

The Overcharge as a Measure for Antitrust Damages

Martijn A. Han
(joint with Maarten Pieter Schinkel and Jan Tuinstra)

Amsterdam Center for Law and Economics (ACLE),
University of Amsterdam (UvA)

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- Motivation: EC white paper on damages
- The model: a vertical production chain
- Results: measuring cartel harm using the overcharge
- Policy implications & concluding remarks

Introduction

What is the overcharge?

$$\begin{aligned}\text{Overcharge} &= \text{price increase cartel} \times \text{amount purchased} \\ &= Q^a (P^a - P^*)\end{aligned}$$

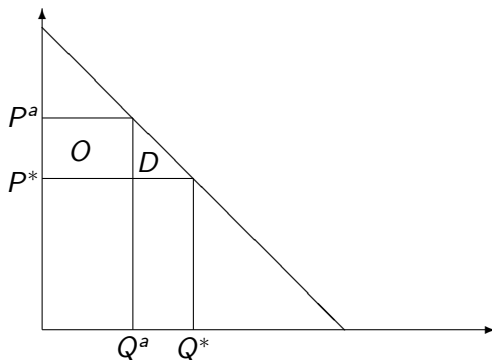


Figure: The overcharge

- Current US practice
 - *Clayton Act* (1914)
 - *American Crystal Sugar* (1952)
 - *Hanover Shoe* (1968) / *Illinois Brick* (1977)
- EC White Paper
 - No punitive damages
 - Full legal standing

The overcharge ignores:

- ① Losses in CS and profits (reduction in output)
- ② Harm incurred by *indirect* purchasers (pass-on)
- ③ Harm incurred by *suppliers* (reduced derived demand)

- Hellwig (2006):
 - Decomposition of antitrust effects in *two-layer model*
 - Focus on showing ‘business loss effect’ \geq ‘pass on effect’
- Verboven and Van Dijk (2007):
 - *Marginal* anticompetitive price increase in *two-layer model*
 - Focus on deriving a ‘pass-on’–discount on the overcharge
- Boone and Müller (2008):
 - *Marginal* anticompetitive price increase in *two-layer model*
 - Focus on distribution of harm between direct purchasers and consumers
- Basso and Ross (2008):
 - *Discrete* anticompetitive price increase in *two-layer model*
 - Focus on deriving overcharge correctors for true harm

Introduction

Our approach

Evaluate the *overcharge* as an estimate for total harm:

- *Explicitly* model full vertical production chain
- *Variable* number of (imperfectly competitive) layers
- *Variable* location of cartel
- Take *all* harm (downstream and upstream) into account

Introduction

Main results

- 1 Downstream harm, as a fraction of the overcharge $\in [1, \infty)$
- 2 Upstream harm, as a fraction of the overcharge is $\in [0, \infty)$

\implies Suitability of the overcharge critically depends on

- market structure, and
- concept of damages.

A Vertical Model of Production

Set-up

- K layers of production, with n_k firms in layer k
- Homogenous product markets
- Cost function firm j in layer k : $C_{jk}(q_{jk}) = p_{k-1}q_{jk} + c_{jk}(q_{jk})$
- Final consumer demand for layer K is $P(Q)$

A Vertical Model of Production

Set-up

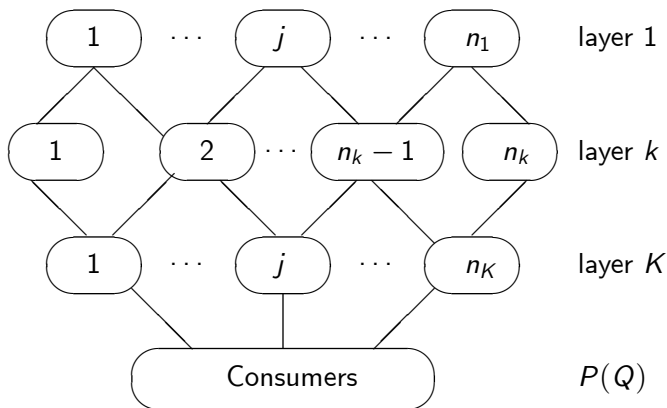
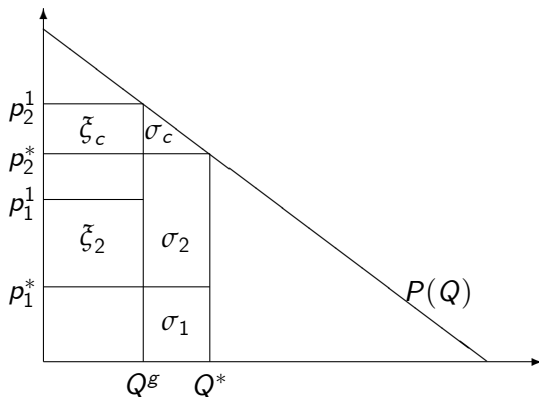


