Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH)
and
Jean-Charles Rochet (SFI-UZH and TSE)

Preliminary and incomplete

Prepared for the

Conference in Honor of Michel Moreaux
November 18, 2011

Introduction: Motivation

- Should environmental associations be allowed to boycott firms that they suspect of adopting hazardous policies?

- Example: 1995 confrontation Shell vs. Greenpeace over the dismantlement of the Brent Spar oil storage
  - Disagreement on the best environmental option
  - Successful call for Shell boycott by Greenpeace

- Associations are a priori less well informed than supervisors...

  - Ex: Greenpeace largely overestimated the amount of oil in the Brent Spar; their own study's conclusion were contradicted by several independent scientific studies

- ... but experts are typically biased
  - Ex: financial crisis, Fukushima catastrophe, ...

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Introduction: What the paper does

- We develop a model of the regulation of environmental risks in the spirit of Laffont and Tirole (1993), Laffont (1995) and Boyer, Mahenc and Moreaux (2007)

- However, we assume that the supervisor is biased in favor of the industry in the spirit of Hiriart and Martimort (2011).

- We determine the optimal regulatory policies when boycotts are forbidden and when they are allowed.

- We characterize the situations in which allowing boycotts increases social welfare.

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Introduction: Outline

- Introduction

- The model

- Optimal regulation when boycotts are forbidden

- Optimal regulation when boycotts are allowed

- Conclusion

The model

- 4 protagonists: Congress C (the Principal, who sets the Law), a public supervisor S (the agent), who is biased towards the firm F (who only plays a passive role), and an environmental association A,

- An environmentally friendly decision (say dismantling an oil platform) can be made or not at cost $c > 0$ for F

- Its social value $v > 0$ is privately observed by S (density $h(v)$; c.d.f. $H(v)$ with decreasing hazard rate). S might force compulsory dismantling ($d_c = 1$) or not ($d_c = 0$)

- A observes an imperfect signal s about v and may start a boycott of intensity x (measured by the cost potentially inflicted to F). Boycott entails deadweight loss (social cost) γx.

- F observes x and decides to dismantle voluntarily ($d_v = 1$) or not ($d_v = 0$)

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Introduction

Model

Forbidden
boycotts

Allowed boycotts

Conclusion

The model(2)

C designs environmental law:

- Transfers to F if dismantling
  - t_c if compulsory $(d_c = 1)$
  - t_v if voluntary $(d_v = 1)$

- whether or not boycotts are allowed

  We rule out negative transfers (taxes)

Preferences/objectives

- Firm's profit:

$$B = (t_c - c)d_c + (t_v - c)d_v$$

- Consumers' surplus:

$$U = \big(v - (1+\lambda)t_c\big)d_c + \big(v - (1+\lambda)t_v\big)d_v - \gamma x,\ \lambda \geq 0$$

- Congress' social objective:

$$W = B + U$$

- Supervisor's objective:

$$S = \alpha B + U,\ \alpha \geq 1$$

- Probability of boycott (from the supervisor's viewpoint):

$$\pi(v) = Pr[s = v + \epsilon \geq \bar{s}|v] = 1 - F\big(\frac{\bar{s} - v}{\sigma}\big)$$

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Game form

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Introduction

Model

Forbidden
boycotts

Allowed boycotts

Conclusion

Figure: Game form

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)
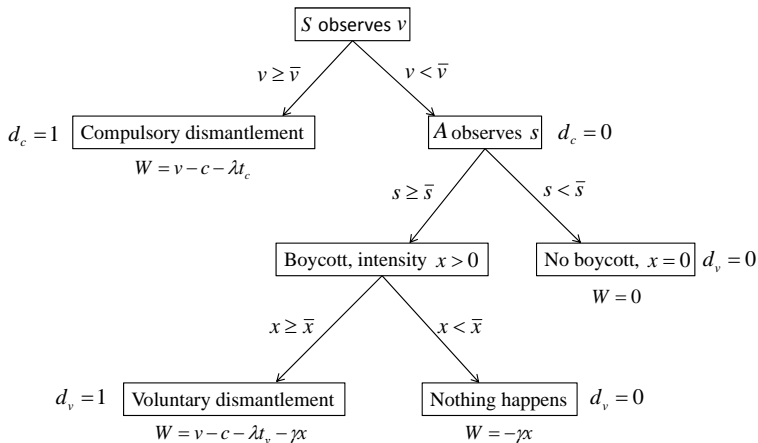
Subgame perfect equilibrium

- Voluntary dismantlement: $d_v = 1\!\!1_{x \geq \bar{x}}$, with $\bar{x} = c - t_v$

- If $s \geq \bar{s}$, A boycotts with intensity $\bar{x}$

- S chooses $d_c = 1$ (compulsory dismantlement) if and only if

$$v - (1+\lambda)t_c + \alpha(t_c - c) \geq \pi(v)\big[v - (1+\lambda)t_v + \alpha(t_v - c) - \gamma(c - t_v)\big]$$

- Single-crossing property: $d_c = 1\!\!1_{v \geq \bar{v}}$

Social welfare

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Introduction

Model

Forbidden boycotts

Allowed boycotts

Conclusion

$$
\begin{aligned}
W &= \int_{\bar{v}}^{+\infty} (v - c - \lambda t_c) \, dH(v) \\
&+ \int_{-\infty}^{\bar{v}} \pi(v)\big(v - c - \lambda t_v - \gamma(c - t_v)\big) \, dH(v)
\end{aligned}
$$

- Note that t_c can be expressed as a function of $\bar{v}$ and t_v:

$$
t_c = \frac{\alpha c - \bar{v} + \pi(\bar{v})[\bar{v} + (\alpha - \lambda - 1)t_v - (\alpha + \gamma)c]}{\alpha - \lambda - 1}
$$

- We assume $\alpha - 1 > \lambda$: supervisor's bias is greater than cost of public funds.

