



ARTICLES

THE MISLEADING CONSEQUENCES OF COMPARING ALGORITHMIC AND TACIT COLLUSION: TACKLING ALGORITHMIC CONCERTED PRACTICES UNDER ART. 101 TFEU

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ABSTRACT: Due to digital markets' transparency, algorithmic collusion may occur even if algorithms are designed to maximize profits rather than to conspire. The literature suggests that competition rules may not cover algorithmic collusion, being the latter an example of tacit collusion: by monitoring market conditions, each algorithm unilaterally and rationally decides to maintain supra-competitive prices. Data analytics ease the monitoring and reaction to competitors' behaviours, increasing the number of markets subject to tacit collusion. Yet, intention to conspire seems absent. In this *Article*, it is submitted that algorithmic collusion is different from tacit collusion and can be tackled under EU competition law. In the traditional scenario, undertakings base their rational decisions on the existing markets conditions. While designing their algorithms to maximize profits, undertakings are contributing to create the conditions allowing "tacit" collusion to occur. Moreover, a quasi-strict liability regime applies to antitrust offences, so that intention and imputability play limited roles. As a consequence, if algorithms programmed to maximize profits end up colluding, a rebuttable presumption of the existence of a concerted practice should apply. The practice should be prohibited unless undertakings can prove that, in the specific case, a concerted practice did not occur or that art. 101(3) TFEU applies. Moreover, competition rules may be enforced even without ascertaining any antitrust infringement. Competitive concerns are enough to adopt commitment decisions. Here, the Commission (or a National Competition Authority) may negotiate with the concerned undertakings technical remedies to prevent algorithmic collusion by intervening on the way the algorithms work.

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I. PRELIMINARY REMARKS

Collusion between “rational” (*i.e.*, profit maximizer) algorithms may occur even if they are not designed to conspire,¹ as confirmed by the economic literature.² Price-fixing could be an automatic consequence of increased market transparency caused by the big data revolution.³

¹ Originally described by the seminal work of A Ezrachi and ME Stucke, *Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy* (Harvard University Press 2016), the idea that self-learning algorithms could autonomously learn to coordinate their prices even if they are not designed to collude, became an “instant classic” of the competition law discourse. In addition to being refined by the same authors (see A Ezrachi and ME Stucke, ‘Sustainable and Unchallenged Algorithmic Tacit Collusion’ (2020) *Northwestern Journal of Technology and Intellectual Property* 217; ME Stucke, ‘Pricing algorithms & collusion’ (2019) *Transactions: The Tennessee Journal of Business Law* 1113; A Ezrachi and ME Stucke, ‘Emerging Antitrust Threats and Enforcement Actions in the Online World’ (2017) *Competition Law International* 125; A Ezrachi and ME Stucke, ‘Artificial Intelligence & Collusion: When Computers Inhibit Competition’ (2017) *University of Illinois Law Review* 1775) and discussed by an ever-increasing number of scholars (see *inter alia* F Beneke and MO Mackenrodt, ‘Remedies for Algorithmic Tacit Collusion’ (2020) *Journal of Antitrust Enforcement* 1; MS Gal, ‘Algorithms as Illegal Agreements’ (2019) *Berkeley Technology Law Journal* 67; JE Gata, ‘Controlling Algorithmic Collusion: Short Review of the Literature, Undecidability, and Alternative Approaches’ (REM Lisboa Working Paper 077-2019); B Jedličková, ‘Digital Polyopoly’ (2019) *World Competition* 309; K Noethlich, ‘Artificially Intelligent and Free to Monopolize: A New Threat to Competitive Markets Around the World’ (2019) *AmUIntlLRev* 923; PG Picht and GT Loderer, ‘Framing Algorithms: Competition Law and (Other) Regulatory Tools’ (2019) *World Competition* 391; T Synder, K Fayne and K Silverman, ‘Antitrust Intelligence: Six Tips for Talking to AI Developers about Antitrust’ (2019) *Competition Law & Policy Debate* 35; S Bhadauria and L Vyas, ‘Algorithmic Pricing & Collusion; The Limits of Antitrust Enforcement’ (2019) *Nirma University Law Journal* 87; L Calzolari, ‘La collusione fra algoritmi nell’era dei big data: l’imputabilità alle imprese delle “intese 4.0” ai sensi dell’art. 101 TFUE’ (2018) *Rivista di diritto dei media* 219; JE Harrington, ‘Developing Competition Law for Collusion by Autonomous Artificial Agents’ (2018) *Journal of Competition Law & Economics* 331; U Schwalbe, ‘Algorithms, Machine Learning, and Collusion’ (2018) *Journal of Competition Law & Economics* 568; A Deng, ‘What Do We Know About Algorithmic Tacit Collusion?’ (2018) *Antitrust* 88; A Deng, ‘An Antitrust Lawyer’s Guide to Machine Learning’ (2018) *Antitrust* 82; S Li and C Chunying Xie, ‘Automated Pricing Algorithms and Collusion: A Brave New World or Old Wine in New Bottles?’ (2018) *The Antitrust Source*. Algorithmic collusion has also been the topic of a Policy Roundtable held in 2017 by the Organisation for Economic Co-operation and Development during which the representatives of several competition authorities expressed concerns about this matter.

