Corporate Leniency Programs in the Cartel Lifecycle

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Introduction

- Leniency program:

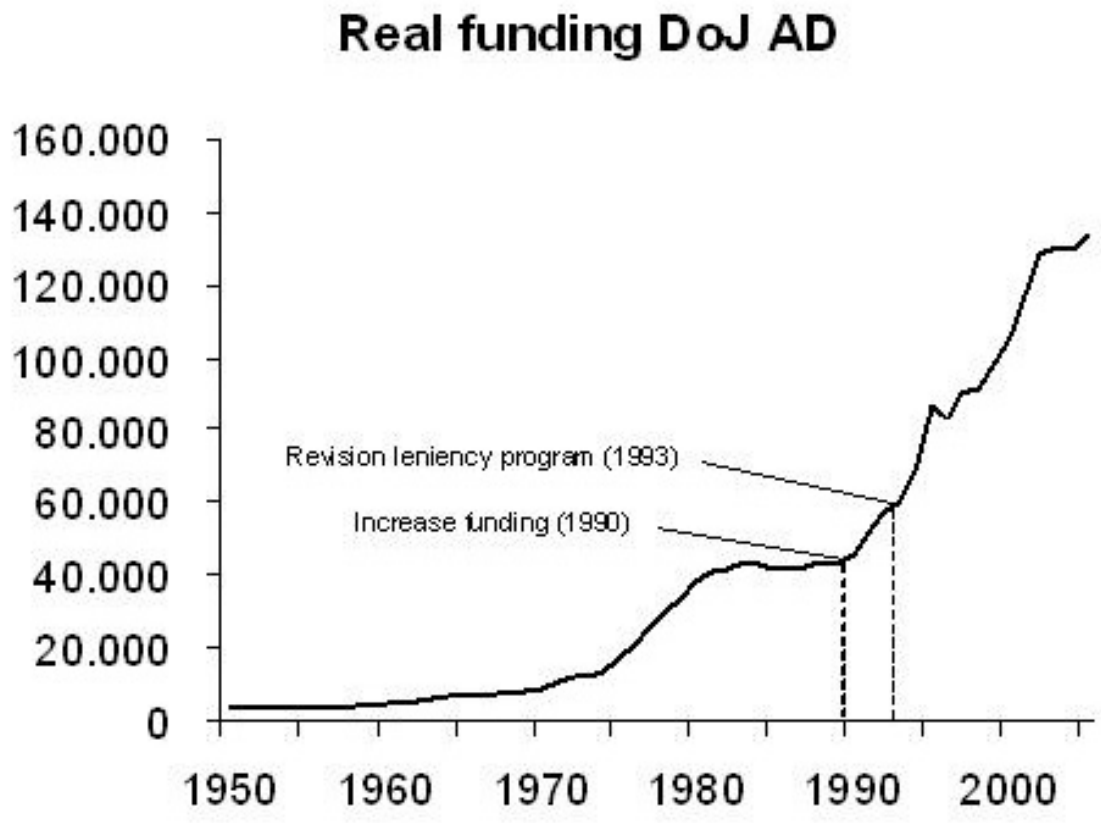
  '[..]granting of immunity from penalties or the reduction of penalties for antitrust violations in exchange for cooperation with the antitrust enforcement authority.'(Wils, 2006)

- Leniency programs were first introduced in in the US (1978/Revision 1993) and in in the EU (1996/Revision 2002)
  - Corporate leniency programs
  - Individual leniency programs
  - Motta and Polo (2003), Spagnolo (2004), Aubert, Rey, Kovacic (2006)

  $\Rightarrow$ Leniency programs typically seen as a success
- Adverse effects of leniency programs (Ellis and Wilson, 2003; Stephan, 2006)

  $\Rightarrow$ Effectiveness of leniency programs $\Rightarrow$ quality of leniency applications

Timeline in US Antitrust Enforcement



(Source: Kingma, 2007)

