Problems with Incentive pay

Risk – pay tied to factors beyond the worker’s control

Variable pay – “Second best policy”
  Want to motivate effort
  Can’t observe effort
  Tie pay to output

Example 1: The Landlord-farmer relationship

Output = \(f\) (Effort, Weather)

Worker \(U = U(w, e)\)
1. \(\frac{\partial U}{\partial w} > 0\), 2. \(\frac{\partial^2 U}{\partial w^2} < 0\), 3. \(\frac{\partial U}{\partial e} < 0\)

Condition (2) indicates risk aversion
  Worker dislikes variability beyond her control
  Incentive contract Pay = \(f\) (e, weather)
  To make worker equally well off need higher \(E(W)\)

Example 2: Why aren’t production line workers given large bonuses if company profits are high?

Little control over company profits, to workers this means that their pay is tied to something beyond their control
Example 3: A large mining corporation

Two possible projects
1. Work existing mines more intensively
2. Speculative search for new mines

(1) low risk, low return
(2) high risk, high return

Shareholders prefer (2)

Manager may prefer (1)

Firm may need to guarantee the manager’s wages and give him a share of finds from the speculative search to induce optimal decisions
Is variable pay good for the firm?

1. Yes – Induces greater effort
2. No – Requires higher wages to compensate for risk, may discourage risk taking

Prediction
A higher % of pay should be variable if the worker’s effort has a large effect on output

Ex: Upper management vs. production workers
Type of weather and farmer compensation

3. No may create perverse incentives

  The multi-tasking problem

  inefficiently high effort in the easily measured tasks

  Variable pay works in the farmer/landlord example because

  1) can contract on just one output
  2) Output is homogenous

In most firms workers are part-contributors to multiple outputs
Examples:

1) Pay football player based on goals scored
   Consequences – players play too far forward,
   Players pass too little, defend too little

2) Pay bankers on new accounts received
   Consequence – insufficient attention given to
   existing customers

3) Pay factory workers piece rates based on output
   Consequence - increase quantity, reduce quality

Because of this problem firms often tie pay to subjective
measures of overall performance rather than objective
measures of individual outputs

Ex: A football player may receive a bonus for being named
to the national team

But non-objective measures may lead to problems with
favouritism, collusion
Incentive Contracts for Upper Management

1. Payment in Stock
   Good performance results in a capital gain
   Very widespread in US & UK

2. Bonuses
   May or may not be linked to company profits
   May be linked to other indicators of performance

3. Stock options—right to future purchase at a specified P
   Removes downside risk
   Reduces incentives after a negative shock

4. Other
   Long-term stock incentives
   “Phantom stock”
     Pay depends on stock price
     Manager receives no stock
A Model of Executive Stock Options

Definitions

K – option price (1 share)
n – number of shares available at the option price
e – per share productivity effect of effort (effort is binary low or high)
C – cost to the worker of high effort (cost of low effort = 0)
u – per share random output level  \( u \sim N(u^*, \sigma_u) \)
V – per share total productivity = e + u

The executive can buy shares at price K at some point in the future. She will exercise this option if the price of the share is greater than K.

Option value =  
\[ e + u - K \quad \text{if } V > K \]
0 otherwise

Value of the option if effort is high:

\[ R_H = n (e + u - K) \times \text{Prob}_H(V \geq K) - C \]

Value of the option if effort is low:

\[ R_L = n (u - K) \times \text{Prob}_L(V \geq K) \]

The firm will chose K and n such that \( R_H \geq R_L \)
Some Points

1. An option scheme is different from a share contract in two ways: i. no downside risk and ii. the principle has two instruments, number shares and share price

2. Reducing K will a) increase the probability that the option will be taken and b) increase the value of the option if it is taken

3. Increasing n will increase the value of the option if it is taken

4. Executive options will tend to be more effective if e is large or $\sigma_u$ is small

5. Options can induce excessive risk taking if K is too high