TACIT COLLUSION UNDER COMPETITION LAW: PRICING ALGORITHMS

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Abstract

A great level of transparency, resulting from data sharing (exchange of information), combined with use of algorithms may lead to reciprocal price or production control by competitors. Algorithms eliminate elements of spontaneity in market and may result in supracompetitive prices. But the collusive effect can also occur even if economic operators do not have this intention. Not always there is an express or implied agreement that fits within the concept of "restriction of competition", as traditionally delimited by European case law in the sense that companies agree to eliminate their independence or freedom to defining their business strategy. In these cases, there may not even have been any concerted practice; each operator, using specific algorithms, which observe and analyse competitors' historical price data, sets its own prices and determines those of rivals. According to the European Commission, in the context of e-commerce, European retailers are already starting to set their prices on the basis of those set by their competitors, using automatic computer developments.

In this way it unilaterally provokes collusion (higher prices). This makes it difficult to apply article 101 TFEU, since it requires some kind of concerted practice involving the idea of agreement. It is necessary to analyse whether it is possible to reinterpret the rule in such a way as to include the phenomenon of tacit collusion.

Keywords: *Pricing Algorithms – Restriction of Competition - Tacit Collusion.*

1. Introduction: Is Tacit Collusion a new phenomenon?

Tacit or implicit collusion refers to the behaviour of a number of undertakings which, as a result of observing each other, but taking their decisions independently, align their business strategy and apply supra-competitive (restrictive) prices. In short, they give up competing with each other, without having agreed to do so.

Tacit collusion is not a new phenomenon, but what is new is the economic context in which it can occur today. Parallel behaviour has been common in duopolies or oligopolies: the small number of competing companies facilitates a high level of transparency in market and thus the risk of price uniformity increases[1]. That is the case of gas station markets, with a small number of suppliers and a high degree of homogeneity in the product offered[2].

Despite its negative effects (those of explicit collusion), it has not generated as much concern (neither for competition authorities nor for legal literature) as it does today with the digital markets and artificial intelligence. The degree of transparency that can be achieved in the new technological environment extends tacit collusion to markets with a large number of competitors, even with a not-so-homogeneous supply. What used to be anecdotal can now become the general rule.

This raises the question of whether existing Competition Law provides a solution to tacit collusion and, if not, whether there is a need to address its regulation. Some of the studies on the subject (doctrinal and institutional) conclude that current law does not provide answers to this problem.

This paper aims to identify and clarify these legal gaps. However and at the same time, we can also find arguments in existing Competition Law to counteract the collusive effect of algorithms, with particular emphasis on the case law of the Court of Justice of the European Union. Finally, some legal solutions are proposed, with the aim of preventing the existence of algorithms with harmful effects on the market: to extend liability for collusive effects to those agents who have an obligation to monitor the algorithm («*culpa in vigilando*» doctrine).

2. What is an Algorithm?

The study of competition law has always required a balance between legal and economic aspects. But in recent times new disciplines, and the need for their understanding, have been introduced into our field: mathematical and computational sciences. It is therefore necessary to introduce, even in a very basic way, what an algorithm consists of.

Competition authorities have begun to familiarize themselves with these concepts, trying to understand how they work. The Competition and Markets Authority of the United Kingdom defines them as a very precise computational calculation procedure, where a value or set of values is taken as a starting value or set of values (in the case of pricing algorithms they take a given price as an input) and, after a process, this

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[1] OECD, Algorithms and Collusion: Competition Policy in the Digital Age, 2017.
[2] Weche / Weck (2021), 5.

results in a value or set of values as an output (final price)[3].

For its part, the German authority (Budendeskartellamt) considered it necessary to break down the different classes of algorithms from a technical point of view, in order to be able to determine the level of human involvement in the final price determination process[4]. And so, it distinguishes between static algorithms and self-learning algorithms, depending on the degree of autonomy they develop. The former are simpler; its behavioral parameters are initially designed and do not change, they remain over time, even though it is nourished by new information. What does vary is the final price if the entry price (that of a competitor, which has been observed by the algorithm itself) changes. It is said that these algorithms are easily interpretable by humans, since their descriptive nature allows to deduce the strategy and the final result of the algorithm itself.