² The conclusion that even “relatively simple pricing algorithms systematically learn to play collusive strategies” and “typically coordinate on prices that are somewhat below the monopoly level but substantially above the static Bertrand equilibrium” has been empirically demonstrated, *inter alia*, by E Calvano, G Calzolari, V Denicolò and S Pastorello, ‘Artificial intelligence, Algorithmic Pricing and Collusion’ (2020) *American Economic Review* 3267, 3268.

³ VM Schonberger and K Cukier, *Big Data: A Revolution that Will Transform How We Live, Work and Think* (Houghton Mifflin Harcourt 2013). See also F Di Porto, ‘La rivoluzione dei big data’ (2016) *Concorrenza e Mercato* 5.

The literature suggests that competition rules may not cover algorithmic collusion. This concern (or relief, depending on the viewpoint) stems from the observation that algorithmic collusion appears to resemble tacit collusion: by monitoring market conditions, each algorithm unilaterally and rationally decides to maintain supra-competitive prices. Data analytics eases the monitoring and reaction to competitors' behaviours, increasing the number of markets subject to tacit collusion. Yet, since algorithms were not instructed to collude, intention to conspire seems absent.

It cannot be denied that the fact that algorithms may collude simply because they were designed to maximize profits poses very complex challenges. However, it is submitted that comparing algorithmic collusion and tacit collusion may prove to be misleading. As it often happens while dealing with the manifold consequences of the big data revolution, this coupling focuses on the *quantitative* dimension of algorithmic collusion (more markets subject to tacit collusion) but it fails to take into consideration its *qualitative* dimension: while in the analogical scenario undertakings act rationally on the basis of *existing* markets conditions, in the digital scenario undertakings actively and consciously contribute to the *creation* of the conditions allowing their rational algorithms to "tacitly" collude. This difference should be duly considered in the context of the imputability of such conduct and its scrutiny under antitrust rules.

Moreover, other arguments supporting the conclusion that "cartels 4.0" can and should be ascribable to undertakings can be found within the system of EU competition law. Firstly, antitrust offences are subject to an almost strict liability regime. Under this regime there is in principle no need to prove the undertakings' intention to commit a given antitrust infringement. A particularly clear example is represented by the EU legal regime on parent company liabilities for the infringement of arts 101 and 102 TFEU.

Secondly, EU competition rules' enforcement does not always require infringements to be ascertained. For example, commitment decisions can be adopted to tackle simple *competitive concerns*. This threshold is arguably met with regard to algorithmic collusion: accordingly, the Commission and National Competition Authorities (NCAs) have at their disposal an enforcement tool that could be used regardless of the imputability of algorithms' behaviours to the undertakings and regardless of the ascertainment of the anti-competitive nature of said conducts.

After all, the diffusion of algorithmic collusion would make affected markets appear to be competitive (many players, little entry barriers, no search costs, etc.) but the market mechanism would actually be lessened or even "replaced" by big data analytics.⁴

⁴ For further reference see L Calzolari, 'International and EU Antitrust Enforcement in the Age of Big Data' (2017) *Diritto del Commercio Internazionale* 855, 874. On the manifold relations between big data and competition law see generally M Maggiolino, *I big data e il diritto antitrust* (Egea 2018) and ME Stucke and AP Grunes, *Big Data and Competition Policy* (Oxford University Press 2016). See also A Giannaccari, 'La storia dei Big Data, tra riflessioni teoriche e primi casi applicativi' (2017) *Mercato Concorrenza Regole* 307; DD Sokol and R Comerford, 'Does Antitrust Have a Role to Play in Regulating Big Data?' in RD Blair and DD

II. THE INCREASING ATTRACTIVENESS OF CARTELS IN THE AGE OF BIG DATA ANALYTICS

Algorithms and data analytics may ease the execution of offences already falling within the scope of competition rules. These are the simpler cases to discuss. The literature identifies various scenarios. For example, undertakings may rely on algorithms to improve the management of a cartel.⁵ Pricing algorithms are often quoted as a common example.⁶ However, the issue is not new and less sophisticated software may fulfil the same purpose too.⁷

In a significant (and increasing) number of markets, prices are no longer fixed by humans.⁸ Although this happens mainly on digital markets, the same may apply also to brick-

Sokol (eds), *The Cambridge Handbook of Antitrust, Intellectual Property, and High Tech* (Cambridge University Press 2017) 271; G Motta, GD Pini and G Tantulli, 'Big Data in the Framework of Antitrust Enforcement' in EA Raffaelli (ed.), *Antitrust Between EU law and National Law: XII Conference* (Larcier 2017) 399; G Colangelo, 'Big data, piattaforme digitali e antitrust' (2016) *Mercato Concorrenza Regole* 425; G Duflos and D Viros, 'The Collection, Storage and Processing of Data and Its Implications for Competition Law: Something Old, Something New' (2016) *Competition Law & Policy Debate* 4; JD Wright and E Dorsey, 'Antitrust Analysis of Big Data' (2016) *Competition Law & Policy Debate* 21; D Sokol and R Comerford, 'Antitrust and Regulating Big Data' (2016) *George Mason Law Review* 1129; A Grunes and ME Stucke, 'No Mistake About It: the Important Role of Antitrust in the Era of Big Data' (2015) *Antitrust source* 4.

⁵ Cf. A Ezrachi and ME Stucke, *Virtual Competition* cit. 39-45.

