

# Economics of Industrial Organization

## Lecture 13: Vertical Mergers

# Vertical mergers

- Recall that a vertical merger is a merger between firms that produce complementary goods (generally when one product is an input into the production process of the other).
- One motivation for such a merger is the elimination of welfare losses from “*multiple marginalization*”, or “*network externalities*”. When firms produce goods that are complements, each firm’s pricing decision imposes an externality on the other firm; a high price for computer hardware reduces demand for PCs, but also reduces demand for software and operating systems. The hardware manufacturer considers the first cost, but not the second. The software manufacturer considers the second cost, but not the first. This leads to a loss in overall welfare.
- A vertical merger will be able to reduce this welfare loss by incorporating both costs inside the same decision maker, and so internalizing the externality.

# Procompetitive vertical mergers

- When firms occupy different stages of the production stream of a particular final consumer product, we call those farthest from the final product as “upstream”, and those closest to the consumer “downstream”.
- Examples: Film studio and movie theatre. Parts manufacturer, car assembly and retail care salesman. Electricity generator, electricity distributor. Cable content creator, cable TV company. Manufacturing, wholesaling, retailing.
- All such relationships can be viewed as producing complementary products; each firm produces an essential service to the final product.
- Vertical relationships can lead to an extra loss of efficiency when multiple players in the supply chain have some market power; each firm implements their own monopolistic markup, which distorts the decision of downstream firms.

# Double marginalization

- Suppose we have a single upstream supplier (a manufacturer) who sells a unique product to a single downstream firm (a retailer). The manufacturer produces the good at constant  $MC = c$ , and sells to the retailer at a wholesale price,  $r$ .
- The retailer then sells the product to consumers at a market-clearing price  $P$ . For simplicity, assume that the retailer has no retailing cost.
- Consumer demand for the good is described by  $P = A - BQ$ , and we assume  $c < A$ .
- Given that the retailer purchases  $Q$  units from the manufacturer at wholesale price  $r$ , and resells these  $Q$  units to consumers at price  $P = A - BQ$ , the retailer's profit is:  
$$\pi^D(Q,r) = (P - r)Q = (A - BQ)Q - rQ$$

- The retailer maximizes profit by setting  $MR = MC$ .  
 $MR = A - 2BQ$  and  $MC = r$ , so the profit maximizing downstream output  $Q^D = (A - r)/(2B)$ .
- Substituting this quantity into the consumer demand function gives the market clearing retail price,  $P^D = (A + r)/2$ , and so the retailers profit is  $\pi^D = (A - r)^2/(4B)$
- Now, what about the manufacturer?  $Q^D = (A - r)/(2B)$  gave us the number of units that the retailer will buy, as a function of the wholesale price  $r$ .
- In other words, this is the demand function faced by the manufacturer. When the retailer has no marginal costs other than the input price charged by the manufacturer, the inverse demand facing the manufacturer is the marginal revenue function facing the retailer:  $r = A - 2BQ$ . The manufacturer will use this function to determine their profit maximizing pricing.

- Now derive the profit-maximizing price that the manufacturer charges. Their profit maximization problem is:  

$$\text{Max } \pi^U_Q : rQ - cQ = (A - 2BQ - c)Q$$
- We can see that marginal revenue for the manufacturer is  $MR = A - 4BQ$ . Solving the maximization problem, or setting  $MR = MC$ , gives us profit-maximizing output and wholesale price:  

$$Q^U = (A - c)/4B, \quad r^U = (A + c)/2$$
 (see figure 17.2)
- When the upstream manufacturer sets the price  $r^U = (A + c)/2$ , then the downstream retailer charges a price  $P^D = (A + r^U)/2 = (3A + c)/4$
- The retailer sells  $Q^D = (A - c)/4B = Q^U$  units.
- Manufacturer profit is  $\pi^U = (A - c)^2/(8B)$ , while retailer profit is  $\pi^D = (A - c)^2/(16B)$
- Combined profit is  $\pi = 3(A - c)^2/(16B)$

- Now, suppose that the two firms merge, so that the upstream and downstream components are managed within the same integrated firm.
- This transforms the integrated firm into a single monopoly, whose is to maximize profit through choice of retail price (or equivalently, output level). This firm solves:  $\text{Max } \pi^I_Q = (A - BQ)Q - cQ$
- The MR curve of the integrated firm is just the MR of the non-integrated retailer,  $\text{MR}^I = A - 2BQ$ . Solving the profit max problem (or setting  $\text{MR} = \text{MC} = c$ ) gives the profit maximizing output,  $Q^I = (A - c)/(2B)$ , and substituting this into the inverse demand curve gives the retail price,  $P^I = (A + c)/2$
- Profits of the integrated firm are  $\pi^I = (A - c)^2/(4B)$ .
- So, the merger results in consumers being charged a lower price, and purchasing a higher quantity. And the merged firms receive a higher profit than the sum of the pre-merger firms!

- So, mergers of vertically related firms with market power can generate an efficiency gain because it allows separate activities of the firm to be coordinated together. In the absence of the merger, the final product price represents double (or multiple, for more than 2-firm supply chains) marginalization, where each firm in the chain marks up its price, which distorts the input decisions of the downstream firm.
- “What is worse than a monopoly? A chain of monopolies!”



