Firm Objectives and Sustainability Agreements

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Motivation

- Recent changes in national competition laws/enforcement guidelines to allow "horizontal sustainability agreements".

- (Indispensability) Question: Why should competitor agreements increase the scope of sustainable activities?

- Standard (synergy) efficiencies, not directly related to sustainability.

- Key departure: Possible key feature of "sustainability" that firms may have direct, non-profit incentives, deriving from share-/stakeholders (Hart and Zingales 2017, Bordalo et al. 2022, Dewatripont and Tirole 2022).

Motivation (cont.)

- Key departure: Possible key feature of "sustainability" that firms may have direct, non-profit incentives, deriving from share-/stakeholders (Hart and Zingales 2017, Bordalo et al. 2022, Dewatripont and Tirole 2022).

- But such preferences raise sustainability even without a cooperation. Prima facie unclear how such preferences should affect the outcome of an agreement / of cooperation.

Strategic game

- Standard duopoly sequential game, where firms first choose sustainability, a_i, and then compete on the product market.

- Reduced form approach: Stage 1 affects competitiveness $v_i(a_i)$. And competitiveness v_i affects Stage 2 profits, $\pi_i(v_i, v_j)$. With $\frac{\partial \pi_i}{\partial v_i} = \pi_1(v_i, v_j) > 0$ and $\frac{\partial \pi_i}{\partial v_j} = \pi_2(v_i, v_j) < 0$

- Example: Linear demand with intercept $u(a_i)$ and marginal cost $c(a_i)$, so that $v(a_i) = u(a_i) - c(a_i)$.

- Possible fixed investment costs, $F(a_i)$.

Modelling cooperation / agreements

- Firms choose joint standard $a_i = a$ to maximize joint payoff, subject to participation constraints.

- No cooperation on the product market.

Firm preferences

1. (Simple) Benchmark case: $V_i = \Pi_i + \lambda_i a_i$.

2. Extension with emissions $e_i = q_i(\phi - a_i)$, $V_i = \Pi_i - \lambda_i e_i$.

3. Broad preferences with emissions: $V_i = \Pi_i - \lambda_i e$.

Benchmark: $\lambda_i = \lambda = 0$

- Define $v'(\widehat{a}) = 0$ and with this maximum competitiveness $\widehat{v} = v(\widehat{a})$.

- Independent choice FOC

$$\pi_1 v'(a_{Ind}) = F'(a_{Ind}),$$

  i.e., $a_{Ind} = \widehat{a}$ without fixed costs, otherwise strictly smaller.

Benchmark with cooperation

- Cooperative choice FOC

$$(\pi_1 + \pi_2)v'\left(a_{Agr}\right) = F'(a_{Agr}).$$

- Additional term thus $\pi_2 v'\left(a_{Agr}\right)$, where $\pi_2 < 0$.

- Now evaluate at $a = a_{Ind}$.
  - Without fixed costs, $v'(a_{Ind} = \widehat{a}) = 0$, so that $a_{Agr} = a_{Ind}$.
  - With fixed costs, $a_{Ind} < \widehat{a}$ and thus $\pi_2 v'\left(a_{Ind}\right) < 0$, so that $a_{Agr} < a_{Ind}$

Narrow sustainability preferences and no fixed costs

- First, $\lambda_i = \lambda$ (symmetry)

- Independent choice FOC

$$\pi_1 v'(a_{Ind}) + \lambda = 0,$$

  implying $v'(a_{Ind}) < 0$ and thus $a_{Ind} > \widehat{a}$ (reduced competitiveness).

- Cooperative choice FOC

$$\left[\pi_1 v'\left(a_{Agr}\right) + \lambda\right] + \pi_2 v'\left(a_{Agr}\right) = 0.$$

  Evaluate again at $a = a_{Ind}$, where now $\pi_2 v'\left(a_{Agr}\right) > 0$ (!). Hence, $a_{Agr} > a_{Ind}$.

No fixed costs (cont.)

- Intuition for $a_{Agr} > a_{Ind}$: Internalization of (negative) effect of own competitiveness on rival implies less weight on profitability under an agreement, and thus more weight on sustainability.

- Extennd to asymmetric sustainability preferences, so that $a_{Ind,i} \neq a_{j,Ind}$.
  –> A successful agreement always leads to $a_{Agr} \geq \mathsf{max}(a_{Ind,i}, a_{Ind,j})$.

Fixed costs

- Independent choice

$$\pi_1 v'(a_{Ind}) + \lambda = F'(a_{Ind}),$$

  so that $v'(a_{Ind}) < 0$ and thus $a_{Ind} > \widehat{a}$ only when $\lambda > \widehat{\lambda} = F'(\widehat{a})$.

- Effect of cooperation: Recall that adds the term $\pi_2 v'\left(a_{Agr}\right)$ to the FOC.

- We have $v'(a = a_{Ind}) < 0$ and thus $\pi_2 v' > 0$ only if $\lambda > \widehat{\lambda}$. Only then we have $a_{Agr} > a_{Ind}$.

- In words: Only then does an internalization of the rival's profits, i.e., a reduction in own competitiveness, imply a further increase in sustainability.

Narrow preferences wrap-up

- *An agreement increases sustainability if firms' own sustainability preferences are sufficiently strong or if this involves only small additional fixed costs,* $\lambda > \widehat{\lambda} = F'(\widehat{a})$.

- Alternative expression of condition: *An agreement increases sustainability if firms are independently willing to increase sustainability beyond the point where this reduces their own competitiveness.*

Narrow preferences (cont.)

- Paper also discusses "strategic leakage" / potential first-mover disadvantage (where an expected increase in a_i leads to a reduction in a_j).

- Paper extends results to alternative (narrow) preferences $V_i = \Pi_i - \lambda_i e_i$, with $e_i = q_i(\phi - a_i)$.

Broad sustainability preferences

- Recall: $V_i = \Pi_i - \lambda_i e$, i.e., depending on all firms' emissions.
- Finding: This strictly expands range of parameters (λ_i) where an agreement leads to higher sustainability.
- Rationale: Reduces real leakage (as lower own competitiveness expands output of rival, if the rival's competitiveness stays constant).

Conclusion

- Benchmark: Without firm sustainability preferences, agreement (strictly) reduces sustainability.

- With sustainability preferences, there are three reasons for why an agreement / cooperation can increase sustainability:

  1. Internalization of rival's profits implies less weight on (own) competitiveness.

  2. Avoids strategic leverage.

  3. (Under broad preferences) Avoids real leakage.

Conclusion (cont.)

- Relevance for antitrust / sustainability policy (e.g., supply chain regulation, environmental regulation)?

- Motivates more scope for delegation to firms and sustainability agreements if firms have proven sustainability preferences (recall condition $a_{Ind} > \widehat{a}$, i.e., $\lambda > \widehat{\lambda}$).

- Caveat: Are such preferences "stable"?