Effects of the Third Party Errors

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Motivation

• Depersonalized exchanges (on D. North) with third-party enforcement as a way for Pareto-improvement of outcomes (natural way of analysis under assumptions of the lack of information on counterparts)

• Optimal deterrence (on G. Becker) by the means of sanctions for rules violators (in the light of errors of type II) within the framework of strategic interaction

• The problem of type I errors in economic exchanges from the cooperation (but not only deterrence) effects perspective
The aim

• To identify not only distributive but also coordination effects of economic exchanges (strategic interaction between players) with third party enforcement and enactment errors of both I and II types
Tasks

• Effects of I&II types errors in third-party enforcement within the context of strategic interaction of participants of economic exchanges

• Errors of I&II types within the context of rules enactment and enforcement interrelations
1. Effects of I&II types errors in third-party enforcement within the context of strategic interaction of participants of economic exchanges
Basic definitions and assumptions on errors in enforcement

Errors of $I$ type in enforcement:
- **Strong form**: prosecution of innocent
- **Weak form**: excessively hard prosecution for rules violation

Errors of $I$ type in enforcement:
- **Strong form**: non-prosecution of rules violator,
- **Weak form**: too law sanctions for violations
Pay-off matrix for one shot «Prisoners’ dilemma» game

$$A_3 > A_1 > A_4 > A_2 \quad B_2 > B_1 > B_4 > B_3$$

Nash equilibrium ($A_4; B_4$) Pareto-non-optimal

<table>
<thead>
<tr>
<th></th>
<th>Abide Rules (rights)</th>
<th>Violate Rules (rights)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abide Rules (rights)</td>
<td>$A_1$</td>
<td>$B_1$</td>
</tr>
<tr>
<td>Violate Rules (rights)</td>
<td>$A_2$</td>
<td>$B_2$</td>
</tr>
</tbody>
</table>
The new game parameters - 1

• $T$ – cost of third-party enforcement for players (A&B)
• Equal distribution of the service cost burden among players
• $Y$ – sanctions for rules (property rights – both absolute and relative) violation
• $Z$ – restoration of rules (property rights) violated (compensations)
## Pay-off matrix with new parameters

<table>
<thead>
<tr>
<th></th>
<th>Abide</th>
<th>Violate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Abide</td>
<td>$A_1 - \frac{T}{2}$</td>
<td>$B_1 - \frac{T}{2}$</td>
</tr>
<tr>
<td></td>
<td>$A_2 - \frac{T}{2} + Z$</td>
<td>$B_2 - \frac{T}{2} - Y$</td>
</tr>
<tr>
<td>Violate</td>
<td>$A_3 - \frac{T}{2} - Y$</td>
<td>$B_3 - \frac{T}{2} + Z$</td>
</tr>
<tr>
<td></td>
<td>$A_4 - \frac{T}{2} - Y + Z$</td>
<td>$B_4 - \frac{T}{2} - Y + Z$</td>
</tr>
</tbody>
</table>
• Third-party enforcement (TPE) is a tool for Nash equilibrium Pareto-improvement under depersonalized exchanges
• There are both coordination and distribution effects of TPE
• Services effectiveness of non-discriminating enforcer doesn’t mean Pareto-efficiency (or even improvement) within the new game structure by default under assumption of pay-offs comparability
• The context of initial game does matter for qualification of subsequent game modifications (Competition on Bertrand vs. Collusion ≠ Rules (rights) abiding vs. unenforced rules (rights)).
The new game parameters - 2

Errors of non-discriminating enforcer:
• $\rho_1$ – probability of errors of I-st type
• $\rho_2$ – probability of errors of II-nd type
## Pay-off matrix with non-zero probabilities of errors of I & II types

