The Design, Practice, and Performance of Corporate Leniency Programs

Joe Harrington

Johns Hopkins University

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Introduction

Gallery of Price Fixers
An anti-cartel program may
- raise the probability of detection
- raise penalties

Desistance: causing collusion to stop.
- Direct effect: cartels are more likely to be caught.
- Indirect effect: cartels are less stable and collapse sooner.

Deterrence: preventing cartels from forming.
- Reducing the average duration of a cartel makes collusion less profitable.
- Increasing expected penalties promotes deterrence.
A corporate leniency program offers reduced penalties to a cartel member, in exchange for cooperating with the competition authority.

Overview of talk

- In theory, how do leniency programs work?
- In practice, how do leniency programs perform?
- How can we improve the design of leniency programs?
Introduction

Description of corporate leniency programs

- Leniency programs:
  - At least 28 countries and unions have leniency programs.

- Leniency programs vary according to
  - conditions for the awarding of leniency.
  - extent of leniency provided.
  - predictability
    - Will an application for leniency be approved?
    - How large are penalties and how much will be waived?
Introduction
Description of corporate leniency programs

Characteristics of a leniency program

- What is required to receive amnesty?
  - At what stage of the process can leniency be received?
  - How many firms can receive leniency?
  - Are all cartel members eligible for leniency?
  - What evidence must be provided in order to receive leniency?

- What does it mean to receive amnesty?
  - How much of government penalties are waived?
  - Are there non-government penalties and are they waived?
### Description of corporate leniency programs

**Before an Investigation**

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<th>Japan</th>
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<td>Second firm</td>
<td>PB</td>
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<td>Fourth or later firm</td>
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PB - Reduced fine from plea bargaining.

Second cartel member to plead guilty received a mean discount from the maximum recommended sentence of 75% (Connor, 2007)
Theory of Leniency Programs

How does a leniency program affect the functioning of a cartel and the decision to form a cartel?

- Motta and Polo (2003)
- Spagnolo (2003)
- Aubert, Kovacic, and Rey (2003)
- Harrington (2006)
Infinitely repeated Prisoners’ Dilemma with \( n \) firms.

- If all firms \textit{collude} then firm profit is \( \pi^c \).
- If all firms \textit{compete} then firm profit is \( \pi^{nc} \).
- If a firm \textit{competes} when the other firms \textit{collude} then its profit is \( \pi^d \).
- \( \pi^d > \pi^c > \pi^{nc} \).
Collusion without an antitrust authority

- Grim trigger strategy
  - Period 1: *Collude*
  - Period $t$:
    - *Collude* if all firms chose *Collude* in all past periods.
    - *Compete* otherwise.

- Equilibrium condition:

$$
\frac{\pi^c}{1 - \delta} \geq \pi^d + \delta \left( \frac{\pi^{nc}}{1 - \delta} \right) \iff \delta \geq \frac{\pi^d - \pi^c}{\pi^d - \pi^{nc}}.
$$
Stage game with an antitrust authority

- $\rho$ is the probability of conviction without use of the leniency program.

Theory of Leniency Programs

- $\rho$ is the probability of conviction without use of the leniency program.
Expected penalties

- If no firm applies for leniency: $\rho F$, where $F$ is the penalty.
- If $m \geq 1$ firms apply for leniency and
  - a firm did not apply: $F$.
  - a firm did apply: $\left[ \left( \frac{m-1}{m} \right) + \left( \frac{1}{m} \right) \theta \right] F$.
- Leniency policy parameter: $\theta \in [0, 1]$.
  - $\theta = 1$: No leniency
  - $\theta = 0$: Maximal leniency
Theory of Leniency Programs

Collusive Equilibrium

- If firms always \textit{Colluded} and the cartel has not been caught then:
  - a firm \textit{Colludes} when $0 \leq \rho \leq \rho^0$.
  - a firm \textit{Competes} when $\rho > \rho^0$ and \textit{Applies} (for leniency) when $\rho > \theta$.

- Otherwise, a firm \textit{Competes}.
Effect of a marginal change in leniency: leniency is high ($\theta$ is low)

- Equilibrium Condition:

$$\pi^c + \delta (1 - \rho) V^c(\theta) + \delta \rho (V^{nc} - F) \geq \pi^d + \delta (V^{nc} - \theta F)$$

- $V^{nc} \equiv \frac{\pi^{nc}}{1-\delta}$ is the non-collusive payoff.
- $V^c(\theta)$ is the expected future payoff from continued collusion.
\[
\pi^c + \delta (1 - \rho) V^c (\theta) + \delta \rho (V^{nc} - F) \geq \pi^d + \delta (V^{nc} - \theta F)
\]

- **Deviator Amnesty Effect** - more leniency makes collusion more difficult.
  - Deviator would use the leniency program.
  - More leniency reduces the penalty paid by a deviator.

- **Cartel Amnesty Effect** - more leniency makes collusion less difficult.
  - Leniency does not affect the current period collusive profit.
  - More leniency reduces the future penalty.
  - \( V^c (\theta) \) is decreasing in \( \theta \).