Figure: A vertical chain of production

A Vertical Model of Production

Decomposition of antitrust harm



	Cartel	Intermediaries	Consumers
Overcharge effect		ξ_2 (-)	ξ_c (-)
Pass-on effect	ξ_1 (-)	ξ_c (+)	
Output effect	σ_1 (-)	σ_2 (-)	σ_c (-)

A Vertical Model of Production

Measures of harm

A. *Direct purchasers harm* multiplier:

$$\lambda_{g+1} = \frac{\Delta \pi_{g+1}}{\xi_{g+1}}.$$

B. *Final consumer harm* multiplier:

$$\lambda_c = \frac{\Delta CS}{\xi_{g+1}}.$$

C. *Downstream harm* multiplier:

$$\lambda_D = \frac{\sum_{k=g+1}^K \Delta \pi_k + \Delta CS}{\xi_{g+1}}.$$

A Vertical Model of Production

Measures of harm

D. *Upstream harm* multiplier:

$$\lambda_U = \frac{\sum_{k=1}^{g-1} \Delta \pi_k}{\xi_{g+1}}.$$

E. *Total (net) harm* multiplier:

$$\lambda_T = \frac{\sum_{k=1}^K \Delta \pi_k + \Delta CS}{\xi_{g+1}}.$$

A Vertical Model of Production

Model specifications

- Inverse demand

$$P(Q) = a - bQ^\gamma, \gamma > 0$$

- Constant marginal costs (fixed-proportions production technology)

$$C_{jk}(q_{jk}) = (p_{k-1} + c_k) q_{jk}$$

- Cournot competition with *conduct* parameter $\vartheta_k = \frac{\partial Q}{\partial q_{jk}}$:

① Quantity competition: $\vartheta_k = 1$

② Price competition: $\vartheta_k = 0$

③ (Full) Collusion: $\vartheta_k = n_k$

- Firms are price takers on input markets – no buyer power

A Vertical Model of Production

Solving the model

Solving the model by backward induction gives

Q^* = 'competitive' equilibrium quantity,

p_k^* = 'competitive' equilibrium price of layer k ,

Q^g = equilibrium quantity, when layer g is cartelized,

p_k^g = equilibrium price of layer k , when layer g is cartelized,

where

$$Q^* > Q^g,$$

$$p_k^* \leq p_k^g \quad \forall k.$$

Results

C. Downstream harm multiplier

$$\lambda_D = \frac{\sum_{k=g+1}^K \Delta \pi_k + \Delta CS}{\xi_{g+1}} = \beta(Q^*, Q^g, \gamma) \left(1 - \frac{1}{\gamma + 1} \prod_{i=g+1}^K \frac{n_i}{n_i + \gamma \vartheta_i} \right)$$

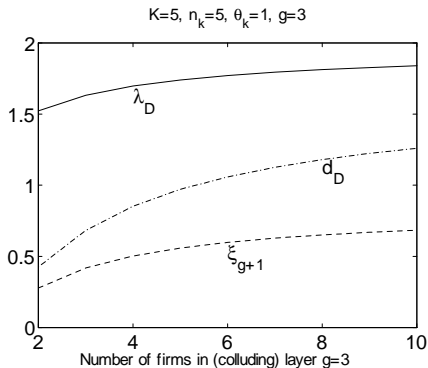
Lemma

Downstream harm, as a fraction of the overcharge, is bounded from below by one and unbounded from above.

- *Downstream harm* multiplier increases with:
 - 1 pre-cartel competition in cartelized layer n_g (or: ϑ_g);
 - 2 market power of intermediate downstream layers n_k (or: ϑ_k), $k > g$;
 - 3 number of downstream layers $K - g$;
 - 4 convexity of demand γ .
- Curiosity: *treble damages*, $\lambda_D < 3$

