Social Entrepreneur and NPO: An incomplete contract approach to collective action for public goods

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Abstract

The "by-product theory" of collective action is re-examined by taking into consideration the indispensability of network formation or organizing work undertaken by social entrepreneurs. A three-stage game in which an enterprise of private good-cum-collective good is undertaken is presented to examine the efficacy of the "selective incentives" schemes. The conditions for NPO to be chosen on a rational basis and those for an entrepreneur to become a social entrepreneur are derived. It is shown that even if the free-rider problem with organizing work is solved by the selective incentive scheme, the so-called undersupply problem remains to be solved as long as social entrepreneurs are of a selfish type.

Key Words: Global Commons, Organizing Work, Selective Incentive, Social Entrepreneur, Not-for-Profit Organization.

JEL Classification Codes: H41, L31, L21

1. Introduction

Let me begin with explaining some historical examples of Japan: The "Social Network of the Yahagi River Basin". An irrigation canal system for paddy plantation was set up in a mid basin area of the Yahagi River in the late 19-th century. The cost of constructing and managing the canal system was, by means of the beneficiaries' voluntarily joining in a cooperative, i.e., their paying membership fees, shared by more than 14,000 paddy planters who were the beneficiaries of the canal system. The cost of the manager's work of the canal cooperative has been also fully covered by those membership fees. The service provided by this irrigation canal was a private good in the sense that it is of an excludable nature. More strictly speaking, it is a club good. The club system became possible, because the enforcement cost of providing the canal service was not prohibitively high, relatively to the fee revenues. Since then, the manager has been serving those cooperative members not only with the canal service but also with their collective interests such as afforestation in the sparsely-populated headwaters area, with the aim of preserving cleaner or more nutritious river water for the canal system. Those collective interests were achieved by his organizing those cooperative members into collective action. In the end, the manager succeeded

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in organizing not only those members of the cooperative but also more than one million beneficiaries who are inhabitants in a region located from the up to down basin of the river, including two cities consisting of more than 300 thousands citizens in the mid basin area. Now, those inhabitants including fishermen families living on the coast of the down-basin area are voluntarily joining in forestation in the headwaters area, for the purpose of not only preserving clean nutritious water for marine resources but also bringing about CO_2 sink-effects. This voluntarily formed socio-economic network is called the Social Network of the Yahagi River Basin. Similar social experiments aimed at forestation are also observed in other river basins in Japan. However, those voluntary activities and/or contributions aimed at their collective interests are not yet on the efficient level, according to the observation that not all of the beneficiaries are not engaged in.

Let me take another example of a different type now under experiment: The "NPO" aiming to preserve mountain forests which are considered to be the headspring of mineral-rich underwater for Japanese sake brewage. There are about ten brewers of Japanese sake in Saijo Town. They voluntarily formed a union to promote or protect their common interests. It was organized without the problem of collective action, due to its negligible organizing and enforcement cost, which means that the union meets the conditions for the "privileged group." Each member makes direct contributions to the union. Recently, it funded an NPO with a view to preserving those mountain forests in which mineral-rich underwater for brewery originates. The managers of the NPO are engaging in social activities such as enlightenment of other citizens on various benefits to them of the mountain forests, with the aim of organizing those citizens into voluntarily joining in forests preservation or forestation. However, those voluntary activities cannot yet expand beyond those persons interested in brewery business. In order to solve this undersupply problem, they are now planning to launch into an eco-good enterprise, a part of the net proceeds of whose sake sales are earmarked for activities to preserve the mountain forests.

I picked out the above two social experiments as typical of similar ones which are organizing collective action by means of selective-incentives schemes, with a view to preserving local or global commons. They meet five characteristics in common as described in what follows:

The first is that those beneficiaries of collective interests for large groups are faced with a free-rider problem with the leadership for network formation or organizing work at ex ante stage. The beneficiaries are ready to share the cost of the benefit directly obtainable from the collective interests, but they prefer their free-riding on someone's leadership for collective action to their own taking on the leadership. This is because in spite of its indispensability to any collective action, the organizing work prior to providing stages is costly to the entrepreneur or organizer, but there is no guarantee of being compensated enough for his organizing work, owing to its non-verifiable nature. If, accordingly, there were no incentive for taking on the leadership for collective action, no entrepreneur had come into existence as organizer of the collective action.

The second is that, thanks to socio-economic networks such as cooperatives and unions providing for "selective incentives," those organizers of collective action could cover the cost to organize the collective action. More concretely speaking, the cost to them of organizing work could be financially covered by their own income revenues obtained from undertaking selective-incentive schemes. That is, they are more or less freed from the

problem that their organizing work for collective action is not verifiable to any third person.