On the contrary, self-learning algorithms develop a more complex computational process that improves their performance as more tasks they perform, as they gain more experience from more data, from more information. In fact, they are changing their own parameters, to the point of being able to move away from the rules originally designed, making it more difficult to predict their behaviour. The mathematical process is the one that makes the decision about the result that it understands most optimal. There are three types: "unsupervised learning", "supervised learning" and "reinforcement learning"[5]. These are the so-called Black Box algorithms, because it is hard to figure out how they get to a certain result[6].

3. Relationship between transparency and algorithms

3.1. Secrecy or Transparency in Competition

Information is an essential element of the competitive process. It is difficult to develop an economic activity in market without taking into account certain data: prices, customers, levels of demand, competitors' reactions or lack of reaction to any competitive effort, etc. To the extent that information has special relevance for economic life, it acquires its significance for competition. These circumstances justify that the disclosure or exchange of data between competitors must be analysed from an Antitrust Law perspective. In order to determine whether the communication of data between undertakings competing in the same market is restrictive of competition, a preliminary question must be resolved. To the extent that information entails transparency in market, it will be necessary to analyse whether it is beneficial or detrimental to it.

This question was discussed in Germany last century in connection with the so-called "doctrine of Hidden Competition" (Geheimwettbewerb). According to it, each company must autonomously set the strategy it intends to follow in market. Faced with the uncertainty of the competitors' offer, the entrepreneur will try to adjust his overall service as much as possible, both in terms of price and the content of his ancillary services. The strictest interpretation of this principle is that effective competition requires the prohibition of any transmission of data and exchange of information among competitors[7].

However, the idea that any level of market transparency is restrictive of competition and detrimental, and should therefore be prohibited, was criticized by many authors[8]. Certainly, it is not possible to support a general principle of Hidden Competition when there are so many rules in the current legal systems that establish transparency obligations. Today it is understood that effective competition requires a situation of perfect information[9]. A well-informed customer will have the necessary elements to choose the product or service best suited to his needs, which will lead to a higher level of demand with regard to the offers presented to him. In turn, the more data the entrepreneur has about his competitors' products or services, the more possibilities he will have to improve his performance compared to those of his competitors. Consequently, the production and dissemination of information can represent a positive activity for the consumer and for a proper functioning of market. But at the same time transparency can have restrictive effects on competition. Under certain circumstances, the exchange of information may be a collusive practice because it encourages and even incentivizes the standardization of competitors' conduct; in some cases, it may be used as a necessary tool for the implementation or reinforcement of a collusive agreement.

Thus, it can be concluded that information is characterized by its ambivalent nature in relation to the competitive process, since, depending on the context in which it is given, it will entail a benefit or a restriction of competition[10]. The criteria for distinguishing when

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[3] Competition and Markets Authority (CMA): Pricing algorithms. Economic working paper on the use of algorithms to facilitate collusion and personalised pricing, 2018, 9.

[4] Bundeskartellamt: Algorithmen und Wettbewerb Schriftenreihe „Wettbewerb und Verbraucherschutz in der digitalen Wirtschaft", 2020, 2-3.

[5] Autorité de la Concurrence / Bundeskartellamt (2019). Algorithms and Competition, 11-12.

[6] Picht / Freund (2018). Competition (law) in the era of algorithms, *Max Planck Institute for Innovation and Competition Research Paper* No. 18-10, 4.

[7] Hoppmann (1966), 97.

[8] Behrens (1963), 85-86; Benisch (1990), 937-949; Dreher (1992), 27-28.

[9] Berti (1996), 563.

[10] Kilian (1974), 292; Wagner-von Papp (2004), 29-31; Benisch (1990), 948-949; Berti (1996), 591-592.

these positive or negative effects occur can be drawn mainly from resolution of the European Union institutions.

3.2. Market transparency in the context of algorithms

A great level of transparency, resulting from data sharing (exchange of information), combined with use of algorithms may lead to reciprocal price or production control by competitors. Algorithms eliminate elements of spontaneity in market and may result in supracompetitive prices. This is what happened in the UK between two competitors selling posters and frames online through Amazon's platform. Both companies agreed not to sell below the price of the other; they used software that automatically checked the prices, controlled them and adjusted them to the competitor. In this case algorithms were used not (or not only) to determine price, but to monitor compliance with a prior collusive agreement and to correct any deviation from that agreement.