- **Net Effect**: More leniency makes collusion more difficult.
Effect of a marginal change in leniency: leniency is low ($\theta$ is high)

- Equilibrium Condition:

$$\pi^c + \delta (1 - \rho) V^c (\theta) + \delta \rho (V^{nc} - F) \geq \pi^d + \delta (V^{nc} - \rho F).$$

- Deviator Amnesty Effect disappears.
- Cartel Amnesty Effect remains - more leniency makes collusion less difficult.
- Race to the Courthouse Effect - more leniency makes collusion more difficult.
  - More leniency destabilizes the equilibrium in which firms do not apply.
  - More leniency reduces the future collusive payoff.
- Net Effect - ambiguous.
Theory of Leniency Programs

Race to the Courthouse Effect vs. Cartel Amnesty Effect
Summary of effects

- Deviator amnesty effect - leniency reduces penalties for a deviator
  \[ \Rightarrow \text{collusion is more difficult.} \]

- Cartel amnesty effect - leniency reduces expected future penalties for colluding firms
  \[ \Rightarrow \text{collusion is less difficult.} \]

- Race to the courthouse effect - leniency destabilizes an equilibrium in which firms remain silent
  \[ \Rightarrow \text{collusion is more difficult.} \]
General properties of an optimal leniency program.

- Partial leniency to the first firm can be optimal.
- More generally, maximal leniency is best.
- Leniency should only be given to the first firm to come forward.
  - Leniency to additional firms does not affect the Deviator Amnesty Effect.
  - Leniency to additional firms raises the Cartel Amnesty Effect.
Some research directions

- Allow probability of conviction, $\rho$, to be persistent over time.
- Allow firms to receive private signals regarding the probability of conviction.
- Allow for firm asymmetries and endogenize cartel size.
Recent experience - U.S. Department of Justice (DOJ)

- 20-fold increase in usage with the 1993 revision.
- As of October 2006, roughly 100 leniency applications had been made.
- Examples of firms awarded amnesty
  - Rhône Poulenc (Vitamins)
  - Christie’s (Fine Arts Auction Houses)
  - Carbide/Graphite (Graphite Electrodes)
Practice and Performance of Leniency Programs

Measuring Usage

Recent experience - European Commission (EC)
  • Increase in usage with the 2002 revision (Arlman, 2005)
    • 1996 - Feb 2002: 16 applications.
    • Feb 2002 - June 2005
      • 140 leniency applications
      • 75 applying for prior to an investigation.


<table>
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<th>Year</th>
<th># of cartel cases</th>
<th># with leniency</th>
<th># with full leniency</th>
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<td>6</td>
<td>4</td>
<td>0</td>
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<tr>
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<td>1</td>
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<td>8</td>
<td>2</td>
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<tr>
<td>2002</td>
<td>10</td>
<td>9</td>
<td>5</td>
</tr>
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<td>2003</td>
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<td>4</td>
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<tr>
<td>2004</td>
<td>6</td>
<td>3</td>
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Leniency has substantially reduced fines (Case Associates, May 2006)

- 40% of fines are waived
  - Fine per firm (in €) reduced from 30.4 million to 18.1 million.
  - Fine per cartel reduced from 161.4 million to 96.2 million.
What is success?

- Success is measured by the reduction of collusion in the economy.
- How has the leniency program impacted ...
  - the probability of successful prosecution?
  - the probability of detection?
  - the average life span of a cartel?
  - the number of cartels?
How many cartels were discovered due to leniency programs?

- Are many cartels applying after having been caught in another jurisdiction?
- Example: Sorbates cartel
  - Chisso received full amnesty from the EC.
  - The day after coming forward to the EC, the U.S. DOJ announced that one of the manufacturers of sorbates had agreed to plead guilty to price-fixing.

EC, 1999-2004

- Of 26 cartels receiving leniency,
  - 12 had already been investigated by the U.S. authorities
  - 7 were under parallel investigations.

- Full leniency was provided in some cartels that were previously detected.
Practice and Performance of Leniency Programs

Measuring Performance

How many cartels were disrupted due to leniency programs?

- Is leniency disrupting well-functioning cartels or being used by cartels that are collapsing?
  - Condition for applying leniency when the cartel is thriving:
    \[
    \delta (\rho F - \theta F) > [\pi^c + \delta (1 - \rho) V^c (\theta) + \delta \rho V^{nc}] - [\pi^d + \delta V^{nc}].
    \]
  - Condition for applying leniency when the cartel is collapsing:
    \[
    \delta (\rho F - \theta F) > 0.
    \]
- Is a firm applying for leniency because an investigation is imminent?
How many cartels were not formed due to leniency programs?

- Data problem: The population of cartels is not observed.
- If a rise in the number of discovered cartels is correlated with a policy change,
  - is it because the policy has been effective in promoting discovery?
  - is it because the policy is perverse and there are more cartels to be discovered?
  - is it because there are more cartels for other reasons?
Using theory to infer performance.

- How do changes in the *observable* population of discovered cartels relate to changes in the *latent* population of cartels?

