Optimal ownership of public goods in the presence of transaction costs

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HIGHLIGHTS

- An NGO can make a non-contractible investment to provide a public good.
- Ex ante only ownership can be specified, since contracts are incomplete.
- Ex post efficiency requires reaching an agreement with the government.
- The NGO must incur transaction costs to reach the bargaining stage.
- Ownership by the government can be optimal even when the NGO has a larger valuation.

ABSTRACT

A non-governmental organization (NGO) can make a non-contractible investment to provide a public good. Only ownership can be specified ex ante, so ex post efficiency requires reaching an agreement with the government. Besley and Ghatak (2001) argue that the party with the larger valuation should be the owner. We show that when transaction costs have to be incurred before the bargaining stage can be reached, ownership by the *government* can be optimal even when the NGO has a larger valuation. Our finding also contrasts with the standard private-good setup where the investing party (i.e., the NGO) should always be the owner.

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1. Introduction

The property rights approach based on incomplete contracts, developed by Oliver Hart and his coauthors (Grossman and Hart, 1986; Hart and Moore, 1990; Hart, 1995), is widely regarded as a major advance in economic theory.[1] Originally, the property rights approach was concerned with optimal ownership arrangements in private-good contexts. Besley and Ghatak (2001) have applied the approach to discuss who should be the owner in public-good settings. In the present paper, we extend their framework in order to study the implications of transaction costs that may restrain ex post negotiations.

Specifically, consider two parties who both care about the benefits of a public good, say the government and a non-governmental organization (NGO).[2] At the outset, the parties can only specify an ownership structure. Subsequently, the NGO has to make a non-contractible investment. After the investment is sunk, provision of

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[1] See Nobel Prize Committee (2016) for a detailed appreciation of Hart's contribution.

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[2] As pointed out by Besley and Ghatak (2001), the two parties could also be different public entities (say, federal and local government).

the public good becomes contractible, and the parties can bargain with each other. Ownership improves a party's bargaining position and hence influences the incentives to invest. In the private-good context studied by Hart and his coauthors, when only one party has to make an investment decision, then this party should always be the owner. In contrast, Besley and Ghatak (2001) argue that in a public-good context, the party who has the larger valuation of the public good should be the owner.

The property rights approach has been criticized because it assumes that ex post efficiency is always achieved by Coasean bargaining (Holmström and Roberts, 1998; Williamson, 2000). In the present paper, we thus introduce transaction costs in the most straightforward way possible, following an insightful paper by Anderlini and Felli (2006). They argue that in order to reach a bargaining stage, a party may first have to incur transaction costs.[3] We show that introducing such transaction costs into Besley and Ghatak's (2001) framework may overturn their main result as well as the standard finding of the property rights theory: ownership by the *government* can be optimal, even though the NGO has a larger valuation of the public good *and* the NGO is the only party that has to make an investment decision.

The intuition behind our result is that the additional surplus that can be generated in the ex post negotiations has to be sufficiently large for the transaction costs to be covered. An ownership structure that yields a poor outcome in the absence of negotiations can hence become desirable, because it makes paying the transaction costs more attractive.

Related literature. Several authors have studied variants of Besley and Ghatak's (2001) public-good model. For instance, Francesconi and Muthoo (2011) consider impure public goods, Halonen-Akatwijuka (2012) investigates indispensability of agents, and Schmitz (2015) allows the ex post negotiations to break down with a small exogenous probability.[4] Yet, transaction costs as modeled by Anderlini and Felli (2006) have not been studied in this literature so far.[5]

2. Model

Consider two parties, G (government) and N (NGO). At some initial date $t = 0$, an ownership structure $o \in \{G, N\}$ is determined. At date $t = 1$, N makes an observable but non-contractible investment $I \geq 0$.[6] The public good which can be produced with the help of N's investment becomes contractible only after the investment is sunk. At date $t = 2$, N has to decide whether to pay the transaction cost $c \geq 0$.[7] A necessary condition for reaching an agreement to collaborate at date $t = 3$ is that N has paid the

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[3] The transaction costs may be interpreted as the time spent preparing for the negotiations. For example, it may be necessary to conceive of a suitable language to describe the states of nature, information about the legal environment must be collected, etc. (see Anderlini and Felli, 2006, section 2).

[4] In Schmitz (2015), the optimal ownership structure looks more like the one in the standard property rights model (Hart, 1995). In particular, in his model it can never happen that ownership by the government is optimal when only the NGO invests and the NGO has a larger valuation of the public good.

