The Conservation Multiplier

Bård Harstad

University of Oslo

bardh@uio.no

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- The Norwegian REDD+ funds are halted, in part because of disagreements over whether the payments should be earmarked or used at the discretion of the current government.
- The government in any resource-rich country faces the decision over whether to exploit or conserve. If the resource is conserved, the subsequent government inherits the dilemma.

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3. Can "principals" (lobbies/compensators) take advantage of the dynamic game between the "agents" (the governments)?
4. How should compensation for conservation be structured and targeted?

Literature

- Political turnover leads to less investments in state capacity (Besley and Persson, 2009; 2010), the accumulation of debt (Persson and Svensson, 1989; Alesina and Tabellini, 1990; Tabellini, 1991; Battaglini and Coate, 2008), and to time inconsistency (Amador, 2003; Bisin et al., 2015; Chatterjee and Eyigungor, 2016; Harstad, 2020a).
  - However, these decisions (f.ex., accumulation of debt) are reversible, while for the multiplier effect, in this paper, the decision to exploit must be irreversible.
  - Alesina and Drazen (1991) model stabilization policies as a once-and-for-all irreversible policy decision. There, each policymaker benefits if another policymaker ends the game (by stabilizing the economy), while in the present paper each policymaker hopes that the other policymakers will *not* end the game. This difference is key and leads to dramatically different results.
- Multiple lobby groups are naturally considered already in the political economy literature: Outcome is efficient when all stakeholders lobby (Grossman and Helpman, 1994).
  - This result fails to hold in the present exploitation vs. conservation game.
  - In contrast, the analysis below uncovers a fundamental asymmetry in the influence between the lobby paying for action (i.e., exploitation) and the stakeholder paying for inaction (i.e., conservation), because the first lobby only needs to pay the president one single time to succeed, whereas the stakeholder paying for conservation needs to pay in every period.

The Model

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- The extraction cost is $c(\cdot)$.
- The common discount factor is δ:

$$V(S_t) = Ax_t S_t + b(1 - x_t) S_t - c(\cdot) + \delta V(S_{t+1}).$$

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- Extraction cost:

$$\frac{c}{2} x_t^2 S_t.$$

The Model: Extraction

- **Microfoundation**:
- Suppose there are temporary iid shocks on costs (-benefits) across the units:

$$\widetilde{c} \sim U\left[0, \overline{c}\right].$$

- It is cost-effective to extract the least-cost fraction x_t. Thus, every unit where $\widetilde{c} < x_t\overline{c}$.
- The expected unit cost vs. total cost is:

$$x_t \cdot \frac{x_t\overline{c}}{2} \quad \text{vs.} \quad x_t \cdot \frac{x_t\overline{c}}{2} S_t.$$

- Holds also if the unit-specific $\widetilde{c}$ is observed only by local suppliers – if the local surplus is internalized, and if it is not (the government's cost is then $\overline{c}x_t^2 S_t$).
- Holds also if the shocks (while iid over time) are perfectly correlated across the units (then, x_t measures expected fraction that is extracted).

Lemma. *S_t is payoff-irrelevant; each Markov-perfect x_t is independent from S_t.*

Proof. If every future action is x_s, the continuation value from $t+1$, is:

$$\sum_{\tau=t+1}^{\infty} \delta^{\tau-(t+1)} (1-x_s)^{\tau-(t+1)} \left[S_{t+1} x_s A + S_{t+1}(1-x_s) b - S_{t+1} c x_s^2/2\right]$$

$$= v(x_s) S_{t+1}, \text{ where } v(x_s) = \frac{x_s A + (1-x_s) b - x_s^2 c/2}{1-\delta(1-x_s)}.$$

Given this, the solution at t is:

$$\arg\max_{x_t} S_t x_t A_t + S_t (1-x_s) b - S_t x_s^2 c/2 + \delta (1-x_t) v(x_s) S_t,$$

where possibly $A_t \neq A$. This solution for x_t is independent from S_t.

The MPE

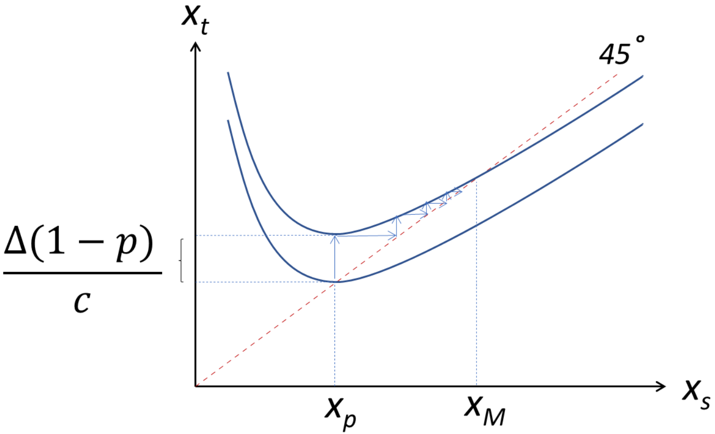

Figure: *If Δ increases a little, x_M can increase by a lot – thanks to the multiplier.*

The Multiplier

Proposition

- *If* $(1-p)\Delta$ *is larger,* x_M *is larger,* $\partial x_t/\partial x_s > 0$ *is larger, and comparative statics are strengthened by a multiplier:*

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\begin{aligned}
\frac{dx}{d\overline{A}} &= \frac{\partial x}{\partial \overline{A}} \cdot (1+\mu), \\
\mu &= \frac{\partial x_t/\partial x_s}{1-\partial x_t/\partial x_s}, \\
\frac{\partial x_t}{\partial x_s} &= \frac{\delta}{c}\frac{(1-p)\Delta}{1-\delta+\delta x} > 0.
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- We can also refer to μ as the "conservation multiplier", because:

$$\frac{d(1-x)}{d\overline{A}} = -\frac{dx}{d\overline{A}} = -\frac{\partial x}{\partial \overline{A}} \cdot (1+\mu).$$

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- The rate of return to lobbying can be very high!
- Suppose K loses F, while L gains G, per extracted unit. Both can offer conditional linear compensations.

