Ec 476 Contracts and Organizations

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Topic 3: How to motivate the manager when performance cannot be measured?

- Earlier we argued

  - motivated agents are a key component of production of collective goods

- but there we did not study incentives for the principals who design the mission

- Clarification: whoever is subject to an incentive problem is an agent given the terminology of principal-agent models

- What we mean here is that we study the incentive problem of the bosses or employers

- Their agency problem is vis a vis workers, donors, society at large

- Study the choice between for-profit and non-profit production in this framework.

- Non-profits are an important part of the economy: 10% of US GDP in 2003

- Very active in health, education, social services, arts

- Key feature: Non Distribution Constraint (Hansmann, 1980, 1987)

  - Cannot distribute residual earnings to individuals who exercise control over the firm (officers, directors, members)

  - Can earn profits: so long as they are used for future services or given to non-controlling persons

- Cooperatives or mutual insurance companies or banks can distribute profits to members

Key theories

- Public goods provision (Weisbrod)

  - Private sector will not provide

  - Donative non-profits such as National Cancer Society

  - Problems

    * Non-profits provide private goods too (commerical non-profits such as hospitals)

* Why not for profits to provide public goods?

- **Contract failure**

  – Quality unobservable

  – So for-profit firm may skimp on quality

  – Cost-quality trade-off

- **Consumer control**

  – Some mutual non-profits such as social clubs

– Quality is perfectly observable

– The main problem is potential monopo-
listic exploitation of consumers by own-
ers

– Source of monopoly power is the specifc-
ity of the social network of the members

Cost-Quality Trade Off Theory of Non-Profits (Glaeser-Shleifer)

- Suppose quality q is very noisy

- There is a firm which is run by a manager

- His outside option is $\bar{u}$

- Consumer buys product from him

- Quality non-contractible: so no incentive contract possible

- Consumers can offer fixed price p

- The benefit to principal (consumer) is $b(q)$

- The cost to firm is $c(q)$

- Naturally, the firm will set $q = \underline{q}$

- Suppose firm is non-profit

- Now cannot take home any profits

- Then will provide q^* (defined by $b'(q) = c'(q)$) so long as given wage $c(q^*) + \overline{u}$

- This is a variant of the multi-tasking argument

- That is another way of modeling it.

- Cost is measurable and is affected by one type of effort (e_1)

- Quality is non-measurable and is affected by another type of effort (e_2)

- Under for-profits (full residucal claimancy), firm has an incentive to cut quality

- Under non-profits (zero or partial residual claimancy), firm will have less incentive to cut costs, but also less incentives to cut quality

- Can directly apply our model from Lecture 1.

Mission integrity problem in public organizations

- Consider the more general problem of firms whose activity generates some pecuniary component (profit) and some non-pecuniary component which is not captured in profit (quality, positive externality)

- For example, consider a firm which is thinking of adopting an environment friendly technology which is bad for profits but good for society

- In some circumstances this may be the right thing to do: namely, the social gains are bigger the private losses

- In others, this may not be the right thing to do: the social gains do not justify the costs

- If there is no informational problem, then this rule is what the society and the firm should contract on

- The problem is, often the firm is the only one who can judge what the circumstances are

- They may have an incentive to sacrifice the social values in order to gain profits

- How to deal with this problem?

- More formally stated, this is a state-contingent cost-quality trade off problem

- Sometimes profit opportunities should be sacrificed for social reasons, sometimes its the opposite

- Only manager has the information on the basis of which this decision can be taken

- The key modeling feature is to study two kinds of moral hazard problem:

  - action moral hazard (mission integrity)

* commercial actions generate profit at the expense of social returns

* social actions do the opposite

– effort moral hazard - more effort good for both social/profit reasons

- Everyone is risk-neutral and there are no limited-liability like constraints

- Similar to multi-tasking with two types of effort

- Cost may be easy to observe, and quality hard to observe

- Then for-profit status is like giving sharp incentives to cut costs

- However, this may be at the expense of quality

- Normally, residual claimancy can solve this problem (even for the multi-tasking model)

- If there is no limited liability constraint, then residual claimancy achieves the first-best (check this using Lecture 1 model)

- Sell the school to the teacher, and he/she will choose the right levels of e_1 and e_2

- Below we develop a model where there is no limited liability constraint, and yet the first-best cannot be achieved.

