Good Donors or Good Recipients? A Repeated Moral Hazard Model of Aid Allocation

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Foreign Aid and Information Issues

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- One possible remedy: Conditionality;
- Conditionality on \textit{performance}: not widely used (Isopi and Mavrotas (2009)).
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In this paper, we ask:

▶ Why do donors seem so reluctant to use incentive schemes in the implementation of aid projects? Is it simply due to institutional inertia and bureaucratic inefficiency or rather to rational behavior?

▶ What types of aid contracts should donors offer to achieve internationally shared objectives, such as lifting countries out of poverty?
Environment

1. 2 Players:

   ▶ 1 Donor: aims at helping the poor, but may also be conditioned by non altruistic motives;
   ▶ 1 Recipient with 2 types of agents: type I agents, the elite, that chooses \( i \in (0,1) \); type II agents, the poor, cannot influence the realization of the project.

2. Three Periods;
3. Moral Hazard: the donor cannot verify the recipient's action;
4. Limited Punishment: negative transfers are not allowed;
5. Production Function: \( q_t(\theta, a_t - 1) = \theta t + a_t - 1 \) (1)

where \( \theta_t \in [\bar{\theta}; \theta] \) with \( \bar{\theta} > \theta \) and \( q_t \in [\bar{q}; q] \) with \( \bar{q} > q \).
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where \( \theta_t \in [\bar{\theta}; \underline{\theta}] \) with \( \bar{\theta} > \theta \) and \( q_t \in [\bar{q}; q] \) with \( \bar{q} > q \).
Preferences of Type I and Type II agents

Type I agents (the elite) preferences:

\[ u^e_{0,t} = \gamma[\pi_0(\bar{\theta} + a_{t-1}) + (1 - \pi_0)(\theta + a_{t-1})] \] (2)

\[ u^e_{1,t} = \gamma[\pi_1(\bar{\theta} + a_{t-1}) + (1 - \pi_1)(\theta + a_{t-1})] - \psi \] (3)

Note: \( \pi_1 \) is the probability of obtaining \( \bar{q} \) after exerting \( i = 1 \). \( \pi_0 \) is the probability of obtaining \( \bar{q} \) after exerting \( i = 0 \). \( \pi_1 > \pi_0 \).
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Type II agents (the poor) preferences:

\[ u_{0,t}^p = (1 - \gamma)[\pi_0(\bar{\theta} + a_{t-1}) + (1 - \pi_0)(\bar{\theta} + a_{t-1})] \] (4)

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The Donor Country

Donor’s preferences:

\[ V_d = E[\lambda u_t^e + (1 - \lambda)u_t^p - C(a_t)] \]  \hspace{1cm} (6)

where \( C(a_t) = \delta a_t^2 \)  \hspace{1cm} (7)
Timing of events

1. *time 0*: an amount $a_0$ is provided by type I agents to start the project;
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3. *time 2*: either $\bar{q}_2 = q(a_1, \bar{\theta})$ is realized or $q_2 = q(a_1, \theta)$. After having observed $q_2$, the donor determines $a_2(q_2)$, $q_2 \in [\bar{q}_2, q_2]$;
Timing of events

1. time 0: an amount $a_0$ is provided by type I agents to start the project;
2. time 1: either $\bar{q}_1 = q(a_0, \bar{\theta})$ is realized or $\underline{q}_1 = q(a_0, \theta)$. The donor determines $a_1(q_1)$, $q_1 \in [\bar{q}_1, \underline{q}_1]$;
3. time 2: either $\bar{q}_2 = q(a_1, \bar{\theta})$ is realized or $\underline{q}_2 = q(a_1, \theta)$. After having observed $q_2$, the donor determines $a_2(q_2)$, $q_2 \in [\bar{q}_2, \underline{q}_2]$;
4. time 3: either $\bar{q}_3 = q(a_2, \bar{\theta})$ is realized or $\underline{q}_3 = q(a_2, \theta)$. The project is completed and the game is over.
**Important Aspects**

- **Standard Model**: the principal wishes that the agent undertakes the **highest** level of effort;
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- Our model: it is **non necessarily optimal** for a donor to always induce good behavior by type I agents;

Note: $V_0$ represents donor's utility function when type I agents undertake the low level of effort. $V_1$ represents donor's utility function when type I agents undertake the high level of effort.
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- Standard Model: the principal wishes that the agent undertakes the **highest** level of effort;
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Therefore:

- if $V_1 > V_0$ equilibrium contracts are those that maximize $V_1$ subject to the intertemporal ICC, the intertemporal PC and NNC.
- if $V_0 > V_1$ then the donor maximizes $V_0$ subject to the intertemporal PC type I agents face when undertake the low level of effort and NNC.

Note: $V_0$ represents donor’s utility function when type I agents undertake the low level of effort. $V_1$ represents donor’s utility function when type I agents undertake the high level of effort.
Proposition 1

Under **Complete Information**,

\[
\begin{align*}
\text{if } & \quad \frac{F}{2\delta} \geq \Delta \pi \omega \quad \text{then} \quad \bar{a}_1 = \bar{a}_2 = \bar{a}_2(q_1) = \bar{a}_2(q_1) = a_2(q_1) = a_2(q_1) = \frac{F}{2\delta}; \\
\text{if } & \quad \frac{F}{2\delta} \leq \Delta \pi \omega \quad \text{then} \quad \bar{a}_1 = \bar{a}_1 = \frac{\psi - \gamma \hat{\theta}}{\gamma}; \quad \bar{a}_2(q_1) = \bar{a}_2(q_1) = a_2(q_1) = a_2(q_1) = 2 \left( \frac{\psi - \gamma \hat{\theta}}{\gamma} \right). \\
\end{align*}
\]

where \( \omega = \frac{\psi - \gamma \hat{\theta}}{\gamma \Delta \pi} \). \( \frac{F}{2\delta} \) is the marginal benefit to the donor (relative to the marginal cost of funds) and \( \Delta \pi \omega \) is the cost of effort.

