Simulating Collusion: Challenging Conventional Estimation Methods

by Nicole Bellert and colleagues

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Summary

- Can current methodologies estimate the life and death of (population) cartels using the data from detected (sample) cartels?
  - Current methods: hazard rate and capture-recapture models
- Idea: simulate industries using theoretical cartel models, and let cartels be created, die naturally or be detected, in order to create simulated population cartels and simulated detected (sample) cartels
- Then see if using the simulated sample and the current methodologies for estimation of dark rates of collusion the population info on cartels can be recovered
- Short answer: no

Summary

Simulated cartels

- First, many parameters will be varied

Parameter		Values	Model
Number of Firms	n_{firms}	$\{2, 3, .., 10\}$	Stigler [1964]
Detection Probability	ρ	{0.1,0.15,..,0.35}	Bos et al. [2018]
Fine (% of Profit)	γ	{0.7, 0.8, 0.9}	Bos and Schinkel [2006]
Leniency (% of Fine to Pay)	θ	{0,0.5,1}	Bos et al. [2018]
Constant (0) vs. Increasing (1) ρ	*structured*	{0,1}	Harrington and Chang [2009]

- There will be many industries with different number of firms. Competition will be repeated. Their discount factor will follow random walks (imperfect financial markets).
- Firms will form cartels if their discount factor is above the critical discount factor, and will leave it is falls below

