Introduction

• Selling to other firms is different from mass consumer markets
  1. Large customers have bargaining power.
  2. Customers compete with each other.
• We suppose the value chain consists of three levels:
  – Upstream firms
  – Downstream firms
  – Final customers
Double Marginalisation

- Model
  - Upstream firm, $U$. Cost 0, charges $p^U$ per unit.
  - Customers demand $q(p) = a - p^D$.
- Profit of downstream firm is
  \[ \pi^D = (p^D - p^U)(a - p^D) \]
  - Differentiating, optimal price is $p^D = (a + p^U)/2$.
  - Optimal quantity is $q^D = (a - p^U)/2$.
- Hence $U$ faces demand curve $q = (a - p^U)/2$. $U$’s profit,
  \[ \pi^U = p^U(a - p^U)/2 \]
  - Differentiating, at optimum, $p^U = a/2$ and $q^U = a/4$.

Double Marginalisation cont.

- Summary
  - Prices: $p^U = a/2$ and $p^D = 3a/4$.
  - Quantity sold: $q^U = q^D = a/4$.
- What if $U$ and $D$ vertically integrated?
  - Charge price $p^I$. Joint profit,
    \[ \pi = p^I(a - p^I) \]
  - Differentiating, at optimum, $p^I = a/2$ and $q^I = a/2$.
- Double marginalisation problem:
  - When one firm raises price, they exert negative externality on other firm.
  - Profit less under vertical separation than vertical integration.
Case Study: Porsche

- In 1984 Porsches sold through VW-Audi dealership
  - Dealers pay low price for car: less than “invoice”
  - 90% sales sold close to suggested retail price.
  - Dealers hold inventory and contribute to national advertising.
  - Setup due to Alfred Sloan: dealerships build loyalty.

- Porsche’s suggested scheme:
  - Dealers book orders. Get 8% commission.
  - PorscheUSA sets prices and holds inventory.

- Huge resistance from dealers (who made 18% margins before).
  - Dealers and VW filed legal suits using franchise laws.
  - Porsche backed down although defended legal position.

Double Marginalisation: Two–Part Tariff

- Suppose $U$ uses two–part tariff
  \[ p^U = F + x^U q \]

- Firms can produce same quantity as when integrated.
  - Set $x^U$ equal to $U$’s MC (zero in this case). $D$’s profits:
    \[ \pi^D = (p^D - x^U)(a - p^D) - F \]
    \[ = p^D(a - p^D) - F \]
    
    Hence $D$ chooses $p^D = p^I$ and $q^D = q^I$.

- How choose $F$?
  - $F = 0$ then $D$ gets all profit. $F = \pi^I$ then $U$ gets all profit.
  - Depends on bargaining power.

- Analogy: First degree price discrimination.
Double Marginalisation: RPM

- **Maximum resale price**
  - $U$ names maximum price, $p^M$, that $D$ can charge

- Firms can produce same quantity as when integrated.
  - $U$ sets $p^M = a/2$, so $D$ sells $a/2$.
  - $U$ sets $p^U$ equal to $p^M$ minus $D$’s MC (zero in this case).

- **Idea:** $U$ chooses upstream and downstream price.
  - Internalise externality.
  - Just make sure $D$ gets positive profits.

- So there are contractual solutions to double marginalisation
  - But many supply chains still suffer.
  - For example, we assumed $U$ knows $D$’s costs.

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Two–part Tariffs with Downstream Competition

- **Model**
  - One upstream firm $U$ with cost 0.
  - Two downstream firms $D_1$ and $D_2$ have cost 0.
  - Two–part tariff: $U$ sells $q_i$ to $D_i$ for fee $t_i$.
  - $D_1$ and $D_2$ Cournot competitors. Demand $p(q) = 1 - q$.

- **Contracts publicly observable.**
  - $U$ chooses $(q_1, t_1, q_2, t_2)$ to maximise
    \[
    \pi_U = t_1 + t_2 \quad \text{s.t.} \quad (1 - q_1 - q_2)q_i - t_i \geq 0 \quad i \in \{1, 2\}
    \]
  - Thus $U$ chooses $(q_1, q_2)$ to maximise
    \[
    (1 - q_1 - q_2)q_1 + (1 - q_1 - q_2)q_2
    \]
  - Solution: $q_1^* + q_2^* = 1/2$ That is, $U$ provides monopoly qty.
Two-part Tariffs with Downstream Competition

- Contracts privately observable.
  - Problem: $U$ has incentive to supply too much to downstream firms. Problem of secret price cuts.
  - $D_1$ anticipates $U$ has contract $(\hat{q}_2, \hat{t}_2)$ with $D_2$.
- $U$ chooses $(q_1, t_1, q_2, t_2)$ to maximise
  $$\pi_U = t_1 + t_2 \text{ s.t. } (1 - q_1 - \hat{q}_2)q_1 - t_1 \geq 0 \text{ and } (1 - \hat{q}_1 - q_2)q_2 - t_2 \geq 0$$
- Substituting, $U$ chooses $(q_1, q_2)$ to maximise
  $$\pi_U = (1 - q_1 - \hat{q}_2)q_1 + (1 - \hat{q}_1 - q_2)q_2$$
- Solution: $q_1^* = (1 - \hat{q}_2)/2$ and $q_2^* = (1 - \hat{q}_1)/2$.
  - In equilibrium expectations correct: $\hat{q}_1 = q_1^*$ and $\hat{q}_2 = q_2^*$.
  - Hence $q_1^* = q_2^* = 1/3$. That is, $U$ provides Cournot qty.

Investment Externalities

- Suppose two downstream firms $D_1$ and $D_2$.
- $D_1$ can invest in product to increase consumers’ values.
  - Advertising
  - Free samples
  - Expertise
- Problem: $D_2$ free-rides on investments and undercuts $D_1$.
- Solutions
  - Resale price maintenance (minimum resale price), e.g. Books in UK. But RPM is illegal in the US.
  - Exclusive territories, e.g. Cars.
  - $U$ pays $D$ for investment, e.g. supermarket shelves.
Assignment

- What is the upstream business of BenQ?
- What is BenQ’s big strategy?
- How did Motorola react to this move?
- How is the strategy working out so far?
- What do you think will happen over the next ten years?