

# Micro Insurance

**SUBMITTED BY:** Nina Hoe, University of Pennsylvania

**SUBJECT(S):** Computation

**GRADE LEVEL(S):** 9, 10, 11, 12

## ≡ OVERVIEW:

This lesson begins with a discussion of insurance, and specifically micro insurance and its function. Students learn the meaning of several key vocabulary terms having to do with insurance in general and read a Knowledge@Wharton article about micro insurance. Students complete several computation problems involving a micro insurance policy breaking even, and think about the relationship between the premium, the payout, the number of policyholders and the likelihood of an event/disaster taking place.

## ≡ NBEA STANDARD(S):

- Computation, I. Mathematical Foundations
- Computation, II. Number Relationships and Operations
- Computation, III. Patterns, Functions, and Algebra
- Computation, VI. Problem-Solving Applications

## Common Core Standard(s):

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context
- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

## Objectives/Purposes:

- Students learn the meaning of insurance, micro insurance and several key insurance related terms.
- Students calculate break-even points of micro insurance policies.
- Students discuss the function and design of micro insurance policies.

**Knowledge@Wharton Article:** [“Micro Insurance: A Safety Net With Too Many Holes?”](#)

**Other Resources/Materials:** Calculators

**Activity:**

1. *Whole Class Discussion: (10 – 15 mins)*

1. What is insurance?  
*(a practice or arrangement by which a company or government agency provides a guarantee of compensation for specified loss, damage, illness, or death in return for payment of a premium; a risk management system under which individuals, businesses, and other organizations or entities, in exchange for payment of a sum of money (a premium), share the risk of possible financial loss through guaranteed compensation for losses resulting from certain perils under specified conditions.)*
2. What is a premium?  
*(an amount to be paid for an insurance policy)*
3. Why do people get insurance? What types of insurance exist?  
*(To protect against unforeseen damage or loss – make a list on the board of different types of insurance – auto, health, life, property, etc.)*
4. Who typically gets insurance? (What types of people?)  
*(People who have access to insurance companies and can afford to pay premiums)*
5. Have students break into groups based on the list generated in #3 (i.e. one group is health, life, auto, etc.) Have students come up with a list of factors/things that an insurance company would want to consider in providing this type of insurance. Report back to class.
6. What is micro insurance?

**Micro Insurance** is insurance characterized by low premiums and low coverage limits, designed to service low-income individuals and businesses not typically service by commercial insurances schemes.

7. For what reasons might low-income individuals or businesses desire micro insurance?  
**(Property, health, life, unemployment)**

Discuss what these would each mean:

**Property:** Particularly for individuals or companies involved in agriculture, protection of property is critical. If a natural disaster occurs (such as hurricane, flood, tornado, earthquake, etc.) or an accident (fire, vandalism, etc.) a property owner would want to be insured.

**Health:** Protect individuals in case of sickness. This would allow individuals to be able to afford/pay expensive hospital bills, etc.

**Life:** If an individual is the primary provider for a family or the head of a company, an unexpected death could be devastating not only emotionally but financially as well. Individuals might buy life insurance on a person's life and if he or she died, the beneficiaries, or certain designated people or the company, would receive payment.

**Unemployment:** A person could purchase unemployment insurance in case of unexpected loss of job to insure being able to eat and pay bills.

[From the Micro Insurance Centre website:

<http://www.microinsurancecentre.org/UploadDocuments/Landscape%20study%20paper.pdf>

## **Policy Holders**

The policy holder pays the premiums and makes the claims (except in the case of life insurance where claims are made by beneficiaries). A policy holder can be an individual or a group. In microinsurance individual policy holders are less common than groups. The reason for this is that it is much cheaper to sell small value policies to all the members of a group than to sell to individuals. Trade unions are common examples of groups that buy insurance 'in bulk' for the benefit of their members.

## **The Insurer**

The most fundamental task of the insurer is to carry the risk and pay the claims. As a consequence of carrying the risk insurers have a final say in managing the risk – which means they have the final say in setting the price and ensuring that the product, and the way in which it is administered, can control some of the risk.]

***(If time is short, this article can be given to students to read at another time, it is not essential to the lesson computations.)***

(5-10 mins) Have students read the Knowledge@Wharton article: “[Micro Insurance: A Safety Net With Too Many Holes?](#),” focusing specifically on the first section. As they read, have students think about:

- What are the tenets of micro insurance?
- What are some of the challenges/barriers faced by micro insurance companies?
- **How would micro insurance carriers set up their system of premium and collection?**

Discuss these points as a class before preceding to the small group activity.