The third is that voluntary contributions or activities are not satisfactory in the sense that they can not yet achieve social optimality. In order to overcome this inefficiency problem, enterprises of selective incentives - cum - collective goods are being undertaken.

The fourth is that the organizational form of the enterprise of selective incentive-cum-collective good is usually of a not-for-profit type. However, those entrepreneurs are not necessarily an altruist, but usually of a selfish type. They chose not-for-profit organizational form, because this organizational form could appeal to more consumers for financial and volunteer support. That is, they chose NPO in order to solve the so-called "expropriation problem" or "appropriation problem."

The fifth is that even if the entrepreneur is of a selfish type, he has more or less his own preference for those collective goods. Such a type of entrepreneur is called *social entrepreneur*, distinguished from *business entrepreneur* who must be able to be compensated only with pecuniary rewards.

The first and second in the above are related with incentives for organizing work or network formation. However, the traditional Olsonian logic of collective action has not explicitly taken up the problem of incentives, even if Olson (1965) pointed out the indispensability of the organizing work. The "selective incentives" hypothesis subsumed everything and turned away that problem.

The third characteristic, i.e., the undersupply problem of voluntary activities under the leadership of entrepreneur, has not been taken up, either. Morgan (2000a, 2000b) came up with some lotteries schemes to address the undersupply problem. He showed that those schemes can ameliorate the problem, but that efficiency is not achieved yet. However, he did not take into consideration the indispensability of the organizing work and of the entrepreneurship for the schemes, and therefore he did not inquire into why NPOs are ubiquitously observed in those schemes. If we take into consideration the entrepreneurs and organizations undertaking the selective incentives schemed, why not-for-profit organizational form is preferred should be explained on a rational basis.

The fourth and fifth characteristics are related with these issues. The rational basis of NPO was given by Hansman (1980, 1996), Glaeser and Shleifer (2001) and Bilodeau and Slivinski (1998). However, they did not examine the conditions of social entrepreneur undertaking selective incentives schemes under not-for-profit organizational form.

In this paper, interrelationships among those characteristics are examined, with a view to sophisticating the Olson's logic of the "by-product theory of collective action". For this purpose, in this paper I come up with a three-stage game model with perfect information.

At the first stage, an entrepreneur chooses not-for-profit or for-profit organizational form before undertaking an enterprise of private good - cum - collective good. At the beginning of the second stage, a network of n consumers is formed by the entrepreneur, in order to organize them into going along with the scheme of private good-cum-collective good. The entrepreneur offers those consumers an ex ante contract comprised of (i) the price of a private good (selective incentive) and (ii) the promise of providing a collective good at the next stage by making use of a portion of the net proceeds of the enterprise. The size of that portion is dependent on under what

type of organizational form the scheme is undertaken. In response to this offer, those consumers decide on the quantity to be purchased at the same stage.

At the third stage, the entrepreneur provides for the collective good by combining his effort with the net proceeds of the private good. Here, the quality or quantity of the collective good depends on how much effort the entrepreneur makes to transform the net proceeds into the collective good. The contracts on the collective good, which was concluded at the previous stage, could not be made a complete one. From this incomplete nature of the ex ante contract comes out the possibility of his ex post appropriation or shirking. If those consumers hesitate to purchase the private good for fear of being shirked later, the entrepreneur may not be able to cover even the cost of his organizing work as well as to secure sufficient net proceeds to fund the collective good. Not-for-profit organizational form is chosen in order to allay those consumers' fear on a rational basis.

From the examination of the above model, I derive several results as follows: (a) that when entrepreneur can create and carry out the schemes of selective incentive-cum-collective good successfully enough to cover the cost of his organizing work, free-rider problem with the organizing work is solvable, and collective goods can be provided, more or less, (b) that the organizational form of not-for-profit is associated with a social entrepreneur type of organizers, (c) that entrepreneurs can achieve collective interests on a more satisfactory level under not-for-profit organizations than under for-profit organization, but (d) that the social optimal level is not achieved yet, so long as the social entrepreneur is a selfish type, and (e) that the possibility of achieving the social optimality depends on whether or not the social entrepreneurs can organize those social networks which can make the outcomes of bargaining between the social entrepreneur and his clients enforceable with negligible cost.

This paper is organized as follows: In the next section, the basic model is submitted. In the third section, it is examined and several results are derived. The fourth section discusses on a bargaining. In the final section, I summarize the main results of this paper and give some policy implications. I emphasize that teaching programs for training social entrepreneurs are required.

