

Pricing and Efficiency in Media Markets

José Luis Moraga-González¹

¹University of Groningen

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Media markets

Media firms (platforms) typically serve two markets:

- Market for **contents** (information, entertainment, etc.)
- Information **intermediation** (since platforms receive consumer attention, producers use platforms to inform consumers about their products)

Some media firms are active in both markets:

- TV stations, radio channels, magazines, newspapers, etc.
- Typical approach: platform bundles content and advertisements and viewers dislike ads (+/-).

For other media firms, the main role is information intermediation:

- Yellow Pages, Internet search engines, Specialized newspapers, Auction sites, etc.
- Typical approach: platform is a place where sellers advertise and consumers like advertisements (+/+).

Two-sided intermediaries and product markets

This presentation is about the second kind of media firms: intermediary/platforms bring consumers and sellers together:

- Internet portals: Marktplaats, E-bay, Yahoo
- Newspapers like “Via Via”, “Segundamano”
- Yellow Pages: Goudengids, Telefoongids

Producers advertise:

- sometimes their existence
- sometimes their products
- sometimes their products and their prices.

What is interesting about these two-sided markets is that intermediaries' pricing policies indirectly “steer” the formation of prices in product markets.

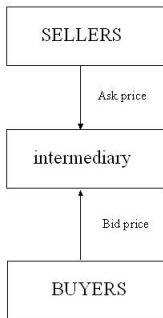
Two-sided intermediaries and product markets (cont.)

Questions:

- How do product markets function in the presence of intermediated trade?
- Who obtains the rents from trade, intermediaries, producers or consumers?
- How do intermediaries deal with the “search market”?
- Does competition at the intermediary level increase or decrease overall efficiency in the market?
- Who gains/loses from fostering competition at the platform level?

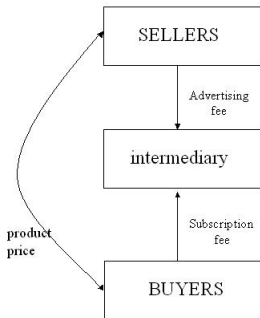
Traditional literature on intermediation

- Stahl (1988), Gehrig (1993), Yavas (1994, 1996), Spulber (1999)



Information intermediation, two-sided markets

- Armstrong (2006), Baye & Morgan (2001), Dukes (2003)
- Caillaud & Jullien (2001, 2003), Belleflamme & Peitz (2008)
- Armstrong & Wright (2004), Rochet & Tirole (2003, 2004)



And the very many papers on two-sided markets and specific markets/issues

- Credit cards: Rochet and Tirole (2002), Schmalensee (2002) and Wright (2003, 2004)
- Commercial media markets: Anderson and Coate (2005), Dukes and Gal-Or (2003a, 2003b) and Dukes (2004)
- B2B marketplaces: Belleflamme and Toulemonde (2004)
- Ownership: Nocke, Peitz, Stahl (2007)
- Software: Hagiu (2006)
- etc.

Monopolistic intermediation

Agents

- N **firms**, producing goods, marginal cost c
- unit mass of **consumers**, each interested in the products,
- **intermediary**, let firms and consumers get in contact

Two-stage game

- first stage: intermediary chooses advertising fee a and subscription fee s .
- second stage: firms and consumers make participation and pricing decisions.

There may or may not be possibilities to “trade” outside the media platform: a *search market* may be active or inactive.

Monopolistic intermediation

Notation:

$\lambda \in [0, 1]$: participation rate of firms

$\mu \in [0, 1]$: participation rate of consumers.

π_{in} : profit to a participating firm (gross of access fees)

π_{out} : profit to a non-participating firm

U_{in} : utility for a subscriber (gross of access fees)

U_{out} : utility for a non-subscriber

Π : intermediary's profits

W : welfare

Monopolistic intermediation

For a given a market structure:

- number of players in the product market
- nature of product differentiation
- active or inactive “search market”, etc.

and for a given $(a, s) \in [0, \bar{a}] \times [0, \bar{s}]$,

assume that the product market (sub-)game has a unique equilibrium, denoted:

$$\{\lambda^*(a, s), p_{in}^*(a, s), p_{out}^*(a, s)\} \text{ and } \mu^*(a, s)$$