When boycotts are forbidden

In this case, $\pi(v) \equiv 0$

- $W = W_0 = \int_{\bar{v}}^{+\infty} (v - c - \lambda t_c) \, dH(v)$,
- where $t_c = \frac{\alpha c - \bar{v}}{\alpha - \lambda - 1} \geq 0 \Leftrightarrow \bar{v} \leq \alpha c$

Proposition

When boycotts are forbidden, the optimal regulation is such that

$$\bar{v}_0 - \frac{\lambda}{\alpha - 1} \frac{1 - H(\bar{v}_0)}{h(\bar{v}_0)} = c(1 + \lambda)$$

when $\alpha c - \frac{\lambda}{\alpha - 1} \frac{1 - H(\alpha c)}{h(\alpha c)} \leq c(1 + \lambda)$; otherwise, $\bar{v}_0 = \alpha c$ and $t_{c0} = 0$.

When α is small, dismantling is not subsidized.

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Dismantling threshold and supervisor's bias

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
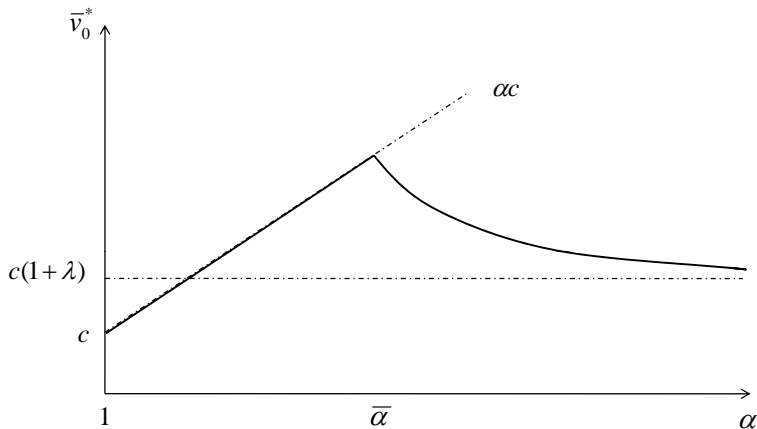and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Figure: Dismantling threshold and supervisor's bias

Environmental Protection: Are Consumer Boycotts a Possible Complement to Regulation?

Julien Daubanes (ETH) and Jean-Charles Rochet (SFI-UZH and TSE)

Introduction

Model

Forbidden boycotts

Allowed boycotts

Conclusion

When boycotts are forbidden: comments

- First-best decision is $d = \mathbb{1}_{v \geq c}$, with $t_c = 0$ since it maximizes $W = \int_{-\infty}^{+\infty} (v - \lambda t_c - c), dH(v)$

- Can be implemented in two cases:
  - $\alpha = 1$ (non-biased supervisor, $S = v - \lambda t_c - c$) with $t_c^* = 0$ and $\bar{v}_0^* = c$
  - $\lambda = 0$ (zero cost of public funds, $S = v - c$) with $t_c^* = c$ and $\bar{v}_0^* = c$

- Hence, distortion under optimal regulation arises because $\alpha > 1$ **and** $\lambda > 0$

- Comparative statics: optimal probability of dismantling $1 - H(\bar{v}_0)$, decreases with λ and c, single peaked in α

When boycotts are allowed

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

$$
\begin{aligned}
W & = \int_{\bar{v}}^{+\infty} (v - c - \lambda t_c) \, dH(v) \\
& + \int_{-\infty}^{\bar{v}} \pi(v)\big(v - c - \lambda t_v - \gamma(c - t_v)\big) \, dH(v),
\end{aligned}
$$

where $t_c = \frac{\alpha c - \bar{v} + \pi(\bar{v})[\bar{v} + (\alpha - \lambda - 1)t_v - (\alpha + \gamma)c]}{\alpha - \lambda - 1}$

Introduction

Model

Forbidden
boycotts

Allowed boycotts

Conclusion

- Remark: W linear in t_v
- We assume $\gamma < \lambda$ (social cost of boycotts smaller than cost of public funds)
  then $t_v^* = 0$
- Hence,

$$
\begin{aligned}
W(\bar{v}) = W_0(\bar{v}) \quad & + \quad \frac{\lambda \pi(\bar{v})}{\alpha - \lambda - 1} \big[(\alpha + \gamma)c - \bar{v}\big]\big(1 - H(\bar{v})\big) \\
& + \quad \int_{-\infty}^{\bar{v}} \pi(v)\big[(v - (1 + \gamma)c)\big] \, dH(v)
\end{aligned}
$$

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Results and comments

Boycotts have 2 effects:

- reduce subsidies needed to get compulsory dismantlement at $\bar{v}$
- generate "voluntary" dismantlements that may or may not be socially beneficial

Proposition

Allowing boycotts is welfare improving if:

- $\bar{s}$ *is not too small (limited bias of consumer association),*
- σ *is not too large (the association's signal is precise)*

Environmental
Protection: Are
Consumer
Boycotts a
Possible
Complement to
Regulation?

Julien Daubanes
(ETH)
and
Jean-Charles
Rochet
(SFI-UZH and
TSE)

Conclusion

- Modest first attempt to examine how imperfect disciplining devices involving less informed third parties (consumers here, could be market investors in other contexts) can improve upon existing regulatory systems
- Conceptual innovation: mechanism design with non-contractible signals