# Anticompetitive effects of vertical mergers

- The previous merger analysis suggested that antitrust authorities should be less concerned about the welfare impact of vertical mergers than the impact of horizontal mergers, since there is a much clearer pro-competitive case for vertical mergers.
- However, this model is based on the assumption that there is a single market in which final goods are sold, and that there is a monopoly at each stage in the vertical chain. Consider relaxing these assumptions.

# Price discrimination

- Suppose that there is an upstream monopolist selling to multiple downstream retailers (eg Coca Cola company and local bottling/distribution plants). These downstream firms (in general) will face different demand elasticities.
- If the upstream firm can perfectly price discriminate (first degree price discrimination), then it can eliminate the double marginalization problem; it could use a two-part tariff to obtain all the producer surplus, while charging a wholesale price that reflected its marginal cost, and so avoid distorting the input prices of the downstream firm.
- In order to price discriminate, the upstream firm must be able to prevent arbitrage. The simplest way to do this is to write no-resale contracts with its buyers, but these are not always enforceable or possible.
- When arbitrage risks undermining a PD strategy, it may be desirable for the firm to vertically integrate with the downstream firms that face more elastic demand, so the upstream firm can lower price where demand is responsive while maintaining higher prices in less responsive markets.
- It is ambiguous whether such a merger is pro-competitive or anti-competitive (ie whether it helps or hurts consumers).

# Vertical merger, oligopoly, foreclosure

- Suppose that instead of monopoly at both stages of production, we had monopoly at one stage and a competitive sector at the other. (Eg: Microsoft or Walmart)
- Either: price competition among manufacturers leads to a wholesale price = MC,  
Or price competition among retailers leads to a retail price = upstream price plus downstream marginal cost.
- In either case, there is no double marginalization problem, and so no efficiency gain to vertical integration.
- But perhaps perfect competition is too extreme; imagine that we have a monopoly at one stage of production, and an oligopoly at the other. While we retain the double marginalization problem in this case, there is now an additional, anticompetitive motive for vertical integration; the possibility of **market foreclosure**.

- After a vertical merger, the vertically related firms might result in an integrated company that can deny downstream rivals a source of inputs, or upstream competitors a market for their products.
- Suppose that two suppliers of computer chips compete for sales to two downstream computer manufacturers, who then sell to the public.
- The chips of the upstream firms are identical, so if the suppliers compete in a Bertrand price setting, they sell at marginal cost. So only the two downstream firms earn any economic profits.
- Suppose now that one of the chip manufacturers and one of the computer firms merge. Suppose then that the upstream chip division of the integrated firm refuses to offer to sell any chips to the remaining independent computer firm; it forecloses sales of its chips to its downstream rival.
- This leaves the independent downstream firm with only a single supplier, the upstream unmerged chip manufacturer, which will then set a monopoly wholesale price for its chips.

- This will raise the costs of the independent computer firm (relative to the pre-merger situation) and make it less able to compete with the downstream division of the integrated firm.  
In turn, this will allow the merged firm to raise the price of its computers and earn more profit.
- Because the upstream market was initially competitive, there was no double marginalization problem, and since there are no other cost savings, the merger is clearly anticompetitive; the merger raises the cost of the non-integrated rivals on the supply side, and leaves them at a disadvantage relative to the integrated firm.
- This story has been of particular interest in the telecommunications industry, where the local physical telephone network has generally been monopolized by a firm that also competes in the more competitive long-distance market. Long distance providers have to gain access to customers by connecting to the local network, but the company that owns the local network has an incentive to price its long-distance competitors out of the market by charging a very high price (or refusing to sell).
- Thus, regulators have been concerned with prices that local phone network owners are allowed to charge for access to the network.  
“Local loop unbundling”

# Conglomerate mergers

- Conglomerate mergers bring under common control firms whose products are neither direct substitutes nor complements.
- In the US, a wave of conglomerate mergers began in the 1960s and went into the early 1980s.
- Why did these seemingly unprofitable mergers occur?

# Cost savings from conglomeration

- Some conglomerate mergers may be motivated by economies of scope; where products or services are more cheaply produced by one firm than by two or more firms. Goods may share a common input (eg an effective marketing division) even if they have unrelated product markets  
Eg: Cigarette company purchases a beer company.
- Alternatively, conglomerate mergers may be motivated by savings on transaction costs; including input search costs, supply contract negotiation costs, contract monitoring and enforcement costs and risks associated with unforeseen changes in supply conditions.

# Managerial motives

- Skepticism surrounding the explanations based on scope economies, transaction cost savings and other arguments leads to another explanation.
- The motive for conglomeration may be that it is in the interest of management, even if it is not in the interest of the firm's owners (shareholders).
- In any large company, ownership is often separated from control; shareholders elect a board, who hire a chief executive, who hires other managers that help run the firm. Management has operational control of the firm, and can often co-opt board members somewhat. These groups can have different interests.
- Monitoring of management by owners is often very difficult; owners often try to create mechanisms to align incentives, but these may create perverse incentives. Firm owners want profits, so they may base executive compensation on firm growth. But growth can be hard to achieve internally, and horizontal mergers may be blocked by competition authorities. So managers may have incentives to support conglomerate mergers, even if this is not in the interest of the shareholders.



- Management may also pursue conglomerate mergers as a means to minimize risk. Manager pay is often linked to firm profit, but this may fluctuate a great deal depending on market conditions beyond manager control.
- So managers may have incentives to pursue conglomerate mergers to “smooth out” profits to reduce fluctuations in their own pay, even when this is not in the interest of firm shareholders.