[5] Transaction costs in the spirit of Anderlini and Felli (2006) have recently also been studied by Müller and Schmitz (2016) in a property rights model with private goods and by Anderlini et al. (2016) in the context of pre-trial agreements.

[6] The model can be extended to the case in which both parties invest. Focusing on the case of one-sided investments only strengthens our main result, because in a standard property rights model (cf. Hart, 1995), N-ownership would always be optimal if only N invests.

[7] One can extend the model such that also G has to pay a transaction cost in order to reach the bargaining stage. Anderlini and Felli (2006) show that the implications of transaction costs are most interesting when there is a 'mismatch' between the distributions of the transaction costs and the parties' bargaining powers. Following Besley and Ghatak (2001) we will assume that both parties have the same bargaining power, hence we focus on the simplest case with asymmetric transaction costs.

Table 1
The parties' date-3 payoffs.

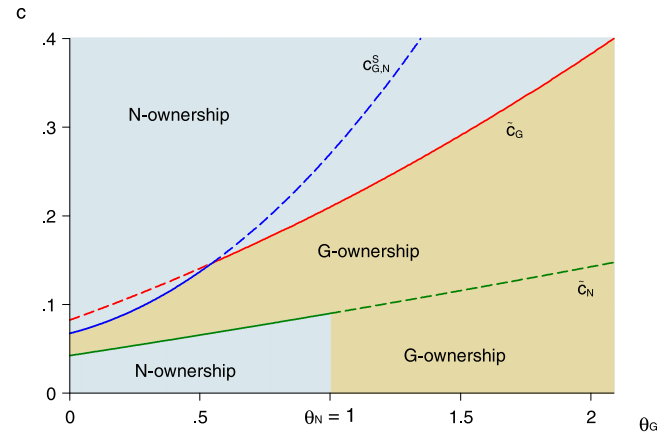|	Payoff of party G	Payoff of party N
Collaboration	$\theta_G y(I) + T$	$\theta_N y(I) - T$
Default, $o = G$	$\theta_G \lambda_G y(I)$	$\theta_N \lambda_G y(I)$
Default, $o = N$	$\theta_G \lambda_N y(I)$	$\theta_N \lambda_N y(I)$

Fig. 1. The optimal ownership structure.

transactions cost c. If the parties agree to cooperate, they together provide the quantity $y(I)$ of the public good, where $y(0) = 0$, $y'(I) > 0, y'(0) = \infty, \lim_{I \to \infty} y'(I) = 0$, and $y''(I) < 0$.

If c has not been paid or if c has been paid but the parties do not reach an agreement to cooperate, the quantity of the public good provided under ownership structure $o \in \{G, N\}$ is $\lambda_o y(I)$, where $0 < \lambda_G < \lambda_N < 1$. Thus, if cooperation fails such that the other party's human capital is missing, the owner can only produce a fraction of the quantity that would be feasible under cooperation; i.e., cooperation is always ex post efficient. Note that since N is the investing party, in the absence of collaboration the investment can be used more effectively when N is the owner.

The valuation of party $i \in \{G, N\}$ for the public good is given by $\theta_i > 0$. The parties' date-3 payoffs are summarized in Table 1, where T denotes a transfer payment from N to G.

To avoid uninteresting case distinctions, in the analysis we focus on $\theta_G > \tilde{\theta}_G$, where

$$\tilde{\theta}_G := \left[\frac{2(\lambda_N - \lambda_G)}{1 - \lambda_G} - 1 \right] \theta_N. \tag{1}$$

Note that $\tilde{\theta}_G < \theta_N$; i.e., G's valuation can be smaller or larger than N's valuation.[8]

3. Analysis

3.1. Ex post division of surplus (t = 3)

Following Besley and Ghatak (2001), we assume that if negotiations are feasible at date $t = 3$, then the outcome is given by the regular Nash bargaining solution.[9] Hence, if N paid the transaction costs at date $t = 2$, the parties always collaborate at date $t = 3$ and agree on a transfer payment T such that each party receives its default payoff plus half of the renegotiation surplus (i.e., the additional surplus that is generated by collaboration). If N did not pay the transaction costs, such that negotiations cannot take place,

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[8] We focus on $\theta_G > \tilde{\theta}_G$ only to shorten the exposition. Note that in the example illustrated in Fig. 1 below, we do not impose this parameter restriction.

[9] See Muthoo (1999) for an excellent exposition of bargaining theory.