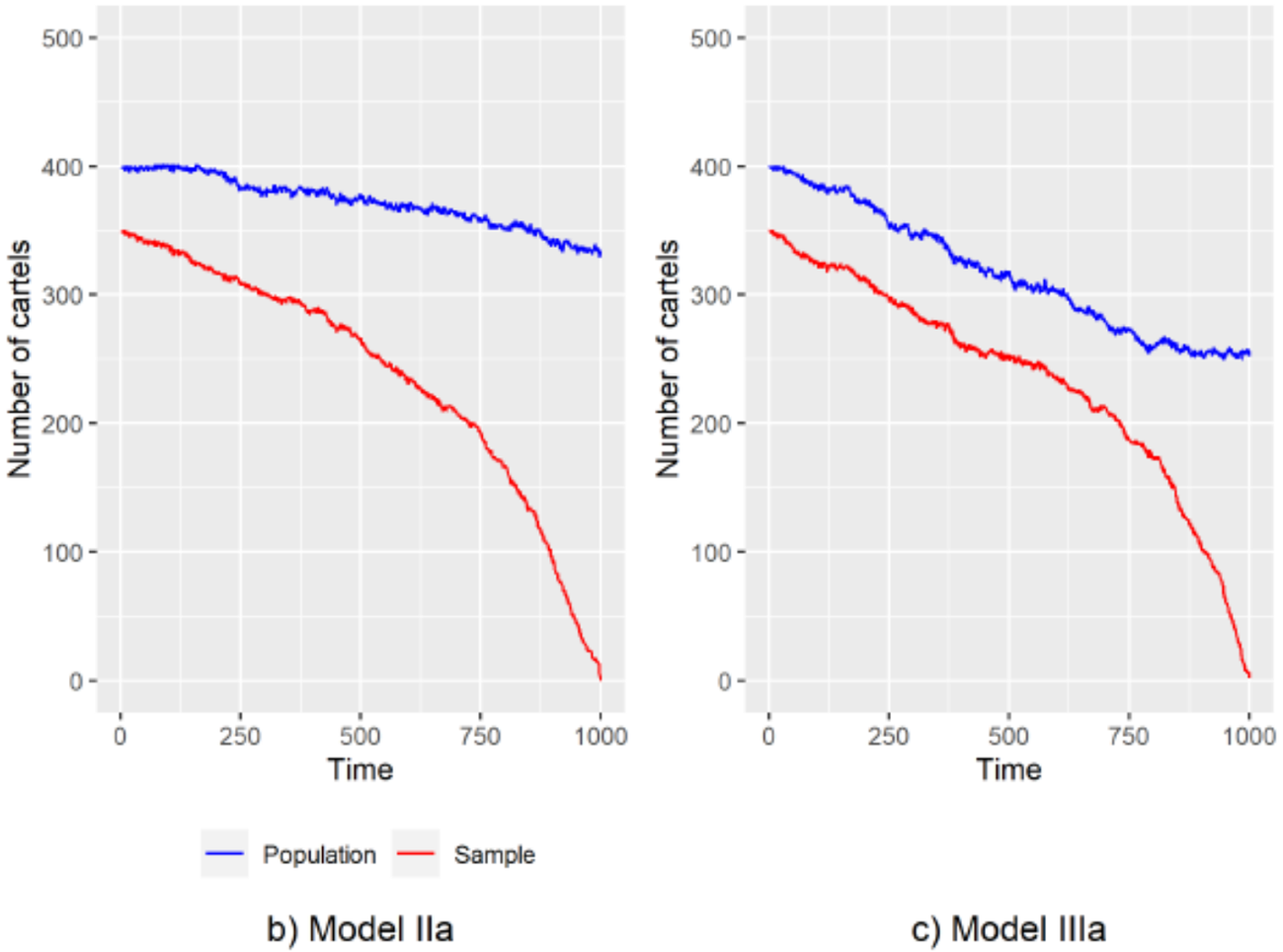
Summary

- Firms compete Bertrand in homogenous products without a capacity constraint.
- If colluded, they charge the monopoly price and market is divided in equal shares.
- A firm can deviate, slightly undercutting the price and so supply the whole market. Grim strategy follows.
- A cartel forms and remains alive, if at least 80% of all firms collude (Salant et al. [1983]). Incomplete cartels are allowed.
- Successive models include more things: detection, increasing probability of detection for repeated offenders, leniency.

Summary


0.95
0.90
0.85
0.80
Discount Factor δ
0
250
500
750
1000
Time
ICC without detection
ICC exit (IIIa)
ICC entry (= ICC exit full leniency)
ICC exit (0.5 leniency, IIIb)
firm 1
firm 2
firm 3
firm 4
firm 5
a) Model IIIa
b) Model IIIb

Summary



- Simulated sample versus simulated population are created and can then be studied
- Then use the sample and methodologies for dark rates and see how well do you do.
- You don’t do too well

Comments

- First thing that I like about the paper: it allows us to have an idea about the life and death of cartels → knowing the population of cartels is interesting on itself.
- Second, I like that we can compare the sample of cartels that are detected, to the population → sampling bias can be studied
- I am convinced that sample bias hinders (destroy?) dark rates estimations for hazard rate and capture-recapture

Comments

Suggestion 1.

- I do not think the current model enables incorporating incomplete cartels.
- Paper: "*a cartel forms and remains alive, if at least 80% of all firms collude*"
- But the competition is homogenous Bertrand, and therefore if any firm does not have a discount factor large enough to cartelize, it will make the cartel unfeasible by either pricing at marginal cost or slightly below monopoly price (this depends on what the firm believes)
- The 80% comes from a quantity competition model (Salant et al., 1983)
- So, keep the model, but run it only for complete cartels

Comments

Suggestion 2.

- Incorporating incomplete cartels would be great, from the point of view of learning about the life and death of cartels and sample (detected cartel) bias.
- Adapt your idea to incorporate Salant et al's model of mergers, that requires the 'merging/cartelizing' firms to actually have larger internal profits as a participation constraint
- (there are papers that simulate mergers or horizontal collaborations that can be of use here)

Comments

Suggestion 3.

- Allow the model to consider private actions for damages.
- In the US, victims are allowed to treble damages. In EU the subject has attracted attention (Directive 2014/104/EU on Antitrust Damages Actions and what follows)
- Possibly the way to go is simple: let the parameter γ (fines) be much larger than 1, but need to think about whether leniency applies to damages.
- It would be great to see how that affects life and death of cartels and the sample of detected cartels

Thank you