- There is a fundamental trade-off between effort moral hazard and action moral hazard

- To get action choice right, have to offer flat incentives - this will be at the expense of effort

- To get effort incentives, have to abandon the goal of getting the action choice right.

- The model

- looks at the factors that shape the trade-off between non-profit and for-profit organizations

- explains why residual claimancy may often not the answer in public organizations

Basic Theoretical Ideas

- Public service delivery has two kinds of tasks:

  - mission oriented

    * beneficiary selection in targeted programs

    * curriculum design in schools

  - efficiency oriented

    * how to deliver the service at low cost

* how hard to work (e.g. teacher absence)

- Organizations for the delivery of public services have to pay attention to both tasks

- The most interesting case is where the tasks are bundled.

- But there is the possibility of mission orientation and task assignment being performed by separate parties.

  - a politician picks a mission in a way that is responsive to voters.

  - a bureaucrat is charged with task delivery.

- But often the person charged with task delivery has an information advantage.

Residual Claimancy?

- In many classes of agency problems, we try to structure problems so that the agent is a residual claimant on the principle that provides the best incentive to commit effort.

- For-profit, private provision is one possibility

  - But this is a problem when mission choice is also at stake.

- Concerns about corruption have a parallel with for-profit provision since this will tend to make service providers behave more like residual claimants.

- There are a variety of institutions for public service delivery – government and NGOs that deliberately delegate authority without residual claimancy.

"Bringing in the top brass of supermarkets into running of foundation hospitals is completely inappropriate. Are these people really best qualified to identify local health needs and match them with services or is this just about helping foundation trusts to grab more income and drop unprofitable activities?" Alex Nunns, Keep our NHS Public. (reported in The Times, 07/06/06, page 22).

The Approach

- Two features:

  - there is a need for flexible provision — providers have private information about the true payoffs/costs which affect some of the decisions made by the organization

    * we will refer to this as mission design.

  - some potential providers are motivated, i.e. have pro-social goals.

    * creates a role for selection as well as incentives in delivering public services.

Overview

- What is the optimal structure of provision?

  - show the sense in which it is better to have motivated agents providing services

  - also show that it is necessary for them to have appropriate incentives

- Look at the conditions under which market provision can deliver optimal public services with motivated agents

  - social entrepreneurs will be donors as well as service providers.

- Existing literature

  - non-profits (Hansmann, 1996, Francois, 2000, Glaeser and Shleifer, 2002)

  - motivated agents (Holmstrom-Milgrom, 1998, Besley-Ghatak 2005)

  - regulation and procurement (Laffont-Tirole, 1986)

- We focus on cost-quality trade off like the first literature. Our focus is:

  - Flexibility: state contingent cost-quality trade off

– How this interacts with selection when some producers are motivated

Structure

- Begin by studying the planner's problem when information is perfect.

- Optimal contractual problem when there is issues of incentives and selection.

- Discuss how to decentralize the optimum

- Explore some additional issues.

Model

- There is a good which has public and private elements (e.g. health intervention)

- There is a single (representative) consumer who gets a private benefit of $b \geq 0$ from consuming a good.

  - it is easy to extend the analysis to many consumers.

- There is a numeraire good of which they have an endowment and utility is linear in this good.

- There is also a benefit to non-consumers from consumption of the good which we denote by θ

- The manager chooses an action x: whether to put more weight on social or financial bottom line

- $x = 0$ means more weight is given on social returns (the mission)

- $x = 1$ means more weight is given on financial returns (cost-reduction)

- The state of the world that creates social payoffs/costs is private information.

- It is uncertain ex ante whether the commercial or social action is optimal.