<table>
<thead>
<tr>
<th></th>
<th>( B )</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abide</td>
<td></td>
<td>Violate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( A )</td>
<td>Abide</td>
<td>( A_1 - \frac{T}{2} - \rho_1(Y - Z) )</td>
<td>( A_2 - \frac{T}{2} + (1 - \rho_2)Z - \rho_1Y )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( B_1 - \frac{T}{2} - \rho_1(Y - Z) )</td>
<td>( B_2 - \frac{T}{2} - (1 - \rho_2)Y + \rho_1Z )</td>
</tr>
<tr>
<td></td>
<td>Violate</td>
<td>( A_3 - \frac{T}{2} - (1 - \rho_2)Y + \rho_1Z )</td>
<td>( A_4 - \frac{T}{2} - (1 - \rho_2)(Y - Z) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( B_3 - \frac{T}{2} + (1 - \rho_2)Z - \rho_1Y )</td>
<td>( B_4 - \frac{T}{2} - (1 - \rho_2)(Y - Z) )</td>
</tr>
</tbody>
</table>

\( \rho \) represents the probability of error.
Threshold for improvement: comparing(!) error-free and erroneous enforcement outcomes

Probabilities of I & II errors types are zero:

\[(A_1 + B_1) - (A_4 + B_4) = T\]

Probabilities of I & II errors types are above zero:

\[(A_1 + B_1) - (A_4 + B_4) = T + 2\rho_1(Y - Z)\]
# Discriminating enforcer (n≠0,5)

<table>
<thead>
<tr>
<th></th>
<th>( A )</th>
<th>( B )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Abide</strong></td>
<td><strong>Violate</strong></td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>( A_1 - nT )</td>
<td>( A_2 - nT + Z )</td>
</tr>
<tr>
<td></td>
<td>( B_1 - (1-n)T )</td>
<td>( B_2 - (1-n)T - Y )</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>( A_3 - nT - Y )</td>
<td>( A_4 - nT - Y + Z )</td>
</tr>
<tr>
<td></td>
<td>( B_3 - (1-n)T + Z )</td>
<td>( B_4 - (1-n)T - Y + Z )</td>
</tr>
</tbody>
</table>

Abide: \( n \neq 0,5 \)
«Everything is for friends, the law is for others»

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abide</td>
<td>$A_1$</td>
<td>$A_2 + Z$</td>
</tr>
<tr>
<td></td>
<td>$B_1 - T$</td>
<td>$B_2 - T - Y$</td>
</tr>
<tr>
<td>Violate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violate</td>
<td>$A_3$</td>
<td>$A_4 + Z$</td>
</tr>
<tr>
<td></td>
<td>$B_3 - T$</td>
<td>$B_4 - T - Y$</td>
</tr>
</tbody>
</table>
Variants of consequences under multidimensional discrimination

1. Restoration of rules absence/universal violation as in initial game. It is possible if sanctions are not high as compared with pay-off for discriminated party(ies).

2. Rules violation by “friends” and rules abiding by “others”. Sanctions are high for those who are prosecuted = illusion of Rule of Law outcomes under imperfect rules enforcement
# Errors of I&II types with discrimination

<table>
<thead>
<tr>
<th>A</th>
<th>Abide</th>
<th>Violate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abide</td>
<td>$A_1 - nT - \rho_1 (a_1 Y - a_2 Z)$</td>
<td>$A_2 - nT + (1 - \rho_2) a_2 Z - \rho_1 a_1 Y$</td>
</tr>
<tr>
<td></td>
<td>$B_1 - (1-n)T - \rho_1 (b_1 Y - b_2 Z)$</td>
<td>$B_2 - (1-n)T - (1 - \rho_2) b_1 Y + \rho_2 b_2 Z$</td>
</tr>
<tr>
<td>Violate</td>
<td>$A_3 - nT - (1 - \rho_2) a_1 Y + \rho_1 a_2 Z$</td>
<td>$A_4 - nT - (1 - \rho_2) (a_1 Y - a_2 Z)$</td>
</tr>
<tr>
<td></td>
<td>$B_3 - (1-n)T + (1 - \rho_2) b_2 Z - \rho_1 b_1 Y$</td>
<td>$B_4 - (1-n)T - (1 - \rho_2) (b_1 Y - b_2 Z)$</td>
</tr>
</tbody>
</table>
Threshold conditions for multidimensional discrimination

\[(A_1 + B_1) - (A_4 + B_4) = T + \rho_1[(a_1 + b_1)Y - (a_2 + b_2)Z]\]

\[2(Y - Z) = (a_1 + b_1)Y - (a_2 + b_2)Z\]

\[2(Y - Z) > (a_1 + b_1)Y - (a_2 + b_2)Z\]

\[2(Y - Z) < (a_1 + b_1)Y - (a_2 + b_2)Z\]
Conclusions - 1

• The service on rules (rights) enforcement is composite good and consists of (1) deterrence based on credible threat of violator prosecution, (2) restoration of the rule (rights) violated.