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

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

- Cartelists employ grim trigger strategies

Antitrust Enforcement/Timing

- Tools of antitrust authority

$$\begin{cases} \beta & : \text{detection probability in period in which all firms colludes} \\ \lambda_2\beta & : \text{detection probability in period in which a firm deviates} \\ \lambda_0\beta & : \text{detection probability in period after cartel collapse} \\ F & : \text{fine levied by authority if firm is convicted} \end{cases}$$

where $\boxed{0 \leq \lambda_0 \leq 1,\ \lambda_2 \geq 1} \Rightarrow \boxed{1 \geq \lambda_2\beta \geq \beta \geq \lambda_0\beta \geq 0}$

- Timing
  - Benchmark cartel enforcement ($\underline{\beta}$) $\rightarrow$ Phase I
  - Increase in budget of antitrust division ($\overline{\beta}$) $\rightarrow$ Phase II
  - Introduction of a leniency program ($\overline{\beta}, L$) $\rightarrow$ Phase III

Cartel Stability in Phase I: Benchmark Enforcement Model

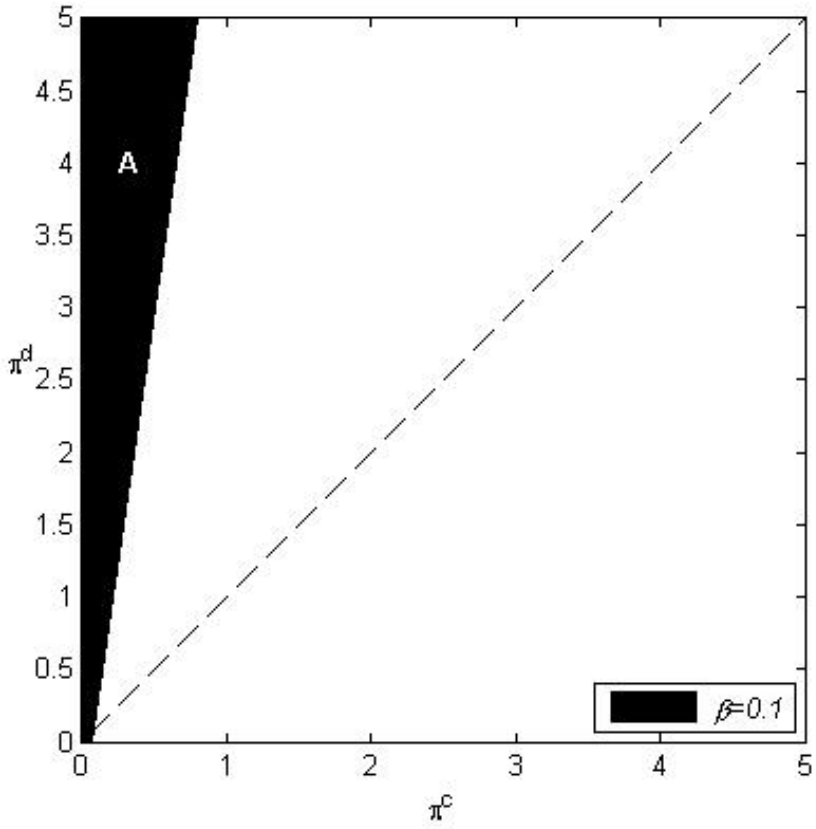
- Payoffs

$$
\begin{aligned}
V_i^n &= \frac{\pi_i^n}{1-\delta} \\
V_i^c &= \frac{\pi_i^c + \beta(\delta V_i^n - F)}{(1-(1-\beta)\delta)} \\
V_i^d &= \pi_i^d - \lambda_2 \beta F + \delta V_i^n - \delta \lambda_0 \beta (1 - \lambda_2 \beta) F
\end{aligned}
$$

