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Dawn of the robots

First cases of algorithmic collusion

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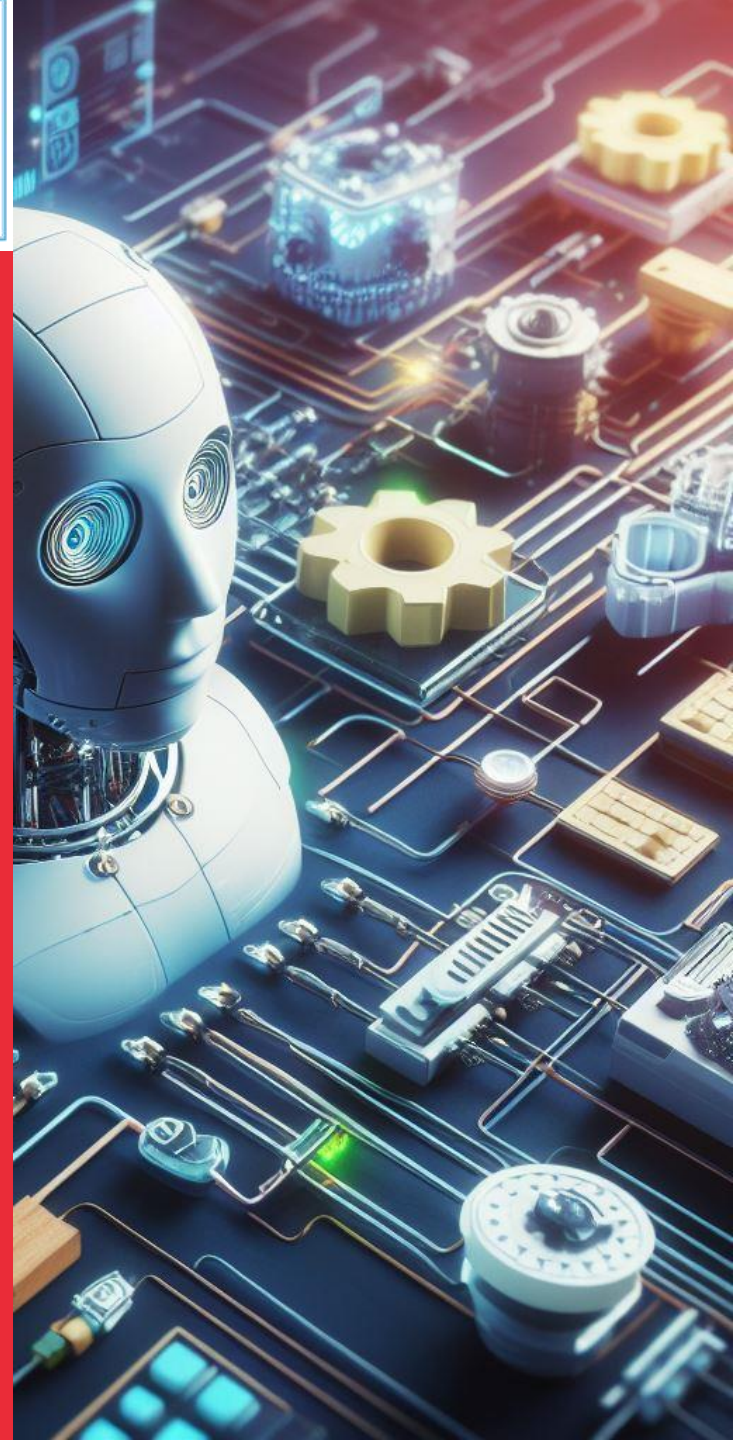


Algorithms and their commercial benefits

Algorithm = **set of instructions** (turning inputs into outputs)

Computerized algorithms provide many **benefits**:

- They can **process** vast amount of **information** in very short time
  - Reduces time lag to adjust supply and demand (e.g. dynamic pricing)
  - Can be used to increase transparency and reduce market failure (e.g. price comparison tools)
  - Allows for personalisation and thereby reduction of deadweight loss

  = Much more efficient than humans
- They **do not need time off** and are not (as much) subject to human biases

