Navigating Vertical Chains: Trends and Challenges in Competition Policy

Claire Chambolle (INRAE)

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Introduction

1. Monopsony power and countervailing power theory.
   - There is a recent debate about whether the effects of firms' monopsony power on workers in the labor market should be an area of interest for competition policy.
2. Vertical integration and EDM.
   - The 2020 revision of the US Vertical Merger Guidelines has rekindled interest in a classic economic concept -the elimination of double marginalisation (EDM).
3. Input price discrimination.
   - The FTC currently aims to reinvigorate use of the Robinson-Patman Act within a broader competition policy objective that aims at giving more weight to small businesses as opposed to consumers and efficiency only.
   - Allain, Chambolle and Turolla (2023): theoretical and empirical analysis of input price discrimination.

Monopsony Power and Countervailing Power

There are controversial views about the buyer power of firms toward input markets:

- The **monopsony power** of firms towards workers in the labor market is seen as an important competition policy concern;
- The **countervailing power** of firms towards their suppliers on input markets is rather perceived as good for consumers.

- Let the labor/raw product supply curve be $w = AC(q)$ an increasing function of q.
- Let the product demand function be $P(q)$ a decreasing function of q.
- Let 1 unit of work be transformed in 1 unit of product.

Perfect competition $AC(q) = P(q) \Rightarrow q = q^1$. The firm makes no profit ($p^* = w^*$).

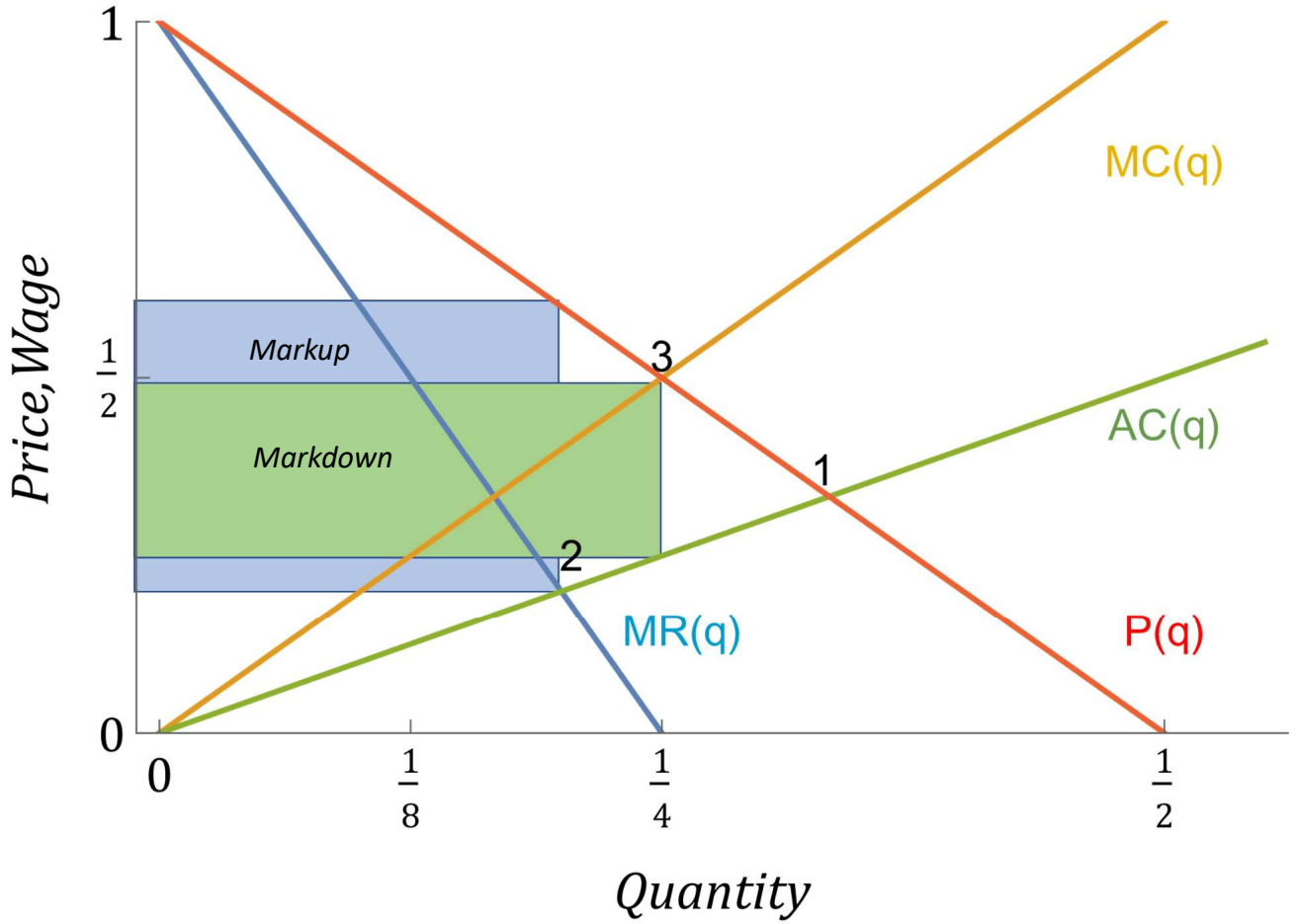
Monopoly power (only) The firm maximizes $P(q)q - wq$

$$\Rightarrow P'(q)q + P(q) - w = 0 \Rightarrow MR(q) = AC(q) \Rightarrow q^2 < q^1$$

