

Fines, Leniency and Rewards in Antitrust an Experiment

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The Leniency “revolution”

- Leniency programs introduced in most advanced countries
 - Reduced fines if self report
 - “Normal way” to detect cartels changed, from buyer complaints, audits, and dawn raids, to Leniency Policies (LPs) ⇒ almost no resources left for inspections
- Consequence: increase in
 - number of convicted cartels
 - size of imposed fines
- Are these elements a good indicator of the effectiveness of Antitrust policy?

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What is a success in law enforcement?

- Main objective of law enforcement: crime **deterrence**
 - *ex ante* deterrence, i.e. **preventing** cartels
 - *general* (no detection needed) \Rightarrow no prosecution costs
 - *ex post* deterrence, or **desistance**
 - *specific* (only if detection) \Rightarrow high prosecution costs
- **Problem:** *ex ante* deterrence not observable (victims not aware)
 - Empirical research difficult
 - Experimental research particularly important

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What we did

- Implemented a **repeated duopoly game in the lab**, framing it in different law enforcement environments:
 - 'traditional' antitrust law enforcement policies
 - leniency programs
 - rewards to whistleblowers
- Looked at the **effects** these alternative policies have on:
 - Cartel deterrence/formation, cartel prices and duration
 - Self reporting behavior
 - Post detection behavior
 - Tacit collusion

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Main Results

- ① **Current antitrust policies** (with and without LPs)
 - deterrence effect BUT
 - increase surviving cartels' stability + overall prices
- ② **Leniency programs**
 - strongly increase cartel detection BUT
 - do not reduce prices
- ③ **Rewards for whistleblowers**
 - strong deterrence effects AND reduction in prices

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Outline

- 1 Theoretical and Empirical Background
- 2 Experimental Design and Related Studies
- 3 Theoretical Predictions
- 4 Results
- 5 Summary

Theoretical background I

Theory and policy:

- Motta and Polo (2003) and Motta (2004): Leniency have **limited ex ante deterrence** effects. But they assume away the possibility of deviating from the cartel agreement and simultaneously report.
- Rey (2003), Spagnolo (2004), Aubert, Rey, and Kovacic (2006) and Harrington (2008) show that if that **crucial assumption is removed**, leniency can have general deterrence effects.
- Spagnolo (2004) also shows that **rewards** could in principle deliver the first best.

Theoretical background II

Empirical evidence:

- Brenner (2009) and Miller (2009) **empirically test for the deterrence effects** of leniency programs.
- Whinston (2006) stresses that the final goal of competition policy is not a reduction in the number of cartels, but **low prices**.
- Sproul (1993) finds that prices rise during the years following an indictment.

Outline

- 1 Theoretical and Empirical Background
- 2 Experimental Design and Related Studies
 - treatments
 - stage game
 - payoffs
 - related studies
- 3 Theoretical Predictions
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Experimental design

- **Differentiated Bertrand duopoly**
- Possibility to **form a cartel** by discussing the lowest acceptable price before setting the price
- Possibility to **report** the cartel **before (secretly)** and **after** the chosen prices become public information
 - consequences of reporting: treatment variable
- **in(de)initely repeated game:**
 - **15% of probability of being re-matched** at each period
 - at least 20 periods, then **15% probability of termination.**

Treatments

Treatment	fine (F)	probability of detection	report	report's effects
L-Faire	0	0		
Fine	200	0.10		
Leniency	200	0.10		
Reward	200	0.10		

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Stage Game

- 1 Communication decision (Yes/No): *simultaneous*
- 2 Communication: *exchange price signals for 30 secs.*
- 3 Pricing (0-12): *simultaneous*
- 4 First possibility of reporting (Yes/No): *before knowing competitor's price*
- 5 Information about prices and 2nd possibility of reporting (Yes/No)
- 6 Detection
- 7 Summary

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treatment L-Faire: steps 4, 5, 6 missing.

Payoff table and myopic best replies

		your competitor's price												
		0	1	2	3	4	5	6	7	8	9	10	11	12
your price	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	29	38	47	56	64	68	68	68	68	68	68	68	68
	2	36	53	71	89	107	124	128	128	128	128	128	128	128
	3	20	47	73	100	127	153	180	180	180	180	180	180	180
	4	0	18	53	89	124	160	196	224	224	224	224	224	224
	5	0	0	11	56	100	144	189	233	260	260	260	260	260
	6	0	0	0	0	53	107	160	213	267	288	288	288	288
	7	0	0	0	0	0	47	109	171	233	296	308	308	308
	8	0	0	0	0	0	0	36	107	178	249	320	320	320
	9	0	0	0	0	0	0	0	20	100	180	260	324	324
	10	0	0	0	0	0	0	0	0	0	89	178	267	320
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Bertrand

Joint profit maximizing

Related Studies

Apesteguia-Dufwenberg-Selten (ET 2007)

- one-shot Bertrand game with homogeneous product. Fine 10% of revenues → standard antitrust is only a useful threat

Hinloopen and Soetevent (RAND 2008)

- repeated version of Apesteguia et al.'s game, no Bonus/Rewards.