- The mission integrity problem: do the right thing

- Let $s \in \{0, 1\}$ denote the state of the world

- Let q be the probability of state 0.

- The state and action together affect the external benefit $\theta(x, s)$ and the cost of production $c(x, s)$ (but not private benefit b)

- The social payoff $\theta(x, s)$ satisfies

$$\theta(1, 1) = \theta(1, 0) = 0$$

and

$$\theta(0, 0) = \bar{\theta} > \theta(0, 1) = \underline{\theta} > 0.$$

- The cost of production satisfies:

$$c(1,1) \;=\; c(1,0) = \underline{c}$$
$$\text{and}$$
$$c(0,1) \;=\; c(0,0) = \bar{c}.$$

- Key features

  - There is a single task

  - Two outcomes: social and private

  - One outcome is easy to measure (c) but not the other (θ)

- Can view this as cost-quality trade off

- Our focus is flexibility: in different states, this trade off should be resolved differently

- How would one achieve it when s is private information?

- Other than θ being non-contractible, and s being private information, no other informational/contractural frictions

- b, c, and x are observable and contractible

- No limited liability or risk aversion

Producers

- The social payoff θ reflects aggregate social valuation

- There are individual producers who can provide this service

- They may be unmotivated/neutral or motivated

- If they are neutral they only care about their monetary returns

- If they are motivated, on top of monetary returns, they internalize to some degree the social payoff

- In particular they receive $\lambda\theta$ where $0 \leq \lambda < 1$

- Each provider can earn $\bar{u}$ in some other activity.

The Nature of Motivation

- One interpretation of $\lambda\theta(x,s)$ is pure ego rent.

  - happy do-gooders (warm glow)

- But $\lambda\theta(x,s)$ could also be a pure public good preference

  - this creates the potential for free-rider problems among potential social entrepreneurs

The First Best

- In both states, if $x = 1$ is chosen social surplus is

$$b - \underline{c}$$

- In state 0 if action 0 is chosen, social surplus is

$$b + \bar{\theta} - \bar{c}$$

- In state 1 if action 0 is chosen, social surplus is

$$b + \underline{\theta} - \bar{c}.$$

- Let

$$\Delta c \equiv \bar{c} - \underline{c}.$$

- Three cases

– Case 1

$$\Delta c > \bar{\theta}$$

– Always choose $x = 1$.

– Case 2

$$\Delta c < \underline{\theta}.$$

– Always choose $x = 0$

– Case 3

$$\underline{\theta} \leq \Delta c \leq \bar{\theta}$$

– Now it is efficient to choose $x = 0$ when $s = 0$ and $x = 1$ when $s = 1$.

- This justifies referring to state 0 as the "social state" in which it is worthwhile to produce the "expensive" action $x = 0$ since it generates social benefits.

- Similarly, we can call state 1 as the commercial state in which it is better to produce the action $x = 1$.

- The first best can be implemented by a social planner if he can observe the state $s \in \{0, 1\}$.

- Alternatively, if θ is contractible, social residual claimancy will solve the problem

- "Sell off the project" to the producer by making his pay contingent on both c and θ

The Second Best

- How to ensure mission integrity when s is private information and θ is not contractible?

- There are two contractible variables: c and x (remember, b is a constant)

  - Since they are perfectly correlated it is sufficient to focus on one, say c

- As c takes two values, it is sufficient to consider a cost share α of the entrepreneur and a fixed payment w (positive or negative)

– In this interpretation, he pays a fraction α of the cost out of his pocket.

- Should doctors' or teachers' pay should be made sensitive to costs?

