Algorithms, AI and Cartel Risks

Ariel Ezrachi

Slaughter and May Professor of Competition Law

Director, The University of Oxford Centre for Competition Law and Policy
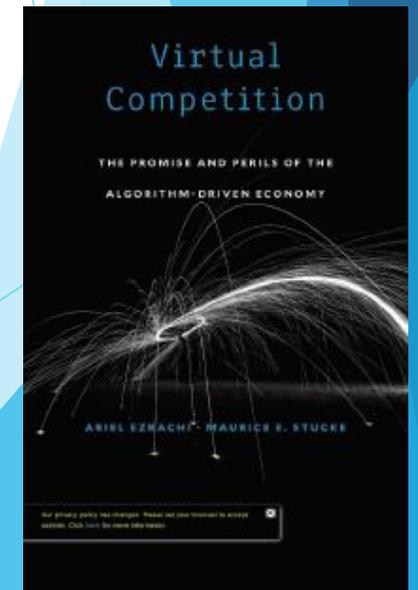
Collusion

Four key scenarios –

1. *'Messenger'*
2. *Hub and Spoke*
3. *Tacit Collusion on Steroids -- The Predictable Agent*
4. *Artificial Intelligence, God View, and the Digital Eye*

Hub and Spoke

1. Dynamic pricing
2. Intentional *v* incidental.
3. Use of same algorithm.
4. Use of same provider – A2I, Boomerang …
5. *"put an end to price wars before they even begin."*
   "auto-detect pricing wars"
   "help drive prices back up across all competition."

1. Legal Challenge – Identify a threshold of illegality
2. Agreement? Signalling?
3. Facilitation?

Tacit collusion

1. **'Basic model'**
   ▶ Rational reaction to market characteristics
   ▶ Inapplicability of Article 101 TFEU & Section 1 of the Sherman Act.

2. **'Basic model+'**
   ▶ Signaling
   ▶ RPM + facilitation using algorithms. (EU Commission – Elec manufacturers - *Asus, Denon & Marantz, Philips and Pioneer* (July 2018))

   ▶ Active decoding and observations.
   ▶ Extend the notion of agreement.

Basic model & the Coordination problem

Likelihood →

- The important role of communications in stabilizing and optimizing collusion.

- Firms are less likely to develop a mutual understanding over a collusive strategy absent direct communication in the initiation phase.

As a result, some have argued →

- The number of collusive equilibria present in a repeated game defies simple alignment of price

- When we observe what appears to be tacit collusion in these markets, it is likely the result of illegal human communications.

1 - A gap between this econ view and the law?

The law accepts parallel behavior as possible outcome under specific market conditions

Tacit collusion falls outside the scope of Section 1 of the Sherman Act and Article 101 TFEU.

It is only when parallel behavior cannot be explained as the outcome of tacit collusion (or due to other factors), that it may serve as proof of illegal collusion.

"Competitors in concentrated markets watch each other like hawks."

- _CISAC v Commission_
- Imperial Chemical Industries (ICI) v Commission (Dyestuffs)

- *'Tacit collusion, sometimes called oligopolistic price coordination or conscious parallelism, describes the process, not in itself unlawful, by which firms in a concentrated market might in effect share monopoly power, setting their prices at a profit-maximizing, supracompetitive level by recognizing their shared economic interests and their interdependence with respect to price and output decisions.'*

  (Group v. Brown & Williamson Tobacco Corp)

- *'Although parallel behaviour may not by itself be identified with a concerted practice, it may however amount to strong evidence of such a practice if it leads to conditions of competition which do not correspond to the normal conditions of the market, having regard to the nature of the products, the size and number of the undertakings, and the volume of the said market.'*

  (Imperial Chemical Industries (ICI) v Commission (Dyestuffs) Case 48/69)

Legal reasoning –

If one were to reject the prevailing legal viewpoint, we may quickly shift to a Type I error (false positive).

If anticompetitive conscious parallelism/tacit collusion is considered implausible without communication, the court could infer communications.

… If the skeptics are right, humans have somehow successfully skirted antitrust liability for decades by disguising their communications. No point in using algorithms, as humans have cracked the system.