⁶ Algorithms may – be deemed to – play a more intensive role in antitrust offences. For example, a lawsuit has been brought against Uber in New York alleging that said platform arranged a hub and spoke cartel by coordinating drivers' prices (cf. J Nowag, 'When Sharing Platforms Fix Sellers' Prices' (2018) *Journal of Antitrust Enforcement* 382; A Ezrachi and ME Stucke, *Virtual competition* cit. 46-55). However, a different view is that online platforms and services providers are a single economic unit for the purposes of competition law (see *infra* section V).

⁷ Already in 1994, for example, the US Department of Justice settled a case concerning an online booking system shared by several airlines which "facilitate[d] pervasive coordination of airline fares short of price fixing" (cf. US District Court for the District of Columbia judgment of 1st November 1993 836 F. Supp. 9 *United States v Airline Tariff Publishing Co.*).

⁸ Indeed, "[t]he increasing power of computers [...] plus the growing ubiquity of the Internet, and increasingly sophisticated data-mining techniques have driven a rapid shift of pricing decisions away from human-decision makers in favor of algorithms-defined as step-by-step procedures for solving problems, especially by a computer", so that "the software programs that apply these algorithms, functioning as 'robo-sellers', can make pricing decisions autonomously" (cf. SK Mehra, 'Antitrust and the Robo-Seller: Competition in the Time of Algorithms' (2016) *Minnesota Law Review* 1323). Although in a different perspective, the issue of automated individual decision-making has been notoriously tackled by art. 22 of the so-called GDPR, according to which "[t]he data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her" (cf. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC). On this topic see, *inter alia*, A Oddenino, 'Decisioni algoritmiche e prospettive internazionali di valorizzazione dell'intervento umano' (2020) *Diritto Pubblico Comparato ed Europeo online* www.dpceonline.it; MS Gal, 'Algorithmic Challenges to Autonomous Choice' (2018) *Michigan Telecommunication and Technology Law Review* 60; P Hacker,

and-mortar stores:⁹ prices showed by shelves' electronic displays are increasingly updated by algorithms just as in the digital world. The aim is precisely to replicate the mechanisms allowing online platforms to dynamically update prices also in brick-and-mortar stores. This means that prices applied by online and physical stores are interconnected too.

Current technological developments blur the distinction between the analogical and the digital world. This is not the place to deal with the manifold issues arising from the development of the so-called internet of things (or internet of everything).¹⁰ It may nonetheless be interesting to recall that having smart sensors inserted in virtually every object may (also) change the modalities by which prices are fixed in contexts which *prima facie* appear quite far from the digital realm.¹¹

Algorithms continuously and dynamically update prices, basing their decisions on the incessant examination of real-time data on market conditions.¹² This monitoring process is carried out through specific software (called "spiders", "scrapers" or "crawlers") which are developed by the undertakings themselves or bought from third parties. In the plain-vanilla scenario a group of undertakings may simply programme their pricing algorithms to coordinate prices among themselves.¹³

More complex mechanisms serving the same purpose may be envisaged and, indeed, they have already been put in practice, as shown by the case law. For example,¹⁴ a group of colluding undertakings may use their pricing algorithms to firstly *i*) monitor market conditions in order to spot the lowest price offered by non-colluding competitors in any given

Teaching Fairness to Artificial Intelligence: Existing and Novel Strategies Against Algorithmic Discrimination Under EU Law' (2018) CMLRev 1143; O Tene and J Polonetsky, 'Taming the Golem: Challenges of Ethical Algorithmic Decision-Making' (2018) North Carolina Journal of Law & Technology 125.

⁹ Indeed, "[s]ellers use dynamic-pricing algorithms to gauge supply and demand and set prices not only for books and air tickets online, but increasingly, for consumer electronics, groceries, and other tangible goods in brick-and-mortar stores" (cf. SK Mehra, 'Antitrust and the Robo-Seller' cit. 1327).

¹⁰ Cf. ME Porter, JE Heppelmann, M Iansiti and A Pentland, 'The Internet of Everything: Smart, Connected Products Will Transform your Business' (2014) Harvard Business Review 63.

¹¹ Although not directly linked with the scope of application of art. 101 TFEU, one common example is represented by vending machines which are increasingly programmed to change the price charged for the products offered (*e.g.*, a cold drink) based, *inter alia*, on weather conditions.

¹² According to an inquiry carried out in 2017 by the EU Commission, "53% of the respondent retailers track the online prices of competitors, out of which 67% use automatic software programmes for that purpose. Larger companies have a tendency to track online prices of competitors more than smaller ones. The majority of those retailers that use software to track prices subsequently adjust their own prices to those of their competitors (78%)" (cf. Commission Staff Working Document accompanying the Final Report on the E-commerce Sector Inquiry of 10 May 2017, document SWD(2017) 154 final para. 149).

¹³ It has been noted that "[t]his scenario is similar to the "traditional" situation in which companies rely on an 'outsider' not only to define prices consistent with a collusive outcome but also to monitor and enforce the agreement" (cf. Autorità Garante della Concorrenza e del Mercato in OECD, Algorithms and Collusion – Note from Italy (2017) para. 11).

