The impact of competition interventions on compliance and deterrence

A controlled economic experiment

A study by London Economics for the UK Office of Fair Trading

Presentation at the University of Amsterdam

Centre for Law and Economics

Behavioural Competition and Regulation

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Office of Fair Trading Competition Evaluation

- An economic experiment that informs the OFT's wider work:
  - Quantification of the overall deterrent effect of the UK competition regime as a whole
  - Analysis of the role of specific competition interventions – individual cases since 2003, knowledge and awareness of competition law, specific sanctions and enforcement tools.
- The experiment was designed to specifically test:
  - Impact of sanctions and social preferences on firm behaviour – choice to participate in a cartel.
- Experiment participants:
  - 93 owner/managing directors or person responsible for regulation and competition compliance
  - Non-random sample self-selected from a sample of 809 respondents to a wider business survey on behaviour and competition law.
- Online experiment:
  - Each participant made 3 choices
  - Total time period was approximately six minutes

The experiment environment

- Observed compliance officers' behaviour when they were:
  - (i) faced with different fine levels (including doubling the fine);
  - (ii) different probabilities of detection/incurring a fine; and,
  - (iii) their decision resulted in third-party consumer harm.
- Incentives
  - Opportunity to win the total amount earned in the 3 tasks completed
  - 3 winners randomly selected and paid their total earnings.
  - Participants told their own choices would impact the real monetary earnings of an 'inactive' participant, for each winner the inactive participant was also paid.
  - This inactive player simulates potentially adverse effects on consumers of firm anti-competitive behaviour.
- Framing
  - Participants knew the study was for the OFT.
  - The questions were, however, unframed.

The choice task

- Participants faced with a choice between two options:

Option 1	It is guaranteed	You receive	£120
		Other participant receives	£160
Option 2	Probability (1-p)	You receive	£120 + Bonus
		Other participant receives	£160 – Loss
	Probability (p)	You receive	£120 – Fee
		Other participant receives	£160

p varied between 1/3 and 2/3, fee varied between £30 and £120, loss between £40 and £80 and bonus set to £60. Total of 9 different tasks. For option 2 either the fee or bonus was no specified, loss to the 'consumer' always provided.

- Participants selected one of the following:
  - Always choose option 1 (not participating in the cartel)
  - Always choose option 2 (participating in the cartel)
  - Choose option 2 if the bonus (fee) was higher (lower) than some level specified by the respondent