Monopsony power (only) The firm maximizes $pq - AC(q)q$

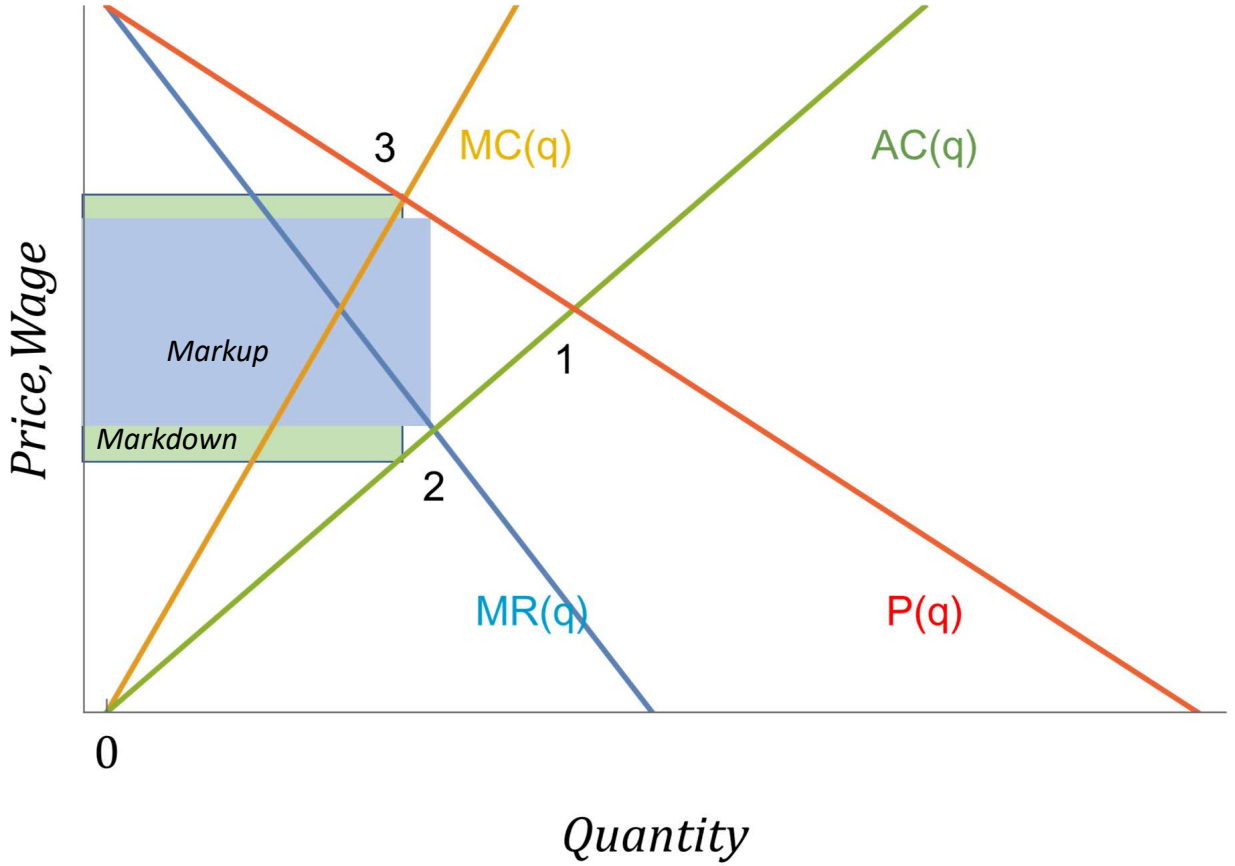
$$\Rightarrow p - MC(q) = 0 \Rightarrow P(q) = MC(q) \Rightarrow q^3 < q^1$$

Monopoly & Monopsony theory



Result

Markup (Markdown) inversely correlated with demand (supply) elasticity!

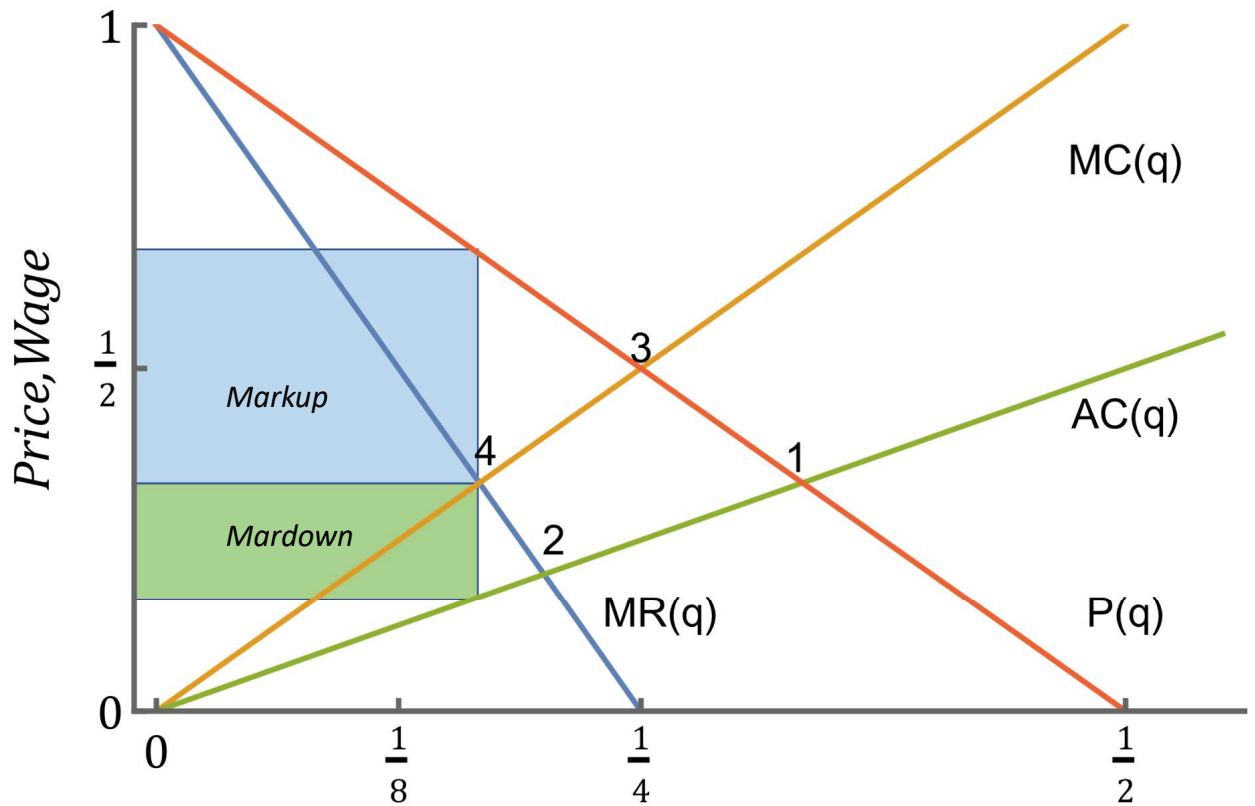


Monopsony power is worse than Monopoly power

$q^3 < q^2$ **when** the **elasticity of demand** to the price is high relative to the **elasticity of input/labor supply**.

Monopsony and Monopoly power: The firm maximizes $p(q)q - AC(q)q$

$$\Rightarrow MR(q) - MC(q) = 0 \Rightarrow q^4 < \min\{q^2, q^3\} < q_1$$



Monopoly and Monopsony Power

- Monopoly and Monopsony powers simply add-up to restrict quantity, lower wages and raise prices.
- This **is not specific to the labor market**. Any highly competitive raw input market (ex: agricultural market) also implies similar effects.
- The effect of horizontal mergers toward consumers and input market should be considered.
- Empirical evidences of markups and markdown on the labor market (Berger et al, 2022, Arnold, 2023,...) and on the French milk market (Avignon and Guigue, 2023), on the tobacco sector in China (Rubens, 2023).
- Any force such as labor unions/organisation of small producers/ cooperative of consumers that would aim at negotiating higher wages/ input prices/ lower prices $\Rightarrow$ moves quantity toward the competitive situation $\Rightarrow$ Prices decrease and wages increase!