**Literature**

- Chang and Harrington (2007)
- Miller (2007)

**Model the birth and death process for cartels.**

- Cartels form when firms have the opportunity and collusion is stable.
- Cartels collapse when market conditions make collusion unstable.
- Cartels are caught by the authorities.
Estimating the impact of the U.S. Corporate Leniency Program (Miller, 2007)

Hypothesis #1: If the 1993 revision resulted in an increase in the probability of discovery then there is an immediate rise in the number of discovered cartels.

Hypothesis #2: If the 1993 revision resulted in a decrease in the rate of cartel formation then the number of discovered cartels adjusts to a lower steady-state level.

Data: January 1985 - March 2005
Impact of a leniency program on the duration of discovered cartels.

Hypothesis #3: If effective, a leniency program increases the average duration of discovered cartels in the short-run.
How many firms should be eligible for leniency?

- EC - leniency is available for many firms and is extensively provided (Arlman, 2005)

![Graph showing the number of times leniency was awarded at different percentage levels. The x-axis represents the percentage of leniency awarded (10% to 100%) and the y-axis shows the number of times awarded. The graph includes bars for 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 70%, 80%, 90%, 95%, and 100%, with the number of times awarded as follows: 49 at 10%, 19 at 15%, 19 at 20%, 11 at 25%, 11 at 30%, 15 at 35%, 14 at 40%, 1 at 45%, 1 at 50%, 1 at 70%, 1 at 80%, 1 at 90%, 1 at 95%, and 11 at 100%).]
Benefits of partial leniency to many cartel members
- Adds evidence to make conviction more likely.
- Economizes on the competition authority’s resources.

Costs of partial leniency to many cartel members
- Reduces expected penalties.
- Reduces the race among firms to come forward.

What difference does leniency to additional firms make?
- What difference does a third insider witness make?
- What is the value of 10% leniency to the 4th or 5th firm?
Should the initiator of the cartel be eligible?

- In the U.S., a firm cannot receive leniency if it was an instigator of the cartel.
- Benefit: Having the initiator be ineligible discourages a firm from forming a cartel.
- Cost: Narrowing the pool of eligible firms reduces the race among firms to apply for leniency.
Should the amount of leniency depend on whether an investigation has started?

- **Current policies**
  - U.S.: 100% of fines are typically waived even after an investigation has begun.
  - Japan
    - Prior to an investigation: 100% of fines are waived for the first firm (50% and 30% for the second and third firms)
    - After an investigation: 30% leniency for the first three firms.

- **Analysis of Japanese policy**
  - It creates a timing game between the cartel members and the competition authority.
  - Once an investigation starts, the race among cartel members for leniency is significantly reduced.
  - High risk strategy that needs to be effectively managed.
Is leniency too generous?

- Leniency should be used to increase the penalties paid by the remaining members.
- Leniency reduces average fines by 40% in the EC.
- Is too much given away through plea bargaining in the U.S.?
  - Hoffman LaRoche in the vitamins price-fixing case.
    - Strong case as Rhône-Poulenc provided insider evidence.
    - DOJ’s sentencing guidelines: $1.3 to $2.6 billion.
    - Actual fine: $500 million.
Should an anti-cartel policy exercise some control over the *competition authority*?

- What are the career concerns of members of the competition authority?
  - Is a guilty plea with reasonable fines considered a "win"?
  - Is success measured by the (observable) number of convictions rather than the (unobservable) number of cartels?

- Does the competition authority take account of how lower fines impacts future cartel formation?

- Should the discretion of the competition authority be limited?
  - In how many firms can receive leniency?
  - In the setting of fines?
Screening is a tool to identify markets where collusion is suspected.

Screening and leniency programs are complements.

- Leniency programs may be ineffective when there are no suspicions about collusion.
- Screening can create those suspicions.
- Identifying an industry for further scrutiny could well induce a race among cartel members to apply for leniency.
Deputy Assistant Attorney General Scott Hammond of the U.S. Department of Justice claimed:

But you may be able to *scare* a thief with an economist and that could be enough to induce them to apply for amnesty.
Develop programs to induce other people who have information to report.

- Buyers
- Employees of the colluding firms who are not themselves involved in the conspiracy
Buyers

- In many cartels, buyers are industrial buyers.
- Suspicions might arise because:
  - firms are steadily raising prices without a cost or demand rationalization.
  - some suppliers are no longer willing to bid for their business
  - firms’ price changes are more coordinated
- Consider financial rewards to buyers.
  - A reward scheme might replicate the incentives created by private customer damages.
Uninvolved company employees

- Sales representatives
  - They witness the change in prices.
  - They might be instructed not to compete aggressively
    - Not to bid for some company's business
    - Not to deviate from the price list even when business will be lost.
    - Industrial and medical gases cartel members instructed their sales people to focus on "implementing the 5% price increase with existing customers and explaining that competitors could be expected to do the same."

- Administrative staff for a colluding executive may find evidence of clandestine meetings.
How do you motivate employees to report to the competition authority?

Proposal: Design a policy whereby both the employee and the company benefit.

- Financial rewards to the employee.
- Company has the opportunity to apply for full leniency (under the usual conditions).
Research and Policy Challenges

- Measuring the impact of leniency programs.

- Improving the design of leniency programs.

- Developing complements to leniency programs.