Testing Leniency Programs Experimentally

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Corruption

- serious and pervasive problem
- harmful effects documented
  - Aidt (2009), Swaleheen (2011)

- hard to detect (illegal, secret)

=> Need to rely on anti-corruption measures that undermine incentives

- Reduce expected gains (penalties, risk of detection, efficiency wages)
- Undermine trust between illegal partners (leniency policies)
**Literature**

Leniency policies

- a promising anti-corruption measure
- rich evidence on cartel deterrence
  - theoretical: e.g. Spagnolo (2004)
  - experimental: e.g. Apesteguia, Dufwenberg and Selten (2004); Hinlooopen & Soetevent (2008); Bigoni, Fridolfsson, Le Coq and Spagnolo (2012, 2015)

- The results from cartel-deterrence not directly applicable (symmetric vs. asymmetric)

- Number of possible contingencies
  (who can apply, when...)

- Leniency policies used in several countries
  (anti-corruption law)
**Motivation**

**Buccirossi & Spagnolo 2006** – the first theoretical work on leniency in the context of corruption

=> poorly designed moderate leniency programs might provide a low-cost punishment mechanism

=> thereby providing an enforcement mechanism for occasional illegal transactions.

=> effectiveness hinges upon proper design and implementation
Experimental Methods

• Especially useful when testing counterfactual institutional arrangements

• Relatively cheap way to examine effects of such arrangements in the controlled environment

→ this is what we wanted to do, find experimental support for B&S’s theoretical result
Recent surge => several experimental studies of LPs in corruption

• Abbink, Dasgupta, Gangadharan, Jain (2014)
  – harassment bribery, one-shot, only context-loaded
  – compare symmetric (both) and asymmetric (briber) leniency
  – “weak economic incentives for the bribe-giver, or retaliation by bribe-takers can mitigate the disciplining effect” [of asymmetric liability where bribers get immunity]
  – not primarily interested in gender differences; find male bureaucrats more likely to demand bribe

• Wu, Abbink (2013)
  – collusive bribery, no early reporting
  – symmetric vs. asymmetric eligibility (who can report)
  – “Rewarding self reporting is likely to be highly effective in reducing bribery in the field but only for one-off interactions”
  – no gender-specific results; context loaded
• Schikora (2011)
  – the only study in which both parties have a chance to initiate bribery
  – symmetric (both can blow the whistle, symmetric punishment) vs. asymmetric leniency (only B can get leniency), no context
  – find male more reciprocal and female more fair when direct costly punishment
  – find that *symmetric punishment reduces negative impact of but also increases stability of corruption; asymmetric leniency for official offsets this negative effect*

• Engel, Goerg, Yu (2013)
  – symmetric vs. asymmetric punishment; control for cultural differences
  – asymmetric leniency (B cannot report and get leniency)
  – partial context (“favor”, “punish”, but not “bribery”), no gender effects
  – *asymmetric punishment gives bribers a credible technology for enforcing corrupt deals*
**LITERATURE**

- Lambsdorf and Frank (2011)
  - the entrepreneur always pays the bribe but can choose the framing (bribe vs. gift);
  - no leniency
    - *men are more likely to retaliate and female less likely to reciprocate*
- to our knowledge, ours is the only one that finds interaction between gender and context
Our Bribery Game

- a generalization of Buccirossi & Spagnolo game
  - collusive bribery (the Entrepreneur initiates)
  - the Entrepreneur has an investment opportunity that hinges upon a favorable decision of the Bureaucrat
  - both have a chance to report to authorities
    (→ pp of conviction <1)
  - even if no one reports, some evidence created unintentionally => can be discovered by an audit
    (→ pp of audit and of subsequent conviction both <1)
  - symmetric leniency
    (both get a chance to report and get immunity)
  - repeated interaction
Figure 1: Extensive form of the corruption game in the generalized model. P stands for Pay, NP for Not Pay, D for Denounce, N for doing Nothing, a for performing Action a, b for bribe, v for the value of the project to the entrepreneur, α for the exogenous probability of an audit, β for the probability of conviction, F_E and F_B for full fines and RF_E and RF_B for reduced fines to the entrepreneur and to the bureaucrat, respectively.
EXPERIMENTAL IMPLEMENTATION

- Nov/Dec 2006, run at CERGE-EI, subjects from FSS, CTU, UE
- computerized using Z-tree
- 2 main treatments (+ robustness checks)
  - Benchmark
  - Context Loaded
- 4 sessions for each treatment, each session:
  - 12 subjects (6 in each role) interacted in 6 rounds
  - roles (E vs. B) were fixed
  - random re-matching in each round
  - alternating low/high per-round endowment (size of bribe) → corruption vs. no corruption equilibrium
- Information to subjects (each round)
  - at the beginning - role and per-round endowment
  - at the end - own and co-player’s actions, detection or no detection, own payoff
Parameterization

\[\alpha = 0.1, \beta = 0.2, \nu = 100, \text{show-up} = 300, F_E = F_B = 300, RF_E = RF_B = 0, E_L = 20, E_H = 40\]

