Multiproduct intermediaries

JPE, 2021

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February 12, 2026

Market Trends: An Empirical Tension

- **Direct-to-Consumer (DTC) sales are expanding:**
  - European Commission (2017): In several EU sectors, more than 50% of manufacturers sell directly online (e.g clothing 85%)
  - OECD (2019): E-commerce has facilitated manufacturers' expansion into direct retail channels.

- **Yet multiproduct intermediaries remain dominant:**
  - Amazon net sales exceed $500bn annually (Amazon 10-K).
  - Growth of private labels and exclusive products (e.g., streaming platforms securing exclusive sports and movie rights).
  - Large retailers continue to operate broad assortments.

- **Puzzle:** If manufacturers can reach consumers directly, why do multiproduct intermediaries remain profitable and rely increasingly on exclusivity?

Motivation

- Many intermediaries sell *multiple products* and choose assortments strategically.
- Core question: How can a multiproduct intermediary remain profitable when manufacturers can sell directly and it does not lower prices?
- Standard models of intermediation: profits arise from
  - reducing search frictions, or
  - lowering prices .
- **This paper:** intermediaries can earn profits *purely through assortment choice*, even without lowering prices or search costs.
- Mechanism: assortment reallocates consumer search across products.

Related Literature

- **Intermediation models**
  - Search, certification, information (Rubinstein–Wolinsky 1987; Gehrig 1993; Spulber 1996)

  $\Rightarrow$ Profits without reducing search frictions
- **Bundling**
  - Chore mechanisms (Stigler 1968; Adams–Yellen 1976; McAfee et al. 1989)

  $\Rightarrow$ Assortment-based bundling
- **Multiproduct search**
  - Exogenous product ranges/price decisions (McAfee 1995; Shelegia 2012; Zhou 2014; Rhodes 2015)

  $\Rightarrow$ Endogenous assortment choice

Setting

- **Products / Manufacturers**
  - Continuum of products $i \in [0,1]$, marginal cost $c_i \geq 0$
  - Per-consumer profit and surplus:

$$\pi_i = (p_i^m - c_i)Q_i(p_i^m), \qquad v_i = \int_{p_i^m}^{\infty} Q_i(p)\,dp$$

- **Consumers**
  - Unit mass, additive utility across products
  - Identical preferences;
  - Pay a search cost $s \sim F$
- **Intermediary**
  - Chooses assortment $A \subset [0,1]$, with $m = |A|$
  - Capacity constraint: $m \leq \bar{m} < 1$
  - Search efficiencies $h(m)$

Timing

1. Contracts (TIOLI) $\longrightarrow$ 2. Pricing $\longrightarrow$ 3. Search & Purchase

- **1.** Intermediary offers (τ_i, T_i, exclusivity)
- **2.** Active sellers choose retail prices
- **3.** Consumers observe availability and search

Pricing and Contracting: Key Implications

- Consumers do not observe prices before search
- $\Rightarrow$ Each seller charges monopoly price p_i^m

Exclusive contract:

$$\tau_i = c_i, \qquad T_i = \pi_i F(v_i)$$

$\Rightarrow$ Each product is summarized by (π_i, v_i)

Simple Case: Consumer Decision

Let $\Omega \subset \mathbb{R}^2_+$ denote the set of feasible (π, v) pairs, with distribution $G(\pi, v)$.

Assumptions: exclusivity, $h(m) = m$, $\bar{m} = 1$

$$\text{Visit } I \iff \underbrace{\int_A v \, dG}_{\text{expected surplus}} \geq \underbrace{s \int_A dG}_{\text{search cost}}$$

$$\iff \quad s \leq \hat{v} \equiv \frac{\int_A v \, dG}{\int_A dG}$$

Consumers compare average surplus to their search cost.

Simple Case: Intermediary Problem

Consumers visiting intermediary: $F(\hat{v})$

Net profit from product (π, v):

$$\pi\left[F(\hat{v}) - F(v)\right]$$

(gains from extra consumers − lump-sum paid to manufacturer)

$$\max_{A \subset \Omega} \int_A \pi\left[F(\hat{v}) - F(v)\right] dG$$

Low-v products earn profits. High-v products attract consumers.

Solution: Optimal Product Selection

Reformulation

Stocking decision:

$$q(\pi, v) = 1 \iff (\pi, v) \in A$$

Intermediary problem

$$\max_q \int_\Omega q(\pi, v)\, \pi(F(\hat{v}) - F(v))\, dG \quad \text{s.t. } \hat{v} = \frac{\int_\Omega q(\pi, v)\, v\, dG}{\int_\Omega q(\pi, v)\, dG}$$

$$\max_q \int_\Omega q(\pi, v) \Big[\underbrace{\pi(F(\hat{v}) - F(v))}_{\text{direct profit}} + \underbrace{\lambda(v - \hat{v})}_{\text{search externality}} \Big] dG$$

where λ is the multiplier capturing the marginal value of attracting consumers.

Solution: Optimal Product Selection

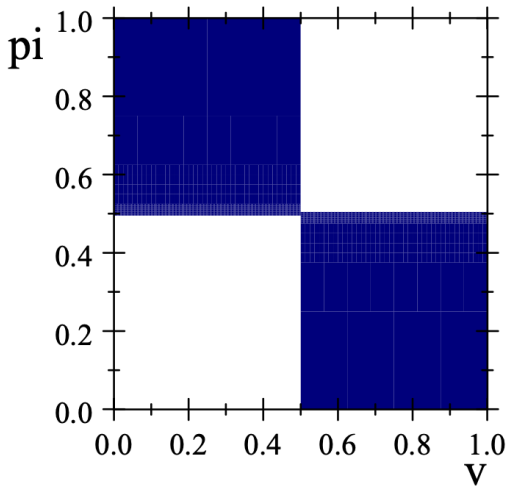

Figure 1: Optimal product range in the simple case

High-π, low-v products make money. Low-π, high-v products attract consumers.

Beyond the Simple Model

Three extensions:

- Endogenous exclusivity vs. non-exclusivity
- Capacity constraint on assortment ($\bar{m}$)
- General search technology $h(m)$

What survives:

- Same traffic–profit tradeoff
- High-v products attract consumers
- Low-v products generate profit

What changes:

- Search technology affects how much exclusivity is needed
- Larger capacity $\Rightarrow$ larger platform, fewer exclusive products
- With strong economies of search, exclusivity becomes less important

Applications

Shopping malls

- Mall acts as a platform (does not set prices).
- Same (π, v) logic applies.
- High-v stores ("anchor stores") attract consumers.
- Mall may subsidize anchors to extract higher rents from other stores.

Direct-to-Consumer (DTC) expansion

- Easier DTC raises manufacturers' outside option ($\pi F(v/\theta)$).
- Intermediary profits decline.
- Optimal response:
  - Smaller assortment
  - Higher fraction of exclusive products
  - More polarized product range

Summary

- Multiproduct intermediaries can earn positive profits even without lowering prices or reducing search frictions.
- Mechanism: assortment reallocates consumer search.
  - High-v products attract consumers.
  - Low-v products generate profit.
- The framework explains:
  - exclusivity and anchor stores,
  - capacity choices,
  - and the impact of DTC expansion.

Discussion and Limitations

- **Pricing**
  - Prices remain at monopoly levels (no price competition).
  - Assortment, not pricing, drives profits.
- **Market structure**
  - Single intermediary.
  - Competing platforms could bid for high-v products.
  - Traffic-generating products may capture the rents.
- **Consumer behavior**
  - Search heterogeneity only.
  - No taste heterogeneity or dynamic learning.
  - Richer demand could change selection patterns.