Vertical chain and the Countervailing power theory

- Consider a vertical chain of monopolies.
- U transforms 1 unit of raw product (competitive market) into 1 unit of input.
- D transforms 1 unit of input into 1 unit of output.

Vertical integration $U - D$ maximizes $p(q)q - AC(q)q$

$$\Rightarrow MR(q) - MC(q) = 0 \Rightarrow q^4$$

Upstream power (only)

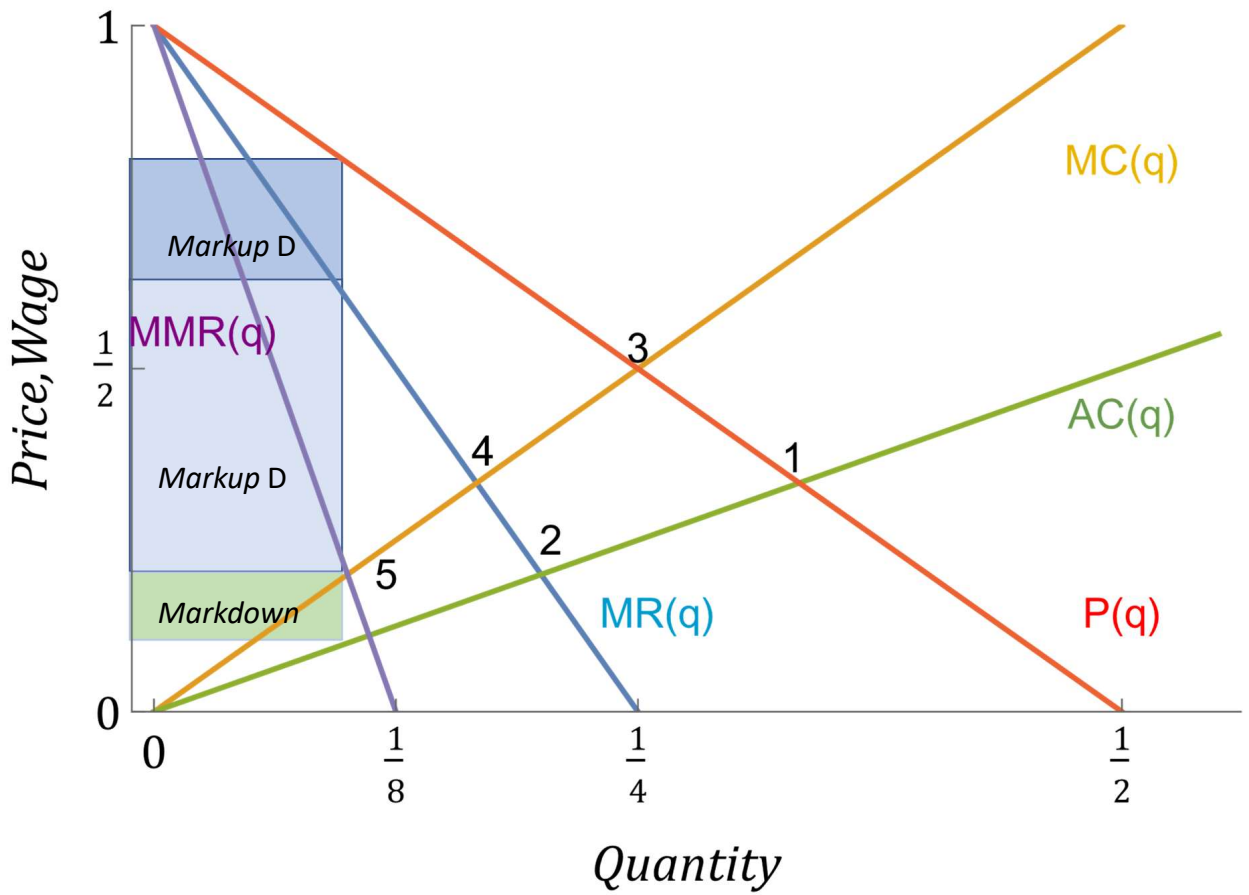
Stage 1: U sets its wholesale unit price w.
Stage 2: D chooses its quantity q.

D chooses q to maximize $P(q)q - wq \Rightarrow MR(q) = w$;
U thus maximizes $wq - AC(q)q$ anticipating $P'(q)q + P(q) = w$

$$\Rightarrow MMR(q) = MC(q) \Rightarrow q^5 < q^4$$

Double markup inefficiency

Vertical chain- Usptream power



Downstream power (only)

Stage 1: D sets its wholesale unit price w.
Stage 2: U chooses its quantity q.

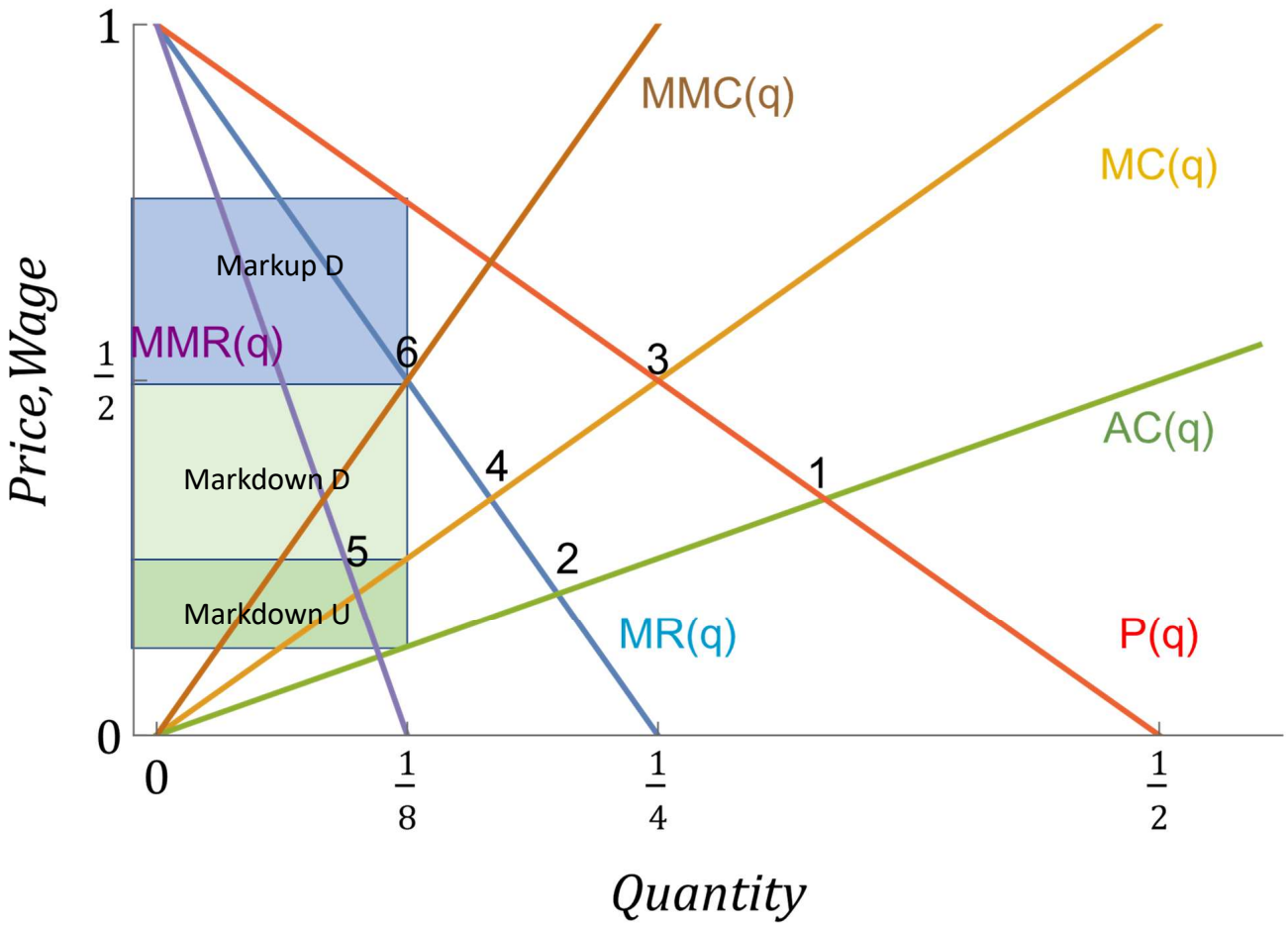
U maximizes $wq - AC(q)q \Rightarrow w = MC(q)$.
D thus maximizes $P(q) - wq$ anticipating that $w = MC(q)$