¹⁴ See US Department of Justice Press Release, Former E-Commerce Executive Charged with Price Fixing in the Antitrust Division's First Online Marketplace Prosecution (2015) www.justice.gov.

moment, and then to *ii*) coordinate their behaviours in order to constantly fix their prices just below the lowest price charged by their non-colluding competitors. This result may be achieved if the colluding undertakings agree that one of them (the “sentry”) programmes its pricing algorithm to monitor market conditions and to dynamically fix its own price just below the lowest price applied by non-colluding competitors, while the other colluding undertakings (the “followers”) programme their algorithm to always match the price set by the sentry. Although somehow disguised and segmented, in this scenario the parties are executing a horizontal price-fixing agreement with the aim to avoid competition among them.

To be sure, monitoring algorithms can also be used in vertical relations as an effective method to achieve (illegal) resale price maintenance: for example, manufacturing undertakings can use algorithms to control the prices applied by their appointed retailers with the aim of keeping resale prices stable at the level that they have “recommended” to such retailers.¹⁵ Such conducts are already covered by provisions on collusive behaviours, such as art. 101 TFEU. From a theoretical perspective, it is not particularly relevant that algorithms facilitate the material execution of a cartel.¹⁶ What matters is the awareness of the collusion, rather than the subsequent implementation of the illicit concertation through an algorithm.¹⁷

¹⁵ In a recent case, the EU Commission ascertained that “[p]rice monitoring was conducted via various means, in particular through the observation of price comparison websites and, for some product categories, by way of internal software monitoring tools that allowed Asus to identify the retailers that were selling Asus products below the desired price level which typically equalled the [recommended resale prices]. Asus was also informed about low pricing retailers via complaints of other retailers. Retailers that were not complying with the desired price level would typically be contacted by Asus and be asked to increase the price” (see Commission Decision of 24 July 2018 relating to a proceeding under art. 101 TFEU, case AT.40465 – *Asus*, C(2018) 4773 final para. 27). On the position of the French NCA with regard to a similar case concerning the sale of cars spare parts through an algorithm capable of identifying the maximum price consumers would be willing to pay for said cars parts, see D Mandrescu, ‘When Algorithmic Pricing Meets Concerted Practices - the Case of Partneo’ (June 7, 2018) CORE BLOG www.lexxion.eu.

¹⁶ Indeed, “[f]rom a legal and policy perspective, this scenario is unremarkable” considering that “[t]echnology in this case does not affect the scope and application of the law” (cf. A Ezrachi and ME Stucke, ‘Algorithmic Collusion: Problems and Counter-Measures’ (2017) OECD Roundtable on Algorithms and Collusion 3). After all, “[t]he straightforward rationale behind it is that if price-fixing cartels are illegal when implemented in the bricks-and-mortar world, they *a fortiori* are when implemented online” (cf. N Colombo, ‘Virtual Competition: Human Liability *Vis-a-Vis* Artificial Intelligence’s Anticompetitive Behaviours’ (2018) European Competition & Regulatory Law Review 11, 12).

¹⁷ The need to focus on undertakings awareness of the anticompetitive practice, rather than on its potential implementation through new technologies, has been confirmed by the Court of Justice in a case concerning a common computerised booking system used by several travel agencies (cf. case C-74/14 *Eturas and Others* ECLI:EU:C:2016:42). After all, “[t]he machinery employed by a combination for price-fixing is immaterial” also for the purposes of applying the Sherman Act pursuant to which, “a combination formed for the purpose and with the effect of raising, depressing, fixing, pegging, or stabilizing the price of a commodity in interstate or foreign commerce is illegal per se” (cf. US Supreme Court judgment of 6th May 1940 *United States v Socony-Vacuum Oil Co.* 310 U.S. 150, 223).

However, it must not be underestimated that the use of pricing algorithms may not only facilitate the execution of cartels¹⁸ but also increase cartels' stability. In principle, and unless specific conditions are met, cartels are inherently unstable:¹⁹ the rational choice of every member of a price-fixing agreement is indeed to cheat on the agreement.²⁰ All the colluding undertakings are aware that they would be better off should they decide to charge lower prices than those agreed upon with competitors rather than to comply with the terms of the illicit agreement. Since the other undertakings are supposed to charge the concerted prices in faithful execution of the cartel, cheating undertakings have the opportunity to attract customers and to increase their market share at the expense of the "trustworthy cartel".

The rational incentive to cheat ceases to exist if – *inter alia* – the members of the cartels are able to monitor their competitors' behaviours in order to detect deviation from the cartel arrangement.²¹ The cheating party would not benefit from the decision to breach the illicit agreement because the other cartelists would immediately mirror its conduct. The cheating party would not have the time to increase its market share. Together with other characteristics,²² market transparency is indeed one of the most significant conditions which are likely to lead to the successful implementation of a cartel. As stated above, pricing algorithms may easily detect deviations from the illicit agreement

¹⁸ Indeed, "increased price transparency through price monitoring software may facilitate or strengthen (both tacit and explicit) collusion between retailers by making the detection of deviations from the collusive agreement easier and more immediate" (cf. Commission Staff Working Document accompanying the Final Report on the E-commerce Sector Inquiry cit. para. 608).

¹⁹ See *inter alia* JD Jasper, 'Managing Cartels: How Cartel Participants Create Stability in the Absence of law' (2017) *European Journal on Criminal Policy and Research* 319. After all, leniency programs (*i.e.*, the most successful enforcement tool against cartels) are also largely based on the idea of taking advantage of the inherent instability of cartels (cf. Notice C 298/11 from the Commission of 8 December 2006 on Immunity from fines and reduction of fines in cartel cases).