2 - A gap between this econ view, market reality and recent experimental evidence?

▶ Misalignment between market realities and the experimental evidence (absolute control over all communications over a number of hours) that some economists rely upon.

▶ "Industry awareness" – Indicators below the legal radar screen,....

▶ Current work with Q-learning suggests possibility and need for future awareness:
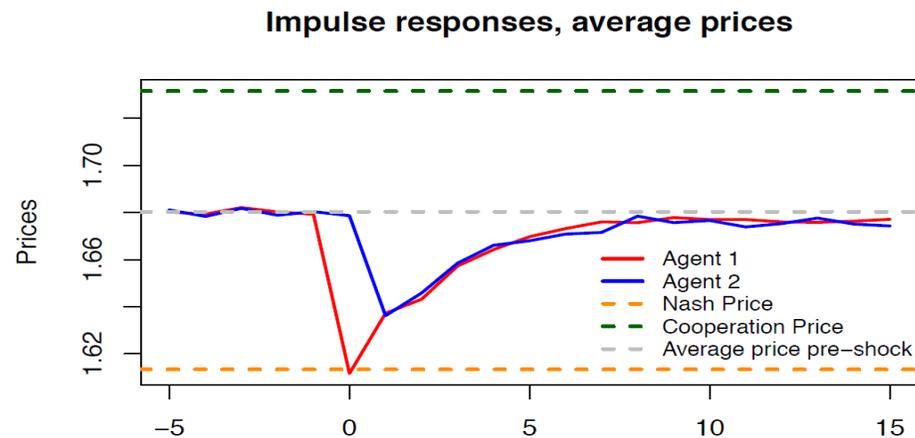
Source: Calvano, Calzolari, Denicolò and Pastorello 'Q-Learning to cooperate'

TECH

Bots Help Each Other Win Videogames

Researchers at Google's artificial-intelligence labs said they have develope
virtual videogame players that learned to play by working with
other digital gamers.

'In most cases, the virtual players played a **capture- the-flag** videogame better than professional, human game testers …'

'Their goal is developing artificial intelligence that can solve a variety of problems in **diverse settings without additional training**, much the same way humans leverage prior experience to navigate new situations or to improvise…. **In collaborative games, players don't know what actions their teammates will take. Plus, one player's actions may influence those of others, creating a more varied assortment of scenarios each player needs to master to be successful.**

DeepMind's software learned to play a multiplayer, first-person game called "**Quake III Arena.**" The game has a variety of modes, including a capture-the-flag challenge during which multiplayer teams work together to obtain a flag in the opposing team's territory. **For the study, the AI-powered players only learned the capture-the-flag component. The task requires developing a strategy and planning, two signs of intelligence, according to AI researchers.**

Enforcement approach

- Algorithmic hub-and-spoke currently remains unchallenged, but could be addressed under current laws.
  - Risks can be mitigated by using internal measures by third party providers.

- 'Tacit collusion **+**' could be captured

- Tacit collusion remains outside current enforcement.
  - The irrationality of making rationality illegal.
  - *'[T]he Sherman Act imposes no duty on firms to compete vigorously, or for that matter at all, in price.'* (In re Text Messaging Antitrust Litig)
  - The limitations of algorithmic audits.
  - The difficulty in monitoring learning by doing.
  - Distortions, opacity, personalisation form unattractive intervention strategies.
  - OECD 2016 – '...serious challenges to competition authorities...'
  - OECD 2017 – '... *algorithms are fundamentally affecting market conditions...*'

Policy considerations

▶ What is the market price?

▶ What amounts to unilateral action?

▶ Same threshold for *Algorithmic* and *Human* tacit collusion ?

▶ Is the legal concept of agreement outdated for computer algorithms? are our current laws sufficient to deter and prevent tacit algorithmic collusion?

▶ How can the agencies identify when algorithmic collusion occurs, especially when pricing is dynamic?

▶ What additional measures should be considered to reduce the additional risks associated with the use of price optimization algorithms?

▶ In what way in which should firms be obligated to integrate ethics and legality into a computer program?

▶ Should companies have an affirmative duty to program the computers so as to not tacitly collude?

▶ Ensure disruption on markets? Introduce distortions?