Note: when \( \frac{F}{2\delta} \geq \Delta \pi \omega \), the participation constraint is never binding. When \( \frac{F}{2\delta} \leq \Delta \pi \omega \), the participation constraint is binding in both periods.
Comments on Proposition 1

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2. *Equilibrium 1*: donor’s preferences determine the size of the aid transfers across periods;  *Equilibrium 2*: the level of the transfers is simply increasing in the cost of effort and over time.
Proposition 2

Under **Incomplete Information**,

\[
\begin{align*}
\text{if} \quad & \omega \leq 0 \quad \text{then} \quad \bar{a}_1 = a_1 = \bar{a}_2(q_1) = \bar{a}_2(q_1) = a_2(q_1) = \frac{F}{2\delta}; \\
& \omega > 0 \quad \text{then} \quad \text{Weak Conditionality or Strong Conditionality.}
\end{align*}
\]

Note: When \( \omega \leq 0 \) the incentive compatibility constraint and the participation constraint are never binding.
Proposition 2

Under **Weak Conditionality**, the optimal level of aid depends only on the outcome of the project of the previous period.

\[
\bar{a}_1 = a_2(\bar{q}_1) = \frac{F}{2\delta} + (1 - \pi_1)\omega
\]  

\[
a_1 = a_2(q_1) = \begin{cases} 
\frac{F}{2\delta} - \pi_1\omega & \text{if } \frac{F}{2\delta} > \pi_1\omega \\
0 & \text{if } \frac{F}{2\delta} \leq \pi_1\omega
\end{cases}
\]  

Note: The incentive compatibility constraint is always binding but the participation constraint in \( t = 2 \).
Proposition 2

Under **Strong Conditionality**, the optimal contracts are given by:

\[ \bar{a}_1 = \frac{F}{2\delta} + (1 - \pi_1)\omega \]  

\[ a_1 = \begin{cases} 
\frac{F}{2\delta} - \pi_1\omega & \text{if } \frac{F}{2\delta} - \pi_1\omega \geq 0 \\
0 & \text{if } \frac{F}{2\delta} - \pi_1\omega < 0 
\end{cases} \]  

\[ \bar{a}_2(\bar{q}_1) = \frac{F}{2\delta} + \omega(2 - \pi_1 - \pi_0) \]  

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\frac{F}{2\delta} + \omega(1 - \pi_1 - \pi_0) & \text{if } \frac{F}{2\delta} + \omega(1 - \pi_1 - \pi_0) \geq 0 \\
0 & \text{if } \frac{F}{2\delta} + \omega(1 - \pi_1 - \pi_0) < 0 
\end{cases} \]  

\[ a_2(q_1) = 0 \]  

Note: The incentive compatibility constraint and the participation constraint are always binding.
Comments to Proposition 2

1. When $\omega \leq 0$ the donor still finds optimal offering **unconditional contracts**. No need to impose an incentive mechanism;
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2. If $\omega > 0$ the donor offers conditional contracts. Conditionality can be: 1) Strong Conditionality or 2) Weak Conditionality;

3. The choice between conditional or unconditional contracts depends only on $\psi$ and $\gamma$. The type of conditionality depends also on the parameter $F$;

4. Weak Conditionality more likely when $F$ is high; Strong conditionality more likely when $F$ is low. In all cases, aid is larger the greater is $F$ and the lower is $\delta$;

5. Both under strong and weak conditionality, optimal transfers can be equal to zero.
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Proposition 3

When $V_0 > V_1$, an optimizing donor offers unconditional contracts, even though incentive compatible contracts exist. Optimal contracts are given by:

$$\bar{a}_1 = a_1 = \bar{a}_2(q_1) = \bar{a}_2(\bar{q}_1) = a_2(q_1) = a_2(\bar{q}_1) = \frac{F}{2\delta}$$

(17)
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2. Donor internalizes the cost of effort: when this cost is high, she prefers that type I agents opt for the low level of effort (i.e. a wasteful use of resources in the recipient country);

3. If $\lambda = 0$, $V_0$ cannot be greater than $V_1 \Rightarrow$ the donor always imposes an incentive mechanism.
Summary and Conclusions

1. We develop a repeated moral-hazard model with limited punishments to study the optimal aid allocation policy of a donor country whose utility function is increasing in the welfare of the recipient;
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2. Under incomplete information, a donor can offer two types of contracts: one, unconditional (constant transfers over time and states) that depends on donor’s preferences;
Summary and Conclusions

3. If conditional, the donor can choose between:

- weakly conditional contracts, where only the outcome of the previous period is taken into account;
- strongly conditional contracts, where aid is tied to the whole history of the project.

4. The type of conditionality depends on the preferences of the donor;

5. The past performance of the recipient country is not a sufficient reason for denying foreign aid;

6. A donor with a strong desire to help a developing country, either for altruistic reasons or for strategic/economic motives, would never deny aid to it.
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