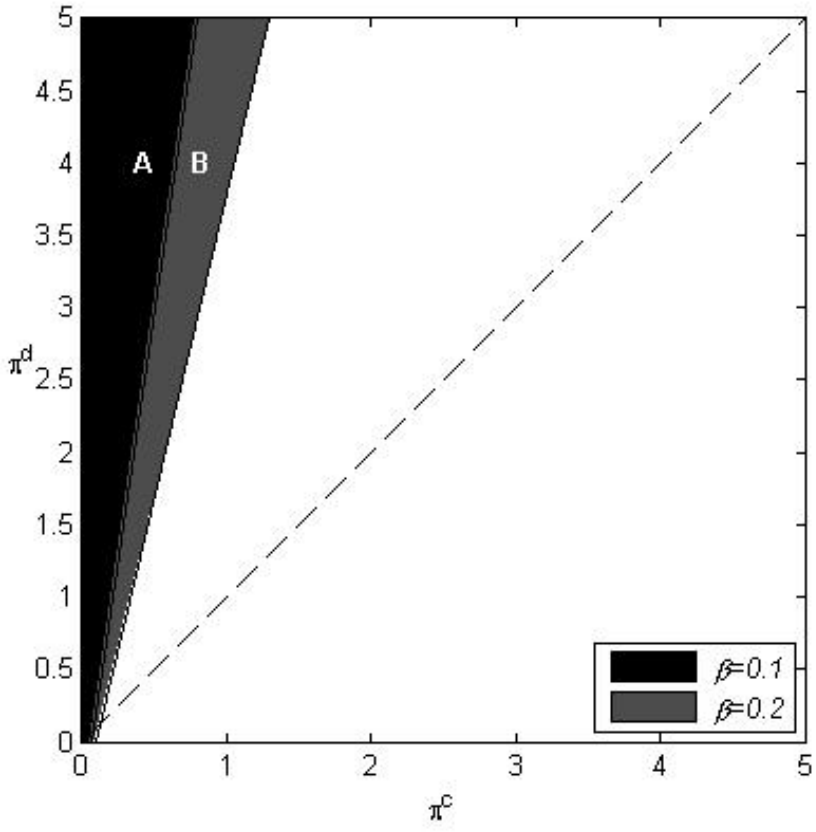
- Firm has incentive to deviate from a collusive agreement whenever

$$V_i^d > V_i^c > V_i^n$$

Cartel Stability in Phase I $\Rightarrow \underline{\beta}$



Cartel Stability in Phase II $\Rightarrow \bar{\beta}$



Cartel Stability in Phase III (Leniency Program)

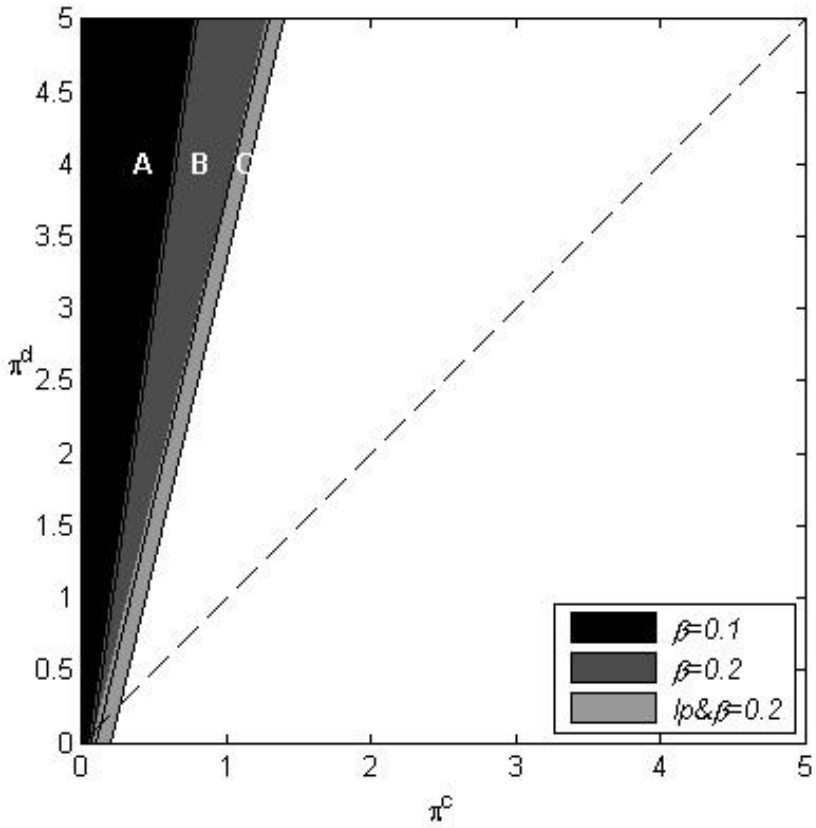
- Reductions in fines for first firm applying for leniency (e.g. $\bar{r} = 0 \longrightarrow$ full amnesty)
- Payoff