²⁰ Indeed, "così come esiste un comune interesse tra le imprese a giungere ad un coordinamento delle loro condotte nel mercato che eviti la reciproca concorrenza e stimoli profitti di tipo monopolistico, sussiste altresì un forte interesse individuale di ciascuna di esse a deviare dalle condizioni concordate, scontando i prezzi per favorire le proprie vendite", so that "[q]uesti atteggiamenti opportunistici – che qualunque impresa può segretamente tenere – rendono la collusione instabile" (cf. P Manzini, 'Algoritmi collusivi e diritto antitrust europeo' (2019) *Mercato Concorrenza Regole* 163, 166).

²¹ On such topic see A Dilip, D Pearce and E Stacchetti, 'Optimal Cartel Equilibria with Imperfect Monitoring' (1986) *Journal of Economic Theory* 251.

²² For example, it has been observed that cartels are more likely to be executed on markets which, in addition to a high level of market transparency, are characterized by a relatively high degree of concentration, significant barriers to entry, homogeneous product and similar costs structures (cf. A Jones and B Sufrin, *EU Competition Law* (Oxford University Press 2016) 654).

on the basis of real-time updated data.²³ By so doing, price algorithms make the cartelization of markets more attractive for undertakings.²⁴

It follows that the use of similar pricing algorithms must be considered – not only as the proverbial smoking-gun evidence of the intention of undertakings to collude in order to raise market prices,²⁵ but also as a relevant factor to be assessed for the purpose of setting fines according to the Commission guidelines.²⁶ While exercising its largely discretionary power to impose fines pursuant to art. 23 of the Regulation (EC) n. 1/2003,²⁷ the Commission must take into consideration *inter alia* the gravity of the infringement. The assessment of the gravity of the infringement has to be carried out by the Commission on a case-by-case basis, taking into consideration all the relevant circumstances of the case.²⁸ These factors include the nature of the infringement, the combined market share of the undertakings concerned, the geographic scope of the infringement and whether or not the infringement has been rigorously implemented.²⁹

The fact that undertakings use pricing algorithms to immediately detect deviations from a cartel should be considered as a rigorous way to implement a cartel. Indeed, once that pricing algorithms designed to collude are put in place by the undertakings, a cartel is, to a large extent, self-executing.

²³ Indeed, “algorithms could be used by conspirators to detect breaches in a cartel and punish actors for deviations from a price-fixing agreement” (cf. DI Ballard and AS Naik, ‘Algorithms, Artificial Intelligence, and Joint Conduct’ (2017) *Antitrust Chronicle* 29, 32; see also A Ezrachi and ME Stucke, ‘Tacit Collusion on Steroids – The Tale of Online Price Transparency, Advanced Monitoring and Collusion’ (2017) *Competition Law & Policy Debate* 24).

²⁴ Cf. G Pitruzzella, ‘Big Data and Antitrust Enforcement’ (2017) *Italian Antitrust Review* 77, 83.

²⁵ Cf. DI Ballard and AS Naik, ‘Algorithms, Artificial Intelligence, and Joint Conduct’ cit. 38.

²⁶ Cf. Commission guidelines on the method of setting fines imposed pursuant to Article 23(2)(a) of the Regulation n. 1/2003. Also for further references, see *inter alia* L Calzolari, ‘Sanctions in EU Competition Law. Ensuring Deterrence Within the Decentralised Enforcement System of Articles 101 and 102 TFEU’, in S Montaldo, F Costamagna and A Miglio (eds), *European Union Law Enforcement: The Evolution of Sanctioning Powers* (Routledge 2020) 241.

²⁷ Cf. Regulation (EC) n. 1/2003 of the Council of 16 December 2002 on the implementation of the rules on competition laid down in articles 81 and 82 of the Treaty.

²⁸ Commission guidelines on the method of setting fines cit. para. 20.

²⁹ Cf. OECD, ‘Algorithms and Collusion – Note from the European Union’ (2017) para. 23. For example, in the TV and computer monitor tubes cartel decision, the Commission considered appropriate to apply for the purposes of the gravity of the infringement a percentage of 18 per cent the sales concerned, since the cartels were highly organised, rigorously implemented and monitored (cf. Commission decision of 5 December 2012 relating to a proceeding under article 101 TFEU, case COMP/39.437 – *TV and Computer Monitor Tubes*, C(2012) 8839 final, para. 1070).

III. COLLUSION BETWEEN RATIONAL ALGORITHMS: THE RELATION BETWEEN MARKET TRANSPARENCY AND ARTIFICIAL INTELLIGENCE IN A WORLD OF BIG DATA

Other and more interesting competitive concerns flow directly from the development of such technologies. Collusion between “rational” algorithms may occur even if they are not designed to conspire but rather to maximize profits. Algorithm collusion may be an automatic consequence of increased market transparency caused by the big data revolution. Market transparency facilitates tacit collusion among competitors allowing undertakings to check and react to their competitors’ conducts.