But the collusive effect can also occur even if economic operators do not have this intention. Not always there is an express or implied agreement that fits within the concept of "restriction of competition" (art. 101 TFEU), as traditionally delimited by European case law in the sense that companies agree to eliminate their independence or freedom to defining their business strategy. In these cases there may not even have been any concerted practice; each operator, using specific algorithms, which observe and analyse competitors' historical price data, sets its own prices and determines those of rivals. According to the European Commission, in the context of e-commerce, European retailers are already starting to set their prices on the basis of those set by their competitors, using automatic computer developments.

4. Algorithms and collusion

4.1. Concept of collusion

The concept of collusion has always been associated with supra-competitive pricing by competing firms. But this result, without any additional requirements, does not fit into the classic legal-economic concept of collusion. In this regard, it has been said[11]:

"… [c]ollusion is difficult to grasp by law. Liability concerns market conduct (possibly with structural consequences), and can only be attributed to market participants. This is why, whereas cartels and joint dominant position are prohibited, collusion as a market outcome is not."

The economic theory of collusion revolves around one idea: to induce competing firms to set

supra-competitive prices. To that end, undertakings apply patterns of reward and punishment towards their competitors. Competitors who maintain a more profitable outcome (higher prices) than under competitive conditions are rewarded. On the contrary, competitors who deviate from that result are penalized[12].

Based on economic theories, the legal concept of "collusion" has always been based on the idea of "concerted practice", where there is a fundamental volitional component, some kind of consent (concurrences of wills - meeting of minds). In this sense, undertakings can simply adapt their own behaviour unilaterally to the current or expected behaviour of their competitors, adjusting or aligning their prices (Judgments ECJ of 16 December 1975, case 40/73, Suiker Unie; of 8 July 1999, case C-49/92 P; Com. v. Anic Partecipazioni SpA; of 4 June 2009, case C-8/08, T-Mobile Netherlands; of 26 January 2017, case C-609/13, P Duravit)[13]. Within the framework of Unfair Competition Law, it has always been said that imitation is a natural response of the market. In other words, it is recognised that there is a natural interdependence among competitors which should not be penalised[14]. According to this idea, tacit collusion is not prosecutable by legal operators.

4.2. Analysis of Algorithms from a Competition Law point of view

There are a variety of scenarios regarding the use of algorithms and collusion. A first approach allows us to see to what extent Competition Law is applicable or not.

4.2.1. Algorithms that help to enforce and monitor a collusive agreement

Under this context, the algorithm does not affect the existence of collusive coordination, since it already exists. On the contrary, it does affect the effectiveness of the collusion. The use of this algorithm does not affect the mandatory application of article 101 Treaty on the Functioning of the European Union (or article 1 Spanish Competition Law – LDC-). Its importance for Competition Law becomes apparent when fixing the sanctions by competition authorities, given the increased anti-competitive effects.

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[11] Weche / Weck (2021), 4.
[12] Harrington (2018), 6; Bundeskartellamt (2020), 4.
[13] Weche / Weck (2021), 5.
[14] Robles Martín-Laborda (2018), 93.

It is also possible to find examples in relation to vertical agreements. That was the case Asus, Denon & Marantz, Philips and Pioneer (European Commission Decision of 24 July 2018). Manufacturers imposed minimum prices on online distributors of their products; if they did not comply, they stopped supplying them. Manufacturers used sophisticated monitoring tools to control the resale price setting in the distribution network and to intervene quickly in the event of price falls.

In these cases, whether the algorithm is static or self-learning does not affect the existence of the collusive agreement itself. But it can be relevant for determining the sanction, trying to assess how it has increased the chances of effectiveness of the agreement and, therefore, with a more or less damaging result.

4.2.2. Use of the same algorithm by competitors involving price alignment

The legal assessment is different depending on whether competitors are aware or not that they are using the same algorithm.

If they are aware, but they have not agreed to use the same algorithm, there are difficulties in applying art. 101 TFEU, since the idea that this provision requires concertation seems to be unanimous.

However, the Spanish Competition Law expressly prohibits consciously parallel practices (art. 1 LDC). This aspect of the Spanish Act has hardly been applied in practice by competition authorities, but it is now relevant within the framework of algorithms. It is questionable whether this type of tacit collusion is punishable under Spanish Law when the Treaty on the Functioning of the European Union does not prohibit it. It should be recalled that Regulation (EC) 1/2003 (art. 3. 2) precludes the application of national law that prohibits agreements, decisions by associations of undertakings or concerted practices which may affect trade between Member States but which do not restrict competition within the meaning of Article 101(1) of the Treaty. The answer to that question must be affirmative, because prohibiting consciously parallel conduct does not frustrate the objectives of European competition law, but rather strengthens them.

