Trust and Deterrence:
Evidence from an Antitrust Experiment

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How does deterrence work for team crimes?

Focus: organized *economic* crime

Premise: organized economic crime must be an equilibrium outcome of a dynamic game between wrongdoers

   must rely on self-enforcing contracts

   => additional deterrence channels:

    1.   Incentive compatibility of the criminal agreement
    2.   Trust among the members of the criminal organization

   There are witnesses: criminal partners have information on each others' crimes, which may be elicited by suitably designed revelation mechanisms

Questions:

Through which channels does deterrence work?

Different channels under different enforcement policies?

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What we did

Ran a set of experiments on explicit collusion in oligopoly

> Results also relevant for strategically similar forms of corporate crime such as corruption, financial fraud, etc.

Simulated a repeated oligopoly in the lab embedded in different law enforcement environments

- Absence of enforcement: collusion is allowed
- "Traditional" law enforcement policies, fines
- Leniency programs

Focus on how deterrence varies under these alternative policies depending on changes of

- size of fines
- probability of detection

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What we find

Main results:

- Leniency programs significantly increase deterrence, and
- alters the main deterrence mechanism

Absent leniency
- Deterrence increases with the expected fine => PC matters most
- The actual fine may work as a credible threat => enforcement effect at work

With leniency deterrence increases more with the actual fine

=> the trust problem appears more important

Implications

1. Well run leniency programs improve welfare
2. Leniency should be complemented with high sanctions rather than with a high probability of detection

=> Improves the efficiency of law enforcement

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Experimental design: **Overview**

Bertrand duopoly with differentiated goods

Possibility to form a cartel by discussing lowest acceptable price
before choosing price

Subjects could both
- deviate and report simultaneously
- report after prices were revealed

In(de)finitely repeated game
15% prob of being re-matched in every period
After 20 periods, experiment ends with 15% prob

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Experimental design: **Treatments**

Two treatment variables:

1. Antitrust policy
2. Mix of fine (F) and prob of det (α)

Antitrust policy	fine (F)	prob of det (α)	report	report's effects
L-Faire	0	0	No	–
Fine	1000 1000 200	0 0.02 0.10	Yes	Pay the full fine
Leniency	1000 1000 200	0 0.02 0.10	Yes	No fine (1/2 fine if both report)

Experimental design: **Stage Game**

1. Communication decision (Yes/No): simultaneous
2. Communication: exchange price signals for 30 sec
3. Pricing: simultaneous
4. First possibility of reporting (Yes/No): before knowing competitor's price
5. Info about prices and 2° possibility to report (Yes/No)
6. Detection
7. Summary

1. communication decision	→	2. communi- cation	→	3. pricing	→	4. reporting 1	→	5. prices & reporting 2	→	6. detection	→	7. summary

In benchmark treatment (L-Faire), steps 4, 5, 6 missing.

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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
	11	0	0	0	0	0	0	0	0	0	0	73	171	269
	12	0	0	0	0	0	0	0	0	0	0	0	53	160

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
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	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
	11	0	0	0	0	0	0	0	0	0	0	73	171	269
	12	0	0	0	0	0	0	0	0	0	0	0	53	160

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
	11	0	0	0	0	0	0	0	0	0	0	73	171	269
	12	0	0	0	0	0	0	0	0	0	0	0	53	160

Bertrand

Joint profit maximizing

Theoretical predictions

Collusion is an equilibrium in all treatments, but …

… the PC, the ICC and the "minimum level of trust" required for collusion to be an eq. change across treatments

Hypotheses

H1 : Given α and F, deterrence is lowest (collusion is most frequent) in L-Faire, followed in order of magnitude by Fine and Leniency

H2 : If αF increases, deterrence increases under Fine and even more so under Leniency

H3 : If F increases but αF remain constant, deterrence increases only marginally under Fine, but strongly under Leniency

H4 : When α = 0 but F > 0, significant deterrence should be observed under Leniency but not under Fine

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Distrust and deterrence at no cost

Result 1: under Leniency, F strongly increases deterrence even if α = 0.