Figure 1: Expected payoffs from the corruption game in the B and in the C treatment. Expected payoffs of Participant X's are always in the first row and those of Participant Y's are below. The theoretical prediction varies with the endowment and the respective branches of the game tree are bold.
Main Result – 1st Stage: Bribe or Not

- **Pooled data**: no impact of context
- **Gender-specific data**: male and female reaction to context cancel each other for low-endowment periods
  - *female less likely to bribe when context is explicit*
  - *male more likely to bribe in context treatment*
  - confirmed by regression analysis
  - in line with Lambsdorf and Frank’s (2011) result that men are more reciprocate (and seem to chose loaded framing to signal that)
- In high-endowment periods the result is not confirmed, possibly because bribing is relatively low

Note: context-free results in the top row, context-loaded results below for each branch
RESULTS – 2ND STAGE: DELIVER OR REPORT

- only descriptive data (few obs)
- context seems to increase denouncing even when this is not expected-profit maximizing strategy (high-endowment)
- this seems to be more so for women than for men
Results – 3rd Stage: Retaliate or Not

- conditional choices in most cases seem to support increased denouncing for both male and female in the context treatment, deviations could be due to random realization,
- few observations for this stage to conduct reliable formal analysis
1. practical question: “to what extent the practical data generated in the controlled environment support the hypothesis the leniency policy can in fact help to facilitate corruption” [by providing low-cost punishment]

\[\rightarrow \text{this has been confirmed not only by our results but also by studies conducted afterwards}\]

\[\rightarrow \text{good understanding of incentives will help to design more efficient measures}\]
2. We also addressed some methodological questions and robustness checks

→ *no clear agreement in literature on whether corruption experiments should be framed or not*

→ *some studies showed no effect which, intuitively, seemed problematic at best*

→ *we discovered that context variable becomes significant when we allow for gender-specific coefficients*

→ *Male and female show different propensity to corruption, female appear to be less tolerant of corruption*
3. Further investigation of gender effects needed

→ *in line with other evidence in literature that women have lower tolerance of corruption*

→ *important policy implications*

→ *properly designed follow-up study aimed to investigate the gender-specific attitudes toward corruption and the interaction with instructions’ framing (for methodological reasons)*
Our results contribute to a longstanding debate about the micro-determinants of corruption and corruptibility and their identification under laboratory conditions.
THANK YOU FOR YOUR ATTENTION.
# Appendix — Regression Results

<table>
<thead>
<tr>
<th></th>
<th>periods 1,3,5</th>
<th></th>
<th>periods 2,4,6</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>-.0287 (.302)</td>
<td>.1280 (.007)</td>
<td>.0220 (.381)</td>
<td>.0913 (.000)</td>
</tr>
<tr>
<td>male</td>
<td>.0686 (.646)</td>
<td>3.3442 (.010)</td>
<td>1.706 (.055)</td>
<td>2.5462 (.014)</td>
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<tr>
<td>econ</td>
<td>-.1601 (.212)</td>
<td>-.6307 (.000)</td>
<td>-.0731 (.503)</td>
<td>.2210 (.001)</td>
</tr>
<tr>
<td>C_treat</td>
<td>.0559 (.657)</td>
<td>-.7156 (.004)</td>
<td>.0230 (.809)</td>
<td>-.0375 (.644)</td>
</tr>
<tr>
<td>age* male</td>
<td>-</td>
<td>-.1852 (.002)</td>
<td>-</td>
<td>-.0941 (.032)</td>
</tr>
<tr>
<td>econ* male</td>
<td>-</td>
<td>.5354 (.002)</td>
<td>-</td>
<td>-.3395 (0.19)</td>
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<tr>
<td>C_treat* male</td>
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<td>.7983 (.006)</td>
<td>-</td>
<td>.0036 (0.983)</td>
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<tr>
<td>const</td>
<td>1.2342 (.068)</td>
<td>-1.4593 (.139)</td>
<td>-.3400 (.553)</td>
<td>-2.1070 (.000)</td>
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<tr>
<td>mean p(y=1)</td>
<td>.5625</td>
<td>.5625</td>
<td>.2361</td>
<td>.2361</td>
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<tr>
<td># of obs, b</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
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<tr>
<td>joint p-value</td>
<td>(.488)</td>
<td>(.000)</td>
<td>(.078)</td>
<td>(.000)</td>
</tr>
</tbody>
</table>

Table 1: Results from estimation of the linear probability model(s). The first row of each cell reports estimated coefficients. The second row reports the corresponding p-value. Mean p b(y=1) denotes the mean predicted probability of a transfer being made.