Recall the concept of **break even**.

Play the Wharton Global Youth Program (WGYP) Glossary: [Break Even](#)

*“Break even is when revenues and expenses are equal. Or, put another way, when net income is zero. The Bluth Company is projected to break even, at selling 100,000 tables. If they sell fewer tables, they’ll make a loss. If they sell more tables, they’ll make a profit.”*

Play the WGYP Glossary: [Break Even Point](#)

*“Break even point refers to either the quantity of output sold, or the total revenues where operating income is zero. The Bluth Company’s break even point in quantity is 100,000 tables, and in sales dollars, is \$1 million.”*

Essentially, the break-even point is when:

$$\text{Revenues} = \text{Expenses}$$

$$\text{Revenues} - \text{Expenses} = 0 \text{ (or the Net Income} = 0)$$

2. *Small Group/Pair Activity: (15 mins)*

[Student Worksheet](#)

1. An insurance scheme is designed so that risk is shared among policyholders. If the payout for a micro insurance policy is \$500 and there are 25 people entering the policy,
  - How much would each policyholder need to pay in premium in order of the insurer to break even from one disastrous incident? **(\$20)**
  - If the insurer expected 2 disastrous incidents, how much would policyholders need to pay in annual premium for the insurer to break even? **(\$40)**
2. How do insurers decide how much to charge for a premium?  
**(They try and predict how likely it is that a disastrous event will occur and then calculate how much they would have to pay policyholders based on that likelihood. They then take into consideration how many people are buying the policy.)**
3. For which types of insurance is it likely that disastrous events would happen to only a few, if any, of the policyholders?  
**(Fatal accident, death, etc.)**
4. For which types of insurance is it likely that disastrous events would happen to most or all policyholders?  
**(none, but maybe if a hurricane hit, everyone would be affect)**
5. In a hurricane prone farming community, an insurer wants to provide a micro insurance policy that would pay \$300 to farmers affected by hurricanes. If 100 people want to participate in this insurance policy:
  - What is the maximum amount that the insurer could end up paying out if a hurricane hit?  
**(\$30,000)**
  - What is the minimum amount that the insurer could end up paying out in a completely hurricane-free season?  
**(\$0)**
  - If the insurer expects to pay make 10 pay outs of \$300 each per year, what should s/he charge for a premium to the 100 policy holders if s/he just wants to break even?  
**( $300 \times 10 = 3000$ ;  $3000 / 100 = \$30$ )**
  - Hurricanes seem to happen ever 4 years and affect 70% of the population when they do strike. What do you think the insurer should charge in premiums if he or she wants to break even?  
**(Over a 4 year period, that means 70 people would need to collect insurance – so  $\$300 \times 70 = \$21,000$ . So for annual premiums,  $21,000 / 4 = \$5250$ .  $\$5250 / 100 = \$52.50$ )**
  - If hurricanes happen every year but only affect 20% annually. On average, what do you think the insurer should charge in premiums if he or she wants to break

even?

**$(20 \times 300 = 6,000. \$6000 / 100 = \$60)$**

6. In Bangladesh, the per capita income is about \$1,500. (Per capita income is the income per person and as calculated by adding a country's total income and dividing by the population.) An insurer wants to be able to provide \$500 to a person in the event of a job lost, because it usually takes about 4 months to get a job.

- If 1,000 people in a city want to buy into this policy, how much should the insurer charge for the premium in order to break even if 200 people lose their jobs?

**$(200 \times \$500 = \$100,000. \$100,000 / 1000 = \$100)$**

- If an insurer charges an annual premium of \$20 per year, how many people need to join the policy if the insurer wants to break even for 70 job losses?

**$(70 \times \$500 = \$35,000. 35,000/20 = 1750.)$**

7. (10 mins) Create your own micro insurance policy. Come up with at least 3 premium-participant-payout scenarios to break even as described above.

### **Tying It All Together:**

#### Whole Class Discussion: (10 mins)

1. Students report back on their answers to computation questions.
2. Students report back on their own micro insurance policies.
3. How are premiums, the number of participants, the payouts, and the frequency or likelihood of incidents related to one another in a break-even scenario?
4. Specifically, how does the likelihood of an event or disaster happening (i.e. a tornado, loss of job, etc.) affect insurance premiums?
5. Why is micro insurance an important service for low-income individuals?

### **Extension:**

6. How can micro insurance be connected to commodity prices?