain conditions $\rightarrow$ improves understanding of this topic
2. **Model:** The model is tractable but incorporates several realistic elements, including illness severity and income risk-aversion $\rightarrow$ this allows for better understanding of the mechanisms influencing treatment decisions
3. **Relevant Topic:** The topic of this paper is very policy relevant $\rightarrow$ can be used to inform better health insurance design

Strengths and Weaknesses

Weaknesses:

1. **Unrealistic Assumptions:** many assumptions are difficult to justify
   - Possible that illness affects risk-aversion
   - Treatment may not be 100% effective or completely eliminate losses
   - Focuses on consumers $\rightarrow$ simplifies provision of health insurance

   $\rightarrow$ If these assumptions are unrealistic, predictions made by the model may not be accurate.

2. **Limited Empirical Evidence:** the authors do not provide evidence to support their findings
   - Comparing health insurance claims under demand management and managed care plans could provide additional support for their findings
   - Do not consider which parameter values (a and b) best fit consumer behaviour

Conclusion

Overall, this paper makes an important contribution to the literature:

- The authors challenge commonly-held beliefs about the role of moral hazard in treatment decisions, and demonstrate that this topic is more nuanced than originally thought
- Their findings serve as an important starting point for future research, including:
  - Extending the model to more accurately reflect treatment decisions
  - Providing empirical evidence to support the conclusions made in this paper

Thank you for listening!