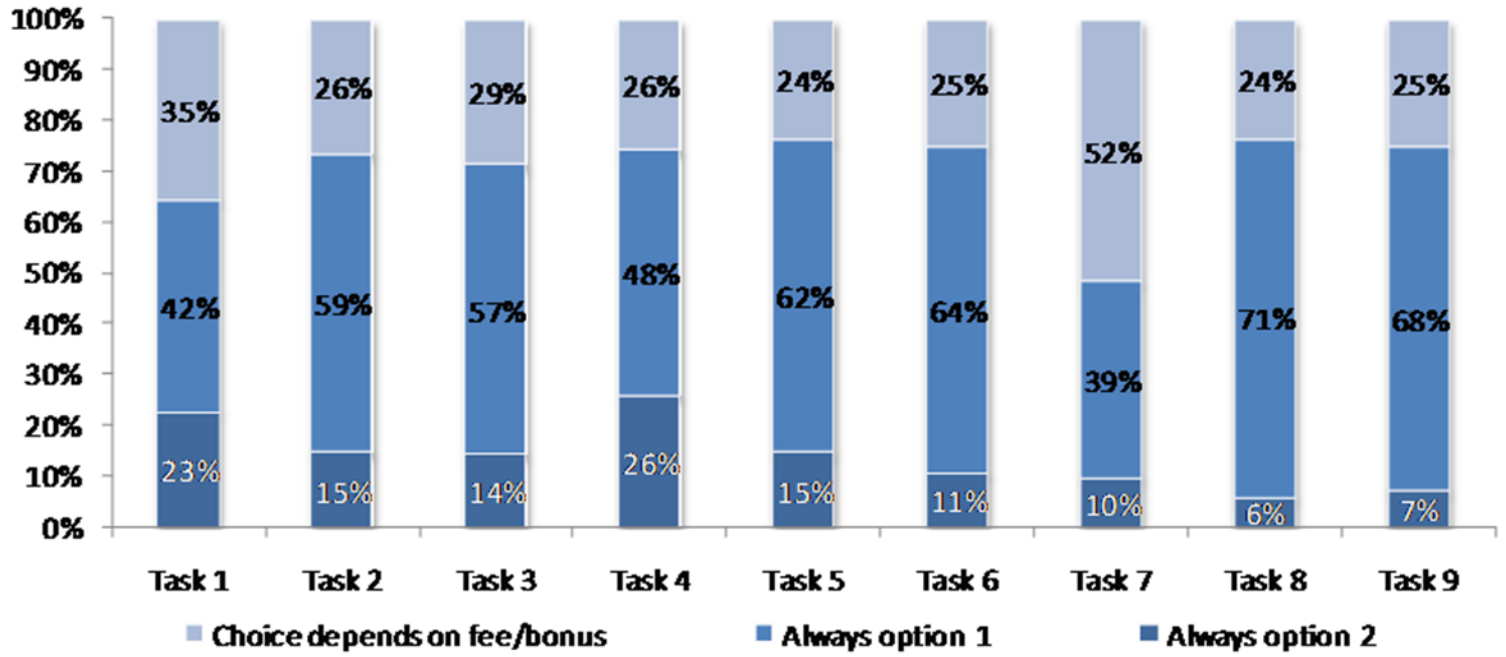
The 9 different choice tasks

Group	Task	Bonus	Loss	Fee	Prob (p)
A	Task 1	?	£40	£60	1/3
B	Task 2	?	£40	£30	2/3
C	Task 3	?	£40	£120	1/3
A	Task 4	?	£80	£60	1/3
B	Task 5	?	£80	£30	2/3
C	Task 6	?	£80	£120	1/3
A	Task 7	£60	£40	?	1/3
B	Task 8	£60	£40	?	2/3
C	Task 9	£60	£80	?	1/3

Respondent group	Tasks	Number of respondents
A	1, 4 and 7	31
B	2, 5 and 8	34
C	3, 6 and 9	28
	Total	93

Tasks designed to isolate the effects of bonus/fine, probability of detection and third party loss on behaviour.

Choice alternative



Always option 1 – consistent with risk aversion or social preferences (however, sponsor bias may have an effect here)

Always option 2 – consistent with risk loving behaviour: suggests there will always be some non-compliance irrespective of sanctions

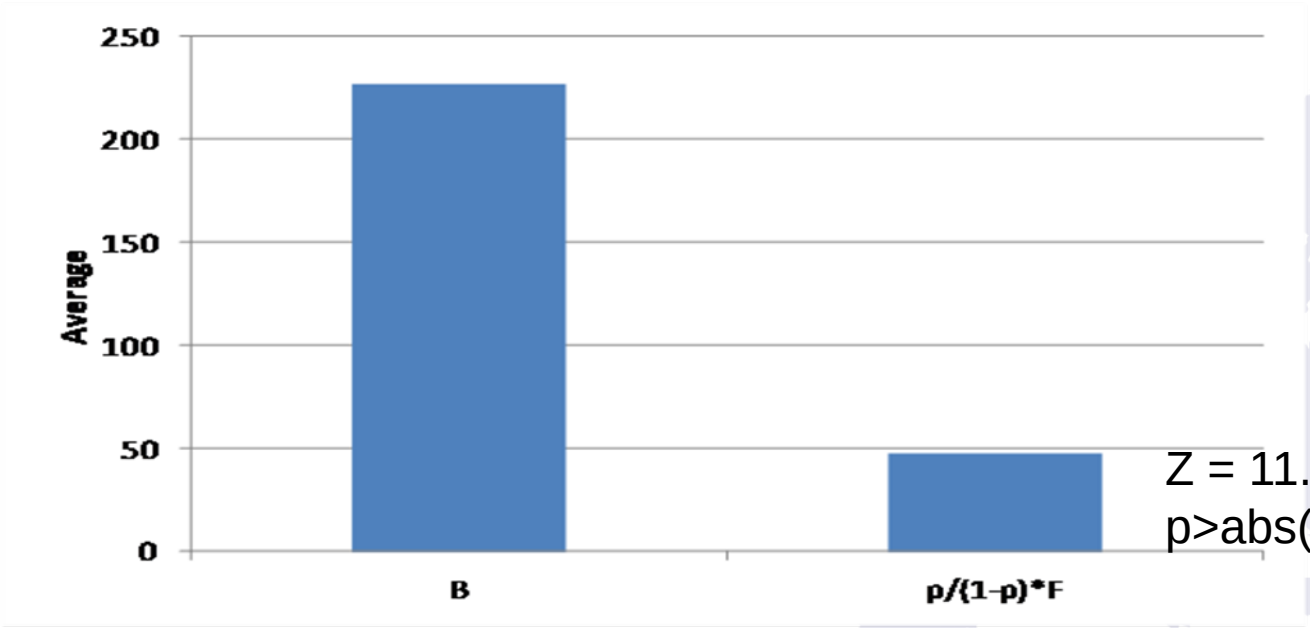
Between 24% and 35% of participants stated that choice depends on the fee/bonus. Except in Task 7, 52%.