2. The Basic Model

In this section, a three-stage game is presented in order to examine interrelationship among network formation (organizing work), unverifiable nature of entrepreneur's organizing work, a scheme of private good-cum-collective good, incompleteness of its contract, and its organizational form.

2.1.The Basic Assumptions and Definitions

The Players and Payoff Functions: There are assumed to be n symmetric consumers and one entrepreneur. The payoff of each consumer is a function of numeraire goods (leisure time), private and collective goods. The payoff of the entrepreneur is a function of nemeraire goods (leisure time), collective goods, and income revenues alloted from the net proceeds of an enterprise of private good-cum-collective good.

The quasi-linear utility function of the representative consumer, U, is defined as follows:

(1) $U(L, x, G) = L + \phi(x) + \nu(G)$,

where $\phi(0) = 0$, $\phi' > 0$, $\phi'' < 0$, $\nu(0) = 0$, $\nu' > 0$, and $\nu'' \leqq 0$. L, x, and G denote, in turn, her leisure time, private good, and collective good she consumes, respectively. The consumer is subject to the following resource constraint:

(2) $I = L + px$

I and p stand for her initial resource endowment and the price of the private good she consumes.

The payoff function of the entrepreneur, Π, is defined as follows:

(3) $\Pi(L_E, y, G) = L_E + y + \nu_E(G)$

where L_E, y and ν_E are, in turn, his leisure time, his income revenues obtainable from undertaking an enterprise of private good-cum-collective good, and the benefit to him of the collective good itself. It is assumed, as usual, that $\nu_E(0) = 0$, $\nu_E' > 0$, and $\nu_E'' \leq 0$. The entrepreneur is subject to the following income constraint:

(4) $I_E = L_E + C + e$

In (4), I_E, C, and e are, in turn, the entrepreneur's initial endowment, the cost of his organizing work, and the effort of his producing the collective good.

The Strategies : The consumer decides on her consumption of the private good, subject to her resource constraint, in the expectation that as well as the benefit of the private good, she can enjoy some benefit of the collective good at later stage. The entrepreneur decides on how much effort to produce the collective good and on what type of organizational form of the enterprise of private good-cum-collective good.

The Price and Cost of Private Good : The price of the private good is assumed to be given by competitive market. The production cost of the private good is defined by $C_1(X)$ where X is the total production of the private good, i.e., $X = nx$, for symmetric case. It is assumed that $C_1(0) = 0$, $C_1' > 0$, $C_1'' > 0$.

The Production Function of Collective Good : The collective good is provided by the entrepreneur's effort to transform a portion of the net proceeds of the enterprise of private good-cum-collective good into the collective good. How much quantity and how high quality of the collective good is provided depend on how much effort of transformation he makes. The transformation function is denoted by $\psi(e)$. It is assumed that $\psi(0) = 0$, $\psi' > 0$, and $\psi'' < 0$, as usual. Thus, G is defined as follows:

(5) $G = \psi(e)(1 - \theta)(pX - C_1(X))$

In the above equation (5), $(1 - \theta)$ denotes a portion of the net proceeds of the enterprise which is allocated to producing the collective good. Here, it should be noted that the cost of organizing work, C, is not subtracted from the net proceeds, because the organizing work is of an unverifiable nature.

The Organizing Work : In order to provide the collective good, n consumers are required to join in the scheme of private good-cum-collective good, and furthermore the portion of the net proceeds which are allocated to production of the collective good must exceed a threshold level of funds, denoted by G_0. This threshold condition

meets both (6) and (7).

(6) $(1-\theta)[p(nx_0) - C_1(nx_0)] \geqq G_0$

(7) $x_0 = \arg\max \{ -px + \phi(x) \}$, with respect to x.

The equation (6) and (7) should be interpreted as follows: Suppose each consumer is purchasing the private good without any benefit of the collective good, and then her optimal consumption level, x_0, is derived from (7). Here, the entrepreneur has to be able to expect that a minimum volume of funds is collected as a precondition for producing the collective good. This relation is described by (6). Only when a portion of the net proceeds which can be allocated to production of the collective good exceed G_0, the effort of his transformation can produce something positive. The quantity of the private good purchased by each consumer under the private good-cum-collective good scheme is expected to be larger than x_0. Therefore, the threshold condition can be met, if n consumers are organized into going along with the scheme.

