

Vertical Merger Notes

Vertical Merger

- Parameters
 - Consider a simple model of vertical merger. Pre-merger, an upstream monopolist U produces an intermediate good at constant marginal cost c_U and chooses wholesale price w at which to sell to a downstream monopolist D . D produces a final good by buying the intermediate good at wholesale price w and converting each unit of the intermediate good into one unit of the final good at constant marginal cost c_D and sells to consumers at retail price p . D faces downward-sloping demand $Q(p)$ and chooses p to maximise profit $\pi_D = (p - w - c_D)Q(p)$. U chooses w to maximise profit $\pi_U = (w - c_U)Q(p)$ since demand for the intermediate good is derived from demand for the final good. D and U merge. Post-merger, the merged firm I produces the final good at marginal cost $c_I = c_U + c_D$ and chooses retail price p_I at which to sell to maximise profit $\pi_I = (p_I - c_I)Q(p_I)$.
- Analysis
 - Pre-merger, in the second stage subgame where D chooses p given w , D chooses monopoly price and enjoys monopoly profit given marginal cost $w + c_D$, i.e. $p = p^M(w + c_D) \equiv \arg \max_p (p - w - c_D)Q(p)$ and $\pi_D = \pi^M(w + c_D) \equiv \max_p (p - w - c_D)Q(p)$. In the first stage where U chooses w , given common knowledge of rationality and incentives, U knows that $p = p^M(w + c_D)$ hence U 's maximisation problem is $\max_w (w - c_U)Q(p^M(w + c_D))$. At the subgame-perfect equilibrium, $w > c_U$ since $\pi_U \leq 0$ otherwise.
 - Post-merger, at equilibrium, I chooses monopoly price and enjoys monopoly profit given marginal cost $c_U + c_D$, i.e. $p_I = p^M(c_I) = p^M(c_U + c_D) \equiv \arg \max_p (p - c_U - c_D)Q(p)$ and $\pi_I = \pi^M(c_I) = \pi^M(c_U + c_D) \equiv \max_p (p - c_U - c_D)Q(p)$.
 - Supposing that marginal revenue is decreasing, an increase in marginal cost causes a decrease in profit-maximising quantity (where marginal revenue is equal to marginal cost) hence an increase in profit-maximising price (given downward-sloping demand). It follows that p^M is an increasing function hence that $p_I = p^M(c_U + c_D) < p = p^M(w + c_D)$ and $Q(p_I) > Q(p)$.
 - Pre-merger, joint profit $\Pi = \pi_U + \pi_D = (p - w - c_D)Q(p) + (w - c_U)Q(p) = (p - c_U - c_D)Q(p)$. Post-merger, joint profit $\pi_I = \pi^M(c_U + c_D) \equiv \max_p (p - c_U - c_D)Q(p) > \Pi$ since $p_I \neq p$.
- Result (Profit)
 - Post-merger, compared to pre-merger, insiders' joint profit increases. Intuitively, this is because of the internalisation of negative externalities between firms due to merger. Pre-merger, the upstream firm imposes a negative externality on the downstream firm in choosing a high wholesale price since this causes an increase in the downstream firm's marginal cost hence a decrease in its profit. The downstream firm imposes a negative externality on the upstream firm in choosing a high retail price since this causes a decrease in demand for the final good hence a decrease in demand for the intermediate good and a decrease in the upstream firm's profit.
- Result (Welfare)
 - Post-merger, compared to pre-merger, consumer surplus increases because retail price decreases. Pre-merger, retail price is greater because of double marginalisation, whereby both the upstream firm and the downstream firm sell at positive margin. Post-merger, the upstream firm effectively "sells" to the downstream firm at marginal cost because of the internalisation of negative externalities.