$$V_i^{dr} = \pi_i^d - \bar{r}F + \delta V_i^n - C$$

- Firm has incentive to defect and report whenever

$$V_i^{dr} > V_i^c > max(V_i^d, V_i^n)$$

Cartel Stability in Phase III $\Rightarrow \bar{\beta}, L, \bar{r} = 0$



Reporting of Collapsed Cartels: Cleaning-out-the- Closet

- Payoffs

$$\begin{aligned} V_i^r &= V_i^n - \bar{r}F - C \\ V_i^{nr} &= V_i^n - \lambda_0 \beta F \end{aligned}$$

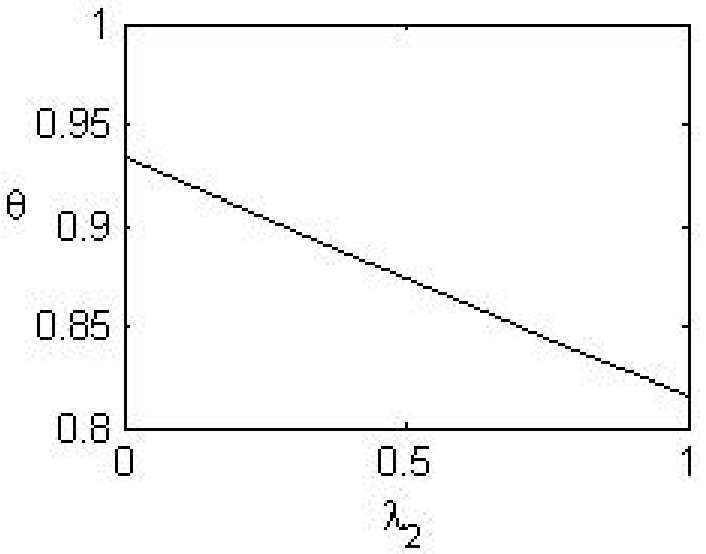
- A firm will claim leniency for a cartel which already broke up in the period before whenever

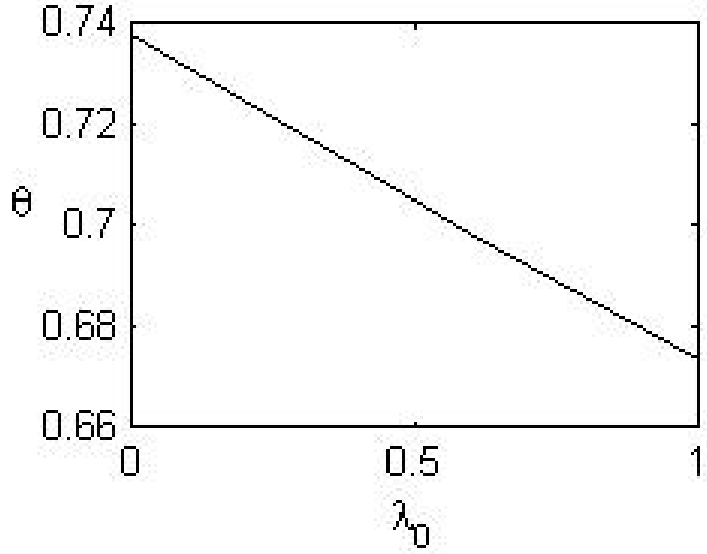
$$\begin{cases} \lambda_0 \beta \geq \bar{r} & \text{if } C = 0 \\ F > \frac{C}{\lambda_0 \beta - \bar{r}} & \text{if } C > 0 \end{cases}$$