The entrepreneur has to organize those n consumers into going along with the scheme of private good-cum-collective good, because he has to advertise it or persuade them to join in that scheme, more or less, in a face-to-face way. This organizing work is costly, and the cost is denoted by $C = C(n)$. Without loss of generality, it can be assumed that $C' > 0$. In what follows, however, $C(n)$ is constant because n is fixed.[1] It should be noted that because of its unverifiable nature, $C(n)$ is not counted in when calculating the net proceeds.

The inequalities of (8) are required for the assumption that no player has incentives for the organizing work without some incentive other than the benefit of the collective good itself.

(8) $C(n) > \upsilon_E(G)$, and $C(n) > \upsilon(G)$, for any G.

Not-for-Profit or For-Profit Firm: The organizational form of not-for-profit is subject to the "non-distribution constraint." (See Hansmann (1980, 1996)). Actually, entrepreneur of NPO can appropriate more or less its net proceeds under various disguises such as perquisites. Here, it is noted that cash revenues are preferable to those perquisites. In accordance with the hypothesis of Glaeser and Shleifer (2001), this circumstance is represented by the assumption that the share of a not-for-profit entrepreneur in the net proceeds is lower than that of the for-profit entrepreneur. Let θ_N and θ_F denote the share of not-for-profit and of the for-profit entrepreneur, respectively. Then, it follows that $\theta_N < \theta_F$.

Enterprise of Private Good-cum-Collective Good: Suppose that consumers have been buying private goods in competitive market. They have some preference for a collective good, which however, has not been provided because there are no incentives for the organizing work. An entrepreneur offers his consumers an ex ante contract which says that a portion of the net proceeds from their purchase of the private good is earmarked for the collective good due to be provided at later stages. When a sufficient number of consumers accept this offer, i.e., n consumers are networked, then the entrepreneur carries out this scheme. Thus, the reward obtainable from his

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[1] If the entrepreneur chooses n so as to maximize his payoff, it is determined by the first necessary condition as follows: $C'(n) = \{ \theta + \nu E'\psi(e)(1-\theta) \} \{ p - C_1' \} x$. This assumption on how to decide n leads to the same conclusions in what follows.
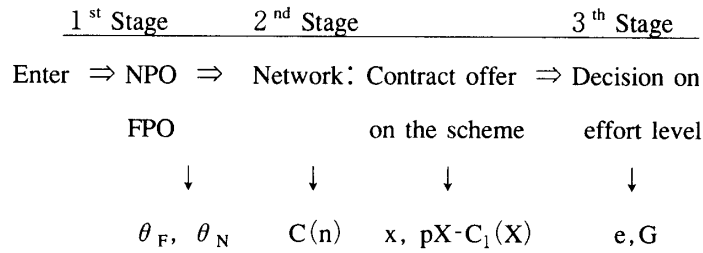
undertaking the enterprise, y, can be defined as (9).

(9) $y_i = \theta_i \{pX - C_1(X)\}$, $i = N, F$

In the above (9), X stands for the total quantity of the private good purchased by those n consumers.

2.2.A Three-Stage Process of Providing the Collective Good

The whole process of providing the collective good is comprised of three stages with perfect information. See the *Figure* 1 below.

Figure 1: *The Time Line of the Game*

1st Stage	2nd Stage		3th Stage
Enter $\Rightarrow$ NPO $\Rightarrow$	Network: Contract offer	$\Rightarrow$ Decision on	
FPO	on the scheme	effort level	
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
θ_F, θ_N	C(n)	x, pX-C$_1$(X)	e,G

At the beginning of the first stage, the entrepreneur decides on whether to undertake the enterprise of private good-cum-collective good. If his net payoff is expected to be positive, he launches into the enterprise. Then, he has to choose an organizational form from between NPO and FPO. When he chooses NPO, he must be subjected to the non-distribution constraint, and therefore he has to be satisfied with a lower share in the net proceeds than when choosing FPO.

At the beginning of the second stage, the entrepreneur has to organize n consumers into going along with the scheme of private good-cum-collective good. It means he has to form a socio-economic network consisting of n consumers who are consciously ready to purchase the private good-cum-collective good. When forming the network, the entrepreneur offers those n consumers contracts on the private good-cum-collective good, which are consisted of both a selling price of the private good, p, and an ex ante promise of allotting a portion, $1-\theta_i$, of the net proceeds to providing the collective good. The size of this proposed portion is dependent on the entrepreneur's organizational choice at the first stage. After each consumer accepts the offer, she makes a decision on how many private goods to consume so as to maximize her payoff including the benefit obtainable from the collective good. At the end of this stage, the total net proceeds come out.

At the third stage, the entrepreneur makes a decision on how much effort he should make to transform the net proceeds earmarked for the collective good into an actually realized quantity and quality of the collective good. The game ends with the ex post provision of the collective good.