Three main differences in our experiment

- **differentiated good** and **fixed fine** → reporting w.o. leniency is costly
- effects of **rewards** in the **repeated game**
- **stochastic rematching** → ex-ante vs ex-post deterrence
- **"secret" reporting** allowed

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 - secret vs. public reporting
 - reporting, deterrence and prices
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Secret vs. Public reporting

The IC constraint depends on when reporting can take place

- IC constraint with **public** reporting **only**:

$$\text{collusive profits} \geq \text{deviation profit} + \text{price war profits}$$

- IC constraint with **secret** reporting:

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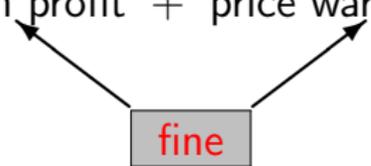
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Secret reporting: protection from fines

Public reporting: punishment/threat

Theoretical Predictions

Reports:

- First (**secret**) reports: simultaneous to deviations in *Leniency* and *Reward*
- Second (public) reports: never used

L-faire Fine Leniency Reward

IC-constraint:

stability:

prices:

detection:

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	L-faire	Fine	Leniency	Reward
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detection:			┆ - - -	-more frequent- - - ➤

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 - experimental procedure
 - deterrence
 - prices
 - enforcement effect
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Experimental Procedure

Computerized Experiment, programmed and conducted with Z-tree.

- run at the Stockholm School of Economics and at the University of Tor Vergata (Rome)
- **326** undergraduate students from the Faculties of Economics and Engineering.
- sessions lasting on average **2 hours**, including instructions and payment.
- average payment: about **24 Euro**

Before starting the real game, subjects were allowed to play **5 practice rounds**.

Reports, Deterrence and Detection

- **Reports:**

- ① subjects understood incentives linked to rewards
- ② but public reports used in *Fine*

- **Deterrence:** *Fine* and *Leniency* increase deterrence; *Reward* seems to reduce deterrence r.t. *Leniency*.

- **Detection:** significant increase in *Leniency* and *Reward*

	Fine	Leniency	Reward
Rate of First Reports <i>given own price deviation</i>	0.002	0.704	0.905

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	Fine	Leniency	Reward
Rate of First Reports <i>given own price deviation</i>	0.002	0.704	0.905
Rate of Second Reports <i>given only rival deviated</i>	0.286	0.481	0.333

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Rate of:	L-Faire		Fine		Leniency		Reward
Comm. att.	0.835	>***	0.566	>***	0.377	<***	0.484
Cartel form.	0.716	>***	0.315	>***	0.178	≈	0.220
Reporting	–	–	0.092	<***	0.507	<***	0.937
Succ. cartel form.	0.226	>***	0.112	>*	0.053	>***	0.017

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Prices and Deviations

- **Average prices:** highest in *Fine*. Only in *Reward* prices are lower than in *L-faire*.
- **Cartel prices:** *Fine* and *Leniency* increase cartel prices.
- **Price deviations:**
 - ① *Fine* and *Leniency* reduce the frequency of price deviations
 - ② *Reward* increase it

	L-Faire		Fine		Leniency		Reward
Average price	4.917	<*	5.349	>***	4.845	>*	3.973
Cartel price	4.971	<***	6.144	<***	7.024	>***	5.339
Rate of price dev.	0.564	>***	0.424	≈	0.373	<***	0.782

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Enforcement effect

High prices in *Fine* and *Leniency*. Three explanations:

- 1 **selection** → defectors deterred
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- almost 30 % of price deviations triggered reporting
- Additional treatment: *Fine* with no reporting:
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In *Leniency*: threat of price wars (profits: 118.8 vs. 159.5)

- Strong post conviction desistance [▶ plot](#)

Wrap-up

Bertrand price game with

- differentiated goods
- uncertain end and stochastic rematching
- “illegal” communication + alternative antitrust schemes

We find that:

- **antitrust w.o. leniency** → deterrence + high cartel prices. Reporting used as a punishment device.
- **leniency** → higher deterrence but surviving cartels more stable, and higher cartel prices.
- **leniency with rewards** → cartels systematically reported and low prices.
- **enforcement** effect → most plausible cause of high prices in *Fine* and *Leniency*

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Bertrand price game with

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- uncertain end and stochastic rematching
- “illegal” communication + alternative antitrust schemes

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Thank You

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Recidivism

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% of cartels re-established after conviction

