

Conferência

Apresentação dos artigos vencedores do prémio

Concorrência nos Mercados

4 de maio de 2018



Gabinete de Estratégia e Estudos
Ministério da Economia

NOVA

School
of Business
& Economics

Shaping
powerful
minds



Associação Mutualista

Montepio

Measuring the Welfare of Intermediation in Vertical Markets

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2018

The views presented herein are those of the authors
and do not necessarily represent the views of the institutions
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Retailer:

intermediary between producer and consumer.

Variety of Vertical Structures

1) Consumers buy from **retailers**.

Household appliances, food.

2) Consumers buy from **manufacturers**.

Mobile telephony.

3) Two vertical structures **coexist**.

Airlines, hotels.

Questions

- 1) Why **variety**?
- 2) Why **retailers**?

Retailers

1) Add **margins** to vertical structure:
double marginalization.

2) Perform **services**:

Welfare Impact of Retailing?

Relevant for **vertical mergers**, regulation of brokerage activities, *etc.*

How Identify Value of Retailers?

Usually, no **counterfactual** without retailers.

Use specificities of **Outdoor Advertising** industry:

- 1) **two** distribution channels.
- 2) retailers' **services**.

Implementation

Develop industry **equilibrium** model.

Estimate **demand**.

Estimate marginal costs and bargaining parameters.

Simulate **counterfactuals**.

Industry Equilibrium Model

Demand:

Mixed logit.

Costly consumer search.

Supply:

Two distribution channels.

Two-layered vertical structure.

Counterfactuals

Quantify channels through which
retailers affect welfare.

Contribution

1) Technical:

New equilibrium model:

- i Mixed logit.
- ii Channel specific preferences.
- iii Costly search.
- iv Bargaining game.

2) Policy:

Retailers add substantial **value** to consumers.
Implications for **vertical merger** analysis.

Literature

- 1) **Intermediaries:** e.g. Rubinstein and Wolinsky (1987); Spulber (1995, 1996, 1999); Rust and Hall (2003), Hagiu and Jullien (2011); Edelman and Wright (2015); Gavazza (2016).
- 2) **Vertical relations:** e.g. Brenkers and Verboven (2005); Villas-Boas (2007); Mortimer (2008); Bonnet and Dubois (2010); Allen, Clark, and Houde (2014); Dubois and Sæthre (2016).
- 3) **Costly search and price dispersion:** e.g. Goeree (2008); De los Santos, Hortaçsu, and Wildenbeest (2012); Honka (2014); Moraga-González, Sándor, and Wildenbeest (2015); Pires (2016); Salz (2017).
- 4) **Bargaining on vertical structures:** e.g. Crawford and Yurukoglu (2012); Draganska, Klapper, and Villas-Boas (2010); Grennan (2013); Gowrisankaran, Nevo, and Town (2014); Collard-Wexler, Gowrisankaran, and Lee (2016); Arie, Grieco, and Rachmilevitch (2016).
- 5) **Quantity discounts and non-linear pricing:** e.g. Busse and Rysman (2005); Miravete and Roller (2004); McManus (2007); Cohen (2008); Chu, Leslie, and Sorensen (2011); Nevo, Turner, Williams (2016); Donna and Pires (2016).
- 6) **Divestitures in the outdoor advertising industry:** e.g. Pereira and Ribeiro (2018).

Plan

- 1) Industry.
- 2) Data.
- 3) Model.
- 4) Demand Estimation.
- 5) Counterfactuals.

INDUSTRY

2 m² Panel



Agents

- 1) **Manufacturers:** install and rent display panels.
- 2) **Retailers:** intermediaries.
- 3) **Consumers:** advertisers.