3. The Examination of the Basic Model

In this section, I examine the third-stage game constructed in the previous section. The participation constraint

and incentive compatibility are used as its optimization concept. In what follows, we assume for simplicity that both ν and ν_E are positive constants.

3.1.The Optimization at the Third Stage

After substitution (2) and (5) for (1), the payoff function of the representative consumer is redefined as (10).

(10) $U(x ;e) = I - px + \phi(x) + \nu [\psi(e) (1 - \theta_i) (pX - C_1(X))]$

On the other hand, the payoff function of the entrepreneur is rewritten as (11) after substitution of (4), (5) and (9) for (3).

$$(11) \quad \Pi_i(e; x) = I_E - C(n) - e + \theta_i \{pX - C_1(X)\}$$
$$+ \nu_E[\psi(e) (1 - \theta_i) \{pX - C_1(X)\}], \qquad i = N \text{ or } F$$

Maximizing Π_i with respect to e, given X, and rearranging it, we obtain the first order condition (12). (It should be noted that Π_i is concave with respect to e, and thus (12) is also the sufficient condition.)

(12) $\psi'(e) [pX - C_1(X)] = 1 / (1 - \theta_i) \nu_E$ for $e = e^i(x)$, $i = N$ or F

Taking into consideration the condition that $\theta_F > \theta_N$, it can be derived from (12) that $e^N(x) > e^F(x)$. That is, *the effort to transform the net revenues into collective good is made harder under not-for-profit organizational form than under for-profit organizational form.*

In general, we can obtain from (12) that $\partial e^i / \partial \theta_i < 0$. It means that *the larger portion of the net proceeds he can appropriate in various disguises, the less effort he makes to transform the net proceeds into collective good.* As a special case, suppose the case of θ_F being unity. Then, $\partial \Pi / \partial e < 0$, and therefore, $e^F = 0$. That is, if all of the net proceeds are distributed to the entrepreneur as his cash revenues, then he has no incentive for making effort of providing the collective good.

Next, differentiating the both sides of (12) by X at the optimum, we obtain the following equation:

$\{pX - C_1(X)\} \psi''(e^i) \partial e^i / \partial X + \psi'(e^i) \{p - C_1'(X)\} = 0$, s.t. (12)

When $p - C_1'(X) \geqq (<) 0$, then $\partial e^i / \partial X \geqq (<) 0$ at the optimum because $\phi'' < 0$, and $pX - C_1(X) > 0$. Thus, the solution of (12) and the relation between e and x are given by (12).*

(12)* $e = e^i(x)$, $i = N, F$
       $p - C_1'(X) \gtreqqless 0 \Rightarrow \partial e^i / \partial X \gtreqqless 0$

3.2.Optimization at the Second Stage

The consumer's participation constraint, $I - px + \phi(x) \geqq I$, for $x \geqq 0$, must be met. It means that the private good is sufficiently beneficial to each consumer. When each consumer accepts the offer at the second stage, she

makes a decision on how much to purchase the private good, under the condition that $e = e^i(x)$. Maximizing (10) with respect to x, subject to $(12)^*$, we obtain the first order necessary condition (13).

$$(13) \quad p = \phi'(x) + \nu (1 - \theta_i) n [\psi'(e^i) \partial e^i / \partial X \{pX - C_1(X)\}$$
$$+ \psi(e^i) \{p - C_1'(X)\}], \text{ for } x = x^i, \text{ and } X = X^i$$

In the above equation, x^i and X^i $(=nx^i)$ denote the optimal values which maximize (10) subject to $(12)^*$.

Here, let's compare x^i with x_0 defined by (7), which is the volume of the private goods purchased by the same consumer under the condition of no scheme for the collective good. That is, x_0 satisfies the equation; $p = \phi'(x_0)$. By comparison of (13) and (7), it is obvious that when $p - C_1'(X^i) \gtreqless 0$, then $x^i \gtreqless x_0$, because taking $(12)^*$ into consideration, the sign of the second term of the left hand of (13) turns out to be dependent on the sign of $[p - C_1'(X^i)]$.