- Take a given producer with motivation $\lambda \geq 0$ (look at selection in the next section)

- In case 1, a for-profit is sufficient to achieve the first-best ($\alpha = 1, w = 0$): no need for intervention

- So long as price $p \leq b$ (exogenous for now) is such that they earn at least $\bar{u}$

- Alternatively, just have a rigid mission: always choose $x = 1$

- In case 2, a non-profit (or fixed wage earning government bureaucrat) is sufficient to achieve the first best ($\alpha = 0, w = \bar{u}$)

- Left to their own devices, a for-profit will choose $x = 1$ in $s = 0$ unless they are sufficiently motivated:

$$p + \lambda \bar{\theta} - \bar{c} \geq p - \underline{c}$$

or

$$\lambda \geq \frac{\Delta c}{\bar{\theta}}$$

- Once again, can also achieve this with rigid mission: $x = 0$ always

- This is the cost-quality trade-off

- Curbing the profit-motive is good

- However, with sufficiently motivated agents, even for-profits will work (social enterprise)

- Now turn to flexible cost-quality trade off

- The mission integrity problem

- Want to balance off two types of errors (like Type 1 and Type 2 errors in statistics)

- Choosing $x = 1$ when $s = 0$ (being too hard/pro-cost error)

- Choosing $x = 0$ when $s = 1$ (being too soft)/pro-mission error)

- In state 0 we want an entrepreneur with motivation λ to prefer choosing $x = 0$ (the high cost action)

$$w(\lambda) + \lambda\bar{\theta} - \alpha(\lambda)\bar{c} \geq w(\lambda) - \alpha(\lambda)\underline{c}$$

or

$$\frac{\lambda\bar{\theta}}{\Delta c} \geq \alpha(\lambda)$$

- In state 1 we want entrepreneur with motivation λ_j to prefer choosing $x = 1$:

$$w(\lambda) - \alpha(\lambda)\underline{c} \geq w(\lambda) + \lambda\underline{\theta} - \alpha(\lambda)\bar{c}$$

or,

$$\alpha(\lambda) \geq \frac{\lambda\underline{\theta}}{\Delta c}.$$

- As $\bar{\theta} > \underline{\theta}$ these can be combined as

$$\frac{\lambda\bar{\theta}}{\Delta c} \geq \alpha(\lambda) \geq \frac{\lambda\underline{\theta}}{\Delta c}.$$

- An interval of incentive-compatible cost shares

1. If λ is high enough (super-motivated manager) $\frac{\lambda\bar{\theta}}{\Delta c} > 1$ and so $\alpha(\lambda) = 1$ is fine

2. Otherwise $0 < \alpha(\lambda) < 1$

3. As $\lambda \to 0, \alpha(\lambda) \to 0$

- Non-profits or flat wages are optimal for unmotivated managers

- With motivated managers some financial incentives are needed (bonuses, partial residual claimancy, social enterprise)

- This is consistent with an arrangement in which there is partial assignment of varying revenue streams by government to the social enterprise based on cost

$$p\left(x, s\right) = \left(1 - \frac{\bar{\lambda}\underline{\theta}}{\Delta c}\right) c\left(x, s\right).$$

- The social enterprise needs to donations to survive, i.e. to co-finance the provision of the good.

- With agents motivation implies less need for incentives (Besley-Ghatak, 2005)

- With managers, motivation enhances the need for some incentive pay

Comparative Statics & Cross-Sectional Implications

- Recall that the set of incentive-compatible cost-shares are given by

$$\frac{\lambda \bar{\theta}}{\Delta c} \geq \alpha \left(\lambda \right) \geq \frac{\lambda \underline{\theta}}{\Delta c}.$$

- As $\underline{\theta} \to 0$, non-profits are fine

- As $\bar{\theta}$ goes up (for any $\lambda > 0$), for-profits are fine (except for $\lambda = 0$)

- To sum up, full residual claimancy is optimal if

- $\Delta c > \bar{\theta}$ (quality considerations not important)

- agents are supermotivated ($\lambda \geq \hat{\lambda}$ where $\hat{\lambda} \equiv \frac{\Delta c}{\bar{\bar{\theta}}}$ so that $\frac{\lambda \bar{\bar{\theta}}}{\Delta c} \geq 1$)

- agents are motivated ($\lambda > 0$) but $\bar{\theta}$ is sufficiently large so pro-cost error is unlikely

- Flat incentives are optimal if

  - $\Delta c < \underline{\theta}$ (cost-cutting considerations not important)