• Enforcement errors of I & II types influence both benefits distribution (including enforcer) and equilibrium efficiency.

• Errors of type I is especially important due to effects of higher enforcement cost for socially desired cooperation.
Conclusions - 2

- The harder error of I type the narrower limits for welfare increase, and weaker deterring sanctions effects even without any risk aversion effects.

- While discrimination in TPE cost of services for players doesn’t effect on cooperation effects discrimination on other enforcement dimensions is not cooperation coordination effects neutral.
2. Errors of I&II types within the context of rules enactment and enforcement interrelations
Errors in rules enactment

Error of I type:
- *Strong form*: enactment of prohibition or restrictions where unnecessary
- Weak form: to hard prohibition or restriction

Error of II type:
- *Strong form*: no prohibition or restrictions where ones are necessary
- Weak form: to easy prohibitions or restrictions
Errors of I & II types in enactment and enforcement: the map

<table>
<thead>
<tr>
<th>Enactment</th>
<th>Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>No errors</td>
<td>1.1</td>
</tr>
<tr>
<td>I</td>
<td>2.1.</td>
</tr>
<tr>
<td>II</td>
<td>3.1.</td>
</tr>
<tr>
<td>No errors</td>
<td>I</td>
</tr>
<tr>
<td>I</td>
<td>2.2.</td>
</tr>
<tr>
<td>II</td>
<td>3.2.</td>
</tr>
<tr>
<td>No errors</td>
<td>II</td>
</tr>
<tr>
<td>I</td>
<td>2.3.</td>
</tr>
<tr>
<td>II</td>
<td>3.3.</td>
</tr>
</tbody>
</table>
Some effects of various interrelations of errors in enactment and enforcement

• Consequences of errors in enactment may be amplified/compensated by errors in rules enforcement.
• BUT in both cases the common result is *bad institutions*
• Various errors combinations may influence both distributive and coordination results of economic exchanges.
• While enforcement errors are qualified as such within the framework “the rule-reglamented action”, enactment errors as such are related to estimates of opportunities for Pareto-improvement, correspondence to Kaldor-Hicks or Kaldor-Hicks-Zerbe criteria.
### Errors of I & II types within the context of market failure remedies

<table>
<thead>
<tr>
<th>Market failures</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidable</td>
<td>Deregulation: Deregulation remedies (increase of the market perfectness as a mechanism of economic agents coordination)</td>
</tr>
<tr>
<td>Unavoidable</td>
<td>Deregulation under unavoidable market failures (increase of market imperfections, for example, due to total cease of inspections) – errors of the II type</td>
</tr>
</tbody>
</table>
## Errors of I & II types in enforcement within the context of interplay “enforcement-enactment”

<table>
<thead>
<tr>
<th>Action (non-action) evaluation by enforcer</th>
<th>Action (non-action) in relation to rules enacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>A* (no violation recognized)</td>
<td>Abiding: The action in accordance with rules enacted is recognized lawful/The action, recognized as rules abiding, is in fact abiding</td>
</tr>
<tr>
<td>V* (violation recognized)</td>
<td>The action in accordance with rules enacted is recognized as violation (error of I type)/The action, recognized as rules violation, is in fact abiding</td>
</tr>
</tbody>
</table>
Conclusions - 2

• Rules enforcement is not whole story and rules enactment does matter too from the perspective of errors of I&II types
• There are opportunities not only for substitution but also complementarities of types I&II errors
• Two types of errors in regulatory perspective is related to two types of fundamentalism in theory
Thank you!