This last conclusion means that, *to the extent that an increase in her purchase of the private good is sure to induce the entrepreneur to make harder effort of producing the collective good, she is willing to consume more of the private good under the scheme of private good-cum-collective good than under no such scheme, and vice versa. Here, the entrepreneur is stimulated to make the harder effort by an increase in his income revenues brought about by increase in the production of the private good, which is described by the condition of $[p - C_1'(X^i)]$ being positive.*

At the beginning of this second stage, the entrepreneur has to make contacts with n consumers in face-to-face manner to persuade them into going along the scheme. It is because those consumers do not have so strong preference for the collective good as to seek information on the scheme on their own. When such a network is formed, it takes the form of a star type of network, and once formed, it is stable in the sense that it is a strong Nash equilibrium (For the mathematical proof, see Ueda and Svendsen (2002)). So, only one network is formed and each member of the network has no incentive to leave it, once formed.

In this paper, it was assumed for simplicity that it costs $C(n)$ to organize n consumers into joining in the scheme. Therefore, the participation constraint of the entrepreneur, given by (14), must be met.

$$(14) \quad \Pi^i(e^i; x^i) = I_E - C(n) - e^i + \theta_i \{pX^i - C_1(X^i)\}$$
$$+ \nu_E [\psi(e^i) (1 - \theta_i) \{pX^i - C_1(X^i)\}] \geq I_E, \text{ for } i = N, \text{ or } F.$$

When (14) is met, he chooses taking on the organizing work at the second stage.

3. 3. Decision on Organizational Form at the First Stage

At the first stage, the entrepreneur chooses an organizational form from between not-for-profit and for-profit organization. The condition for him to choose NPO, i.e., $\Pi^N \geq \Pi^F$, is rewritten by arranging (14), as follows:

$$(15) \quad \theta_N \{pX^N - C_1(X^N)\} + \nu_E [\psi(e^N) (1 - \theta_N) \{pX^N - C_1(X^N)\}]$$
$$- \theta_F \{pX^F - C_1(X^F)\} + \nu_E [\psi(e^F) (1 - \theta_F) \{pX^F - C_1(X^F)\}] \geq e^N - e^F$$

The effects of θ on e can be examined by differentiating Eq. (12). By differentiating the both sides of Eq. (12) by θ, taking (13) into consideration, and rearranging, we can derive the inequality (16) below.

(16) $[\ |\psi'(e)\ |p - C_1'(X)|^2 - |\psi''(e)\ |pX - C_1(X)|^2\ ]\ \partial e\ /\partial\ \theta > 0$

Accordingly, the sign of $(e^N - e^F)$ depends on the sign of

$[\ |\psi'(e)\ |p - C_1'(X)| - |\ \psi''(e)\ |\ |pX - C_1(X)|\ ]$.

Here, we can derive the following result: *The higher is the ratio of $\psi'(e)\ /\ |\ \psi''(e)\ |$ and /or that of $|p - C_1'(X)|\ /|pX - C_1(X)|$, the more plausible it is that $\partial e\ /\partial\ \theta > 0$.*

Because $\theta_N < \theta_F$, the sign of the right hand of (15) depends on the sign of $\partial e\ /\partial\ \theta$, i.e., on whether $[\psi'(e)\ |p - C_1'(X)| - |\ \psi''(e)\ |\ |pX - C_1(X)|\ ]$ is positive or not. Thus, we can gain the following result:

(*) $\psi'(e)\ |p - C_1'(X)| - |\ \psi''(e)\ |\ |pX - C_1(X)| \gtreqqless 0 \Rightarrow e^N - e^F \lesseqqgtr 0$

In short, we can derive the conditions for NPO to be chosen on a rational basis, as follows; *Under the condition of $(e^N - e^F)$ being positive (negative), (i) that $\psi(e^N)$ must be large (small) enough relatively to $\psi(e^F)$, and /or (ii) that $|pX^N - C_1(X^N)|$ is large (small) enough relatively to $|pX^F - C_1(X^F)|$.* Remember here that $[\ |pX^N - C_1(X^N)| - |pX^F - C_1(X^F)|\ ] \geq 0$ and $\partial X/\partial e \geq 0$, if $p - C_1'(X) \geq 0$, and that this last inequality is a necessary condition for the feasibility of the scheme of private good-cum-collective good.

In other word, those two conditions *for the entrepreneur to choose NPO under the condition of $(e^N - e^F)$ being positive, mean (i) that the productivity of his effort of providing the collective good must be so high enough as to compensate for harder effort under the not-for-profit organization, and (ii) that the net revenues of the enterprise is so large enough as to compensate his work with an increase in pecuniary incomes and with an increase in the collective good itself.*

When $\Pi^i \geq I_E$ for $i = N$ and F, and $\Pi^N \geq \Pi^F$, the action-profile (S_E, S_C) of the entrepreneur and consumers satisfies their participation constraints and incentive compatibilities. Here, S_E is defined as the entrepreneur's strategy consisted of his choosing NPO at the first stage, and choosing $e^N(x^N)$ at the third stage. S_C is defined as the consumer's acceptance of the scheme under NPO and their choice of x^N at the second stage.