α = 0
F =1000

α = F = 0

0,78

0,28

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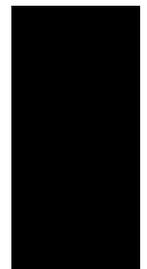
■ Leniency   ■ L-Faire

Remarks

Leniency generates distrust (according to the model)

Policy impl.: some deterrence possible at no cost

Issue: what about the trade-off between α and F ?

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With Leniency, F mainly determines deterrence

Result 2: F significantly increases deterrence under leniency, even if αF remains constant.

α = 0.1   α = 0.02   α = 0
F = 200   F =1000   F =1000

0,34

0,25

0,28

>***   <*
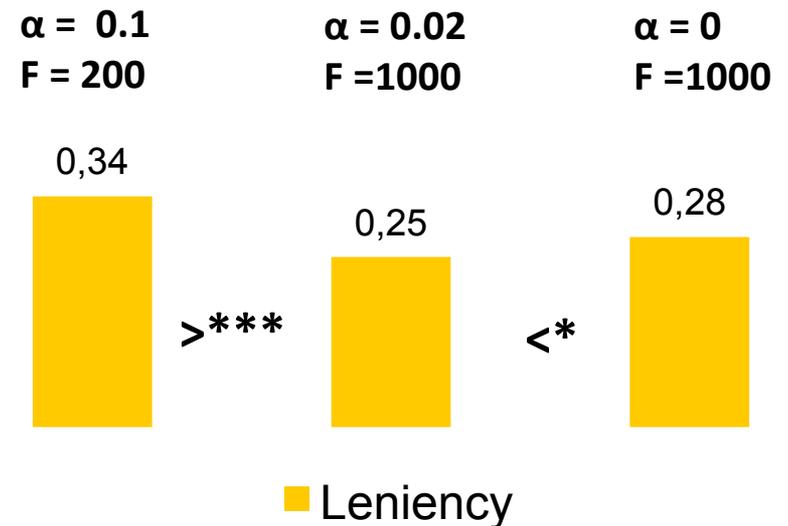
■ Leniency

Remarks

An increase in αF also generates some deterrence …

… but the effect is small

Distrust appears the main deterrence channel under Leniency

Policy implication: complement Leniency with a high F rather than costly α

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Low F may reduce deterrence even absent leniency

Result 3: A reduced F, keeping αF constant, significantly reduces deterrence even absent leniency

α = 0.02
F =1000

α = 0.1
F = 200

0,59

0,38

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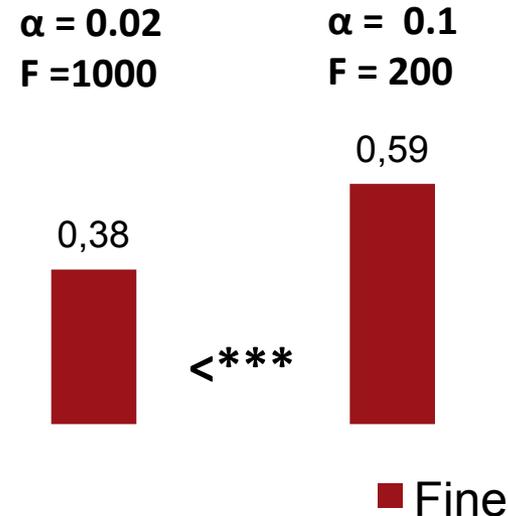
■ Fine

Remarks

The strong reduction in deterrence with the same expected sign is puzzling without Leniency, as we control fr subject's risk aversion

Subjects used (costly) reports to punish defectors when the fine was moderate.

