

Corporate Leniency Programs: 'The Cleaning-out-the-Closet-Effect'

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- Leniency programs offer immunity from fines or a reduction in fines to corporations that cooperate with the antitrust enforcement authority
- Leniency programs were first introduced in in the US (1973/Revision 1993) and in the EU (1996/Revision 2002/Revision 2006)

Perception of Effectiveness of Leniency Programs

The leniency program is proving to be an efficient and successful tool to detect and punish cartels, destabilising those that exist and preventing those that might otherwise be created. (Kroes, 2005)

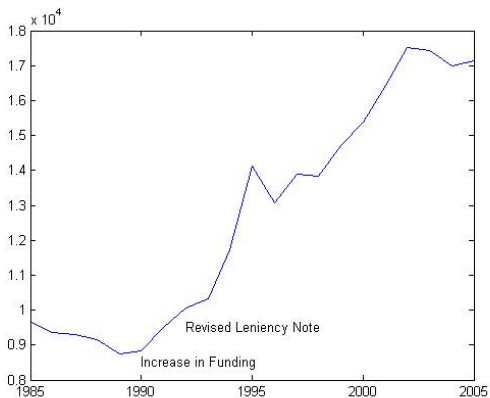
Over the last five years, the United States Corporate Leniency Program (Amnesty Program) has been responsible for detecting and cracking more international cartels than all of our search warrants, secret audio or videotapes, and FBI interrogations combined. It is, unquestionably, the single greatest investigative tool available to anti-cartel enforcers. (Hammond, 2000)

Study the yield of the leniency program in the historical context of antitrust enforcement using a stylized model of an infinitely repeated game with two unexpected policy changes:

- I. Stepped up enforcement
- II. Introduction of a leniency program

Research Question: What types of cartels does a leniency program attract?

Real Funding of US Department of Justice Antitrust Division in Million Dollars



Theoretical literature

- Motta and Polo (2003), Spagnolo (2004)
- Aubert, Rey, Kovacic (2006)
- Motchenkova (2006)
- Harrington and Chang (2008)

Experimental literature

- Hinloopen and Soetevent (2006)
- Onderstal and Hinloopen (2008)

Empirical literature

- Miller (2007)

Possible adverse effects of leniency programs

- Ellis and Wilson (2003)
- Chang and Harrington (2008)
- Magos (2008)
- Bigoni, Fridolfson, Le Coq, Spagnolo (2008)
- Stephan (2008)

Structure of the Market

- Pool of N markets
- Each market i consists of $n_i \geq 2$ identical firms
- Infinite time horizon, discrete periods, common discount factor δ
- In each period each firm in industry i can choose from three types of behavior with per-period payoffs:

$$\left. \begin{array}{l} \pi_i^n \text{ if firm competes} \\ \pi_i^c \text{ if firm colludes} \\ \pi_i^d \text{ if firm defects} \end{array} \right\} \pi_i^d > \pi_i^c > \pi_i^n$$

- Cartelists employ grim trigger strategies

- Tools of antitrust authority

$$\left\{ \begin{array}{l} \beta \quad : \text{detection probability in period in which all firms colludes} \\ \lambda_d \beta \quad : \text{detection probability in period in which a firm deviates} \\ \lambda_o \beta \quad : \text{detection probability in period after a firm has deviated} \\ F \quad : \text{Fine levied by authority if firm is convicted} \end{array} \right.$$

where $0 \leq \lambda_o \leq 1, \lambda_d \geq 1 \Rightarrow 0 \leq \lambda_o \beta \leq \beta \leq \lambda_d \beta \leq 1$

- Timing
 - Benchmark Enforcement: Phase I
 - Increase in Budget of Antitrust Division: Phase II
 - Introduction of a Leniency Program: Phase III

Cartel Enforcement without Leniency Program I

- Payoffs

$$V_i^n = \frac{\pi_i^n}{1 - \delta}$$

$$V_i^c = \frac{\pi_i^c + \beta(\delta V_i^n - F)}{1 - (1 - \beta)\delta}$$

$$V_i^d = \pi_i^d - \lambda_d \beta F + \delta V_i^n - \delta \lambda_o \beta (1 - \lambda_d \beta) F$$

- Firm has incentive to collude whenever

$$\begin{aligned} V_i^c &\geq V_i^n \\ \iff \pi_i^c - \pi_i^n &\geq \beta F \end{aligned}$$