3.4.The Social Entrepreneur

Here, in order to make the effect of NPO more conspicuous, let's take up the case of θ_F being unity. This is the case of the private good being purchased without any scheme for collective action. When the entrepreneur engages only in selling the private good in a competitive market, he need not take on the organizing work. Thus, not only e^F but also $C(n)$ is zero in this case. Then, the condition of (15) is changed to (17).

(17) $[\ \theta_N + \nu_E\psi(e^N)\ (1 - \theta_N)\ ]\ |pX^N - C_1(X^N)| - e^N - C(n)$
$\geq pX^F - C_1(X^F)$

The right side of the above inequality, $\{pX^F - C_1(X^F)\}$, is the maximum of $\{pX - C_1(X)\}$. Therefore, the inequality, $\nu_E \psi(e^N) > 1$, is a necessary condition for (17) to be met. It means that the benefit obtainable from making effort to provide the collective good must be sufficiently large in order to induce the entrepreneur to prefer the enterprise of private good-cum-collective good to the enterprise without any such a scheme. That is, the benefit factor itself, ν_E, must be sufficiently large, and/or the transformation efficiency itself, $\psi(e^N)$, must be large enough, as said in the previous subsection.

Here, the *social entrepreneur* can be defined in a difinite way as a type of entrepreneur who has so high a value of $\nu_E \psi(e^N)$ as to make the condition (16) be met. This means that only a special type of entrepreneur can choose to become a *social entrepreneur*. Those conditions for an entrepreneur to choose to become a social entrepreneur give us some significant implication that if there are not so many candidates of social entrepreneurs who can take on the leadership for collective goods, we may have to arrange for the teaching programs which can promote those candidates to come into existence.

4. The Social Optimality

In this section, it is shown that the quantity of the collective good provided by social entrepreneur is still less than the socially optimal level, but that it is larger than that provided by voluntary contributions. A bargaining game is presented in order to show the conditions for the social optimality to be met.

4.1.Comparison with Voluntary Contributions

If at the second stage of the three-stage game in the previous section, each consumer were asked to directly contribute to provision of the collective good rather than to purchase the private good-cum-collective good, her payoff function is changed to (18).

(18) $U(x) = I - px + \nu \psi(e) (1 - \theta_i) nx$

From the first necessary condition, (19) is derived.

(19) $-p + \partial [\nu \psi(e) (1 - \theta_i) nx] / \partial x \leq 0$

As long as the marginal benefit of the private good is larger than that of the collective good, the left side of (19) becomes negative, leading to the extreme conclusion that $x = 0$ at the optimum of (18). That is, no consumer is voluntarily willing to contribute to producing the collective good.

4.2.Inefficiency

The social optimization requires maximizing $(\Pi + nU)$ which is defined by (20) as follows:

(20) $\Pi + nU = (\nu_E + n\nu) [\psi(e) (1 - \theta_i) (pX - C_1(X))] + n\phi(x)$
$\qquad + \theta_i (pX - C_1(X)) - pX - C(n) - e + I_E + nI$

From the necessary condition for maximizing (20) with respect to e given X, we obtain (21).

(21) $\psi'(e) = 1 / (\nu_E + n\nu)(1 - \theta_i) \mid pX - C_1(X) \mid$, for $e = e^*(x)$

On the other hand, the maximization of the entrepreneur's own payoff, with respect to e, already derived the necessary condition (12).

(12) $\psi'(e) = 1 / [\nu_E (1 - \theta_i) \mid pX - C_1(X) \mid]$, for $e = e^i(x^i)$, $i = N, F$

Comparing (21) with (12), it is obvious that $e^* > e^i$. It means that *the effort of providing for the collective good by the entrepreneur is less than the social optimum level, to the extent that he is a selfish type of individualist. The larger is the benefit to consumers of the collective good, the less efficiently it is provided.*

Next, maximizing (20) with respect to x, given $e = e^i(x^i)$, we gain the following equation:

(22) $p = (\nu_E + n\nu) [\psi(e)(1 - \theta_i) \mid p - C_1'(X) \mid + \psi'(e)(1 - \theta_i)(pX - C_1(X))$
$\times \partial e / \partial X] + \phi'(x) + \theta_i \mid p - C_1'(X) \mid$, for $x = x^*(\theta_i)$

On the other hand, the selfish maximization of each consumer entails the necessary condition (13), the optimal value of which was defined as x^i. It is obvious that $x^*(\theta_i) \geqq x^i$, since $\nu_E > 0$ and $p - C_1'(X) \geqq 0$. Thus, *the demand for private good can not exceed the social optimal level, when each consumer pursues the selfish maximization of her own utility.*

4.3.Nash Bargaining

Is it possible for both the entrepreneur and consumers to agree to achieving x^* and e^*, i.e., the social optimality? If we can take into consideration the possibility of bargaining among those players, the optimality may be achievable. In this subsection, I add a simple Nash bargaining process to the three-stage model in the previous sections.

