Multiproduct intermediaries

JPE, 2021

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February 11, 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)

  ⇒ Profits without reducing search frictions
- **Bundling**
  - Pricing-based mechanisms (Stigler 1968; Adams–Yellen 1976; McAfee et al. 1989)

  ⇒ Assortment-based bundling
- **Multiproduct search**
  - Exogenous product ranges (McAfee 1995; Shelegia 2012; Zhou 2014; Rhodes 2015)

  ⇒ Endogenous assortment choice

Setting

- **Products / Manufacturers**
  - Continuum of products $i \in [0,1]$, marginal cost $c_i \geq 0$
  - Demand $Q_i(p)$, monopoly price p_i^m
  - 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; heterogeneity only in search cost $s \sim F$
  - Observe availability, not prices
- **Intermediary**
  - Chooses assortment $A \subset [0,1]$, $|A| \leq \bar{m}$
  - TIOLI contracts (τ_i, T_i), exclusive or not
  - Search cost $h(|A|) \cdot s$

Pricing and Contracting

- In equilibrium, all sellers charge monopoly prices p_i^m.
- Two-part contracts allow the intermediary to extract manufacturer surplus.

$$\Rightarrow \text{Products can be indexed by } (\pi_i, v_i)$$

Let $G(\pi, v)$ denote the joint distribution with support Ω.

Simple Case: Consumer Decision

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

Intermediary stocks $A \subset \Omega$ exclusively.

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

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

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)

define OMEGA!!!

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

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

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

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

Solution: Optimal Product Selection

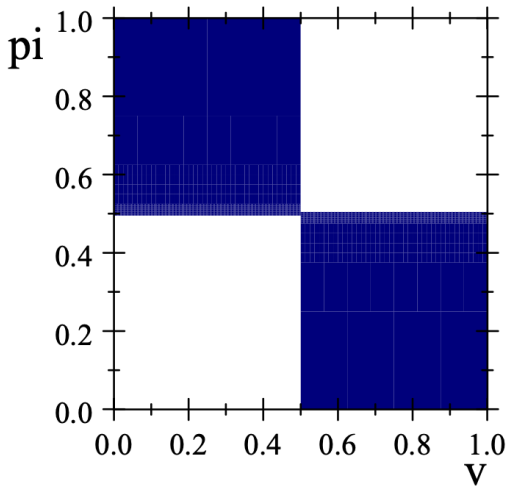

Figure 1: Optimal product range in the simple case

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

Beyond the Simple Model

- The paper extends the benchmark to a richer environment:
  - endogenous exclusivity vs non-exclusivity
  - capacity constraint on assortment size ($\bar{m}$)
  - general search cost technology $h(m)$
- **Key insight:** the same search-reallocation mechanism survives, but now interacts with:
  - the exclusivity margin
  - the capacity margin
- As a result, the intermediary may optimally stock:
  - traffic-generating products
  - profit-generating products
  - *and* products that do both.

Applications (Overview)

- **Retail platforms / malls**
  - Some products are used to *attract consumers* (anchors), others to *generate profits*.
  - Explains subsidies to high-value sellers and cross-store externalities.
- **Exclusivity and private labels**
  - Exclusive products optimally have high consumer surplus but low standalone profitability.
  - Predicts overuse of exclusivity relative to the social optimum.
- **Direct-to-consumer (DTC) sales**
  - Easier DTC weakens the intermediary and shrinks its assortment.
  - Intermediaries respond by relying more on exclusivity.

Summary

- Introduces a new framework to study multiproduct intermediaries with consumer search frictions and endogenous assortment.
- Main result: a multiproduct intermediary can earn strictly positive profits *without improving prices or search efficiency*.
- Mechanism: assortment choice reallocates consumer search across products with different roles.
- The framework provides a unified way to think about exclusivity, capacity, and DTC competition.

Discussion and Limitations

- **Pricing environment**
  - Retail prices are fixed at monopoly levels.
  - The intermediary cannot adjust prices or eliminate double marginalization.
  - In practice, pricing and assortment decisions interact.
- **No intermediary competition**
  - The model considers a single intermediary.
  - With competing intermediaries, platforms may compete for traffic and exclusive products.
  - Competition could reduce the profitability of distortionary assortment choices.
- **Consumer search structure**
  - Consumer heterogeneity operates only through search costs.
  - The sensitivity of the mechanism to alternative forms of consumer search or platform choice is not fully characterized.