Strategic Transparency and Informed Trading: Will Capital Market Integration Force Convergence of Corporate Governance?

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1 Appendix

In this appendix, we provide the formulae for the analysis of product market competition leading to Proposition 1.

The formulae for section 3 are obtained by standard calculations. Throughout, we consider the case in which quantities and prices are positive. For the case of competition under symmetric information (R, R), the equilibrium quantities are

$$Q_{HL}^{RR} = \frac{1}{2+\gamma}\left(\theta_H + \frac{\gamma}{2-\gamma}(\theta_H - \theta_L)\right),$$
$$Q_{HH}^{RR} = \frac{\theta_H}{2+\gamma},$$
$$Q_{LL}^{RR} = \frac{\theta_L}{2+\gamma},$$
$$Q_{LH}^{RR} = \frac{1}{2+\gamma}\left(\theta_L - \frac{\gamma}{2-\gamma}(\theta_H - \theta_L)\right),$$

The corresponding profits (remember that costs are normalized to zero) are

$$\pi_{ij}^{RR} = (Q_{ij}^{RR})^2.$$

In the case where both firms' quality is private information, (P, P), each firm maximizes its expected profit, taking expectations over the other firm's θ.

The logic behind the payoff formula (**??**) is simple: if firm i chooses a very high quantity ($Q_i \geq \theta_i - \gamma Q_L^{PP}$), then it is sure to drive prices to zero; if it chooses a smaller, but sufficiently high quantity ($\theta_i - \gamma Q_H^{PP} \leq Q_i \leq \theta_i - \gamma Q_L^{PP}$), prices will be zero if the opponent is strong and positive if the opponent is weak; and for all other quantities ($Q_i \leq \theta_i - \gamma Q_H^{PP}$) prices will always be positive.

We restrict attention to parameters for which the first case in (**??**) is relevant, in order to keep the calculations simple. It is then straightforward to show that the unique symmetric Bayesian Nash equilibrium is given by

$$
\begin{aligned}
Q_H^{PP} &= \frac{1}{2+\gamma}\left(\theta_H + \frac{\gamma}{2}(1-q)(\theta_H - \theta_L)\right), \\
Q_L^{PP} &= \frac{1}{2+\gamma}\left(\theta_L - \frac{\gamma}{2}q(\theta_H - \theta_L)\right),
\end{aligned}
$$

which are positive by (**??**). The corresponding profit levels in the four possible states are

$$
\begin{aligned}
\pi_{HL}^{PP} &= \frac{1}{(2+\gamma)^2}\left(\theta_H^2 + \frac{\gamma}{2}(2+\gamma q)\theta_H(\theta_H - \theta_L)\right. \\
&\qquad \left. + \frac{\gamma^2}{4}(1-q)(1+(1+\gamma)q)(\theta_H - \theta_L)^2\right), \\
\pi_{HH}^{PP} &= \frac{1}{(2+\gamma)^2}\left(\theta_H^2 - \frac{\gamma^2}{2}(1-q)\theta_H(\theta_H - \theta_L)\right. \\
&\qquad \left. - \frac{\gamma^2}{4}(1-q)^2(1+\gamma)(\theta_H - \theta_L)^2\right), \\
\pi_{LL}^{PP} &= \frac{1}{(2+\gamma)^2}\left(\theta_L^2 + \frac{\gamma^2}{2}q\theta_L(\theta_H - \theta_L) - \frac{\gamma^2}{4}q^2(1+\gamma)(\theta_H - \theta_L)^2\right), \\
\pi_{LH}^{PP} &= \frac{1}{(2+\gamma)^2}\left(\theta_L^2 - \frac{\gamma}{2}(2+\gamma-\gamma q)\theta_L(\theta_H - \theta_L)\right. \\
&\qquad \left. + \frac{\gamma^2}{4}q(1+(1+\gamma)(1-q))(\theta_H - \theta_L)^2\right).
\end{aligned}
$$

