Resistance to outside investment: A rational model of surplus destruction

Sourav Bhattacharya, University of Pittsburg
Tapas Kundu, University of Oslo

June 3, 2009
Background

Growing phenomena in developing economies over the last decade:

- Reliance on outside private investment for growth
- Investor-friendliness of governments
- Competition between governments to attract private investment
- Popular resistance to such investor-friendliness – sometimes violent: destruction of productive assets

Indian experience: Debate over SEZs, Industrialization in West Bengal
Motivation: Current Debates

- Supposition: Globalization always leaves groups impoverished, and hence the resistance. But this is inconsistent with the fact that governments can redistribute surplus from productive investment.
- Resistance is a response to governments “selling out” to the investors – but is there a reverse causality?
- Should the government subsidize the investor and increase investment or tax the investor and redistribute the profits in the society?
Questions

- What explains the extent of investor-friendliness of governments?
- What explains the apparent puzzle of destructive resistance to productive investment?
- How does surplus destruction by social groups affect the government’s investor-friendliness?
- How does competition between governments affect social welfare?
Our Approach

- Government cares only about welfare of groups within the society, and does not directly care about the outside investor’s welfare.
- The government uses taxes or subsidies to affect the extent of investment.
- Different groups gain differently from investment, and there is uncertainty about the benefit derived by groups within the society.
- A group with low valuation of surplus destroys some surplus as a credible signal to the government to make a demand for redistribution.
Players:

- 2 groups of citizens, A & B
- The regional government G
- An outside investor I
The investor decides the size of a project $x \geq 0$
Investor’s return (prior to any transfer)

$$x - \frac{x^2}{2k}$$

$k$ denotes the economic strength (of the region) to attract investment.

Benefit to group $J \in \{A, B\}$ from investment $x$:

$$\nu^B = \begin{cases} \overline{\nu} \text{ with probability } (1 - p) \\ \nu \text{ with probability } p \end{cases}$$

Assumptions: $(1)\overline{\nu} > \nu$, $(2)\nu^A + \nu > 0$. 
Sequence of events

- Stage 1: Policy
  
  $G$ decides a tax/subsidy $\tau$ on the total size of the project $x$
Sequence of events

- Stage 1: Policy
  
  \( G \) decides a tax/subsidy \( \tau \) on the total size of the project \( x \)

- Stage 2: Investment decision
  
  \( I \) decides the size of \( x \)
Stage 3: Signaling

$B$ can take a costly action to signal its valuation

Public cost: If $B$ takes an action with public cost $a > 0$, the effective size of the project is

$$x (1 - a)$$
Stage 3: Signaling

$B$ can take a costly action to signal its valuation.
Public cost: If $B$ takes an action with public cost $a > 0$, the effective size of the project is

$$x(1 - a)$$

Stage 4: Redistribution

$G$ distributes/collects tax/subsidy from $A$ and $B$ at some pre-specified rate $s \tau x$ and $(1 - s) \tau x$, $s \in [0, 1]$.
$G$ decides a transfer of wealth $t$ from group $A$ to group $B$. 
Resistance to outside investment: A rational model of surplus destruction

The model
Framework

Timing

Timing of the game

Policy Making  |  Investment  |  Signaling  |  Redistribution
---|---|---|---
G offers tax $\tau$ to $I$  |  $I$ decides scale $x$  |  Valuations $v^B$ realized  |  $B$ chooses action $a$  |  G decides transfer $t$
Payoffs

- Investor

\[ x(1 - a) - \frac{x^2}{2k} - \tau x \]
Payoffs

- Investor

\[ x(1 - a) - \frac{x^2}{2k} - \tau x \]

- Citizens

\[ u^A = v^A x (1 - a) + s\tau x \]
\[ u^B = v^B x (1 - a) + (1 - s)\tau x \]
The model

Government’s objective function

Weighted welfare function $W_1(w_A, w_B, t)$

$$(u^A - t)^{1-\lambda} (u^B + t)^{\lambda} \text{ for } \lambda \in (0, 1) \text{ if } \min(u^A + t, u^B - t) \geq 0$$

$-M - [t - \{\lambda u^A - (1 - \lambda) u^B\}]^2 \text{ for some large } M > 0 \text{ otherwise}$$
Resistance to outside investment: A rational model of surplus destruction

The model

Government’s objective function

Government

- Weighted welfare function $W_1(w_A, w_B, t)$

$$
(w_A - t)^{1-\lambda} (w_B + t)^{\lambda} \text{ for } \lambda \in (0, 1) \text{ if } \min(u^A + t, u^B - t) \geq 0

- M - \left[t - \{\lambda u^A - (1 - \lambda) u^B\}\right]^2 \text{ for some large } M > 0 \text{ otherwise}

- Alternative specification, that gives the same optimum choice:

$$
W_2(w_A, w_B, t) = \left[u^A + u^B\right] - \left[\lambda(u^A - t) - (1 - \lambda)(u^B + t)\right]^2