$$\Rightarrow MR(q) = MMC(q) \Rightarrow q^6 < q^4$$

Double markdown inefficiency

Bargaining: Any situation of bargaining between U and D over a wholesale unit price should lie between q^5 and q^6.

Vertical chain - Downstream power



Countervailing Power

Galbraith (1952)

"*The development of countervailing power requires a certain minimum opportunity and capacity for organization [...]. If the large retail buying organizations had not developed the countervailing power which they have used, by proxy, on behalf of the individual consumer, consumers would have been faced with the need to organize the equivalent of the retailer's power.*"

- Does a big retailer replace a cooperative of consumers? NO!
  - In the monopsony model presented above: Buyer power does not solve DM: $q^6 < q^4$... it may even be worse than seller power q^5. Buyer power may increase the quantity sold $q^6 > q^5$ only when the elasticity of demand is low relative to the elasticity of input supply.
- The countervailing power theory only applies in the following framework:
  - The competitive market has a perfectly elastic supply: the marginal cost is constant. No monopsony power to exploit.
  - The wholesale price set by U and D is a linear tariff.

If the seller has all the power, there is DM: $q^5 < q^4$. If D has all the power, there is EDM: $q^6 = q^4$. **This is a "countervailing power effect".**

Empirical evidence

- Molina (2023) builds a structural model of demand and supply to represent the vertical chain in the bottled water industry. He finds evidence that retailer's buying groups created in France in 2014 have :
  - reinforced the bargaining power of their participants,
  - enabled them to capture a larger share of profit (from 69% to 83%),
  - decrease the margin of producers by 54.1% and the industry profit by 3.4%,
  - set more competitive prices (by 7.1%).
- Decarolis et al. (2019) show that when the same intermediary concentrates demand from multiple advertisers, auctions might become a flawed selling system leading to large revenue losses for the FAANG companies (Facebook, Amazon, Apple, Netflix, and Google).
  - No evidence that these lower ad prices would result in larger profit for advertisers or larger consumer surplus.

Vertical integration

In this model, and **in presence of a linear unit wholesale price** between U and D which creates double-marginalization, vertical integration solves double marginalization: q^4

1. BUT the use of linear tariff contracts between U and D remains a key condition. Is EDM specific to vertical integration? No, firms routinely develop contractual arrangements that yield the same cost benefits as integration: nonlinear prices, quantity minimums (Kwoka and Slade, 2020)

2. Introducing imperfectly competing upstream or downstream firms change matters:
   - With public contracts, there is DM but to a lower extent and partial VI may solve DM for the integrated firm but create DM for others (RRC) (Ordover et al, 1992).
   - Secret contracting over two-part tariffs $\Rightarrow$ Opportunism solves DM but now VI may create DM (Hart and Tirole, 1990, Rey and Vergé, 2023).

Vertical integration

3 Introducing multi-products downstream firms change matters- The Edgeworth-Salinger paradox:

- Reducing DM on one good may raise the price of other goods sold at the same store. Because the retailer makes a larger margin on the "integrated product", it increases prices of other imperfect substitutes goods to shift demand toward the product with the larger margin.
- In some very particular circumstances: it may even increase all prices (not very likely in terms of demand as cross effects should be stronger than direct effects.)

4 Imperfect information changes the deal-

- In presence of asymmetric information (about suppliers' costs, buyer's valuation,...), nonlinear pricing alone fails to eliminate DM absent VI (Calzolari et al, 2020).
- Choné et al. (2023)-A margin (informational rent) must be left to the supplier but the extent of DM is inversely related to the bargaining power of the supplier. In this context, VI solves DM.

Input Price discrimination

- **Input price discrimination** refers to the behavior of a supplier who applies different conditions of sales to different buyers who resell the product (price discrimination on the intermediate market).
  - Buyers are more aggressive if they can obtain personalized unit rebates: *Competition effect*
  - Strong buyers may require lower input prices to gain a competitive advantage towards weaker buyers: *Exclusion effect*
- **U.S.**: Robinson-Patman Act (1936) prohibits price discrimination to equally-situated distributors "where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly".
- **E.U.**: TFEU, article 102: "[An abuse of a dominant position may consist in] applying dissimilar conditions to equivalent transactions with other [...] parties, thereby placing them at a competitive disadvantage. "

- Enforcement of the Robinson-Patman Act was sporadic during the 1970s and eventually ceased after 2000, as the prohibition of input price discrimination faced allegations of leading to price increases.
- In the US, the FTC currently aims to reinvigorate use of the Robinson-Patman Act within a broader competition policy objective that aims at giving more weight to small businesses as opposed to consumers and efficiency only.
  - Since January 2023 The Coca-Cola Company and PepsiCo are under preliminary investigation by the FTC due to potential price discrimination in the United States' soft drink market
  - *[T]o my knowledge, some 86 years after its passage, there is not one empirical analysis showing that Robinson-Patman actually raised consumer prices.* FTC Commissioner Bedoya, Speech, September, 2022.
- Norway recently considered introducing a ban on input price discrimination.