Let V^* denote the optimal value of $\Pi + nU$ defined by (20). That is,

(23) $V^* = \Pi(e^*) + nU(x^*)$

On the other hand, the break-down payoff of the entrepreneur and of each consumer is defined as (24) and (25), respectively. (In what follows, the subscripts of θ are omitted.)

(24) $\Pi(e; \theta) = I_E - C(n) - e(\theta) + \theta \mid pX(\theta) - C_1(X(\theta)) \mid$
$+ \nu_E [\psi(e(\theta))(1 - \theta) \mid pX(\theta) - C_1(X(\theta)) \mid]$
(25) $U(x; \theta) = I - px(\theta) + \phi(x(\theta))$
$+ \nu [\psi(e)(1 - \theta) \mid pX(\theta) - C_1(X(\theta)) \mid]$

The payoff functions, Π and U, are not only continuous but also concave with respect to their own strategy

variable, e and x, respectively, over their own defined ranges. Therefore, the Nash Equilibrium of (24) and (25) exists.

Here, suppose that at the forth stage, the entrepreneur and his consumers bargain over how to split V^*. Then, under the assumption of equal bargaining power, the bargaining outcomes are derived as follows:

(26) $\Pi^* = \Pi(\theta) + \{V^* - \Pi(\theta) - U(\theta)\} / 2$

(27) $U^* = U(\theta) + \{V^* - \Pi(\theta) - U(\theta)\} / 2$

If the network formed by the entrepreneur's organizing work can make both of e^* and x^* enforceable with negligible cost, then the social optimality is possible. It depends on the cost of monitoring and enforcing both e^* and x^*.

5. Main Conclusions and Implications

The collective action problem is comprised of two kinds of free-rider problems: The first is the free-rider problem of who should take on the organizing work at ex ante stage prior to the provision of collective good. The second is that of how much contribution to the collective good each beneficiary should make.

Olson (1965) pointed out the problem of organizing cost for collective action. He addressed it as a fixed cost to provide collective goods. The by-product theory of collective action could give a rational foundation to the first type of free-riding problem. However, the traditional Olsonian logic of collective action has not taken into consideration the problem of who are willing to take on the organizing work at ex ante stage, that is, the problem of the incentives for the organizing work which must be done without any assurance of compensation or rewards.

This paper constructed a three-stage game model played by an entrepreneur and his consumers in order to reexamine the Olsonian logic, based on an incomplete contract approach to the organizing work. According to the analysis of the model, we could obtain the following main results: (i) that if an entrepreneur type of social organizer can create and carry out the scheme of private good-cum-collective good, he can solve the problem of collective action of a first type, and (ii) that in order for not-for-profit organizational form to be preferred by him to for-profit one, the entrepreneur must be a social entrepreneur, in the sense that he can enjoy a sufficient level of the benefits from the collective good itself, and / or that the effects of his effort on the quantity and / or quality of the collective good are sufficiently significant.

Regarding the second type of free-rider problem, however, the so-called undersupply problem is not yet solved by the selective-incentive scheme, as long as the social entrepreneur is a selfish type of individualist. This is because he does not take into allowance the benefits of other consumers in making a decision on how much effort to provide collective goods, and because those consumers do not take into allowance the benefit of the entrepreneur. In order to be able to achieve the social optimality, accordingly, both parties have to able to set up those bargaining games in which they can agree to achieving the efficient provision level, and furthermore they have to be able to enforce those bargaining outcomes with negligible cost. In this sense, even if the problem of how to organize collective action could be solved by selective incentives schemes, that of *how to manage the*

production of collective goods remains to be solved yet.

Turning our eyes to the global commons, however, the collective action problem even with *how to organize* or with *who to take on the leadership for network formation* has not yet been solved. It is sure, therefore, that local networks now under experiment can contribute to preserving, or sustainable use of, the global commons, even if their own provision cannot reach the socially optimal level yet. In this respect, we should come up with more ingenious and practicable selective-incentive schemes.

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