Institutional Overview

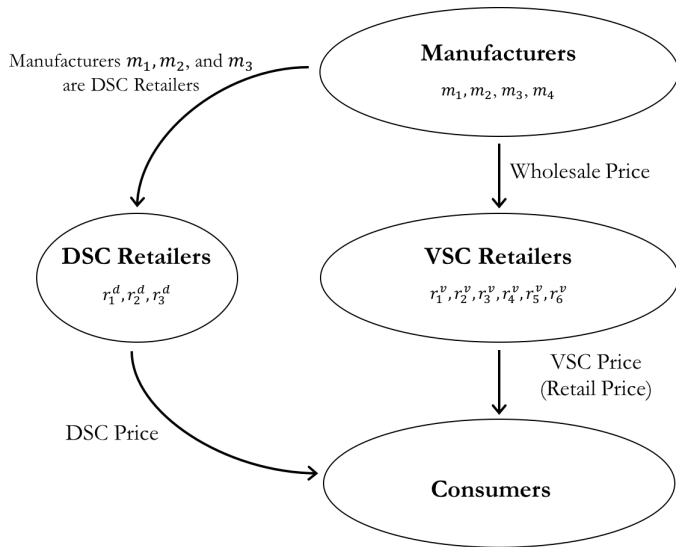
1) **Two** distribution channels.

- Vertical Sales Channel (VSC): consumers buy from **retailers**.
- Direct Sales Channel (DSC): consumers buy from **manufacturers**.

2) Retailers provide **services**.

- Consulting services.
- Search services.
- Purchase aggregation services.

Industry Structure



Quantity Discounts

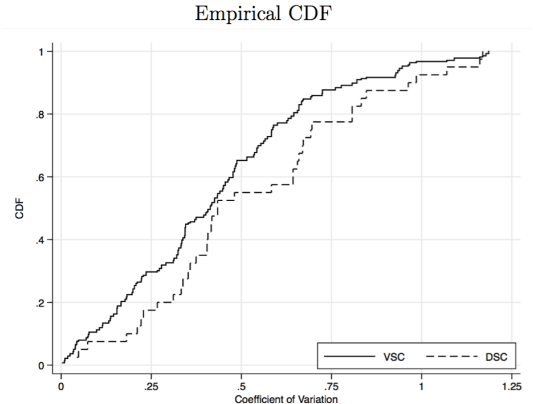
Quantity discounts in VSC, but not in DSC.

Price per m^2	(1)	(2)	(3)	(4)
Log(m^2)	-7.0708*** (0.4472)	-1.8348 (1.2105)	-6.9948*** (0.4511)	-1.5502 (1.1810)
Log(m^2) \times VSC		-6.0297*** (1.2990)		-6.2510*** (1.2576)
Manufacturers F.E.	Yes	Yes	Yes	Yes
Retailers F.E.	Yes	Yes	Yes	Yes
Display Formats F.E.	No	No	Yes	Yes
Months F.E.	No	No	Yes	Yes
Adj. R^2	0.4081	0.4291	0.4493	0.4723
Nmbr. Obs.	570	570	570	570

Standard errors in parentheses. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Price Dispersion and Returns to Consumer Search

Price dispersion lower in the VSC than in the DSC.



The empirical CDF for DSC sales first-order stochastically dominates the one for VSC.

DATA

Dataset

Data from **manufacturers** and **retailers** for 2013.

Product: display format, manufacturer, retailer.

Observation: monthly sales shares.

- Total sales (euro).
- Total quantity of advertising (faces/ m^2).
- Retail and wholesale prices (euro).
- Commissions, fees, and rebates paid to manufacturers (euro).
- Installed capacity (faces).
- Number of offices of each manufacturer and retailer.
- Google searches about each firm.

MODEL

Two-Layered Vertical Structure

1) **Manufacturers:**

$$\Pi_m = \sum_{j \in \Omega_m} (\omega_j - \mu_j) Ms_j(\mathbf{p}).$$

2) **Retailers:**

$$\Pi_r = \sum_{j \in \Omega_r} (p_j - \omega_j - \rho_j) Ms_j(\mathbf{p}).$$

Consumer Choice is Two Step Process

1) **Search decision:** choose subset of firms to search.

2) **Purchase decision:** choose product,
conditional on price quotes and random shocks from first step.

