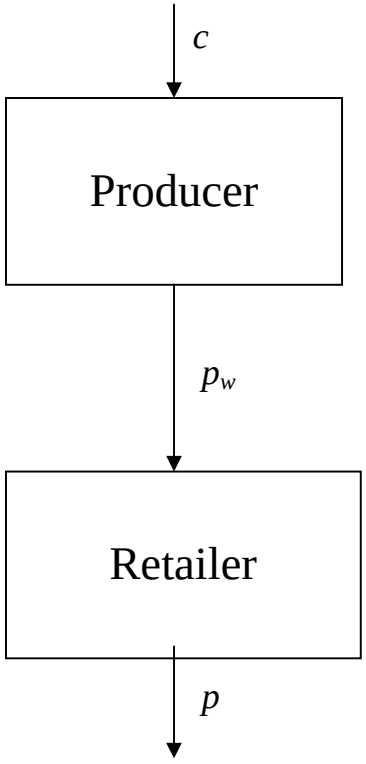
Vertical relations

Products are sold through retailers.
How does this affect market performance?



p_w – wholesale price

p – retail price
Demand: $q = D(p)$

Contracts producer-retailer

One extreme:
vertical integration –
producer and retailer act as if they are one firm

The other extreme:
linear price –
total price is $T(q) = p_w q$

Two-part tariff
total price is $T(q) = A + p_w q$
price per unit decreasing in q – quantity discount
A – franchise fee

Resale price maintenance
Producer determines the retail price.
Variations: price ceiling, price floor.

Exclusive dealing
Retailer is not allowed to carry competing producers' products.
(inter-brand competition)

Exclusive territories
Retailer has the sole right to sell the producer's products within a specified area.
(intra-brand competition)

Arguments for vertical integration

- incentives for relationship-specific investments

- we focus here on other arguments

Vertical externalities

- Double marginalization

If both producer and retailer are monopolists, then quantity sold is less than if they were integrated.

$p_w > c \Rightarrow p^m(p_w) > p^m(c)$

Example: $D(p) = 1 - p, \quad c < 1$

(i) No integration

The retailer solves:

$$\max_p \ \pi_r = (p - p_w)(1 - p)$$

$$\Rightarrow p = \frac{1 + p_w}{2} \quad \Rightarrow q = \frac{1 - p_w}{2}$$

The producer solves:

$$\max_{p_w} \pi_p = (p_w - c)\frac{1 - p_w}{2}$$

$$\Rightarrow p_w = \frac{1 + c}{2} \quad \Rightarrow p = \frac{3 + c}{4}, \quad q = \frac{1 - c}{4}$$

Total profit: $\pi_{ni} = \pi_p + \pi_r = \frac{(1-c)^2}{8} + \frac{(1-c)^2}{16} = \frac{3}{16}(1-c)^2$

(ii) Integration

The integrated firm solves:

$\max_p \ \pi_i = (p - c)(1 - p)$

$$\Rightarrow p = \frac{1+c}{2} < \frac{3+c}{4}, \quad q = \frac{1-c}{2}$$

Profit: $\pi_i = \frac{(1-c)^2}{4} > \pi_{ni}$

Both the two firms and society would gain from an integration.

Alternatives to full integration

(a) two-part tariff

$T(q) = A + p_w q$

The producer can set: $p_w = c, \quad A = \frac{(1-c)^2}{4}$

Interpretation: Sell the whole business to the retailer for a price equal to monopoly profit – the retailer becomes the *residual claimant.*

But:

- risk-sharing: what if D(p) is uncertain and the retailer is risk averse?
- asymmetric information about $D(p)$

(b) resale price maintenance

Producer restricts retail price: $p \leq p^m$,
sets wholesale price: $p_w = p^m$.

But again: risk sharing

Other externalities

- retailer service

The retailer may, by putting in promotion effort, increase the demand for the product. But some of the increase in demand will benefit the producer.

Two-part tariff still works (but: risk sharing?)

Resale-price maintenance is not sufficient:
The producer would want to control the service level, too.

- input substitution

Tie-in: producer sells both inputs to the retailer.

A horizontal externality

Several retailers.

One retailer's advertising effort benefits also the other retailers.

The producer needs to encourage such efforts in order himself to benefit from this externality.

Two-part tariff with $p_w < c$

Retailer power

What if the retailer has the bargaining power?
Example: recent changes in the Norwegian grocery industry.
Gabrielsen & Sørgard, *Scand J Econ* 1999

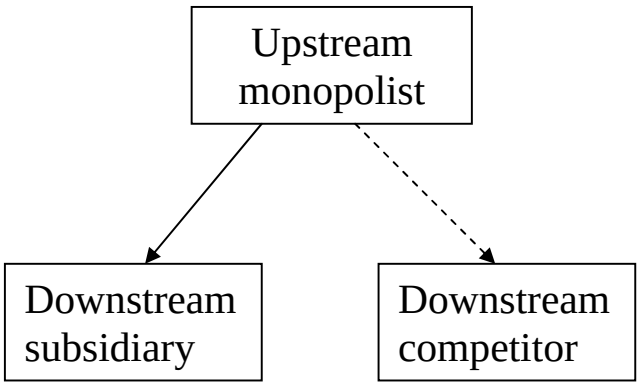
Vertical foreclosure

- A firm has control over the production of a product or service that is an essential input for producers in a potentially competitive industry. The competition in this industry can be altered by the firm by denying or limiting access to the input.