Allain, Chambolle and Turolla (2023)

Allain, Chambolle and Turolla (2023)

- Ordonnance relative à la liberté des prix (1986) prevents any supplier from offering different conditions to similar buyers.
- Loi de Modernisation Economique (2008): suppresses this non-discrimination principle in the retail sector with the goal to lower retail prices. LME

Roadmap

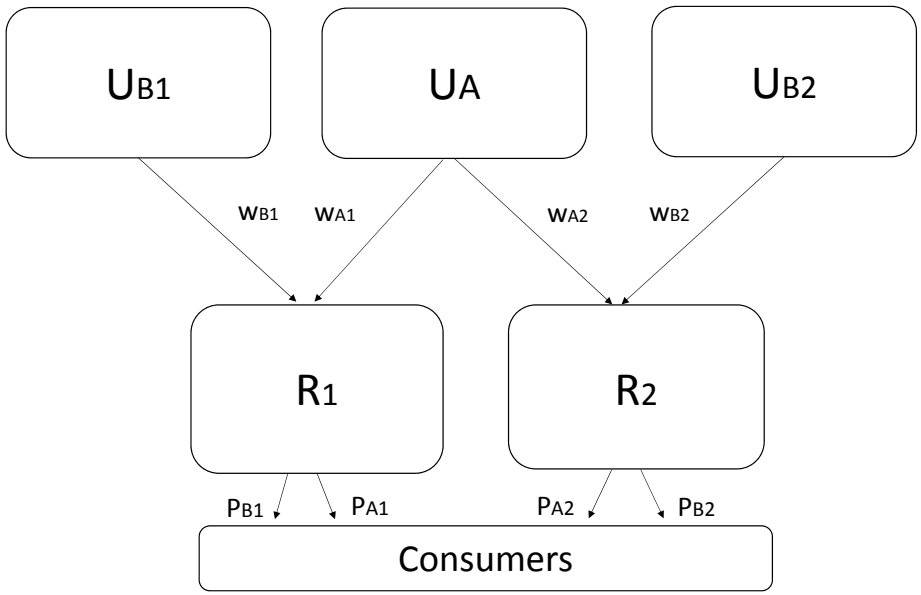
1. We first build an original model of vertical relationships featuring imperfect competition in the upstream and downstream markets, multi-product retailers, and secret contracts.
   - Prediction: Intuition with a simple linear demand model; discussion of robustness; implications for empirical method.

2. We run a DID on household scanner data to test empirically the effect of authorizing input price discrimination on food prices in France.
   - We use consumer panel data on food prices in France.
   - Our model helps us building the comparison group.

The model

Setup

- Two imperfectly competing retailers R_1 and R_2.
- U_A produces good A at cost c and sells it to both retailers (direct effect of the reform - national brand).
- Product B is produced by a dedicated supplier U_{Bi} for each R_i at the same marginal cost c (no direct effect of reform - private label).



The model

Whether discrimination is allowed or banned is common knowledge.

Timing:

- Stage 1: simultaneous secret contract offers
  - National brand producer U_A offers to R_1 and R_2 secret two-part tariff take-it-or-leave-it contracts
    - (w_{A1}, T_{A1}) and (w_{A2}, T_{A2}) when discrimination is allowed.
    - (w_A, T_{Ai}) when discrimination is banned.
  - Private label producers: each U_{Bi} (simultaneously) offers a take-it-or-leave-it contract (w_{Bi}, T_{Bi}) to its R_i.
  - Retailers secretly accept or reject contracts.
- Stage 2: simultaneous price setting
  - Each R_i observes only its own contracts and chooses its final prices (p_{Ai}, p_{Bi}).

Contract equilibrium à la Cremer and Riordan (1987): each manufacturer sends an independent delegate to make an offer to a retailer $\Rightarrow$ passive beliefs.

The model

Intuition: Linear demand specification

Linear demand with substitution a between products and b between retailers:

$$p_{ki} = 1 - q_{ki} - aq_{li} - bq_{kj} - abq_{lj}$$

Simultaneous bargaining over secret, two-part tariffs; Contract equilibrium concept.

- Downstream continuation equilibrium: $\frac{dp^*_{Ai}}{dw_A} = \frac{1}{2-b} > 0, \frac{dp^*_{Bi}}{dw_A} = 0$
- Discrimination is allowed: $w^d_{Ai} = w^d_{Bi} = c; p^d_{Ai} = p^d_{Bi} = p^d$.
- Discrimination is banned: $w^{nd}_A = c + \frac{(1-a)b(1-c)}{2} > c$; $w^{nd}_B = c$; $p^{nd}_{Ai} > p^d$; $p^{nd}_{Bi} = p^d$.

Theoretical prediction in the linear demand case

A ban on input price discrimination leaves p_B unaffected but leads to an increase in p_A.

The model

Intuition: strategy

- Use a Difference in Difference method on consumer panel purchasing data to assess the impact of LME in France in 2008;
- Treatment and control groups:
  - Treatment group: National brands
  - Control group: Private labels
- Next steps:
  - Develop a more general theoretical approach to check robustness of result and validity of control group;
    - Linear demand suppresses many indirect effects
  - Run the DID.

The model

General demand model

Assumption 1 Retailers and products are horizontally differentiated: 4 products overall, demand symmetric across retailers and products.
The demand for good ki is :

$$D(p_{ki}, p_{li}, p_{kj}, p_{lj}).$$

- Products are imperfect substitutes:

$$D_1 < 0, D_2 > 0, D_3 > 0$$

- Cross effects are smaller than direct effects:

$$|D_1| > |D_2|, |D_3| > |D_4|$$

The model

Assumption 2: existence and uniqueness of price equilibrium

- For a given vector of input prices W, there exists a unique equilibrium vector of final prices $p^*(W)$;
- Prices are strategic complements: for any vector P and for $i = 1, 2$,
  - (i) $0 < \pi^i_{21} \leq -\pi^i_{11}$ and $0 < \pi^i_{12} \leq -\pi^i_{22}$.
  - (ii) $0 \leq -\pi^i_{23} < \pi^i_{13}$ and $0 \leq -\pi^i_{14} < \pi^i_{24}$.
  - (iii) $\pi^i_{31} + \pi^i_{11} < 0$, $\pi^i_{24} + \pi^i_{22} < 0$, $\pi^i_{23} + \pi^i_{21} > 0$ and $\pi^i_{14} + \pi^i_{12} > 0$.

Assumption 3 (when needed) a unit increase in the prices of product K at both retailers –e.g. cost shock– affects more the marginal profit of a retailer on this product than his marginal profit on the rival product L: for any vector of positive prices,

$$|\pi^i_{13} + \pi^i_{11}| > |\pi^i_{23} + \pi^i_{21}|$$
$$|\pi^i_{24} + \pi^i_{22}| > |\pi^i_{14} + \pi^i_{12}|$$
$$|\pi^i_{24} + \pi^i_{22}| > |\pi^i_{23} + \pi^i_{21}|$$

The model

Equilibrium pass-through

Proposition 1 Under Assumption 1-3, for any vector of wholesale prices that satisfies symmetry across the retailers (*i.e.* $w_{A1} = w_{A2} = w_A$, $w_{B1} = w_{B2} = w_B$):

- $\frac{dp^*_{Ai}}{dw_A} > 0$,
- the sign of $\frac{dp^*_{Bi}}{dw_A}$ is ambiguous.
- In the linear case $\frac{dp^*_{Ai}}{dw_A} > 0$ and $\frac{dp^*_{Bi}}{dw_A} = 0$.