Step 1: Search Decision

Consumers face uncertainty about p_{jt} , ϵ_{ijt} :

Engage in **costly search** to obtain information:

- 1) Cost of obtaining information: s^{VSC} , s^{DSC} .
- 2) Retailers provide larger samples.
- 3) **Fixed sample search.**

Step 2: Purchase Decision

Conditional indirect utility consumer i , product j , period t :

$$U_{ijt|R_i} = -\alpha_i p_{jt} + x_{jt}\beta + \tau_m^D + \tau_r^D + \tau_t^D + \tau_{df}^D + \xi_{jt} + \hat{\epsilon}_{ijt}.$$

$$\alpha_i = \alpha + \Sigma v_i, \quad v_i \sim P_v(v) = \mathcal{N}(0, 1), \quad \hat{\epsilon}_{ijt} = \zeta_{igt} + (1 - \sigma)\epsilon_{ijt}.$$

Two Stage Game

1) **Manufacturers' Game:**

manufacturers and retailers **bargain** over wholesale prices.

2) **Retailers' Game:**

VSC and DSC retailers **set** retail prices.

DEMAND ESTIMATION

Demand Estimation

	Model 1: Logit		Model 2: RCNL		Model 3: RCNL + Search	
	Coeff	SE	Coeff	SE	Coeff	SE
<i>Price:</i>						
Mean (α)	-0.005	0.002	-0.031	0.006	-0.063	0.017
Std dev (σ)			0.027	0.000	0.027	0.012
<i>Firm Dummies:</i>						
Wholesaler 1	-0.037	0.032	-0.129	0.085	-0.316	0.231
Wholesaler 2	0.069	0.040	0.084	0.105	0.502	0.287
Wholesaler 3	-0.031	0.026	-0.165	0.068	-0.234	0.186
Retailer 1	-1.538	0.096	-1.264	0.251	1.576	0.683
Retailer 2	-0.055	0.035	-0.127	0.093	1.584	0.252
Retailer 3	-0.057	0.037	-0.163	0.098	1.276	0.267
Retailer 4	-1.591	0.078	-1.273	0.205	1.487	0.559
Retailer 5	-0.035	0.029	-0.119	0.077	1.900	0.209
Retailer 6	-1.582	0.083	-1.291	0.218	1.416	0.593
Retailer 7	-0.036	0.029	-0.061	0.076	2.191	0.207
Retailer 8	-0.129	0.069	-0.338	0.182	0.704	0.496
<i>Product Dummies:</i>						
2 m ² panel	0.032	0.027	0.149	0.070	0.264	0.192
Senior	-0.059	0.034	-0.086	0.088	-0.434	0.239
Nest Parameter	0.920	0.039	0.788	0.102	0.348	0.279
<i>Search Parameters:</i>						
Constant					0.589	0.131
Previous Market Share					2.294	86.153
Objective function						
N	570		570		570	

COUNTERFACTUALS

Scenarios 1 and 2

1) No **consulting** services:

gross utility of purchasing in VSC equal to that of DSC.

2) No **search** services:

eliminate search advantage of buying through retailer.

Scenarios 3 and 4

3) No **purchase aggregations** services:

two successive price setting games.

4) No **retailers**:

(1) + (2) + (3).

Counterfactuals Results

Variable	Baseline	CF1 (no consult)	CF2 (no search)	CF3 (no QD)	CF4 (cf1+cf2+cf3)
Inside Share	61.6%	58.1%	61.6%	39.0%	38.2%
DSC fraction (of inside)	18.2%	22.7%	18.1%	69.5%	73.2%
Mean price	16.85	16.85	16.85	59.38	59.38
Mean price (weight)	8.76	9.34	8.76	26.20	24.31
Number of Visits	5.12	5.11	5.12	5.09	5.09
Count of Search Costs	5.12	5.11	15.48	5.09	15.15
Δ Cons Surplus (euros/m2)		-3.79	-0.92	-17.32	-19.04

Conclusion

Contribution

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2) Policy:

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Thanks!