  - agents are unmotivated

– agents are motivated $(\lambda > 0)$ but $\underline{\theta}$ is sufficiently small so pro-quality error is unlikely

Selection and Incentives

- Suppose there are several producers who vary in terms of λ

- This is private information

- To take the simplest case, $\lambda \in \{0, \overline{\lambda}\}$

- Non-profits or fixed wage contracts meant for neutral managers are attractive for motivated managers

- But this violates cost efficiency (they will choose $x = 0$ when $s = 1$)

- On the other hand, partial/full residual claimancy meant for motivated managers will attract in neutral managers

- But this violates mission integrity

- We show that there does not exist a separating pair of contracts that will cause them to self-select

- Let (α_m, w_m) and $(0, w_n)$ be such that $\alpha_m \in [\min(1, \frac{\lambda\bar{\theta}}{\Delta c}), \frac{\lambda\underline{\theta}}{\Delta c}]$

- To discourage motivated managers from selecting flat-incentives

$$w_m + q\left(\overline{\lambda\theta} - \alpha_m\overline{c}\right) + (1-q)(-\alpha_m\underline{c}) \geq w_n + q\overline{\lambda\theta} + (1-q)\overline{\lambda\underline{\theta}}$$

or

$$w_m - w_n \geq (1-q)\overline{\lambda}\underline{\theta} + \alpha_m\{q\overline{c} + (1-q)\underline{c}\} \quad (1)$$

- To discourage unmotivated managers from selecting partial/full residual claimancy

$$w_n \geq w_m + q\left(-\alpha_m\underline{c}\right) + (1-q)(-\alpha_m\underline{c})$$

or

$$w_m - w_n \leq \alpha_m\underline{c}. \qquad (2)$$

- Both (1) and (2) cannot hold simultaneously.

- Intuitively, motivated managers like non-profits as they get utility out of choosing $x = 0$

- Unmotivated managers like social enterprise as they make money by always choosing $x = 1$

- The flat wage differential cannot solve both selection problems.

What is to be done?

- Two solutions

  - Screen out neutral managers offer a contract only a motivated manager will accept

  - Allow pooling: offer a contract meant for neutral managers, and then accept the chance a motivated manager might take it who always chooses $x = 0$

Solution 1

- Suppose (α_m, w_m) is such that, for $\varepsilon > 0$

$$w_m - \alpha_m \underline{c} = \overline{u} - \varepsilon$$

- The payoff to a motivated manager is

$$w_m + q\overline{\lambda\theta} - \alpha_m\{q\overline{c} + (1-q)\underline{c}\}.$$

- Substituting the value for w_m from above

$$\overline{u} - \varepsilon + \alpha_m\underline{c} + q\overline{\lambda\theta} - \alpha_m\{q\overline{c} + (1-q)\underline{c}\}$$

- This simplifies to

$$\overline{u} - \varepsilon + q\overline{\lambda\theta} - \alpha_m q\Delta c.$$

- At $\alpha_m = \frac{\lambda\overline{\theta}}{\Delta c}$ this is negative but at $\alpha_m = \frac{\lambda\theta}{\Delta c}$ it is positive.

- Under this, so long there are some motivated managers, we get the first-best social surplus

$$\overline{S} = b + q\overline{\theta} - \{q\overline{c} + (1-q)\underline{c}\} - \overline{u}.$$

Solution 2

- Set up non-profit.

- If a motivated manager selects in, then social surplus is

$$\overline{S}' = b + q\overline{\theta} + (1 - q)\underline{\theta} - \overline{c} - \overline{u}.$$

- This is less than $\overline{S}$ as $\Delta c > \underline{\theta}$

Choice between the two options

- Suppose there is some uncertainty about the distribution of motivated producers.