Anticompetitive risks of algorithms

Capabilities of algorithms can be used for **collusive purposes** as well

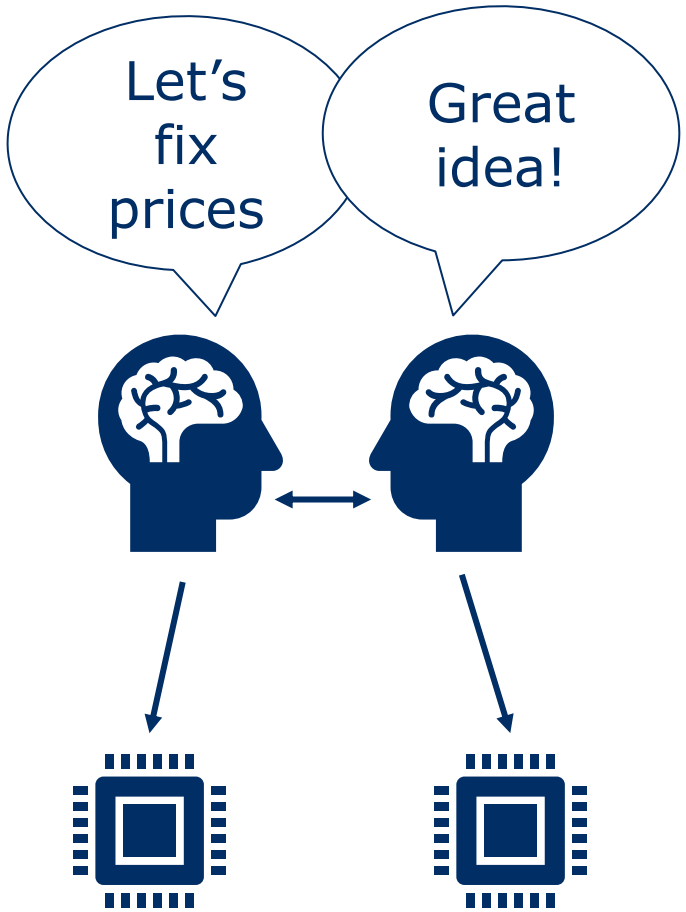
→ May be contrary to Article 101 TFEU (and national equivalents) which prohibits **anticompetitive agreements and concerted practices**.

Types of concerns:

1. Algorithms as tools for collusion
2. Hub-and-spoke collusion through algorithms
3. Collusion by autonomous algorithms

Note: current cases revolve around *pricing* algorithms but similar concerns could arise re product quality or availability (e.g. through recommender systems)

1. Algorithms as tools for collusion



Humans conclude anticompetitive agreement

Humans use algorithms to implement agreement:

- Monitoring deviations
- Automatically adjusting prices/offerings

1. Algorithms as tools for collusion

Case study: Online posters

Plea agreement U.S. v Topkins (N.D.Cal. 2015)

Decision CMA 12 August 2016 (Case 50223)

- Companies agree not to undercut each other on Amazon
- Because of difficulties to implement this agreement manually, automated repricing software was used (but each party used different algorithm)

1. Algorithms as tools for collusion

Enforcement and detection

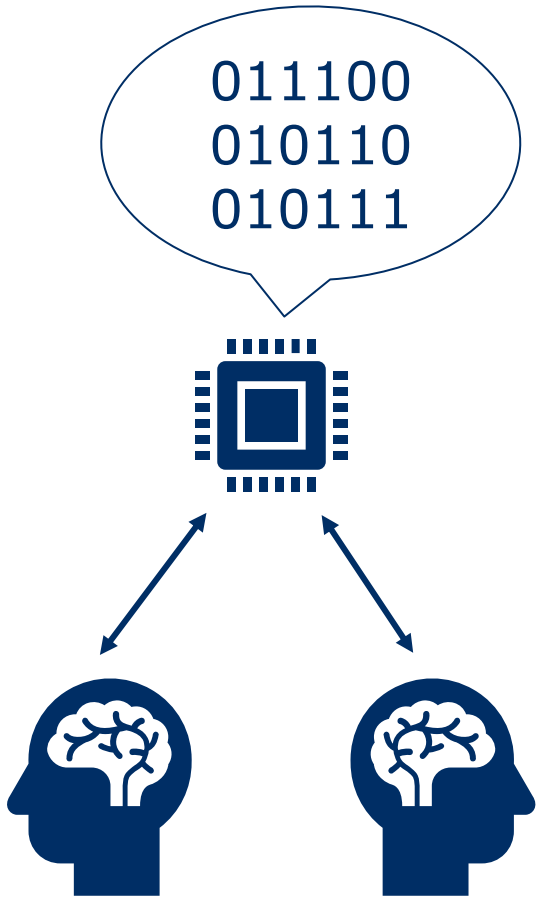
No legal difficulties:

- Acting FTC Chair Maureen Ohlhausen: "*If it isn't ok for a guy named Bob to do it, then it probably isn't ok for an algorithm to do it either*"

Classical tools for detection (leniency, whistleblowing, dawn raids, etc.) are available

- But amount of evidence can be reduced due to use of algorithm

2. Hub-and-spoke collusion through algorithms



Competitors use the same software:

- Software may be designed to restrict competition
- Software may increase parallelism