Coding the data for analysis

- Our analysis considers both the raw data on average bonus/fine required to choose cartel activity (option 2), but due to a small number of participants selecting this option we also re-code the data:
  1. Raw data where we look at estimates of average bonus/fine for those who actually stated these values
  2. Recoded data: We use a number of different reasonable assumptions in the paper, the one illustrated in this presentation re-codes in the following way:
     - If always option 1 = for tasks where the fine was missing then fine = £0, for tasks where bonus was missing then bonus = £501 (max stated bonus in the experiment plus £1)
     - If always option 2 = for tasks where fine was missing then fine = 501 and for tasks where bonus was missing bonus = 0.
     - Other specifications for maximum bonus/fee tested were £200; £300; £1,000; £1,000,000. results do not change across these specifications.

Impact on behaviour: Expected pay-offs

- The risk-neutral, profit-maximising participant:
  - fine/bonus such that the expected return from Option 2 (the cartel) exceeds the certain return from the Option 1 (non cartel activity). Profit-maximising participant would not be concerned with the level of the loss to the other participant.
  - £120 = (1-p)(£120+B) + p(£120-F), such that the stated bonus: B = p*F/(1-p)
  - Using a Wilcoxon signed-rank test, on average the bonus required by participants is much larger than would be expected given the probability of detection and the fine