The issue is different when the algorithm was designed to use self-learning methods and when implemented autonomously, it came to set prices on a par with those of competitors. It has been said that there is "algorithmic communication"[15]. In this scenario, it is more difficult to find the volitional element. It does not seem to be enough to solve it with a "more economic approach".

If the collusive outcome is to be avoided, a prior firewall must be established. It should therefore be considered to make the economic operator liable for the risk of the activity it carries out, so that, in its contractual relationship with the designer or developer of the algorithm, the latter would assume obligations to supervise its operation. The technical possibilities of supervision and the costs of such a system should be analysed.

On the other hand, it is possible that the algorithm is sold indiscriminately and that the buyer is unaware that its competitors are using it and may lead to a standardization of commercial conduct. Moreover, they may conclude that price alignment is a natural response. In those cases, it would not even be possible to speak of consciously parallel conduct under Spanish Competition Law. Would it be possible to hold them liable in the sense described above?

Conversely, if competitors have somehow agreed to use the same algorithm, they are certainly looking to coordinate their behaviour. It is called "Hub and Spoke" and fits into the traditional legal concept of collusion: competitors are actually giving up unilaterally determining their business strategy. As soon as some complicity is revealed, even through passivity, the case law of the EU Court of Justice fits it into the concept of concertation (Judgment of 22 October 2015, C-194/14, AC-Treuhand AG v. European Commission).

4.2.3. Algorithm Developer's Responsibility

Competitors may be unaware that they use the same algorithm, unlike the algorithm developer. The latter may benefit from the collusive result, provided that the algorithm succeeds in increasing the turnover of each competitor (his customers) through price parallelism. The developer of the algorithm finds incentives in this behavior. The question therefore arises as to whether he can be held responsible for the collusive effect or outcome.

The European Court of Justice has held that an undertaking may be held liable for agreements or concerted practices having an anti-competitive object when it intended to contribute by its own conduct to the common objectives pursued by all the participants and was aware of the actual conduct planned or put into effect by other undertakings in pursuit of the same objectives or that it could reasonably have foreseen it and was prepared to accept the risk (Judgment of 8 July 1999, Commission v Anic Partecipazioni, C-49/92; Judgment of 21 July 2016, VM Remonts, C-542/14).

On other occasions, the Court has used the role of facilitator for restrictive conducts. The company does not participate in the market in which the collusion occurred, but its participation was necessary to implement the cartel (Judgment of 22 October 2015, AC-Treuhand AG, C-195/14 P).

It remains doubtful whether the algorithm developer alone can be held liable, even if competitors are not responsible because eventhough they also benefit of collusion, they are unaware of it.

4.2.4. Adjusting the price to competitors by using my own algorithm

In this case, an undertaking individually uses a custom-designed algorithm that aligns its prices with

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[15] Schwalbe (2018), 594.

those of the competitor. Consciously parallel conduct falls on only one subject and not on his competitors. This is a case of unilateral collusion. But it is questionable whether there is a damaging result for the market, in the sense of supra-competitive prices. As the European Court of Justice has traditionally said (Judgment of 16 December 1975, cases 40 to 48, 50, 54 to 56, 111, 113 and 114/73, Suiker Unie v. Com.):

"(…) it is correct to say that this requirement of independence does not deprive economic operators of the right to adapt themselves intelligently to the existing and anticipated conduct of their competitors (…)".

5. Conclusions

1. Collusive effect alone is not prohibited. Both the economic and legal concepts of collusion require a common strategy aimed at obtaining supra-competitive prices. The absence of such association has traditionally been an obstacle to the punishment of so-called tacit collusion. The problem may have been anecdotal so far. But with the digital revolution and the use of increasingly precise algorithms, competitors can dispense with any contact. They can collude without any prior agreement.

2. Only the Spanish Competition Law (article 1) makes it possible to prosecute some of these conducts, by prohibiting consciously parallel practices. But it also does not solve all possible anti-competitive scenarios.

3. Part of the literature begins to propose measures to sanction collusion where supra-competitive prices (harmful to the market and consumers) are proven to exist, without any additional requirements[16]. In this way, the problems of tacit collusion would be overcome.

4. It would also be desirable to consider whether responsibility for the collusive effect should be attributed to the company developing the algorithm and the company using it. It would be part of the liability rules for risky activities.

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[16] Weche / Weck, *cit.*, 9.