

# Subjective Evaluation

Class 7 - July 27, 2010

Articles: Bol (2005), Kerr (1975)

# Introduction

- When effort cannot be observed or verified, a pay for performance contract can provide incentives
- Factors to consider:
  - Risk attitudes
  - Multiple signals
  - Multiple tasks
- What if effort can be observed but not verified?
  - Valuable information
  - Explicit contract still cannot be based on effort

# Outline

1. Case Study: GP Focus Practice Exemption
2. Gaming of Objective Performance Measures
3. Advantages of Subjective Measures
4. Disadvantages of Subjective Measures
5. Application: Evaluation of Students

# 1. Case Study: GP Focus Practice Exemption

- Family physicians in capitation models
  - reduced pay if their patients seek care from other family physicians, except those who have focus practice
- How to identify Focus Practice Family Physicians?
  - Not easily identifiable using fee codes
  - Additional information available: training, letters of peer and community support, application letter
- How can you use this additional, soft information?

## 2. Gaming

- Ability of agent to manipulate objective performance measure for his benefit (“game the system”)
- Examples:
  1. **Strict adoption rules for orphans**
    - Budget based on the number of orphans
  2. **Medical errors**
    - Pronounce patient healthy when sick
    - Pronounce patient sick when healthy
  3. **Bonuses at H.J. Heinz**
    - Bonus if earnings increased from previous year

## 2. Gaming

# Model of Gaming

### Production

$$(1) q = e + u, \text{ with } u \sim (0, 1)$$

### Payment

$$(2) w = a + by$$

$$(3) y = kq$$

- $k$  is known to the agent only
- The principal knows only  $E[k]=1$ ,  $\text{Var}[k]=V$
- $V$  represents extent of gaming

## 2. Gaming

# Payoffs and Constraints

### Agent

$$(3) E[U] = E[w] - c(e) = a + bke - 0.5e^2$$

- Agent knows  $k$ , so it is actual  $k$  that enters  $U$

### Principal

$$(4) E[\Pi] = E[q] - E[w] = e - a - be = (1-b)e - a$$

### Constraints

$$(ICC) bk = e$$

$$(PC) a + bke - 0.5e^2 = R$$

## 2. Gaming

# Optimal Contract

$$\text{Max } E[\Pi] = (1-b)e - a$$

$$= (1-b)e - be - 0.5e^2 - R \quad (\text{PC})$$

$$= e - 0.5e^2 - R$$

$$= E[bk] - 0.5E[(bk)^2] - R \quad (\text{ICC})$$

$$= \mathbf{b - 0.5b^2(1+V) - R}$$

- Note that  $\text{Var}(k) = E[k^2] - E[k]^2 \Rightarrow E[k^2] = E[k]^2 + V = 1 + V$
- FOC:  $b = 1/(1+V)$   
 $\Rightarrow \mathbf{0 < b < 1}$

### 3. Subjective Performance Measures

- Performance measure that can be observed but not verified by a third party
- Subjective evaluation can be used in three main ways:
  1. In addition to, or replacing the objective measures
  2. Flexibility in weight on objective measures
  3. Adjustment based on factors other than performance measures specified in the contract

### 3. Advantages of Subjective Evaluation

## Example: Student Evaluation

- Suppose the goal is to test learning
  - Objective measures: written test; multiple choice
  - Subjective measures: oral exam; essay questions
- Examples of uses of subjective measures
  - Use both multiple choice and essay questions
  - Final exam: (a) out of 40 percent for students who wrote midterm, or (b) out of 60 percent for those who missed midterm for medical reason
  - Adjust final grade on student's enthusiasm, class participation, involvement, etc.