In the asymmetric case, where one firm's type is publicly revealed and the other's only privately known, the equilibrium is given by

$$
\begin{aligned}
Q_H^{RP} &= \frac{1}{2+\gamma}\left(\theta_H + \frac{\gamma(1-q)}{2-\gamma}(\theta_H - \theta_L)\right), \\
Q_L^{RP} &= \frac{1}{2+\gamma}\left(\theta_L - \frac{\gamma q}{2-\gamma}(\theta_H - \theta_L)\right), \\
Q_{HH}^{PR} &= \frac{1}{2+\gamma}\left(\theta_H - \frac{\gamma^2(1-q)}{2(2-\gamma)}(\theta_H - \theta_L)\right), \\
Q_{HL}^{PR} &= \frac{1}{2+\gamma}\left(\theta_H + \gamma\frac{2-\gamma(1-q)}{2(2-\gamma)}(\theta_H - \theta_L)\right), \\
Q_{LL}^{PR} &= \frac{1}{2+\gamma}\left(\theta_L + \frac{\gamma^2 q}{2(2-\gamma)}(\theta_H - \theta_L)\right), \\
Q_{LH}^{PR} &= \frac{1}{2+\gamma}\left(\theta_L - \gamma\frac{2-\gamma q}{2(2-\gamma)}(\theta_H - \theta_L)\right),
\end{aligned}
$$

with profits

$$
\pi_{ij}^{PR} = (Q_{ij}^{PR})^2
$$

for $ij = HH, HL, LH, LL$, and

$$
\begin{aligned}
\pi_{HH}^{RP} &= \frac{1}{(2+\gamma)^2}\left(\theta_H^2 + \frac{\gamma^3(1-q)}{2(2-\gamma)}\theta_H(\theta_H - \theta_L)\right. \\
&\qquad \left. - \frac{\gamma^2(1-q)^2(2-\gamma^2)}{2(2-\gamma)^2}(\theta_H - \theta_L)^2\right), \\
\pi_{HL}^{RP} &= \frac{1}{(2+\gamma)^2}\left(\theta_H^2 + \frac{\gamma(4-\gamma^2 q)}{2(2-\gamma)}\theta_H(\theta_H - \theta_L)\right. \\
&\qquad \left. + \frac{\gamma^2(1-q)}{2(2-\gamma)^2}(2+2q-\gamma^2 q)(\theta_H - \theta_L)^2\right), \\
\pi_{LL}^{RP} &= \frac{1}{(2+\gamma)^2}\left(\theta_L^2 - \frac{\gamma^3 q}{2(2-\gamma)}\theta_L(\theta_H - \theta_L) - \frac{\gamma^2 q^2(2-\gamma^2)}{2(2-\gamma)^2}(\theta_H - \theta_L)^2\right), \\
\pi_{LH}^{RP} &= \frac{1}{(2+\gamma)^2}\left(\theta_L^2 - \frac{\gamma(4-\gamma^2(1-q))}{2(2-\gamma)}\theta_L(\theta_H - \theta_L\right. \\
&\qquad \left. + \frac{\gamma^2 q}{2(2-\gamma)^2}(2(2-q) - \gamma^2(1-q))(\theta_H - \theta_L)^2\right).
\end{aligned}
$$

Proof of Proposition 1: Comparing the means of profit levels under transparency and opacity, using the above formulae, yields

$$E\pi^{RR} - E\pi^{PR} = q(1-q)\frac{\gamma^2}{(2-\gamma)^2}(\theta_H - \theta_L)^2(2 - \frac{\gamma^2}{4}) > 0 \quad (3)$$

$$E\pi^{RP} - E\pi^{PP} = q(1-q)\frac{\gamma^2}{(2+\gamma)^2(2-\gamma)^2}(\theta_H - \theta_L)^2(3 - \frac{\gamma^2}{4}) > 0 \quad (4)$$

The result for the variances follows similarly. ■