2. Hub-and-spoke collusion through algorithms

Case study: Eturas

Decision Competition Council of Lithuania 7 June 2012

- 30 travel agents used an online tour search and booking system provided by Eturas
- Eturas sent message that it was going to limit discounts on the system to 3% and implemented technical restrictions to this effect
- Preliminary reference on appeal led to confirmation by CJEU:

> "where the administrator of an **information system**, intended to enable travel agencies to sell travel packages on their websites using a uniform booking method, sends to those economic operators, via a personal electronic mailbox, a message informing them that the discounts on products sold through that system will henceforth be capped and, following the dissemination of that message**, the system in question undergoes the technical modifications necessary to implement that measure** those economic operators may — if they were aware of that message — be presumed to have participated in a concerted practice" (case C-74/14 Eturas)

2. Hub-and-spoke collusion through algorithms

Case study: Car insurance

Commitments decision OFT December 2011 (OFT1395)

- Pricing information provided by car insurance to brokers was reused in a database that was accessible to the car insurers
- Database software allowed car insurers to do batch analysis and reverse engineer rating models of competitors

→ To concluded investigation, car insurers and software providers committed to only use pricing data that was at least six months old and only data that was anonymized and aggregated

2. Hub-and-spoke collusion through algorithms

Enforcement and detection

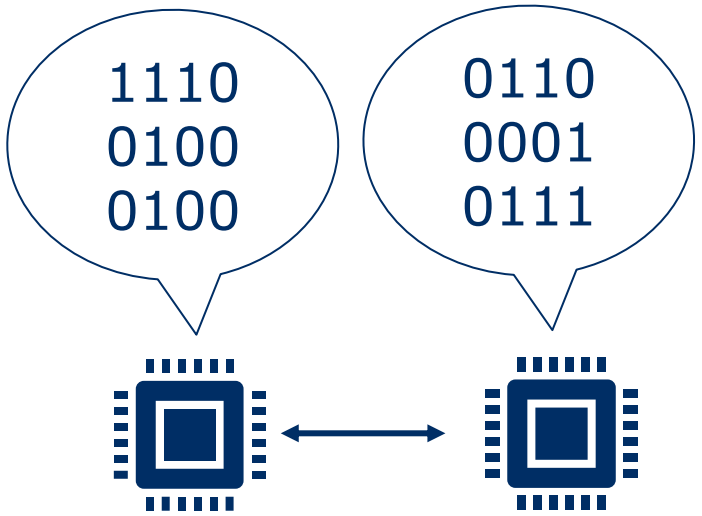
Evidentiary value of software

- May reduce amount of direct communication between participants
- May itself reveal collusion

Liability of intermediary

- CJEU case law in C-194/14 P AC-Treuhand *etc.*
- Relevance of whether software was designed for collusion v negligent design that allowed for collusion?

3. Collusion by autonomous algorithms



Independent algorithms themselves create collusive agreement/concertation

→ Could increase the prevalence of tacit collusion

In particular reinforcement learning algorithms

- Can be used in dynamic environment (like a market)
- Learn through trial and error

Assumes that relevant market features can be synthetized

3. Collusion by autonomous algorithms

Case study: German petrol stations

Assad, S., Clark, R., Ershov, D., & Xu, L. (2020). Algorithmic pricing and competition: Empirical evidence from the German retail gasoline market. https://www.econstor.eu/bitstream/10419/223593/1/cesifo1_wp8521.pdf

- Adoption of AI-powered pricing software at petrol stations identified based on measures related to price changes
- Empirical data suggests 9% increase in margins for petrol stations that adopt such pricing software
- Empirical data suggests that in duopoly markets:
  - Margins do not change when only one of the two stations adopts, but
  - Margins increase by 28% where both stations adopt

3. Collusion by autonomous algorithms

Enforcement and detection

No actual enforcement yet

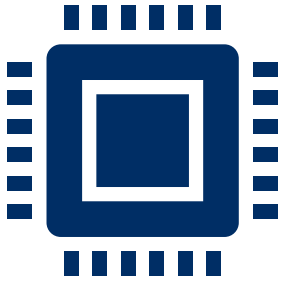
Several concerns for competition law enforcement:

- Tacit collusion is not prohibited by the antitrust rules: "*economic operators [have] the right to adapt themselves intelligently to the existing and anticipated conduct of their competitors*" (40/73 Suiker Unie)
- Even if prohibited, what evidence should be used to distinguish tacit collusion from other (legitimate) commercial strategies?
- Even if detected, what action could be undertaken to stop it?

Alternative approaches to enforcement:

- Pursuing cases of signalling
- Commitments to adjust parameters
- Regulatory intervention

Conclusion



Increased use of code/algorithms in commerce increases opportunities for humans to use them for collusive purposes:

- For independent monitoring and implementation of offline agreements
- Through joint software

Collusion by autonomous algorithms:

- Theoretically possible
- Hard to detect + punish + fix

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