### 3. Advantages of Subjective Evaluation

# Advantages of Subjective Evaluation

- Comprehensive, timely, flexible
- Potentially can address:
  1. Risk
  2. Multitasking
  3. Gaming
  4. Short-run focus
  5. Unforeseen circumstances

## 4. Shortcomings of Subjective Evaluation

- Distinguish between two cases:
  1. Principal is a residual claimant
    - Single-layer organizations
    - Example: owner of the firm
  2. Principal is not a residual claimant
    - Multiple-layer organizations
    - Example: CEOs
      - Principal 1: Shareholders, Agent 1: CEO
      - Principal 2: CEO, Agent 2: Employees

#### 4. Disadvantages of Subjective Evaluation

### 4a. Single layer organizations

- Principal has an incentive to lie about performance:
  1. Pay decrease to agent is pay increase to principal
  2. Contract cannot be enforced in the court
- **The problem is how to enforce the contract**
  - Agent must trust the principal
  - Principal can be trusted only if it is in his best interest to report truthfully

#### 4. Disadvantages of Subjective Evaluation

## Trust in One Period Model

- Suppose  $E[q]=e$ ,  $c(e)=0.5e^2$ , and  $R=0 \Rightarrow e^*=1$
- Effort can be observed but not verified
- Implicit Contract:  $S= c(e^*)=0.5$  if  $e \geq 1$ ,  $S=0$  otherwise
- Principal:
  - Claim that  $e < 1$ :  $\Pi=1$
  - Claim that  $e \geq 1$ :  $\Pi=1 - 0.5=0.5$

Strong incentives to misreport!

#### 4. Disadvantages of Subjective Evaluation

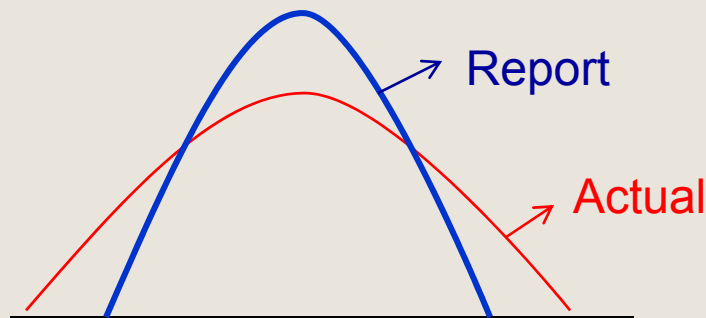
## Reputation Concerns

- If the principal misreports today, he risks not being able to contract with any agent in the future
- **Principal's payoffs:**
  - Claim  $e < 1$ :  $1+0+\dots+0+\dots = 1$
  - Claim  $e \geq 1$ :  $0.5+ \beta 0.5+ \beta^2 0.5 + \dots = 0.5/(1- \beta)$where  $\beta$  is the discount factor
- **Implicit contract is self-enforceable if  $\beta > 0.5$**   
⇒ The principal must care sufficiently about future.

#### 4. Disadvantages of Subjective Evaluation

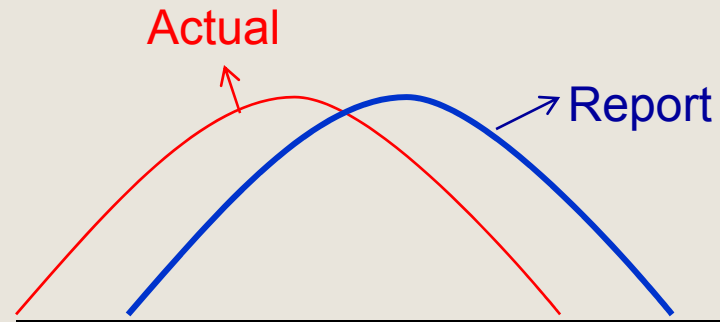
### 4b. Multilayer organizations

- Example: University Dean - Professors -Students
- Principal not residual claimant; doesn't gain by lying
- Reporting can still be biased for other reasons



Centrality Bias

$$\text{Var}[q^R] < \text{Var}[q^A]$$



Leniency Bias

$$E[q^R] > E[q^A]$$

#### 4. Disadvantages of Subjective Evaluation

## Why is there bias?

### 1. Information Gathering

- Costly monitoring with no incentives to do it right
- 'Halo' effect: global impression, prior performance, ...