Monopolistic intermediation

Equilibrium prices are given as:

$$p_{in}^*(a, s) = \arg \max_p \{ \pi_{in}^j(p_{in}; p_{in}^*, p_{out}^*, \lambda^*, \mu^*) \}$$

$$p_{out}^*(a, s) = \arg \max_p \{ \pi_{out}^j(p_{out}; p_{in}^*, p_{out}^*, \lambda^*, \mu^*) \}$$

and equilibrium participation rates λ^* and μ^* solve the inequalities:

$$\pi_{in}(p_{in}^*, p_{out}^*, \lambda^*, \mu^*) - a \geq \pi_{out}(p_{in}^*, p_{out}^*, \lambda^*, \mu^*)$$

$$U_{in}(p_{in}^*, p_{out}^*, \lambda^*, \mu^*) - s \geq U_{out}(p_{in}^*, p_{out}^*, \lambda^*, \mu^*)$$

Monopolistic intermediation

Consider now the problem of the intermediary. Her profits are:

$$\Pi(a, s) = N\lambda^*(a, s)a + \mu^*(a, s)s$$

First observation: in SPE, it must be the case that

$$\pi_{in}^* - a = \pi_{out}^*$$

$$U_{in}^* - s = U_{out}^*$$

Monopolistic intermediation

Therefore, profits of monopolist intermediary can be written as:

$$\begin{aligned}\Pi(a, s) &= N\lambda^*(a, s)[\pi_{in}^*(a, s) - \pi_{out}^*(a, s)] \\ &\quad + \mu^*(a, s)[U_{in}^*(a, s) - U_{out}^*(a, s)]\end{aligned}$$

Notice that welfare is given by

$$W(a, s) = \Pi(a, s) + N\pi_{out}^*(a, s) + U_{out}^*(a, s)$$

so we can write intermediary's profits as:

$$\Pi(a, s) = W(a, s) - N\pi_{out}^*(a, s) - U_{out}^*(a, s)$$

Monopolistic intermediation

Proposition:

A profit-maximizing monopoly platform chooses access fees so as to maximize welfare in the system and minimize the value of the agents' outside options. As a result, if a SPE equilibrium exists:

- platform and social incentives are generally misaligned
- the monopoly platform always extracts all the rents in the market (up to the value of the outside options).

Remark: Assume absence of a search market, so for any (a, s) ,

$$\pi_{out}^*(a, s) = U_{out}^*(a, s) = 0.$$

Then, if a SPE equilibrium exists, it is (constraint-) efficient and all the rents are extracted by the monopolist intermediary.¹

¹This result easily extends to situations where outside options are independent of the participation fees.

Example 1.1: Independent product sellers, no search market (Galeotti & Moraga-González, 2004)

- Suppose N sellers sell independent products, which they produce at marginal cost c .
- Consumers are interested in all products, and are willing to pay v for one unit of each of the products.
- Sellers and buyers cannot trade on their own (inactive search market).

Monopolistic intermediation

Example 1.1 (cont.)

In this case, the continuation game equilibrium is as follows:

$$p_{in}^*(a, s) = v$$
$$\mu^*(a, s) = \begin{cases} 0 & \text{if } s > 0 \\ 1 & \text{if } s = 0 \text{ and } a \leq v \end{cases}$$
$$\lambda^*(a, s) = \begin{cases} 0 & \text{if } s > 0 \\ 1 & \text{if } s = 0 \text{ and } a \leq v \end{cases}$$

and therefore

$$U_{in}^* = 0$$

and

$$\pi_{in}^*(a, s) = \begin{cases} 0 & \text{if } s > 0 \\ v - a & \text{if } s = 0 \text{ and } a \leq v \end{cases}$$

Example 1.1 (cont.)

Proposition:

In the monopoly platform case with independent products and in the absence of a search market, the unique outcome which can be sustained as a SPE takes the following form:

- firms participate in the platform with probability 1, advertise a price equal to v and their profits are extracted by the platform via advertising fees $a^* = v$
- consumers are given free access ($s^* = 0$), buy all the products and obtain no utility.

In equilibrium the monopoly platform obtains a profit $\Pi = v$ and the market outcome is efficient.

Monopolistic intermediation

Example 1.1: Independent product sellers, with an active search market (Galeotti & Moraga-González, 2004)

In this case, the continuation game equilibrium is as follows:

$$p_{in}^*(a, s) = v$$

$$p_{out}^*(a, s) = v$$

$$\lambda^*(a, s) = \begin{cases} 1 & \text{if } s = 0 \text{ and } a = 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\mu^*(a, s) = \begin{cases} 1 & \text{if } s = 0 \text{ and } a = 0 \\ 0 & \text{otherwise} \end{cases}$$

and therefore

$$U_{in}^* = U_{out}^* = 0$$

and

$$\pi_{in}^*(a, s) = v$$

Example 1.2 (cont.)