Tacit collusion is also defined as “oligopolistic price coordination” because its effects are similar to those of a cartel.³⁰ Indeed, both explicit and tacit collusion may result in a reduction of social welfare by means of either higher prices or lower output. Yet, “analogic” tacit collusion does not fall within the scope of antitrust rules because price fixing results from unilateral and rational decisions taken by each of the undertakings active in a market.³¹

If a market presents specific features (*e.g.*, few players, barriers to entry, homogeneous products, high transparency, etc.), every undertaking is likely to reach its own independent decision that it is in its best interest to maintain prices at a supra-competitive level – and to mirror possible price increases by competitors – because other undertakings are likely to reach the same independent and rational decision.³²

³⁰ Indeed, “[t]acit 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 supra-competitive level by recognizing their shared economic interests and their interdependence with regard to price and output decisions” (cf. US Supreme Court judgment of 21st June 1993 *Brooke Group Ltd v Brown & Williamson Tobacco Corp.* 509 US 209, 227).

³¹ As is well known, the point has been widely debated, so much that a leading author as Judge Posner changed his approach to the matter over time, firstly supporting the idea that tacit collusion shall be prohibited by the Sherman Act (see RA Posner, ‘Oligopoly and the Antitrust Laws: A Suggested Approach’ (1969) *StanLRev* 1576; RA Posner, *Antitrust Law: An Economic Perspective* (University of Chicago Press 1976)), than concluding that said practice shall be considered as falling outside the scope of application of antitrust rules (see RA Posner, ‘Review of Kaplow, Competition Policy and Price Fixing’ (2014) *Antitrust Law Journal* 761). Among those supporting the (prevailing) view that – especially in the US legal order – tacit collusion is not covered by the current antitrust rules see, *inter alia*, DF Turner, ‘The Definition of Agreement Under the Sherman Act: Conscious Parallelism and Refusal to Deal’ (1962) *HarvLRev* 655; JB Baker, ‘Two Sherman Act Section 1 Dilemmas: Parallel Pricing, the Oligopoly Problem, and Contemporaneous Economic Theory’ (1993) *Antitrust Bulletin* 143; MS Gal, ‘Algorithms as Illegal Agreements’ cit. 99). The idea that – not being efficient – tacit collusion should fall within the scope of application of antitrust rules is expressed *inter alia* by L Kaplow, *Competition Policy and Price Fixing* (Princeton University Press 2013) 217 ff.

³² Indeed, “when firms can react by matching price undercutting by rivals in order to retain their customers, monopoly pricing is the only rational course of conduct, as firms lose the incentive to lower prices in the first place” (cf. P Siciliani, ‘Tackling Algorithmic-Facilitated Tacit Collusion in a Proportionate Way’ (2019) *Journal of European Competition Law & Practice* 31, 32).

Undertakings have no incentive to reduce prices for the very same reasons that explain why market transparency increases the stability of a cartel: price reductions would be detected and replicated by competitors before the undertaking that firstly applied rebates can benefit from this choice (e.g., by attracting new customers). Reductions would have the sole effect of reducing the overall earning of the sector, without benefiting the undertaking that first decides to discount.

The supra-competitive level at which prices are “fixed” is actually the result of the rational decision not to be worse off unilaterally taken by each of the undertakings: a smaller cake means that everyone loses out. Newcomers’ (if any) incentives to compete would also be significantly reduced: the best strategy is to take advantage of the supra-competitive equilibrium at which prices are set.³³ From the antitrust viewpoint, in other words, *coordinated* prices are not the same as *interdependent* prices.

In the analogic world, monitoring competitors used to be a timely and costly activity and real-time updates, in principle, simply could not be obtained. Yet in a medium-sized city, a brick-and-mortar store could not be aware of its competitors’ strategies when establishing its pricing policy. As a consequence, tacit collusion could occur only in small and concentrated markets.³⁴ As is well known, the exemplary textbook case is that of the gas station retail market on a small island.³⁵ Due to the peculiar market conditions,³⁶ each gas station would quickly become aware that the more it reduces prices, the less it will earn: other gas stations will likely mirror the decision; while the market share of each of the gas stations will not be affected by the discount, their incomes will.

In a world of big data,³⁷ business decisions are immediately exposed to competitors. Algorithm-based monitoring mechanisms allow undertakings to instantly discover any

³³ *Contra*, P Siciliani, ‘Tackling Algorithmic-Facilitated Tacit Collusion in a Proportionate Way’ cit. 34, according to whom “the common adoption of this price-matching algorithm would not, in and of itself, deter a new entrant from competing away supracompetitive profits”, as long as “demand is [not] saturated, with customers already attached to an incumbent firm, and possibly facing switching costs” and “the prevailing price-cost mark-up allows firms to earn a profit well above what needed to cover fixed costs”.

³⁴ Indeed, “[t]ime lags between defection from a cartel and its discovery make that defection more profitable and undermine collusion” (cf. SK Mehra, ‘Antitrust and the Robo-Seller’ cit. 1328). The limited diffusion of tacit collusion in traditional markets is one of the main reasons that reduced the practical relevance of discussing whether or not such scenario was caught by art. 101 TFEU and similar dispositions: “sino ad oggi, la circostanza che la *tacit collusion* sfugga all’applicazione del divieto antitrust non ha rappresentato un problema eccessivo perché, affinché si realizzi, il mercato deve presentare condizioni strutturali non comuni” (cf. P Manzini, ‘Algoritmi collusivi e diritto antitrust europeo’ cit. 169).

³⁵ Cf. United States Court of Appeals for the First Circuit judgment of 18th February 2011 *White v R.M. Packer Co.*, 571 579.

³⁶ *Inter alia*, no competition on the quality of the gasoline exists. Competitors from mainland cannot enter the market without investments. Each gas station may easily monitor the prices applied by the few competitors located nearby.

