Transitional Politics: Emerging Incentive-based Instruments in Environmental Regulation*

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Appendix to be made available upon request

This appendix derives the policy preference of industry interests when the two types of firms are allowed to organize separate lobby groups. The profits of the two lobby groups as a function of the target are shown in the Table above. Proposition 1 summarizes the main insight.

Proposition 1 *(Conflict) Let $\theta_H > \frac{9}{5}$. There exist two critical values of the environmental target, e_f^L and e_f^H with $e_u > e_f^L > e_f > e_f^H > e_L$ such that*

1. *For $\overline{e}_t \in (0, e_f^H]$, both lobby groups prefer [**P**];*
2. *For $\overline{e}_t \in [e_f^L, e_H)$, both lobby groups prefer [**S**];*
3. *For $\overline{e}_t \in (e_f^H, e_f^L)$, lobby group L prefers [**P**] and lobby group H prefers [**S**].*

Proof. First, for $\overline{e}_t \in (0, e_L]$, a direct comparison of $\pi_t^i[P1] - \pi_t^i[S1]$, $i = L, H$ from Table 2 establishes that both prefer [**S**] to [**P**]. Second, suppose that $\overline{e}_t \in (e_L, e_u]$. Define $\Delta\pi_t^i(\overline{e}_t) = \pi_t^i[S2] - \pi_t^i[P1]$, $i = L, H$. Use the expression in Table 2 to calculate

$$\begin{aligned}\Delta\pi_t^L(.) &= \frac{2a^2}{9} - \frac{11a}{9}\overline{e}_t + \left(\frac{19 + \theta_H(74 + 19\theta_H)}{18(1+\theta_H)^2}\right)\overline{e}_t^2 \\ \Delta\pi_t^H(.) &= -\frac{a\overline{e}_t}{3} + \frac{1}{6}\left(4 + \frac{12}{(1+\theta_H)^2} - 3\theta_H\right)\overline{e}_t^2.\end{aligned}$$

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Case	$\overline{e}_t$	π_t^L and π_t^H
[S1]	$(0, e_L]$	$\pi_t^L[S1] = (a - \overline{e}_t)\,\overline{e}_t - \frac{\overline{e}_t^2}{2}$ $\pi_t^H[S1] = (a - \overline{e}_t)\,\overline{e}_t - \frac{\overline{e}_t^2}{2\theta_H}$
[S2]	$(e_L, e_H]$	$\pi_t^L[S2] = \frac{(2a-\overline{e}_t)^2}{18}$ $\pi_t^H[S2] = \frac{1}{6\theta_H}\left(4a\theta_H\overline{e}_t - (3+2\theta_H)\overline{e}_t^2\right)$
[P1]	$(0, e_u)$	$\pi_t^L[P1] = a\overline{e}_t - \left(\frac{3+\theta_H^2+2\theta_H}{(1+\theta_H)^2}\right)\overline{e}_t^2$ $\pi_t^H[P1] = a\overline{e}_t - \left(\frac{1+\theta_H^2+4\theta_H}{(1+\theta_H)^2}\right)\overline{e}_t^2$
[P2]	$[e_u, e_H]$	$\pi_t^L[P2] = \frac{1}{2}\left(\frac{a}{1+\mu}\right)^2$ $\pi_t^H[P2] = \frac{\theta_H}{2}\left(\frac{a}{1+\mu}\right)^2$
[T1]	$(0, e_u)$	$\pi_t^L[T1] = \pi_t^L[P1] - a(1 - \frac{\overline{e}_t}{e_u})\overline{e}_t$ $\pi_t^H[T1] = \pi_t^H[P1] - a(1 - \frac{\overline{e}_t}{e_u})\overline{e}_t$
[T2]	$[e_u, e_H)$	$\pi_t^L[T2] = \pi_t^L[P2]$ $\pi_t^H[T2] = \pi_t^H[P2]$

Table 1: Profits Levels for Lobby Group L and H

Evaluate: $\Delta\pi_t^i(0) \geq 0$, $\Delta\pi_t^i(e_L) < 0$, $\Delta\pi_t^i(e_u) > 0$ $i = 1, 2$. Thus each of $\Delta\pi_t^i(.)$ has one and only one root in $(e_L, e_u]$. Call these for e_f^L and e_f^H. Notice that $\Delta\pi_t^H(e_L) > \Delta\pi_t^L(e_L)$, that $\Delta\pi_t^H(e_u) > \Delta\pi_t^L(e_u)$ for $\theta_H \geq \frac{9}{5}$ and that $\Delta\pi_t^i(\overline{e}_t)$ are strictly increasing in $\overline{e}_t$. Thus, $e_f^L > e_f^H$. Finally, a direct comparison shows that $\pi_t^L[S2] > \pi_t^L[P2]$ for $\overline{e}_t \geq e_u$. Write $w(\overline{e}_t) = \pi_t^H[S2] - \pi_t^H[P2] = \frac{1}{6}\left(4a\overline{e}_t - \frac{3a^2\theta_H}{(3+\theta_H)^2} - \frac{3+2\theta_H}{\theta_H}\overline{e}_t^2\right)$. Note that $w(e_U) > 0$, $w(e_H) = 0$ and $\frac{\partial w}{\partial \overline{e}_t} < 0$ for $\overline{e}_t > e_u$. Thus $\pi_t^H[S2] > \pi_t^H[P2]$ for $\overline{e}_t \geq e_u$ ■