Results

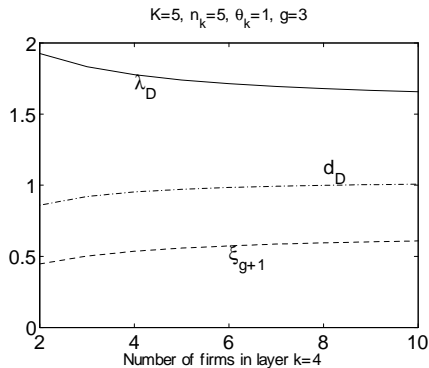
C. Downstream harm multiplier



Downstream multiplier increases
with pre-cartel competition

Results

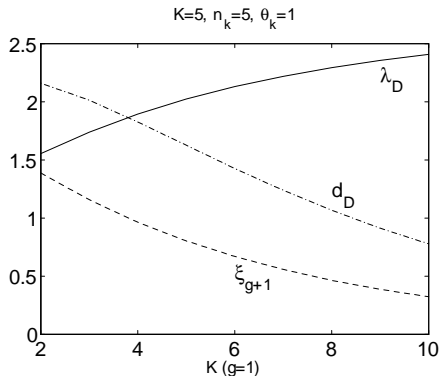
C. Downstream harm multiplier



Downstream multiplier increases
with downstream market power

Results

C. Downstream harm multiplier



Downstream multiplier increases
with number of downstream layers

Results

C. Downstream harm multiplier

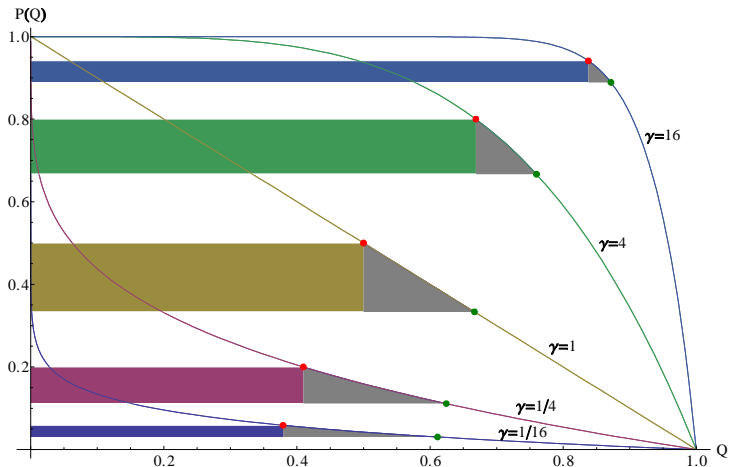


Figure: Downstream multiplier increases with demand convexity

Results

C. Downstream harm multiplier

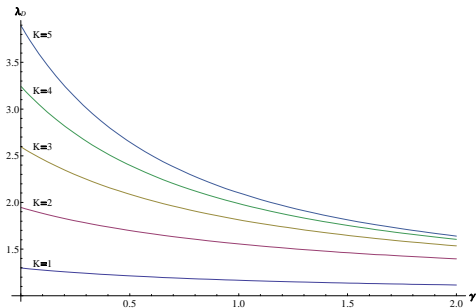


Figure: Downstream multiplier increases *without bound*, with demand convexity and number of downstream layers

Lemma

If $\gamma \rightarrow 0$, λ_D is bounded from above by $(1 + K - g)(e - 1)$, with e the natural number.

Results

D. Upstream harm multiplier

$$\begin{aligned}\lambda_U &= \frac{\sum_{k=1}^{g-1} \Delta \pi_k}{\zeta_{g+1}} \\ &= \beta(Q^*, Q^g, \gamma) \frac{n_g + \gamma \vartheta_g}{n_g} \left(\prod_{i=1}^{g-1} \frac{n_i + \gamma \vartheta_i}{n_i} - 1 \right)\end{aligned}$$

Lemma

Upstream harm, as a fraction of the overcharge, is bounded from below by zero and unbounded from above.

- *Upstream harm multiplier increases with:*
 - 1 pre-cartel competition in cartellized layer n_g (or: ϑ_g);
 - 2 market power of upstream layers n_k (or: ϑ_k), $k < g$; and
 - 3 number of upstream layers $g - 1$.

Results

A. Direct purchasers harm multiplier & B. Final consumer harm multiplier

$$\lambda_{g+1} = \frac{\Delta \pi_{g+1}}{\zeta_{g+1}}$$

- In the linear case, $\lambda_{g+1} > 1$ iff. direct purchaser is a monopolist

$$\lambda_c = \frac{\Delta CS}{\zeta_{g+1}}$$

- $\lambda_c > 1$ if all intermediate downstream layers are perfectly competitive

Results

What is the effect of the location of the colluding layer on total net harm?

Lemma

- *Location of colluding layer has no effect on total (net) harm*
- *Overcharge decreases with lower location of colluding layer*

\implies *Total (net) harm multiplier increases with lower location of colluding layer*

- Cartel harm, as a fraction of the overcharge, is unbounded
- Upstream (supplier) harm may be substantial

⇒ Suitability overcharge critically depends on:

- market structure, and
- concept of damages.

- The Commission calls for
 - full compensation ("actual damages, lost profits, and interest"); and
 - "simplified rules on estimating the loss"
- Supplier harm
 - *Wilson v. Ringsby Truck Lines (1970)*
 - *Christie's and Sotheby's price-fixing case (2001)*