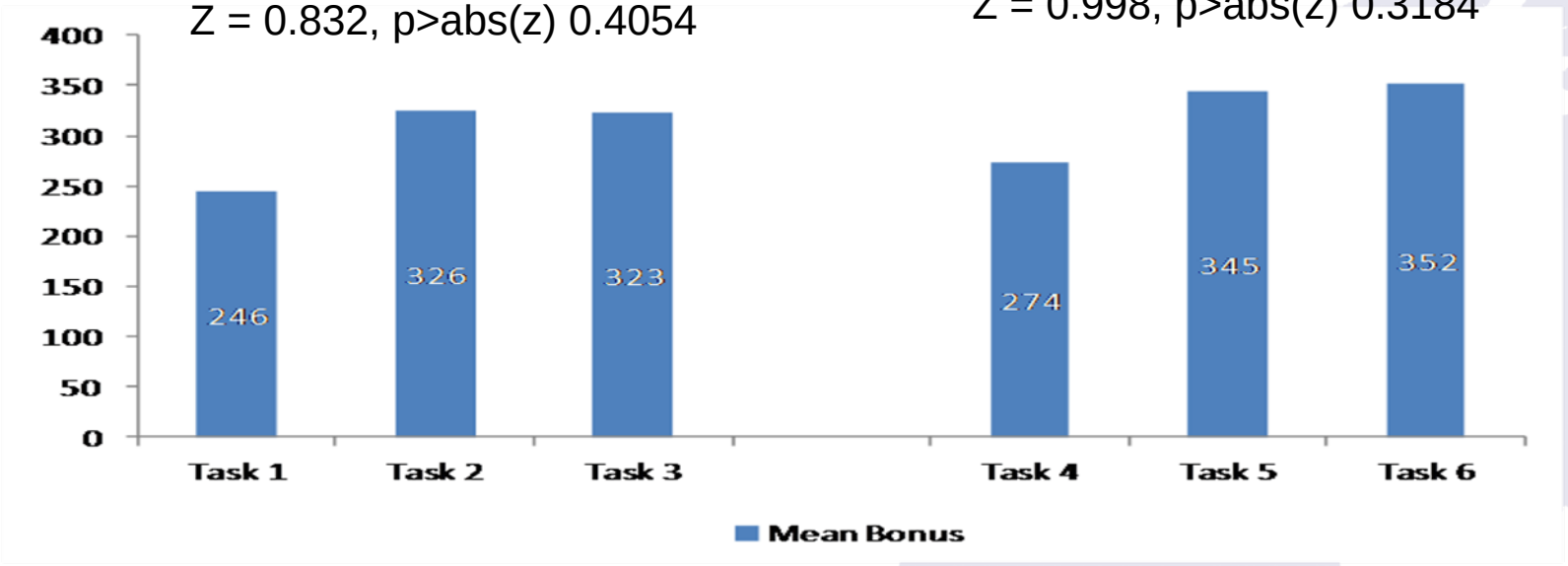
Z = 11.019
p>abs(z) = 0.000

Impact on behaviour: Expected punishment

- Average stated bonus, to engage in a cartel activity should be large if expected punishment is high (p*F).
- Looking at sets of tasks we can investigate importance of (p*F) on choice:
  - Task 1 (1/3*60)/Task 2 (2/3*30) = £20 versus Task 3 (1/3*120) = £40, and loss in all 3 tasks is 40.
  - Task 4 (1/3*60) /Task 5 (2/3*30) = £20 versus Task 6 (1/3*120) = £40, and loss in all 3 tasks is £80
  - Mann-Whitney U test, pooled average , no statistical difference
  - However, there is a relatively large difference between task 1 and 3 as well as between tasks 4 and 6 (although not statistically significant). This suggests that the absolute size of the sanction (i.e. the fee irrespective of the probability of detection, p =1/3 in both choices) may be more important than the size of the expected sanction (p*F).