The model

Equilibrium pass-through

- Effects of a decrease in w_{Ai}: leads R_i to
  - $\searrow$ in p_{Ai} to increase demand on product A;
  - $\searrow$ in p_{Bi} as the result of inter-brand competition (prices are strategic complements);
  - $\nearrow$ in p_{Bi} to shift demand towards product A_i.
  - $\nearrow$ in p_{Ai} (by strategic complementarity of prices).

- Edgeworth (1925) and Salinger (1991) : *The Edgeworth-Salinger effect*
  - We extend their result to a setting with competing multi-product retailers.
- Resulting effect:
  - on p_A: unambiguous decrease (due to demand symmetry, in line with Salinger, 1991).
  - on p_{Bi}: ambiguous.

Equations

The model

Equilibrium contracts under discrimination

- Secret contracts (opportunism): under Assumptions 1-3, unique equilibrium with cost based wholesale prices $w_{A1}^d = w_{A2}^d = c$ and $w_{B1}^d = w_{B2}^d = c$.
  - This opportunism reflects *the competition effect*: each retailer wants to obtain a lower price than its rival and the only contract they are willing to accept is cost based.
  - Remark: symmetry implies no input price discrimination in equilibrium.
- Equilibrium retail prices are:

$$p_{ki}^d = p^d = p^*(c, c, c, c).$$

The model

Equilibrium contracts under a ban on input price discrimination: w_A

No effect on w_B BUT two effects may affect the input price w_A under a ban :

- The commitment on w_A solves the opportunism issue. The absence of *competition effect* tends to push w_A upward.
- Committing on low w_A may enable the manufacturer to reduce the retailer's status-quo profit in its bargaining. Indeed, if R_1 rejects the offer of M_A, it still sells B but competes with R_2 who sells product A and which is more aggressive when benefiting from a low w_A. We denote this effect the *bargaining leverage effect*.

Input prices

Authorizing discrimination has an ambiguous effect on w_A.

Potential effects of authorizing input price discrimination

	$w_A \nearrow$ *Bargaining leverage effect*	$w_A \searrow$ *Competition effect*
$\frac{dp^*_{Bi}}{dw_A} = 0$ (linear case)	–	(i) $p_A \searrow$ $p_B \rightarrow$
$\frac{dp^*_{Bi}}{dw_A} < 0$	–	(ii) $p_A \searrow$ $p_B \searrow$ (iii) $p_A \searrow$ $p_B \nearrow$ *Edgeworth-Salinger effect*
$\frac{dp^*_{Bi}}{dw_A} > 0$	(iv) $p_A \nearrow$ $p_B \nearrow$	(ii) $p_A \searrow$ $p_B \searrow$

- Taking private labels as a control group leads either to the causal effect (i), an underestimation (ii) or an overestimation (iii).
- As $|\frac{dp^*_{Bi}}{dw_A}| < |\frac{dp^*_{Ai}}{dw_A}|$, scenarios (i), (ii) and (iii) should lead to a negative coefficient, and (iv) a positive coefficient.

Empirical approach

We use a difference-in-differences (DID) approach to assess the price effect of authorizing input price discrimination – LME in 2008.

- Data
  - Kantar World Panel 2006-2010 survey;
  - Daily purchases of food products by 10 000 households in France.
  - Information on the quantity and the expenditure for each product purchased, product characteristics (brand, retail chain, store type).

- Treatment and control groups:
  - Affected group: national brand products (if sold by at least 2 retailers).
  - The comparison group: private labels (PL)
    - To improve matching, ensure “common trend hypothesis" and reduce endogeneity issues, we remove all first-price products (FP) and PL sold at discount chains.

Empirical approach

Sample Selection

- **Time period**: 2006 to 2010
  - law enacted August 5, 2008; yearly negotiations in fall.
- **Product Category under the Scope of the LME**: We exclude product categories that are not concerned by the LME (e.g. raw fresh agricultural products traded on spot markets).
- **National Brands and Private Labels** We keep only NB products sold at least by two retail groups and PLs sold by a single retail group; Exclude discounters who sell few NB and first-price products that are remote substitutes for NB.
- **Chain-Product Pair over Time** We impose that each chain-product pair must be present at least once in the pre- and in the post-LME periods. (25% of the chain-product pairs, almost 83% of the observations).
- **Product Category Assignment** Each product category retained in the final sample is composed of NBs and PLs.

Empirical approach

Sample Selection (ctd)

- **We require that the parallel trends assumption holds within product categories**
  - We remove all product categories whose trend is not parallel in the pre-LME period.
  - For each product category:
    - Test whether NB have a specific-time trend compared to PL before LME period: estimate (Weinberg and Hosken, 2013)

$$\ln(P_{ikt}) = \alpha Month_t + \beta Month_t XT_{ik} + \delta T_{ik} + \mu_{ik} + \varepsilon_{ikt} \quad (1)$$

    - P_{ikt} denotes the monthly average price of chain-product pair ik at month t;
    - $Month_t$ indicates the monthly period;
    - T_{ik} dummy treatment (=1 when chain-product pair ik is a national brand);
    - μ_{ik} set of chain-product fixed effects.

Empirical approach

Table 1: Summary Statistics for Affected and Comparison Products

	Affected group	Comparison group	Total
Panel A: Product			
Number of products	17,744	8,912	26,656
Number of product categories	76	76	76
Number of product families	27	27	27
Average number of products per category	233.47	117.26	350.74
Number of chain stores	77	69	86
Panel B: Brand type			
Percentage of national brand products	100	–	66.57
Percentage of private label products	–	100	33.43
Panel C: Price			
Mean of monthly average product price	10.53	8.22	10.02
S.D. of monthly average product price	23.60	11.72	21.49
Min. of monthly average product price	0.01	0.07	0.01
Max. of monthly average product price	3151.15	1878.23	3151.15
Panel D: Purchase transaction			
Number of purchase transactions	6,213,600	3,174,937	9,388,537
Total expenditures	23,101,467	8,583,887	31,685,354
% of KWP expenditures	17.81	20.02	18.36

Empirical approach

- Before ad after regression:

$$\ln(P_{ikt}) = \beta T_{ik} \times PostLME_t + \delta T_{ik} + \gamma PostLME_t + \mu_{ik} + \varepsilon_{ikt} \qquad (2)$$

Table 2: Prices Changes around the LME

Dependent variable: (log) price (P_{ikt})		
Variable	(1)	(2)
PostLME	-0.0126***	
	(0.0019)	
PostLME × PL		0.0024
		(0.0040)
PostLME × NB		-0.0136***
		(0.0020)
Chain-product FE	Yes	Yes
R^2	0.989	0.989
Observations	1,919,906	1,919,906

Notes : The observations are weighted by the expenditure shares of food products, calculated at the national level during the pre-LME period. The standard errors, shown in parentheses, are clustered at the retail chain level.