Conjecture: F (not too large) is used as a credible threat against defectors

Low F may enforce cartels

Conjecture confirmed:

Removing the possibility to self-report significantly reduced deterrence

| α = 0.02 | α = 0.1 | α = 0.1 |
| F =1000 | F = 200 | F = 200 |

0,59

0,38

<***   >***

0,32

■ Fine ■ NoReport
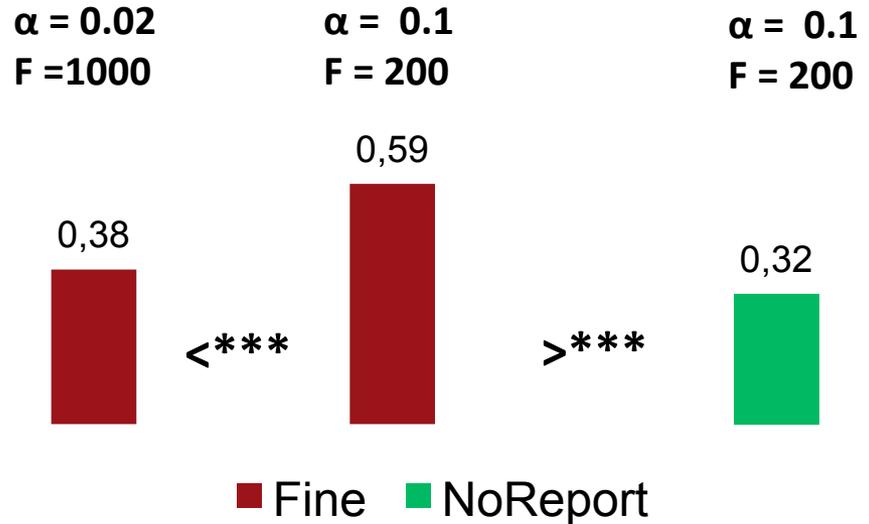
Remarks

Absent Leniency, the fine may work as punishment/disciplinary device

With Leniency, the fine instead generates distrust and thereby increases deterrence.

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The expected fine increases deterrence absent leniency

Result 4: α significantly increases deterrence, absent leniency

α = 0
F =1000

α = 0.02
F =1000

0,54

0,38

>***

■ Fine
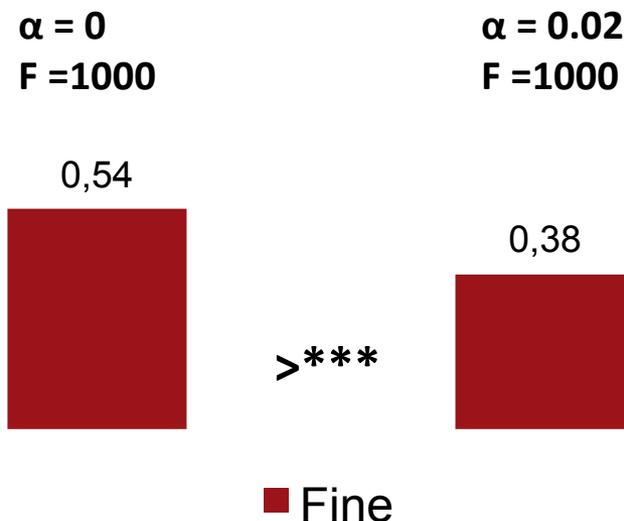
Remarks

The deterrence effect of an increase in α is much stronger absent leniency

- In Antitrust, deterrence works through the PC
- In Leniency, the Trust Problem prevails

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Wrap-up and conclusions

Main results

- Absent leniency
  - Deterrence increases with the expected fine
  - The fine (if not too large) may work as a credible punishment
- Leniency seems to alters the main channels for deterrence
  - Increases the cost of being betrayed and thereby generates distrust
  - Some deterrence even at 0 cost

Policy implications

- Benefits of high sanctions possibly underestimated
- Concerns that too many leniency applications in antitrust could keep competition authorities too busy to undertake random audits may be misplaced

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Thank You