Grade Contracts

Principles of Economics

https://jiamingmao.github.io/principles-of-economics

Private Contracting

You are allowed to form contracts with each other using your exam scores as the reference entity and J-points as the currency. Here are some examples:

Example 1.

An insurance contract in which B provides insurance to A for her exam performance: A pays B x J-points as the insurance price. After the exam scores are announced, B pays A y J-points if A's score is $\leq$ threshold (and 0 if A's score is $>$ threshold).

Example 2.

A standard betting contract: B pays A x J-points if the class average score is $\geq$ threshold. Otherwise, A pays B x J-points.

Example 3.

An option contract: A pays B x J-points for the *right* to bet with B on the class average score before a certain expiration time. The expiration time is set at after the exam, but before the exam scores are announced. At any time before the expiration time, A can decide whether to *exercise* the option. If she does, then after the exam scores are announced, B would pay A y J-points if the class average score is $\geq$ threshold and A would pay B y J-points if the class average score is $<$ threshold.

Note there is no limit on how many private contracts you can enter into. Here are some examples of how a combination of different contracts can benefit you:

Example 4.

You want to protect yourself against the risk of scoring below 60, but are concerned that the exam may turn out to be too easy, in which case you waste your money purchasing an insurance. One way to deal with this problem is to purchase an option that allows you to buy an insurance if the exam turns out to be hard. Another way is to enter into two contracts:

1. An insurance contract that protects you against the risk of scoring below 60
2. A betting contract in which your position is that the class average will be above, say, 80.

In this way, if the exam is hard and you fall below 60, you may lose money on your bet but receive compensation from your insurance. If the exam is easy and the class average is high, you may lose money on your insurance but receive compensation from your bet.

Example 5.

A forms betting contracts respectively with B and C. A's contract with B: A pays B 10 J-points if the class average midterm score is ≥ 70. Otherwise, B pays A 10 J-points; A's contract with C: C pays A 10 J-points if the class average midterm score is ≥ 60. Otherwise, A pays C 10 J-points. Then,

$$\text{A's payoff} = \begin{cases} 0 \text{ J-points} & \text{if class average} \geq 70 \\ 20 \text{ J-points} & \text{if class average} \in (60, 70) \\ 0 \text{ J-points} & \text{if class average} < 60 \end{cases}$$

Official Offering

In addition to private contracting, you can purchase the following official products:

A

An insurance that pays you 20 J-points in the event that your midterm exam score is < 60.

- **Price:** 3 J-points
- *Payoff*: $\begin{cases} 17 \text{ J-points} & \text{if } M < 60 \\ -3 \text{ J-points} & \text{if } M \geq 60 \end{cases}$, where M denotes your exam score.

B

An option that gives you the *right* to buy product A on or before expiration time.

- **Price:** 1 J-point
- **Expiration time**: end of the exam day
- *How it works*: After you purchase this option, you have the right to buy product A any time before the expiration time.
  - ▷ If you exercise your right to buy product A, your final payoff will be $\begin{cases} 16 \text{ J-points} & \text{if } M < 60 \\ -4 \text{ J-points} & \text{if } M \geq 60 \end{cases}$
  - ▷ If you do not buy product A, your payoff will be -1 J-point.

C

An insurance that pays you 20 J-points in the event that your midterm exam score is < 70.

- **Price:** 7 J-points
- *Payoff*: $\begin{cases} 13 \text{ J-points} & \text{if } M < 70 \\ -7 \text{ J-points} & \text{if } M \geq 70 \end{cases}$

D

An option that gives you the *right* to buy product C on or before expiration time.

- **Price:** 3 J-points
- **Expiration time**: end of the exam day
- *How it works*: After you purchase this option, you have the right to buy product C any time before the expiration time.
  - ▷ If you exercise your right to buy product C, your final payoff will be $\begin{cases} 10 \text{ J-points} & \text{if } M < 70 \\ -10 \text{ J-points} & \text{if } M \geq 70 \end{cases}$
  - ▷ If you do not buy product C, your payoff will be -3 J-points.

E

A betting contract on whether the class average midterm exam score is ≥ 80.

- **Your position**: The class average is ≥ 80
- **Amount bet**: 5 J-points
- *Payoff*: $\begin{cases} -5 \text{ J-points} & \text{if } \overline{M} < 80 \\ 5 \text{ J-points} & \text{if } \overline{M} \geq 80 \end{cases}$, where $\overline{M}$ denotes the class average of exam scores

F

An option to buy E on or before expiration time.

- **Price:** 1 J-point
- **Expiration time**: end of the exam day
- *Payoff*:
  - ▷ $\begin{cases} -6 \text{ J-points} & \text{if } \overline{M} < 80 \\ 4 \text{ J-points} & \text{if } \overline{M} \geq 80 \end{cases}$ if you buy.
  - ▷ -1 J-point if you don't.

G

A betting contract on whether the class average midterm exam score is < 80.

- **Your position**: The class average is < 80
- **Amount bet**: 5 J-points
- *Payoff*: $\begin{cases} 5 \text{ J-points} & \text{if } \overline{M} < 80 \\ -5 \text{ J-points} & \text{if } \overline{M} \geq 80 \end{cases}$

H

An option to buy G on or before expiration time.

- **Price:** 1 J-point
- **Expiration time**: end of the exam day
- *Payoff*:
  - ▷ $\begin{cases} 4 \text{ J-points} & \text{if } \overline{M} < 80 \\ -6 \text{ J-points} & \text{if } \overline{M} \geq 80 \end{cases}$ if you buy.
  - ▷ -1 J-point if you don't.

Rules

- For official products:
  - ▷ Each person can only buy one of A, B, C, D.
  - ▷ Each person can only buy one of E, F.
  - ▷ Each person can only buy one of G, H.
- There is no limit to the number of private contracts you can enter into.