Z = 0.832, p>abs(z) 0.4054

Z = 0.998, p>abs(z) 0.3184



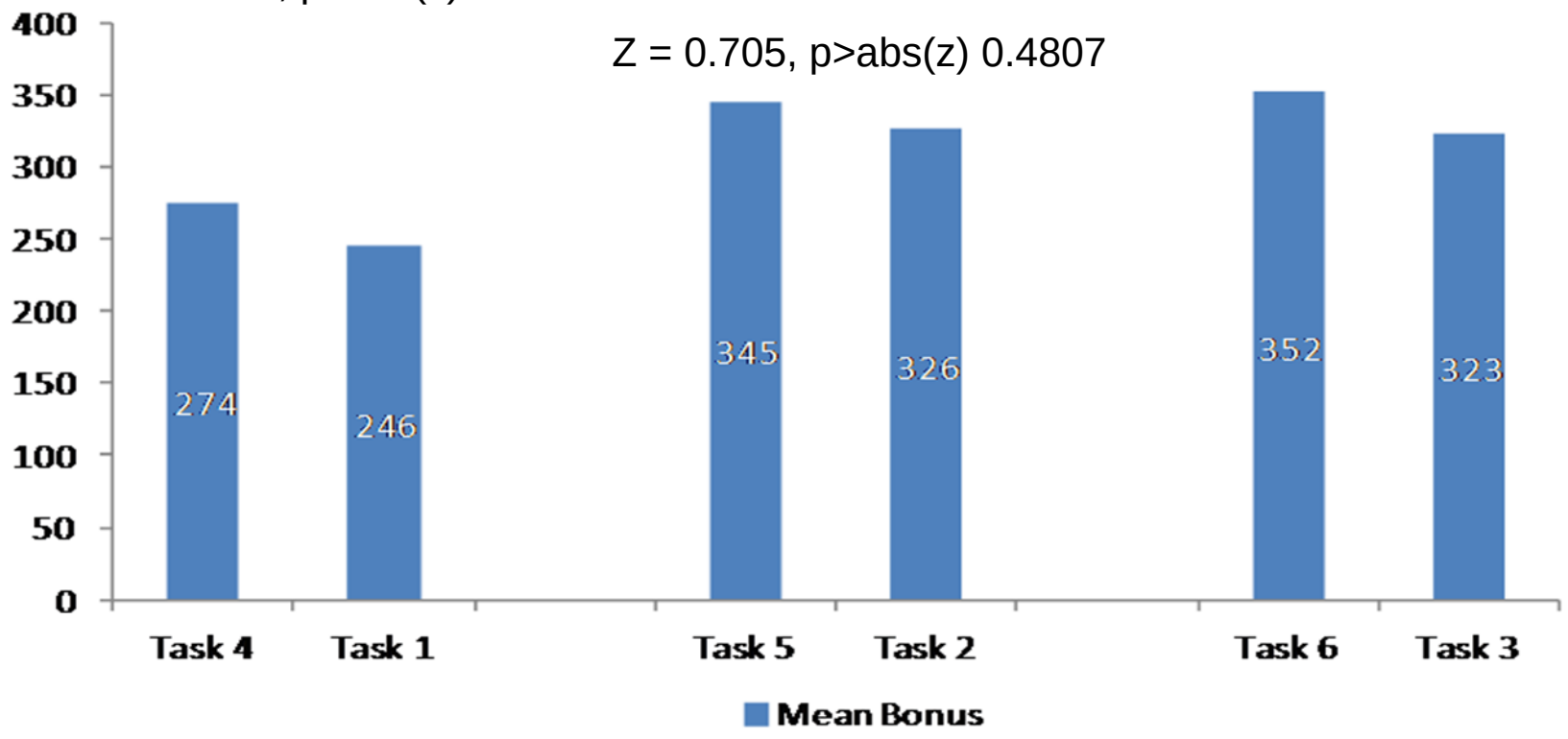
Impact on behaviour: Social concerns

- We observe that average requested bonus tends to be lower in tasks in which the loss to the 'consumer' is lower.
- However, statistically the average bonuses are not different.

Z = 0.815, p>abs(z) 0.4151

Z = 0.705, p>abs(z) 0.4807

Z = 0.373, p>abs(z) 0.7092



What are the most important factors influencing compliance?

Stated bonus:

- increasing in level of fine and the probability of detection: participants require a higher bonus level in order to select the risky option.
- increasing in the loss to the other person: suggests a level of consideration towards the other participant. However, not significant.
- knowledgeable about competition law, coefficient is negative and statistically significant: suggests that those knowledgeable of competition law would require a lower bonus to participate in a cartel than those not knowledgeable about competition law.

Variable	Co-efficient (p-value)
Loss to consumer	1.7 (0.303)
Fine	5.3 (0.088)*
Probability of detection	1279.1 (0.072)*
Knowledge	-552.4 (0.039)*
Constant	-2.9 (0.996)
N	186

Tobit model

Knowledge about competition law

- In the broader study participants self-reported their knowledge level:
  - We find that 47.5% of participants that are knowledgeable of competition law chose option 2 compared to 17.9 percent of participants that reported they were not knowledgeable.
  - While of those that chose option 2 'depending on bonus/fee', 45 % were knowledgeable and 11% were not knowledgeable.
  - In addition we find, on average the bonus required by participants choosing option 2, is much larger than would be expected given the probability of detection and the fine (statistically significant).
  - Knowledge may not always be a driver of compliance. Instead a high level of knowledge may be a sign of potential non-compliance.

What are the most important factors influencing compliance?

- Stated fine:
  - The fact that the coefficient on the probability of detection is negative suggests that the higher the chance of detection, the lower the fee level must be for participants to choose Option 2 (the cartel).
  - There is also an indication that participants care about negative impacts on other people, as the negative coefficient on loss indicates that the higher the loss level, the lower the fee has to be for the participant to undertake the risky option. However, this effect is statistically insignificant.
  - Again the coefficient on the variable indicating whether the participant is knowledgeable about competition law has the opposite sign to that which we might have expected if knowledge is a driver of compliance.

Variable	Co-efficient (p-value)
Loss to consumer	-3.4 (0.157)
Time taken	-0.0 (0.001)
Probability of detection	-505.4 (0.062)*
Knowledge	281 (0.038)*
Constant	44.8 (0.816)
N	93

Policy conclusions

- A experiment involving business representatives:
  - anti-competitive behaviour responds to financial incentives:
    - Experiment participants were less likely to choose a risky alternative (the cartel option) if there was a high probability of detection, a high sanction or a low gain from a risky option.
  - choice of whether or not to participate in a cartel depends not only on financial incentives but also on the degree of risk aversion and social preferences to minimise costs to other people in the economy.
    - the biggest challenge for competition authorities is therefore to deter the group of people who display risk-loving behaviour, i.e. always choose the cartel option because it involves the possibility of a high gain.
  - knowledge about competition law may not only be associated with greater compliance but may also be a sign of potential non-compliance:
    - as respondents that reported being more knowledgeable about competition law were more likely to choose the riskier (cartel) option in the experiment, and required a lower possible pay-off for taking the risk.

Thank you

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