= \left[u^A + u^B\right] - L_\lambda(u^A, u^B, t)$$
Analysis
When G can costlessly elicit valuations

Theorem

Optimal taxation

\[ \tau^o = \frac{1 - (v^A + Ev^B)}{2} \]

*G will subsidize investment if and only if the total social valuation is high i.e.,* \( v^A + Ev^B > 1 \).
Equilibrium analysis

4) Redistribution stage

\[ t = \lambda u^A - (1 - \lambda) u^B \]

Post transfer payoffs

Group A : \( u^A - t = (1 - \lambda) S \),

Group B : \( u^B + t = \lambda S \),

where \( S = u^A + u^B = (v^A + v^B) x (1 - a) \)
3) Signaling stage

Observation:
- High type will take no action
- Condition to ensure that no type misrepresenting its own type

\[
\frac{\lambda (\bar{v} - v)}{((v^A + \bar{v}) - \lambda(v^A + v))} \leq a \leq \frac{\lambda (\bar{v} - v)}{(1 - \lambda)(v^A + \bar{v})}
\]

Lemma

For the signaling subgame, in the unique separating equilibrium with beliefs satisfying intuitive criterion, the optimal action by B, is given by

\[
a(\bar{v}) = 0
\]

\[
a(v) = \frac{\lambda (\bar{v} - v)}{((v^A + \bar{v}) - \lambda(v^A + v))} = a^* \in (0, 1)
\]
2) Investment stage

\[ x^* = \arg \max_x (1 - p) x + px (1 - a^*) - \frac{x^2}{2k} - \tau x \]
\[ = k (1 - \tau - pa^*) \]

1) Policy stage

\[ \tau^* = \arg \max_{\tau} \left( (1 - p) (v^A + \bar{v}) x^* + p (v^A + \bar{v}) x^* (1 - a^*) + \tau x^* \right) \]
\[ = \frac{1}{2} \left[ pa^* \left( v^A + \bar{v} - 1 \right) - \left( v^A + Ev^B - 1 \right) \right] = \tau^0 - \tau^a \]
Characteristics of surplus destruction

Theorem

*The amount of surplus destroyed, i.e. \( a^* \) is decreasing in \( \lambda, v^A \) and \( v \).*

As \( \lambda \) goes from 0 to 1, \( a^* \) goes from 1 to 0
\( x^* \) is decreasing in \( a^* \), and thus increasing in \( \lambda, v^A \) and \( v \).
Action makes G more investor-friendly

$G$ will subsidize if and only if

$$pa^* \left( v^A + v - 1 \right) < \left( v^A + E v^B - 1 \right).$$

If the following condition holds, $G$ subsidizes investment when it is information-constrained, when $G$ would have imposed a tax if information about valuations were costlessly available.

$$pa^* \left( v^A + v - 1 \right) < \left( v^A + E v^B - 1 \right) < 0,$$

which is more likely to happen for low values of $\lambda$ or high values of $p$. 


Action makes G more investor-friendly

$G$ will subsidize if and only if

$$pa^* \left( v^A + v - 1 \right) < \left( v^A + Ev^B - 1 \right).$$

If the following condition holds, $G$ subsidizes investment when it is information-constrained, when $G$ would have imposed a tax if information about valuations were costlessly available.

$$pa^* \left( v^A + v - 1 \right) < \left( v^A + Ev^B - 1 \right) < 0,$$

which is more likely to happen for low values of $\lambda$ or high values of $p$. 
Value of Information for G

Gain from signaling: Information necessary for optimal redistributive transfer
Loss from signaling: Loss of surplus, muted incentives - need to compensate the investor

\[ G \text{ would prefer NOT to "ban" resistance (or precommit to a redistributive scheme) provided} \]

- \( \lambda \) is low
- \( k \) is large
- \( p \) is not very large

For large enough \( p \) or \( \lambda \), the government always prefers to pre-commit to a redistributive scheme
The model under competition

2 regions, 1 and 2, competing for investment

1) Policy stage: Both states simultaneously announces tax rates $\tau_1$ and $\tau_2$

2) Investment stage: I decides where to invest and how much to invest (can invest in one jurisdiction alone)

3) Signaling stage and Redistribution stage as before
Effects of Competition

- Investor’s profit is an increasing function of $\tau$
- Subsidy war between the two jurisdictions - both jurisdictions lose, the investor gains.
- Equilibrium tax is weakly lower than monopoly tax in either jurisdiction.
- Two parameters of competitiveness: $k_i$ (economic efficiency) and $\lambda_i$ (political structure)
- Inefficient allocation: Investment may not go to the jurisdiction with higher $k_i$ if $a_i^*$ is also very high there.
- Increased action in one region weakly increases the welfare of the other region.
Normative questions: Allowing side payments between states? Policy differentiation or uniformity?

When does resistance get support from other political parties and groups?

Why signaling through surplus destruction?