- *Essential facility*
  - bottleneck
  - network industries: firms need access to network to deliver product or service
    - telecom: AT&T, Telenor
    - power: Statnett
    - shipping: harbours
    - railway: Eurotunnel
  - outside network industries: firms are at a disadvantage without access
    - computer reservation systems for airlines
    - cooperatives: ski lifts, newspapers, ATMs
    - distribution of goods: retailing chains (food stores, pharmacies, book stores, pubs)

- Horizontal foreclosure: *bundling*, *tying*
  - complement products with one firm having (near) monopoly in one of the markets
  - Microsoft
    - Windows/internet browser
    - Windows/media player

The Chicago School



- There's only *one monopoly profit* to be had.
- Vertical integration and vertical foreclosure cannot be harmful.
- If there is a problem, it is that there is no competition upstream.

The foreclosure doctrine

The upstream firm does indeed have incentives to favour one downstream firm, such as a downstream subsidiary.

A reconciliation: the role of commitment

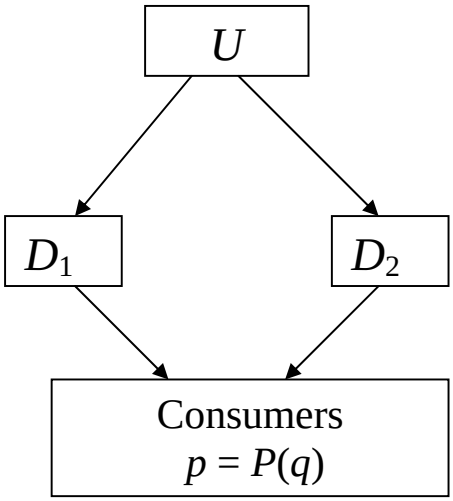
- Having contracted with one downstream firm, the upstream firm has incentives to contract further with other downstream firms, even though these firms in turn will compete with the first firm and decrease its profit.

- The first downstream firm realizes this and is less willing to sign a contract. This reduces the upstream firm's profit.

- The upstream firm will be looking for ways to get around this problem. $\rightarrow$ Vertical foreclosure

- Analogue: The durable-good monopolist. (Ronald Coase)

Model



Timing

Stage 1: Firm U offers firms D_1 and D_2 tariffs $T_1(\cdot)$ and $T_2(\cdot)$ for purchase of the intermediary good. Each D_i then orders a quantity q_i and pays $T_i(q_i)$.

Stage 2: Firms D_1 and D_2 transform intermediate good into final good and sell at price $p = P(q_1 + q_2)$.

Define: $Q^m = \arg\max_q \{[P(q) - c)]q\}$
$p^m = P(Q^m)$, $\pi^m = (p^m - \text{c})Q^m$

Observable contracts

Firm U offers $(q_i, T_i) = (Q^m/2, p^mQ^m/2)$ to each downstream firm. They both accept and sell in total monopoly quantity at monopoly price. No rationale for foreclosure.

But can firm U commit to these contracts?

- If U and D_2 agree on $(q_2, T_2) = (Q^m/2, p^mQ^m/2)$, then firms U and D_1 would want to sign a contract that maximizes their joint profit given the U/D_2 contract, with a quantity q_1 given by:
  $q_1 = \arg\max_q \{[P(Q^m/2 + q) - c)]q\} > Q^m/2$.

- Anticipating this, firm D_2 would turn down the $(Q^m/2, p^mQ^m/2)$ offer.

Secret contracts

Passive beliefs: If a firm receives an unexpected offer, it does not revise its beliefs about the offer made to its rival.

Consider a candidate equilibrium in which firm D_j is offered a quantity q_j. Whatever firm D_i is offered, it still believes that firm D_j is offered q_j.

Firm U offers firm D_i a quantity q_i so that the joint profit for U/D_i is maximized, *given* the offer of q_j to firm D_j:

$$q_i = \arg\max_q \{[P(q + q_j) - c]q\}$$

This is the same problem as the one facing a Cournot duopolist.

$$q_1 = q_2 = q^C \text{ – the Cournot quantity}$$

The profit of the upstream firm:

$$\pi_U = 2\pi^C < \pi^m$$

- The upstream firm suffers from its inability to commit.
- The problem becomes more severe the larger the number of downstream firms.
- The more competitive the downstream industry, the more interested is the upstream bottleneck owner in foreclosure in order to retain profit.

Why does the upstream firm foreclose access?

- Not in order to extend its market power to the downstream market, but rather in order to re-establish the market power lost because of its inability to commit.

Downward integration

Firm U buys one of the downstream firms. It credibly offers the monopoly quantity Q^m to its own affiliate and nothing to the other.

Bypass: Sometimes, there is an alternative supplier available to the non-integrated firm, so that the foreclosing firm can be bypassed. Still, if the alternative supplier is less efficient – for example, has higher production costs $\hat{c} > c$ – foreclosure with bypass is inefficient.

Exclusive dealing

- By entering an exclusive-dealing contract with D_1, firm U commits itself not to supply to D_2.
- A substitute for vertical integration.