

Social insurance: moral hazard

Definition – Moral hazard is the adverse behavior taken by individuals or producers in response to insurance against adverse outcomes.

Source: Gruber, J. (2016) *Public Finance & Public Policy*

Intuition – The world is risky: negative events occur at random all the time. People can receive insurance from the government to minimize the impact of these randomly occurring negative outcomes. This government-provided insurance is called **social insurance**. However, when individuals are insured against negative outcomes they may not try as hard to avoid those negative outcomes. We call this **moral hazard**. In the case of social insurance, moral hazard manifests as fraudulent insurance claims, higher expenditures when negative outcomes occur, failure to reduce risk, and longer periods of time in negative state.

Mathematical / Technical

- To illustrate moral hazard with a mathematical model, consider an employee who may receive worker's compensation (WC). WC is a type of social insurance where the government pays workers a portion of their income if an on-the-job injury makes them unable to work.
- Model:** The individual puts in an amount of effort E to reduce the probability of getting injured. The probability of injury is given by $p(E) = 1 - E^2$, where E goes from 0 (no effort) to 1 (high effort). The individual's utility is $U(C, E) = \sqrt{C} - 50E$, where C is the consumption level. Note that utility increases with consumption and decreases with effort.
- Goal:** Find the optimal effort when there is no insurance and the person's wage is \$10,000 if the adverse event does not occur or \$0 if the adverse event occurs. Find the expected utility and maximize it.

$$E[U] = \underbrace{p(E) * U(0, E)}_{\text{adverse event}} + \underbrace{(1 - p(E)) * U(10000, E)}_{\text{no adverse event}}$$

$$E[U] = (1 - E^2) * (\sqrt{0} - 50E) + E^2 * (100 - 50E)$$

$$E[U] = -50E + 50E^3 + 100E^2 - 50E^3 = -50E + 100E^2$$

- To maximize utility, the worker will put in maximum effort, or $E = 1$.
- Now, consider a WC benefit $b = \$5,625$, that the government pays out if the adverse event occurs. Find the optimal effort again.

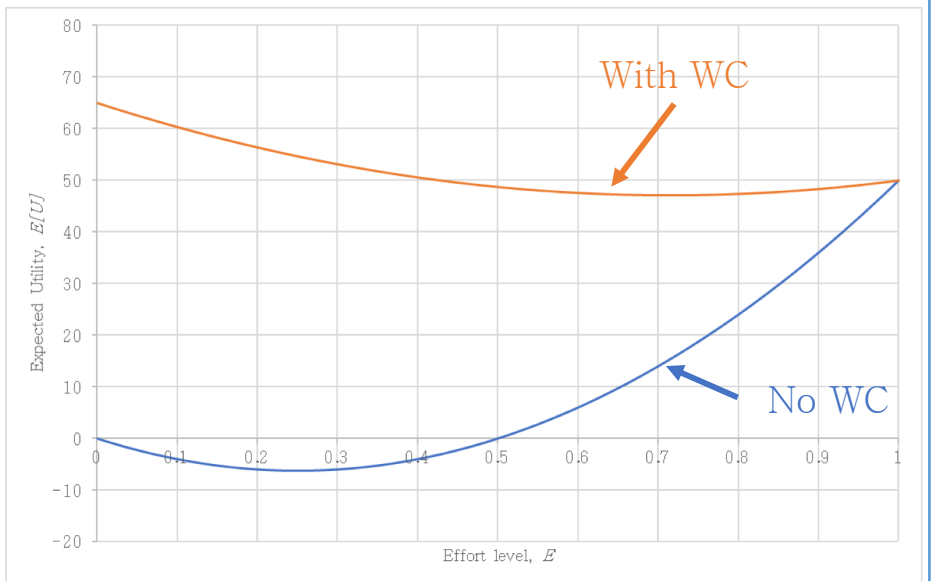
$$E[U] = p(E) * U(5625, E) + (1 - p(E)) * U(10000, E)$$

$$E[U] = (1 - E^2) * (75 - 50E) + E^2 * (100 - 50E)$$

$$E[U] = 75 - 75E^2 - 50E + 50E^3 + 100E^2 - 50E^3$$

$$E[U] = 75 - 50E + 25E^2$$
- Now to maximize utility, the worker will put in minimum effort, or $E = 0$. Moral hazard has occurred, since the existence of the social insurance caused the individual to **decrease their effort into avoiding an injury**, thereby **increasing the risk of an adverse event**.
- A similar outcomes occurs for the other forms of moral hazard: increased time spent or increased expenditures in the adverse state.

Graphical – Worker's Compensation



The utility tradeoff for an individual based on the amount of effort they put in to avoid being injured. Introducing WC can shift expected utility, increasing risk of injury.

Real-world aspects

Worker's compensation (WC): Researchers have identified two kinds of moral hazard with respect to WC. First, workplaces are less likely to reduce risk when WC is offered. Second, workers are more likely to falsely report workplace injuries, such as by claiming that a non-workplace injury occurred on the job.^a

Unemployment insurance: Studies suggest that “a 10% increase in unemployment benefits raises average unemployment durations by 4–8% in the US.”^b Many argue that moral hazard plays a role in this increase.

Health insurance: Studies show that reduced health care costs from insurance do in fact increase overall healthcare spending,^c though there is some debate over whether this increase can be attributed to moral hazard.^d

Conclusion: The existence of moral hazard does not mean we should get rid of social insurance altogether because it still has clear benefits. However, careful planning has to be undertaken to minimize the social costs of moral hazard, such as by creating incentives to reduce risk.

Sources: ^a Bolduc, D., et al. (2001) *The Journal of Human Resources*, ^b Chetty, R. (2008) *Journal of Political Economy*, ^c Einav, L., Finkelstein, A. (2018) *Journal of the European Economic Association*, ^d Nyman, J. (2004) *Health Affairs*

Practice questions

- Describe ways insurance providers – including the government – can reduce moral hazard in health insurance.
- Considering the worker's compensation example in the mathematical/technical section, predict which direction the effort level will move if benefits dropped to \$1,600. Show that your prediction is correct by solving for E .
- An individual without health insurance is choosing how many units of healthcare to buy. Their demand is given by $Q_d = 10 - 2P$, and the marginal cost for healthcare is given by $Q_s = 2 + 2P$.
 - Find the equilibrium price and quantity.
 - Suppose the individual receives full insurance, such that their healthcare cost is \$0 per unit. What quantity of healthcare will the individual consume? Argue that moral hazard has occurred.

Numerical solutions: **2.** E rises to 1. ; **3A.** $P = \$2$, $Q = 6$ units ; **3B.** $Q = 10$ units. An inefficient outcome: for units 7 – 10, $MC > MB$.