Synergistic information$^{3.0}$

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Abstract

Very preliminary, do not circulate.

1 Literature

- Optimal merger policy when firms have private information [1]
- Information sharing in oligopolies
- Data as assets
- Computer science and data synergies
- Joint ventures before merger

2 Model

References

[1] David Besanko and Daniel F Spulber. Contested mergers and equilibrium antitrust policy. *The Journal of Law, Economics, and Organization*, 9(1):1–29, 1993.

$l > 0$, if share s and compete profits are $X - \theta ls$ for 1 and θs for 2. Firm 2 has full negotiation power. There are two relevant levels of sharing: $s = 0$ and s^*. If 0, firm 2 does not know θ at the time of merger; if sharing is s^*, firm 2 knows θ.

θ has ex-ante distribution $F(\theta)$, with continuous density, MLRP satisfied.

Note: given s^*, the threat point of firm 1 is a decreasing function of θ while the threat point of firm 2 is an increasing function of θ. Since firm 2 has full bargaining power, firm 1 accepts a price for her asset of $p(\theta) = X - \theta ls^*$, and firm 2 has a surplus from merger of

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$X(1+\theta) - p(\theta) = \theta(X - (1-l)s^*$. Ex-ante, the parties have to agree on a price T for sharing s^*. Type θ accepts to share if $p(\theta) + T \geq u_0(\theta)$, where $u_0(\theta)$ is θ's payoff if there is no sharing of information.

(Note that if firm 2 offers a price T for a sharing of s^*, and a set $\Theta(T)$ refuses the offer, when the merger possibility arises, firm 2 believes that firm 1 is of type in $\Theta(T)$.

In a revelation game at the merging stage, the variation of equilibrium utility given to type θ is (assuming that $\Theta(T)$ has compact support, hence that the conditional distribution has a positive density on its support) is increasing in θ (note that all type in $\Theta(t)$) have the same outside option of X).

The value to the merger is $\frac{1}{2}X(1+\theta)$. There is no loss of generality in assuming that firm 1 gets all the surplus in exchange for paying a price to firm 2.

A mechanism is $(p(\theta), z(\theta))$, where $p(\theta)$ is the price paid by firm 1 to firm 2 and $z(\theta)$ is the probability that firm 1 agrees to the merger. The participation constraint is

$$-p(\theta) + z(\theta)X(1+\theta) + (1-z(\theta))X \geq X \tag{1}$$

or

$$p(\theta) \leq z(\theta)X\theta$$

while the truth-telling constraint is

$$\theta \in \arg\max U(\hat{\theta}|\theta) := -p(\hat{\theta}) + X + z(\hat{\theta})X\theta$$

Usual manipulations yield

$$Xz(\hat{\theta})(\theta - \hat{\theta}) \leq U(\theta) - U(\hat{\theta}) \leq Xz(\theta)(\theta - \hat{\theta})$$

hence that $U(\theta)$ and $z(\theta)$ are non-decreasing function. Moreover, by the envelop theorem, $\dot{U}(\theta) = z(\theta)X$.

Hence, firm 2 offers a mechanism (p, z) to solve

$$\max_{(p(\cdot);z(\dot{)})} \int (-U(\theta) + X + Xz(\theta)\theta)dF(\theta)$$

$$U(\theta) \geq X \qquad \text{(IR)}$$

$$\dot{U}(\theta) = z(\theta)X \qquad \text{(IC)}$$

Standard derivations show that $U(\underline{\theta}) = X$ and that $z(\theta)$ solves

$$\max_{\{z(\theta)\}} \int_{\underline{\theta}}^{\overline{\theta}} z(\theta) \left(\theta - \frac{1 - F(\theta)}{f(\theta)} \right) f(\theta) d\theta.$$

Clearly, by MLRP, there exists t^* such that the optimal solution is to set $z(\theta) = 0$ for $\theta < \theta^*$ and $z(\theta) = 1$ for $\theta > \theta^*$.