### 2. Negative Consequences

- Negative feedback unpleasant, damages personal relationships, leads to discussion and criticism, etc.

### 3. Cognitive Limitations

- Lack of experience and knowledge of outcomes

#### 4. Disadvantages of Subjective Evaluation

## Why is there bias?

### 4. Favoritism

- Personal considerations:
  - Reward appreciated employees
  - Encourage loyalty
  - Promote personal agendas
  - Punish rebellious employees

### Problem: Rent-Seeking Activities

- Agent can improve pay in two ways:
  1. Work hard
  2. Influence principal's evaluation

#### 4. Disadvantages of Subjective Evaluation

## Model of Rent-Seeking

### Production

$$(1) q=e+u, \text{ with } u\sim(0,V)$$

### Payment

$$(2) w=a+bs$$

$$(3) s=q+i$$

- $s$  is subjective performance measure
- $i$  agent's influence activity
- $i$  is known to the agent only

#### 4. Disadvantages of Subjective Evaluation

## Payoffs and Constraints

### Agent

$$(4) E[U] = E[w] - c(e) - c(i) = a + b(e+i) - 0.5e^2 - 0.5ki^2$$

### Principal

$$(5) E[\Pi] = E[q] - E[w] = e - a - b(e+i)$$

### Constraints

$$(ICC) \quad b=e \quad \text{and} \quad b=ki$$

$$(PC) \quad a + b(e+i) - 0.5e^2 - 0.5ki^2 = R$$

#### 4. Disadvantages of Subjective Evaluation

## Optimal Contract

$$\begin{aligned}\text{Max } E[\Pi] &= e - b(e+i) - a \\ &= e - b(e+i) - 0.5e^2 - 0.5ki^2 - R + b(e+i) && \text{(PC)} \\ &= e - 0.5e^2 - 0.5ki^2 - R \\ &= b - 0.5b^2 - 0.5k(b/k)^2 - R && \text{(ICC)} \\ &= b - 0.5b^2 - 0.5b^2/k - R \\ \\ &\Rightarrow b = k/(1+k) \\ &\Rightarrow \mathbf{0 < b < 1}\end{aligned}$$

#### 4. Disadvantages of Subjective Evaluation

## Preventing Biased Ratings

### 1. Forced Ratings

- Categorize workers into groups
- Ensures that distribution of outcomes unbiased
- Problems:
  - Employees compete against each other, which may induce sabotage and discourage co-operation
  - Performance based on other agents' performance, which introduces additional risk
  - Does not address favoritism

#### 4. Disadvantages of Subjective Evaluation

## Preventing Biased Ratings

### 2. Punish biased ratings

- Monitoring very costly
- Allow agents to appeal:
  - Ineffective because of under-reporting (retaliation) and because management is reluctant to reverse decisions

### 3. Training

- May make principals aware of their unconscious biases and cognitive limitations
- Does not address biasing rating deliberately

#### 4. Disadvantages of Subjective Evaluation

## Preventing Biased Rating

### 4. Bureaucratic Rules

- Example: promotion based on seniority
- Advantage: less corruptible
- Disadvantage: not necessarily related to performance

## 5. Application: Evaluation of Students

- Forced rating: A (5-25%), A+B (<67%), F<50%
- Punish biased rating
  - Evaluation of appeals by an independent party
- Continuing education on best practices in evaluation
- Bureaucratic rule: small weight on class attendance
- Preventing favoritism:
  - Mask student names and numbers
  - Keep the identity of marker (TA) confidential

# Subjective Evaluation - Summary

1. Using subjective performance measures may help with risk, multitasking, gaming, etc.
2. In single layer organization, the main problem is how to enforce the contract based on subjective measures. Reputation concerns may provide a self-enforcing mechanism.
3. In multilayer organizations, the main problem is biased rating, which occurs in part because of favoritism. Biased rating may be prevented using forced rating, punishing its occurrence, training, and using bureaucratic rules.