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- For $p \in [0, 1]$,

$$-\frac{\partial x_M / \partial G}{\partial x_M / \partial F} = 1 + \delta \frac{1-p}{1-\delta} \frac{1-\delta(1-x_M)}{1-\delta(1-x_M)(1-p)} \in \left[1, \frac{1}{1-\delta}\right].$$

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$p =$	0	$\frac{1}{7}$	$\frac{1}{2}$	1
$-\frac{\partial x_M / \partial G}{\partial x_M / \partial F} =$	6.7	3.7	1.7	1

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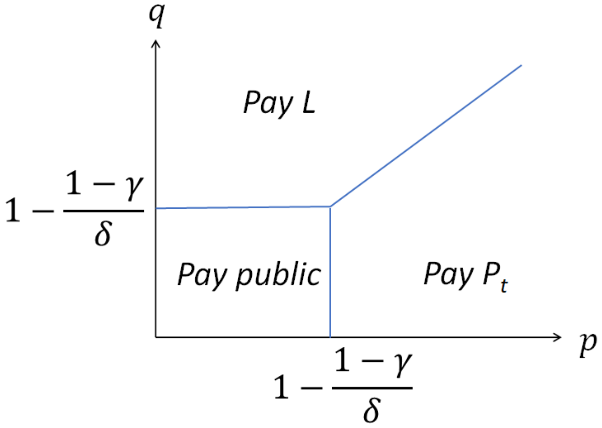
  - The future payments from K are appreciated by P_t if $p = 1$,
  - but not if $p = 0$.
- The smaller is p, the smaller is the influence of F relative to the influence of G.

Earmarks, Targets, and Paying the Lobby

- Payments might be earmarked public goods, with value $\gamma \in (0,1)$ for P_t, even when out of power.
- K may pay L per conserved unit. If so, L finds it optimal to lobby less.
- Suppose L stays in power in any future period with probability q. Then:

$$-\frac{dx_M/dG}{dx_M/dF} \to 1 \textit{ when } q \to 1.$$

Earmarks, Targets, and Paying the Lobby



Heterogeneity

- Even if $\Delta = 0$, rotation/instability raises x_M if parties prefer different x_s's.
- Each party thinks the other "mismanages" the resource.
- If the conservation-friendly party is expected to conserve even more, because of compensations from K, the exploitation-friendly party may want to exploit more.
- REDD+ can be counter-productive.

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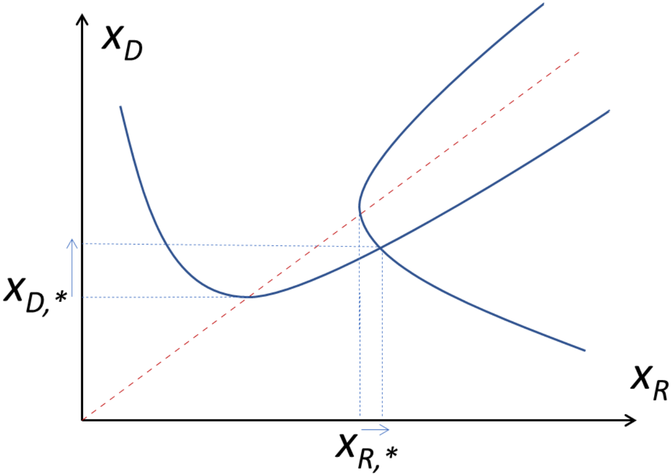

Figure: *When the parties are heterogeneous and the best-response curves cross, both extraction rates are higher than the parties' bliss points.*

Heterogeneity

Suppose $x_{D,*} = 0$ and $\delta = 0.85$:

$(x_D \ , x_R)$	$p_R = \frac{1}{7}$	$p_R = \frac{1}{2}$	$p_R = \frac{6}{7}$
$x_{R,*} = 0.10$	(0.01 , 0.12)	(0.01 , 0.11)	(0.02 , 0.10)
$x_{R,*} = 0.20$	(0.02, 0.26)	(0.04 , 0.22)	(0.05 , 0.20)
$x_{R,*} = 0.30$	(0.05 , 0.40)	(0.08 , 0.33)	(0.09 , 0.31)

Endogenous stability

- If voters are identical, and voters forward-looking, then x_t cannot influence p.
- With heterogeneous parties, a "minority" party prefers a larger x_t.
- Voters (may) dislike that $x_m > x_*$, and thus prefer to elect a major party (self-enforcing eq.)
- The minority party may prefer to raise x_t to end its handicape.
- The principals may also want to influence p:
- L prefers large p and instability.
- K prefers small p and stability.

Literature

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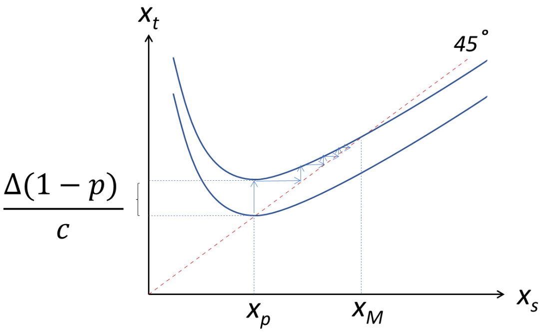

If expected future exploitation increases a little, exploitation today may increase by a lot.

Donors can exploit the multiplier, but lobbies are more powerful

... unless donors commit to earmark .