Proposition:

In the monopoly platform case with independent products and an active search market, the unique outcome which can be sustained as a SPE takes the following form:

- firms are given free access to the platform ($a^* = 0$), advertise a price equal to v and obtain profits equal to v
- consumers subscribe freely to the intermediary ($s^* = 0$), buy all products and obtain no utility.

In equilibrium the monopoly platform obtains no profit ($\Pi = 0$) and the market outcome is efficient. All surplus is extracted by the product sellers.

Example 2.1: Homogeneous product sellers, no search market (Galeotti & Moraga-González, 2004)

- Suppose N sellers sell homogeneous products, which they produce at marginal cost c .
- Consumers are interested in one unit of the products, and are willing to pay v for it.
- Sellers and buyers cannot trade on their own (inactive search market).

Monopolistic intermediation

Example 2.1 (cont.)

$$F_{in}^*(p) = \frac{1}{\lambda} - \frac{1-\lambda}{\lambda} \left(\frac{v}{p}\right)^{\frac{1}{N-1}}, \text{ with support } \sigma = [v(1-\lambda)^{N-1}, v]$$

$$\lambda^*(a, s) = 1 - \left(\frac{a}{\mu^*(a, s)v}\right)^{\frac{1}{N-1}}$$

$$\mu^*(a, s) \text{ solves } v[1 - (1 - \lambda^*)^{N-1}(1 + \lambda^*(N - 1))] - s = 0$$

Therefore

$$\pi_{in}^* = \mu^* v (1 - \lambda^*)^{N-1}.$$

and

$$U_{in}^* = v[1 - (1 - \lambda^*)^{N-1}(1 + \lambda^*(N - 1))]$$

Example 2.1 (cont.)

Proposition:

In the monopoly platform case with homogeneous product sellers and in the absence of a search market, the unique outcome that can be sustained as a SPE takes the following form:

- The monopolist sets an advertising fee $a^* = 0$ and a subscription fee $s^* = v$.
- Firms enter the market with probability 1, advertise a price equal to the marginal cost and obtain zero profits.
- Consumers subscribe to the intermediary with probability 1, buy a product surely and obtain no utility.

In equilibrium the monopoly platform obtains a profit $\Pi = v$ and the market outcome is efficient.

Example 2.2: Homogeneous product sellers, no search market (Baye and Morgan, 2001)

- Suppose N retailers sell homogeneous products, which they obtain at marginal cost c .
- Consumers are interested in one unit of the products, and are willing to pay v for it.
- Each consumer has a single local shop to buy from, so sellers and buyers can bypass the intermediary and trade on their own.
- Firms cannot price discriminate.

Example 2.2 (cont.)

Proposition (Baye and Morgan, 2001):

In the monopoly platform model with homogeneous product sellers and an active search market, the unique outcome that can be sustained as a SPE has the following features:

- firms have to pay so large fees for participation that $0 < \lambda^* < 1$; as a result, advertised market prices are dispersed
- consumers subscribe to the intermediary with probability 1, buy a product surely and obtain positive utility.

In equilibrium all agents, intermediary, firms and consumers, obtain positive rents. The market outcome is NOT efficient.

Example 3.1: Differentiated product sellers, in the absence of a search market (Galeotti & Moraga-González, 2008)

Market outcome is constraint-efficient, with all rents extracted by intermediary.

Example 3.2: Differentiated product sellers, with an active search market (Galeotti & Moraga-González, 2008)

Market outcome is constraint-efficient, with all rents (up to the value of the outside option) extracted by intermediary.

Competing intermediation:

- With single-homing
- With multi-homing

Competing intermediation:

Single-homing:

Proposition (Galeotti & Moraga-González, 2004):

In the competing platform model with homogenous product sellers, suppose that agents cannot multi-home. Then if an equilibrium exists where all the platforms are active, it cannot be efficient.

Competing intermediation:

Multi-homing

Proposition (Galeotti & Moraga-González, 2004):

In the competing platform model with homogenous product sellers: Suppose consumers cannot multi-home. Then, an efficient equilibrium where all the platforms are active cannot be sustained.

Existence of an efficient equilibrium, requires consumers to multi-home surely and firms to mix across intermediaries.

Conclusions

- Intermediation introduces *inefficiencies* in product markets.
- The extent of the inefficiency depends on the characteristics of the market served
 - number of players
 - degree of product differentiation
 - existence of a search market, etc.
- Competing intermediation does not help when agents (must) *single-home*. Transactions fail to be realized because of coordination frictions.
- Efficiency can be obtained when consumers and firms can *multi-home*. In that case, consumers must multi-home surely while firms not.

Thank you!