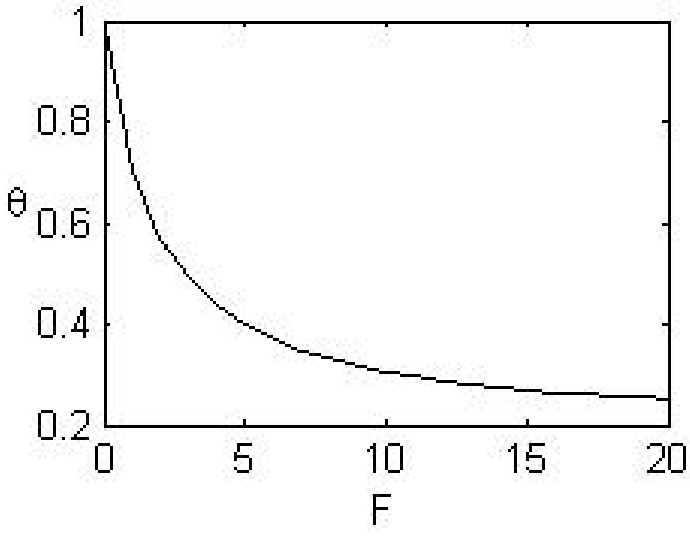
- Inefficiency measure of leniency:

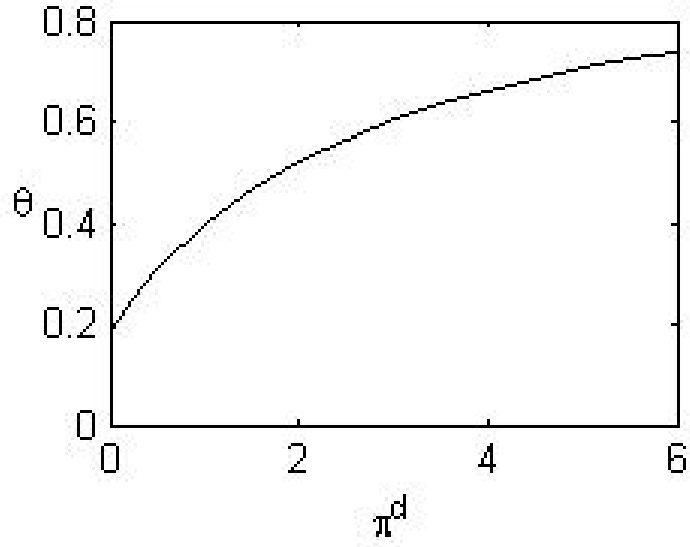
$$\theta = \frac{\text{number of collapsed cartels applying for leniency}}{\text{total number of leniency applications}}$$

(In-)Efficiency of Leniency Program: Comparative Statics









Concluding Remarks

- Number of leniency applications not necessarily and indication of its quality
- 'Cleaning-out-the-Closet Effect':collapsed cartels may have an incentive to apply for leniency$\longrightarrow$ calls into question the effectiveness of current leniency programs
- 'Cleaning-out-the-Closet Effect' might be aggravated by budget constrained competition authorities

A cartel member operating in an environment where the detection probability is given by β_0, β, β_2 and where the fine is given by F has an incentive to defect whenever it holds that

$$\pi_i^c - \pi_i^n > \beta F \tag{1}$$

$$\pi_i^d > \frac{1}{1-\kappa}\left[\pi_i^c - \kappa\pi_i^n\right] - \left(\frac{1}{1-\kappa} - \lambda_2 - \delta\lambda_0(1-\lambda_2\beta)\right)\beta F \tag{2}$$

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

An increase of the detection probability β, makes it harder for a firm to sustain a collusive agreement (or equivalently slackens the ICC given in equation (2), whenever $F \geq F^*$ where

$$F^* = -\frac{\delta(\pi_i^c - \pi_i^n)}{1 - \delta + [1 - \delta(1 - \beta)]^2[\delta\lambda_0(2\lambda_2\beta - 1) - \lambda_2]}$$

Leaving the detection probability unchanged, a firm will claim leniency for a collusive agreement whenever

$$\pi_i^c - \pi_i^n > \beta F \tag{3}$$

$$\bar{r}F + C < \pi_i^d - \frac{1}{1-\kappa}(\pi_i^c - \kappa\pi_i^n) + \frac{\beta}{1-\kappa}F \leq (\lambda_2 + \delta\lambda_0(1-\lambda_2\beta))\,\beta F \tag{4}$$