- Let μ be the probability that a producer is motivated

- Then under solution 1, $\mu\overline{S}$ is the expected surplus

- Under solution 2, $(1-\mu)\,\overline{S} + \mu\overline{S}'$ is the expected social surplus

- If either $\mu = 0$ or $\mu = 1$ there is no selection problem and get the first-best

- But for intermediate ranges of μ, the higher is μ the more attractive is solution

- This simplifies to

$$\overline{u} - \varepsilon + q\overline{\lambda\theta} - \alpha_m q \Delta c.$$

- At $\alpha_m = \frac{\overline{\lambda\theta}}{\Delta c}$ this is negative but at $\alpha_m = \frac{\lambda\overline{\theta}}{\Delta c}$ it is positive.

Market provision

- Having offered a contractual arrangement to solve the incentive and selection problems, we can now try to generate an insight into the nature of market failure in the delivery of public services in this context.

- We will develop a model of market competition among the N potential providers who compete to provide the service by offering prices Bertrand style.

Market Equilibrium

- Consider first the case where $\lambda < \hat{\lambda}$ (no supermotivated agents) and assume that $b > \underline{c}$

- Then we have

Suppose that $\lambda < \hat{\lambda}$, then the market equilibrium has $p(x, s) = \underline{c}$ and $x = 1$ for $s \in \{0, 1\}$.

- The market equilibrium has zero profits – and in a conventional sense competition works.

- However, the market cannot deliver the socially optimal mission even if some entrepreneurs are somewhat motivated.

- The contract that we have proposed fixes the market failure in this case by attenuating the profit motive suitably.

- But, as we saw, in general some market incentives is needed if agents are motivated.

  - There is needs to a be legal (contractual) structure beyond the standard notion of residual claimancy

  - It is clear why a market equilibrium that generates zero profits is different from a non-profit firm in this context.

- Now suppose that $\bar{\lambda} > \hat{\lambda}$.

- We now have

Suppose that $\bar{\lambda} \geq \hat{\lambda}$. Then a competitive (Bertrand) provision with a social entrepreneur exists and achieves the first best: $p(x, s) = \underline{c}$ and $x = s$ for $s \in \{0, 1\}$.

- The market equilibrium price of the good is unchanged.

- However, the social entrepreneurs are willing to give up profits to take the correct action in the social state.

- So with sufficient motivation, the first best can apparently be achieved without government intervention

- This kind of model seems to fit football entrepreneurs who are willing to subsidize football clubs with their own money.

- Competition now only increases the amount of private wealth that is needed.

Free-riding in Market Equilibrium

- Free-riding is now a potential issue in the case of this market equilibrium with social entrepreneurs.

- Observe: the result is stated as there exists a Nash equilibrium where a single social entrepreneur with $\lambda_j > \hat{\lambda}$ provides the good.

  - But an inefficient (mixed strategy) Nash equilibrium also exists where there is no efficient provision with some probability.

  - Our proposed contract provides coordination away from that equilibrium.

– The government is serving the Coasian role of creating a property right and then auctioning off provision.

Further Issues

- The contract that we have proposed to efficiently decentralize public provision with motivated providers requires that motivated providers also have a source of co-finance

- This could potentially match the model of public private partnerships in city academies that we have seen in the U.K. where providers have to raise private donations before bidding to run schools.

- Our model gives some insight into how incentives and selection interact in this kind of private outsourcing activities

- At present we are exploring two sets of issues:

  - Introduce multi-tasking considerations (effort that raises the probability of low costs)

  - Wealth constrained social entrepreneurs: raising of funds

Concluding Comments

- We have laid out a framework for thinking about provision of public services when

    - social benefits are not contractible

    - the social cost/benefit decision rests on the expertise of decentralized private information of providers

    - there are heterogeneous providers some of whom are motivated (potential social entrepreneurs)

- Unlike our previous work on motivated agents, this paper has shown that in the mission alignment dimension, there is typically a need for incentives only for motivated agents and not for standard (greedy agents).

    - This is because we have focused on a different aspect of the problem (mission alignment rather than effort provision).

- Under fairly strong assumptions – wealth endowed social entrepreneurs can achieve first best provision

    - but the circumstances as brought out here are quite specific.

Some material to be added next week.