³⁷ On the relation between the availability of (big) data and collusion, see also S Colombo and A Pignataro, ‘Raccolta e condivisione di big data: quali effetti sulla collusione?’ (2019) *Mercato Concorrenza Regole* 315.

change in prices (or other trading conditions) applied by competitors, no matter where the latter are based and operate. Algorithms make it easier and cheaper to monitor and react to competitors' behaviours, thereby lessening the benefit that undertakings would otherwise likely obtain from reducing their selling price.³⁸ This, in turn, significantly increases the number and type of markets in which tacit collusion may occur.³⁹

Moreover, pricing algorithms are usually based on some form of self-learning artificial intelligence: this means that price algorithms are capable to progressively learn not only from data but also from their past decisions. If they are designed to maximize profits, they will assess the results of every single decision that they have taken in order to establish whether it has increased or reduced profits. Just as the managers of the island's gas stations, algorithms will soon note that applying lower prices than those charged by competitors cannot but lead to an undesirable outcome: the same amount of goods are sold but incomes are reduced. Experience will teach pricing algorithms that the best strategy to perform their task (*i.e.*, maximizing profits) is to avoid any alteration of the *status quo*. The capability of self-learning algorithms to learn from data and self-adapt with experience will lessen the struggle to compete even if such forms of artificial intelligence have not been instructed to collude.

IV. EXISTING VS CREATED MARKET CONDITIONS: TACIT COLLUSION OR ALGORITHMIC CONCERTED PRACTICES?

The literature suggests that current competition rules may not be adequate to cover algorithmic collusion. For example, it is argued that it may prove difficult to ascribe to undertakings (let alone to hold them liable for) the autonomous decisions of their algorithms to cooperate among themselves if they were not programmed to collude.⁴⁰

According to this view, the autonomous decision taken by the algorithms interrupts the causal link between the conduct of the undertakings (*i.e.*, the decision to use a pricing algorithm designed to maximize profits) and the anticompetitive effects (*i.e.*, the alignment of

³⁸ Indeed, "[c]onscious parallelism would be facilitated and stabilized by the shift of many industries to online pricing, as sellers can more easily monitor competitors' pricing, key terms of sale and any deviations from current equilibrium. In such an environment, algorithmic pricing provides a stable, predictable tool, which can execute credible and effective retaliation" (cf. A Ezrachi and ME Stucke, 'Algorithmic Collusion' cit. 3).

³⁹ Of course "the higher the proportion of firms adopting the price-matching algorithm the more sustainable collusion would tend to be, as the pay-off from cheating is lower (*i.e.*, as the cheating pie must be divided up among all the adopting firms)" (cf. P Siciliani, 'Tackling Algorithmic-Facilitated Tacit Collusion in a Proportionate Way' cit. 33).

⁴⁰ For example, it has been observed that "[t]he fact that companies unilaterally adopted profit-maximizing pricing algorithms that more accurately reflect present market conditions does not fit the type of conduct meant to be proscribed by Section 1 of the Sherman Act" (cf. DI Ballard and AS Naik, 'Algorithms, Artificial Intelligence, and Joint Conduct' cit. 33).

prices at a supra-competitive level).⁴¹ From a more radical viewpoint, it is suggested that designing an algorithm to rationally implement a given company's pricing policy should be qualified as a unilateral conduct of that undertaking, rather than a collusive one.⁴²

According to this view, the fact that the undertakings have not instructed their algorithms to conspire cannot be neglected for the purposes of antitrust analysis: the lack of joint intention precludes the possibility to apply art. 101 TFEU because algorithms that have been programmed only to maximize profit do not collude. In this perspective, however, the fact that more than one undertaking active on the same market use similar pricing algorithms cannot be ignored either. It is therefore suggested that the lack of intent to collude does not prevent the possibility to assess the totality of these unilateral decisions to rely on similar algorithms under art. 102 TFEU: if the relevant conditions of this provision are met, the undertakings could be qualified as a collective entity that may hold and, possibly, abuse a so-called collective dominant position on the market.⁴³

It is worth noting that, in this scenario as well, the abusive conduct would consist precisely in the fact that algorithms jointly end up setting supra-competitive prices applied by the undertakings belonging to the collective entity. The difference is that the coordination between the algorithms is not considered to be the consequence of a collusive scenario but rather as the outcome of the different unilateral decisions taken by entities belonging to a single collective entity that, as a consequence, abuses its collective dominant position.

This is actually in line with the origin and the aim of the theory of collective dominance.⁴⁴ Indeed, the concept of collective dominance has been elaborated and used mainly in those situations where it was impossible (or considered too difficult) to address a given conduct under art. 101 TFEU, for example because the relevant economic sector

⁴¹ Indeed, "as AI develops further, the links between the agent (the algorithm) and its principal (the human being) become weaker and the ability of algorithms to act and price autonomously puts in question the liability of the individuals or firms who benefit from the algorithm's autonomous decisions" (cf. A Capobianco, P Gonzaga and A Nyesó, 'Algorithms and Collusion: Competition Policy in the Digital Age' (2017) OECD Paper for the Roundtable on Algorithms and Collusion 39). More incisively, it has been held that "punishing companies simply for designing such technology would clearly go too far – in the same way that you wouldn't sentence a gun manufacturer for someone else committing a murder with a gun the manufacturer produced" (cf. M Zdzieborska, 'Brave New World of "Robot" Cartels?' (7 March 2017) Kluwer Competition Law Blog competitionlawblog.kluwercompetitionlaw.com). More generally, see Y Bathaee, 'The Artificial Intelligence Black Box and The Failure of Intent and Causation' (2018) *Harvard Journal of Law & Technology* 890.