The price Effect of Authorizing Input Price Discrimination

- We now estimate the following weighted OLS regression:

$$\ln(P_{ikt}) = \beta T_{ik} \times PostLME_t + \delta T_{ik} + \gamma PostLME_t + \mu_{ik} + \varepsilon_{ikt}$$

where

  - P_{ikt} monthly average price of a chain-product pair ik at month t;
  - T_{ik} dummy: chain-product pair ik belongs to the affected group;
  - $PostLME_t$ dummy $= 1$ for months following the introduction of the LME;
  - μ_{ik} set of chain-product fixed effects.

- $\Rightarrow$ The ATE of the LME is captured through the coefficient β: average price effect of the LME.

- The DID allows to get rid of price variations caused by cost shocks (e.g. 2008 crisis of agricultural commodities)

The price Effect of Authorizing Input Price Discrimination

Empirical Results

Average price effect

Table 3: Authorizing Input Price Discrimination and Changes in Prices

Dependent variable	(log) price (P_{ikt})			(log) $\lvert \widehat{P}_{ik}^{post} - \widehat{P}_{ik}^{pre} \rvert$
		With monthly trend by		
	Baseline	Chain	Category	
	(1)	(2)	(3)	(4)
Treatment				0.3534***
				(0.0357)
Treatment × PostLME	-0.0160***	-0.0162***	-0.0262***	
	(0.0045)	(0.0047)	(0.0052)	
PostLME	0.0024			
	(0.0040)			
Chain-product FE	Yes	Yes	Yes	No
Chain-month FE	No	Yes	No	No
Category-month FE	No	No	Yes	No
Category FE	No	No	No	Yes
R^2	0.9886	0.9890	0.9893	0.4002
Observations	1,919,906	1,919,559	1,919,872	100,862

Notes: The observations are weighted by the expenditure shares of food products, calculated at the national level during the pre-LME period. The point estimate of the *Treatment* variable is absorbed by the chain-product fixed effects in Columns (1)-(3) and thus not available.

The price Effect of Authorizing Input Price Discrimination

Average price effect

- As predicted by the model, authorizing input price discrimination has reduced the *relative* prices of NB compared to PL.
- Causal effect (column 3): the LME has led to a *relative* price decrease of affected products of about -2.62%.
  - Chain-month fixed effects do not alter the point estimate
  - Category-month fixed effects reinforce the effect (2007/08 food products crisis –costs shocks– and recession)
- Approximate effect on average monthly price of shopping basket: -4.6 euros per household (households shopping basket on NB: 175 euros / month)

Discussion

Average price effect - discussion

DID eliminates scenario (iv)

- (iv) $\frac{dp^*_{Bi}}{dw_A} > 0$ and $w_A \nearrow$: $p_A \nearrow$ and $p_B \nearrow$ less than p_A;
  - Column (4) validates that price variations for PL are lower than that of NB, this scenario predicts a positive coefficient $\Rightarrow$ Scenario eliminated by DiD as coefficient is negative. The **competition effect** dominates the *bargaining leverage effect*.

DID estimates consistent with scenarios (i), (ii) and (iii).

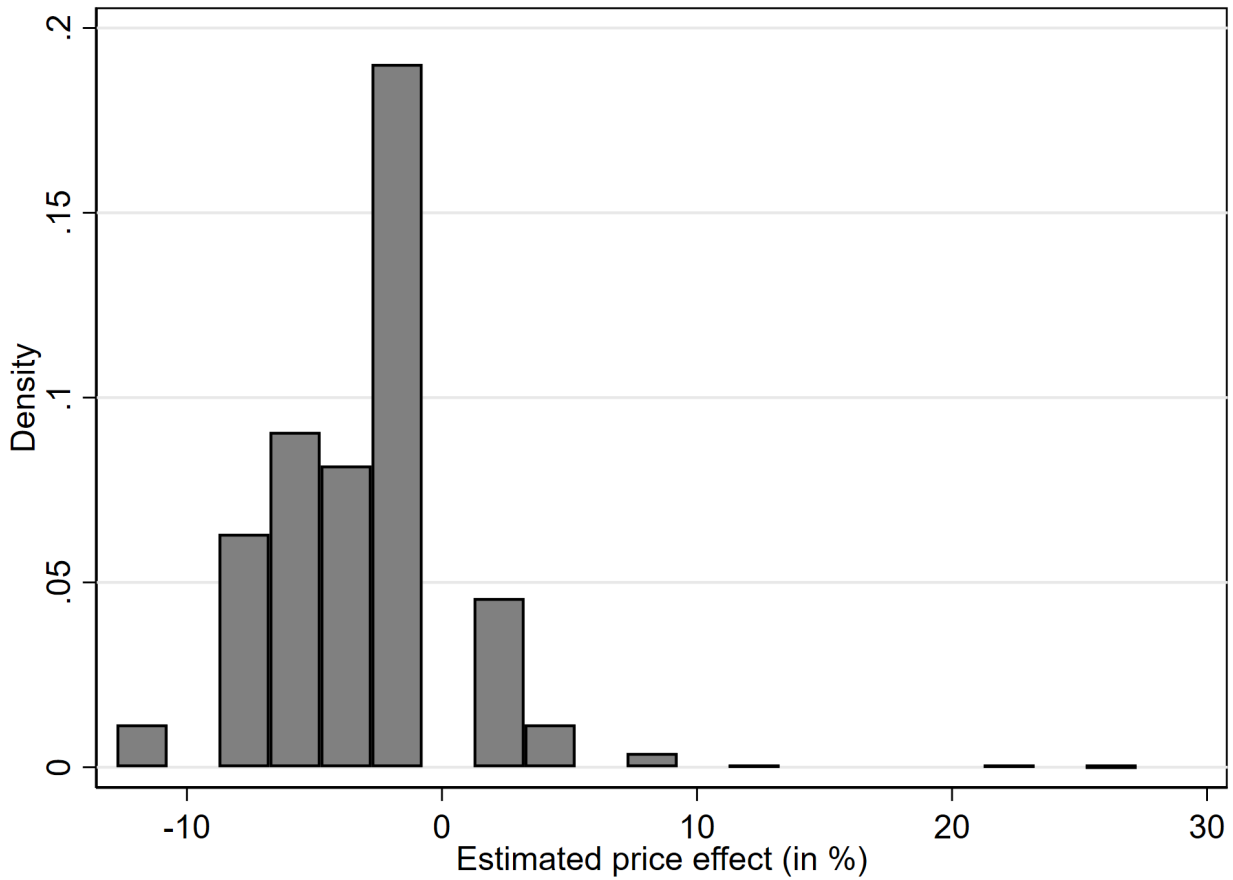
- (i) $\frac{dp^*_{Bi}}{dw_A} = 0$ (*e.g.* linear demand): $w_A \searrow$, $p_A \searrow$ and p_B unchanged
  - Table 1, column 2 (B&A) suggests that we may be in this scenario: PL products are good candidate for control group.
- (ii) $\frac{dp^*_{Bi}}{dw_A} > 0$ and $w_A \searrow$: $p_A \searrow$ and $p_B \searrow$ less than p_A;
  - DID should yield a negative coefficient (effect underestimated).
- (iii) $\frac{dp^*_{Bi}}{dw_A} < 0$: then $w_A \searrow$, $p_A \searrow$ and $p_B \nearrow$
  - DID should yield a negative coefficient (effect overestimated).

