Tacit Collusion in the Age of AI: The EU towards the regulation of AI

Lighthouse Europe

October 2023

ANALYSIS

Introduction

The Fourth Industrial Revolution, characterized by the integration of AI and Big Data generated by the Internet of Things, has significantly transformed markets, ushering in efficiency gains and improved **access to valuable information**. According to the [U.S Bureau of Labor Statistics](#), the employment rate of data scientists is expected to grow by 36% per cent in the decade between 2021 and 2031, rendering data science as the [sexiest job of the 21st century](#), rebutting Google Chief Economist's, Hal Varian's famous quote in 2012 that "*the sexy job in the next ten years will be statisticians*".

However, as businesses harness AI algorithms to analyze vast datasets and **optimize strategies,** concerns have arisen over potential **anti-competitive behavior**. The crux of the matter lies in the possibility of AI-powered market mapping leading to a **coordination of behaviors** among market players and the **adoption of monopolistic pricing** (tacit collusion), posing challenges to effective competition and social welfare.

This article will examine AI's role as a potential **barrier to competition**, particularly in facilitating tacit collusion and the feasibility of such practices in modern markets. Furthermore, the discussion will revolve around the **recent EU legislative initiatives** aimed at regulating AI to strike a delicate balance between technological advancement and the protection of fundamental rights and the rule of law.

Can algorithms be rational market players?

Tacit Collusion

Article 101 paragraph 1 of the Treaty on the Functioning of the EU (TFEU) prohibits **concerted practices**[1] among market players, i.e., forms of coordination between market players without any previous **explicit communication** which can lead to price fixing or competitors' exit.

However, competition law has no interest in punishing actions of players originating from **a rational decision-making** process due to a correct estimation of market parameters. In a nutshell, a gas station owner who sets the price in accordance with the prices of his competitors, after observing their prices on the billboards, **does not infringe** Article 101 TFEU.

This behavior is completely rational and it is deeply based on **game theory**, according to which, the players of a game opt for the **optimal action** that will bring in the **largest profit** (Nash equilibrium). Therefore, a gas station owner active in an oligopolistic market, will take into consideration their competitors' prices and will adapt theirs accordingly, in order to acquire the highest possible profits **avoiding retaliation and price wars by their competitors.**

Briefly speaking, **tacit collusion** refers to **an implicit coordination among competitors in the same market, who align their interests and practices aiming to higher profitability without any formal agreement or communication, benefitted by the structure of the market**. Tacit collusion constitutes no competition law infringement, as it is based on **observations and rational reactions** of market players to the environment of the relevant market avoiding any kind of communication.

Collusive algorithms

The rise of data science and AI in the realm of modern commerce, along with the leaping developments of technology has redefined competition rules, reshaping the dynamics of the markets like never before. The ubiquitous IoT data is processed by powerful Machine Learning algorithms, offering significant **insights** regarding **consumers' behaviour** and **competitors' choices**, improving our lives by reducing **information asymmetries**. Nevertheless, how could algorithms converge to supra-competitive prices without explicitly colluding, reducing, thus, social welfare[2] ?

The answer lies in **Q- Learning**, Reinforcement Learning algorithms, which learn to evaluate the value of their actions at specific states. These algorithms are trained by participating in a continuous game following a **trial-and-error** process, where choosing the **optimum strategy** grants larger rewards than

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[1] On concerted practices see C-89/85 - Ahlström Osakeyhtiö and Others v Commission, 1988.

[2] For examples anti-competitive implementation of collusive algorithms, see DoJ, United States v. Topkins, cr 15–00201 WHO, 30.04.2015 and C-74/14, Eturas UAB and Others v Lietuvos Respublikos konkurencijos taryba, 2016.

others. With the implementation of Deep Learning and Neural Networks, such algorithms possess larger computational capacity for calculating different parameters. Like gas station owners, these algorithms learn to **interact** with their competitors by **experimenting with prices**, and calculating the **consequences of retaliation** against them. Remarkably, such algorithms can learn how to charge supra-competitive prices close to monopolistic prices and avoid competitors' retaliation against them.

Nonetheless, different research papers[3] show that such pricing algorithms face significant hindrances when the **number of players** in a market rises and when there **is a lack of adequate market data**. Moreover, the **instability** of the algorithmic training processes and the dynamic nature of real-world problems currently render algorithms incapable of tacitly colluding. However, as Reinforcement Learning continues to advance over the years, algorithms **will** likely become more adept at handling complex problems **reshaping market dynamics** in unforeseen ways.

The rapid advance of AI has already triggered the adoption and proposal of legal texts by the EU, aiming to contribute to the creation of reliable AI systems.

EU trends on regulating AI

On **14 June 2023**, the EU Parliament adopted its negotiating position on the **AI Act**. The EU Institutions are currently at the last stage of interinstitutional negotiations – trilogues. The Proposal aims to ensure that AI systems deployed in the EU are **safe**, **transparent** and respect **fundamental rights** and **EU's general goals**. Pursuant to the AI Act, AI systems will be classified and then regulated according to their perceived level of risk with the AI Act distinguishing 4 categories of risk:

- **Unacceptable risk:** AI systems proceeding to social scoring, behavioural manipulation or real-time and remote biometric recognition, are completely prohibited.
- **High risk:** AI systems negatively affecting safety and individuals' fundamental rights will be subject to hefty restrictions, such as the use of AI in health and medical devices.
- **Foundation models:** AI such as Open AI's Chat-GPT and Google's Bard will also be subject to certain requirements, such as registration and transparency.
- **Limited risk:** AI systems like chatbots will be obliged to follow specific transparency requirements.

The AI Act constitutes the EU's **first** initiative in regulating AI and algorithms, whilst setting the basis of a robust legislative framework, with the vision of an AI respecting EU values and goals. However, the AI Act is a product safety Regulation at its core.

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[3] See Salcedo 2015, Klein 2018, Calvano et al. 2019, Hettich 2021, Calvano et al. 2021 and Zhang 2023.

Another legislative initiative on AI is the AI Liability Directive, based on the AI Act. The Directive's proposal, was published on **28 September 2022** with purpose to facilitate evidence in cases of **non-contractual civil liability** cases caused by AI systems. Moreover, particular EU initiatives might not focus on AI per se, but **revolve around data**, which are quintessential to the learning process of AI algorithms, such as the Data Act and the European Health Data Space, aiming to **remove the barriers to access** to data. Additionally, the Digital Services Act, which came into force on **16 November 2022**, establishes **algorithmic due diligence** rules for online platforms, in order to eradicate **illegal online** content. On **03 October 2023** the EU Commission published a recommendation, where classifies AI as a technology area highly likely to present the most sensitive and immediate risks related to technology security.

Conclusion

Although AI decision makers might be able to hamper effective competition in the future, we strongly believe that developments in the field of AI should be **warmly welcomed** by EU citizens, and, above all, by the EU authorities. AI innovations can add incredible and sophisticated **tools** to the arsenal of **national competition authorities** and the Directorate-General for Competition of the EU Commission, if the usage of such technologies is promoted. To this end, it is essential to start with **proper education** in AI and perhaps in basic programming, in order to understand AI's fundamental principles and uses, and to develop an efficient **ex post** enforcement system.

Whilst the current legislative texts regarding AI do **not extend to competition law** matters, they start from the basics, e.g., respect of the **fundamental rights**, setting the bedrock for **trustworthy** and hopefully **explainable** AI that will upgrade our lives, anticipating as many risks as possible. Achieving the golden ratio between **innovation** and **regulation** might be a toilsome task, however, EU legislators should be vigilant and strive for striking this balance at any cost.

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