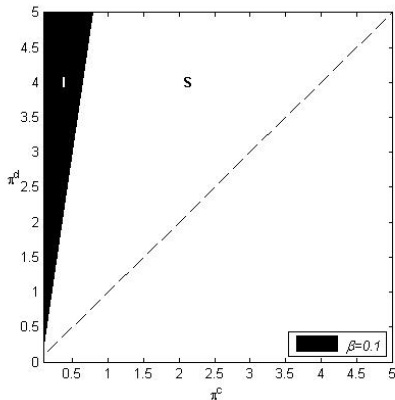
Proposition 1

In the absence of leniency programs, cartels are unstable in markets in which it holds that

$$\pi_i^d \geq \frac{1}{1-\kappa} [\pi_i^c - \kappa \pi_i^n] - \left(\frac{1}{1-\kappa} - \lambda_d - \delta \lambda_o (1 - \lambda_d \beta) \right) \beta F \quad (1)$$

where $\kappa \equiv (1 - \beta)\delta$

Cartel Enforcement without Leniency Program III



Parameter values:

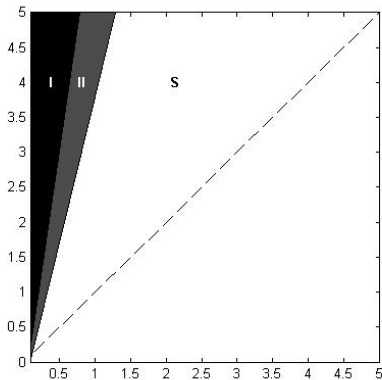
$$\beta = 0.1, \delta = 0.95, \pi^n = 0, \lambda_d = 2, \lambda_o = 0.5, F = 1$$

Proposition 2

An increase of the detection probability β makes it harder for an industry to sustain a collusive agreement, whenever $F \geq F^$ where*

$$F^* = -\frac{\delta(\pi_i^c - \pi_i^n)}{1 - \delta + [1 - \delta(1 - \beta)]^2[\delta\lambda_o(2\lambda_d\beta - 1) - \lambda_d]}$$

Stepped up Cartel Enforcement II



Parameter values:

$$\beta = 0.2, \delta = 0.95, \pi^n = 0, \lambda_d = 2, \lambda_o = 0.5, F = 1$$

Introduction of a Leniency Program I

Firm have an additional strategy of deviating and reporting

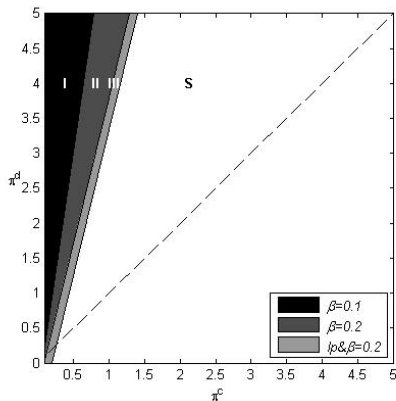
$$V_i^{dr} = \pi_i^d - (1 - r)F + \delta V_i^c - C$$

Proposition 3

At a constant detection rate β , a leniency program will destabilize cartels that were not already destabilized through the increased in the detection probability in Phase II if

$$(1 - r)F + C < \pi_i^d - \frac{1}{1 - \kappa}(\pi_i^c - \kappa\pi_i^n) + \frac{\beta}{1 - \kappa}F \leq (\lambda_d + \delta\lambda_o(1 - \lambda_d\beta))\beta F$$

Introduction of a Leniency Program II



Parameter values:

$$\beta = 0.2, \delta = 0.95, \pi^n = 0, \lambda_d = 2, \lambda_o = 0.5, F = 1, r = 1, C = 0$$

- Payoffs

$$V_i^r = V_i^n - (1 - r)F - C$$

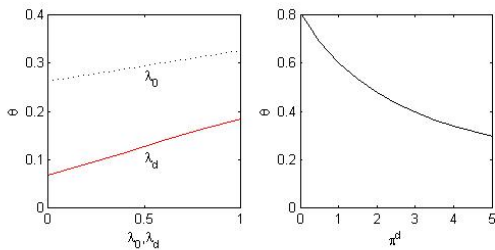
$$V_i^{nr} = V_i^n - \lambda_0 \beta F$$

Proposition 4

A firm will claim leniency for a cartel which already broke up in the previous period whenever

$$\lambda_0 \beta F \geq (1 - r)F + C \quad (2)$$

Effectiveness of Leniency Program in collecting active Cartels: Comparative Statics of the Cleaning-out-the-closet-effect



Cartel Stability under a leniency program with budget constrained competition authority

- CA has a fixed budget which it has to allocate between active detection (β) and the leniency program
- It can be shown that under these circumstances cleaning-out-the-closet effect becomes compounded
- It can be shown that all leniency applicants stem from already collapsed cartels, $\theta \rightarrow 0$

Concluding Remarks

- Number of leniency applications is not necessarily representative of the effectiveness of leniency programs in collecting active cartels
- Leniency program might collect a lot of collapsed cartels→cleaning-out-the-closet effect
- Cleaning-out-the-closet effect can be compounded when a CA is budget constrained
- CA needs to find the right mix between active detection methods and leniency programs