Discussion

Average price effect - discussion

- Definition of the comparison group:
  - ATE: the price variation of NB has been more negative than that of PL: estimate gives the direction of the effect.
  - But could all prices have increased after the merger, with a stronger increase for PL than for NB? (scenario not predicted by theory, consistent with negative estimated β...)
    - We compare the absolute values of the price variations. It is lower for PL than for NB $\Rightarrow$ the average price of MN must have decreased.
  - Hence we show that:
    - The reform has caused a decrease in the price of NB.
    - PL prices have varied less than the NB prices.
    - The *competition effect* highlighted in theory seems to prevail.
  - Revisit on the use of PL or rivals products as a control group
    - standard in the retrospective merger literature (*e.g.* Ashenfelter and Hosken 2010, AHWeinberg 2013, Bjornerstaedt and Verboven 2016)
    - our back-and-forth between theory and empirics challenges this method.

Relative price effect (NB/PL) by product category



- 72% of product categories experienced a decrease:
  - From -12.76% to $+26.27\%$.
  - The bulk of products experimented a price drop by 0 to 10%

Relative price effect (NB/PL) by initial price gap NB/PL

Table 4: Price Gap between MN vs PL

Dependent variable: (log) price (P_{ijt})		
	(1)	(2)
Treatment × PostLME	-0.0262***	
	(0.0052)	
Treatment × PostLME × Price Positioning 0-20		-0.0113*
		(0.0064)
Treatment × PostLME × Price Positioning 20-80		-0.0261***
		(0.0055)
Treatment × PostLME × Price Positioning 80-100		-0.0310***
		(0.0045)
Chain-product FE	Yes	Yes
Category-month FE	Yes	Yes
R^2	0.989	0.989
Observations	1,919,872	1,919,872

Notes: The observations are weighted by the expenditure shares of food products, calculated at the national level during the pre-LME period. The point estimate of the *Treatment* variable is absorbed by the chain-product fixed effects in Columns (1)-(2) and thus not available. The standard errors, shown in parentheses, are clustered at the chain level.

Relative price effect (NB/PL) by initial price gap NB/PL

Relative price effect across retail groups

Dependent variable: (log) price (P_{kit})		
	(1)	(2)
Treatment × PostLME	-0.0250***	
	(0.0055)	
Treatment × PostLME × R1	0.0021	-0.0228***
	(0.0017)	(0.0053)
Treatment × PostLME × R2		-0.0250***
		(0.0053)
Treatment × PostLME × R3		-0.0187***
		(0.0053)
Treatment × PostLME × R4		-0.0210***
		(0.0054)
Treatment × PostLME × R5		-0.0256***
		(0.0054)
Treatment × PostLME × R6		-0.0305***
		(0.0053)
Treatment × PostLME × R7	-0.0076***	-0.0327***
	(0.0018)	(0.0054)
Treatment × PostLME × Other R8		-0.0395***
		(0.0065)
Chain-product FE	Yes	Yes
Category-month FE	Yes	Yes
R^2	0.989	0.989
Observations	1,919,872	1,919,872

Notes: The observations are weighted by the expenditure shares of food products calculated at the national

Conclusions

Conclusions

- We build an original model of multi-product retail competition (private labels, national brands) in a secret contracting environment.
  - Authorizing input price discrimination leads to a potentially ambiguous impact on all final prices.
- We provide the first ex-post empirical analysis of a *the authorization of input price discrimination* on final prices.
  - We empirically investigate the effect of input price discrimination on a broad range of products (large-scale study).
  - We highlight a significant and negative effect of its lifting on prices by 2.62% on average.

Thank you !

Robustness tests & Extensions

- Alternative definitions of the comparison group: results are robust
  - Private labels offered by discounters only;
  - All private labels (conventional+discounters+ first price products).

- Potential confounders:
  - The "2007-2008 global food crisis":
    - affects similarly PL and NB in selected product categories (parallel trend assumption).
    - run an alternative estimation removing months from September 2007 to September 2008. The estimated effect is significant at 1% and about -2.53%.
  - The Great Recession, in 2008.
    - No significant effect of the Great Recession on both NB and PL market shares.
    - Our results are robust to alternative definition of the transitory period

The context: the regulation on negotiations between producers and retailers in France

- Since 1986: price discrimination by a supplier among similar buyers forbidden in France
  - public general terms of sales: unit prices must be identical for “similar" buyers, not the (unobserved) fixed fees
- Galland Act (1996): ban of loss-leading
  - Uniform unit price turns to price-floor.
  - French prices increased significantly (by 5 pp compared to EU between 01/96 and 01/2000)
- Dutreil II Act (2005) : ban on loss-leading lifted.
- Loi de Modernisation de l’Economie (LME, 2008) lifts the ban on input price discrimination (unit prices).

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Equilibrium pass-through

- **Price competition stage**
  - R_i sets p_{Ai}, p_{Bi} to max. profit given p_{Aj}, p_{Bj}:

$$\pi^i(p_{Ai}, p_{Bi}, p_{Aj}, p_{Bj}) \equiv \sum_{k=A,B} (p_{ki} - w_{ki}) D(p_{ki}, p_{li}, p_{kj}, p_{lj})$$

  - FOCs:

$$\begin{aligned} \pi_1^i &= D(p_{Ai}, p_{Bi}, p_{Aj}, p_{Bj}) + (p_{Ai} - w_{Ai}) D_1 + (p_{Bi} - w_{Bi}) D_2 &= 0 \\ \pi_2^i &= D(p_{Bi}, p_{Ai}, p_{Aj}, p_{Bj}) + (p_{Ai} - w_{Ai}) D_2 + (p_{Bi} - w_{Bi}) D_1 &= 0 \end{aligned} \tag{3}$$

- Yields equilibrium prices $p_{Ki}^*(w_{Ki}, w_{Kj}, w_{Li}, w_{Lj})$.

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