⁴² According to this view, "the implementation of pricing policies by one firm's employees is unilateral conduct (whether it factors in the prices of competitors or not) and is not actionable under Section 1 of the Sherman Act without evidence establishing an agreement with another firm over the purpose or effect of a pricing algorithm" (cf. OECD, *Algorithms and Collusion – Note by the United States* (2017) para. 6).

⁴³ On this concept, see *inter alia* A Albers-Llorens, 'Collective Dominance: A Mechanism for the Control of Oligopolistic Markets?' (2000) *CLJ* 256.

⁴⁴ As is well known, the concept of collective dominance was first developed in joined cases T-68/89, T-77/89 and T-78/89 *SIV and Others v Commission* ECLI:EU:T:1992:38.

was subject to some sort of exemption from the application of that provision, as has long been the case for liner shipping.⁴⁵ In this vein, already in the past, a turn to art. 102 TFEU occurred precisely in the light of the ambiguities surrounding the applicability of art. 101 TFEU to tacit collusion⁴⁶ in order to cover those situations where undertakings, “because of factors giving rise to a connection between them, are able to adopt a common policy on the market and act to a considerable extent independently of their competitors, their customers and, ultimately, of consumers”.⁴⁷

The reference to the adoption of a common policy (in place of competition) and to specific factors suggests that some similarities may exist between the notion of collective dominance and that of concerted practices under art. 101 TFEU, which will be discussed below. And, unsurprisingly, collective dominance is indeed essentially understood to be an equivalence of oligopolistic coordination,⁴⁸ as the two concepts are based on the same conditions.⁴⁹ While they may be similar from the theoretical perspective, choosing between collective dominance and oligopolistic coordination has a rather significant

⁴⁵ See for example joined cases C-395/96 P and C-396/96 P *Compagnie Maritime Belge Transports and Others v Commission* ECLI:EU:C:2000:132. Also in the EU legal order, liner shipping was exempted from the application of art. 101 TFEU until the entrance into force in 2008 Regulation (EC) 1419/2006 of the Council of 25 September 2006 repealing Regulation (EEC) n. 4056/86 laying down detailed rules for the application of arts 85 and 86 of the Treaty to maritime transport, and amending Regulation (EC) n. 1/2003 as regards the extension of its scope to include cabotage and international tramp services. On this topic see *inter alia* F Munari, ‘Competition in Liner Shipping’ in J Basedow, U Magnus and R Wolfrum (eds), *The Hamburg Lectures on Maritime Affairs 2009 & 2010. Hamburg Studies on Maritime Affairs* (Springer 2012) 3; SM Carbone and L Schiano Di Pepe, ‘Gli accordi orizzontali tra imprese nel settore del trasporto marittimo dopo l’abrogazione del regolamento (CEE) n. 4056/86’ in G Berlingieri, A Boglione, SM Carbone and F Siccardi (eds), *Scritti in onore di Francesco Berlingieri* (2010) Special Issue of Diritto Marino 302; P Wareham (ed.), *Competition Law and Shipping: the EMLO Guide to EU Competition Law in the Shipping and Port Industries* (Cameron May 2010); PD Camesasca and AK Schmidt, ‘EC Commission’s Post-conference Maritime Transport Guidelines: True Guidance to Navigate Through Antitrust Compliance’ (2009) *European Competition Law Review* 143; F Munari, ‘Liner Shipping and Antitrust After the Repeal of the Regulation 4056/86’ (2008) *LMCLQ* 602; SM Carbone and F Munari, ‘La concorrenza nei traffici marittimi comunitari ritorna al diritto comune: good bye maritime conferences e altre importanti novità a valle dell’entrata in vigore del reg. (CE) n. 1419/2006’ (2007) *Diritto dei trasporti* 335.

⁴⁶ Cf. N Petit, ‘The Oligopoly Problem in EU Competition Law’ in I Lianos and D Geradin (eds), *Handbook on European Competition Law. Substantive Aspects* (Edward Elgar 2013) 259, 297.

⁴⁷ Cf. joined cases C-68/94 and C-30/95 *France and Société commerciale des potasses and de l’azote and Entreprise minière and chimique v Commission* ECLI:EU:C:1998:148 para. 221.

⁴⁸ Cf. M de la Mano, R Nazzini and H Zenger, ‘Article 102’ in J Faull and A Nikpay (eds), *The EU Law of Competition* (Oxford University Press 2014) 329, 382.

⁴⁹ According to the case law, three conditions must be established for a finding of collective dominance and they are essentially the same market conditions under which a concerted practice is likely to occur, *i.e.*, *i)* the market must be transparent and undertakings must be able to become rapidly aware of each other’s conducts; *ii)* coordination must be sustainable over time; and *iii)* the foreseeable reaction of current and future competitors, as well as of consumers, must not be capable of jeopardising the results expected from the common policy (cf. case T-342/99 *Airtours v Commission* ECLI:EU:T:2002:146 para. 62; case T-464/04 *Impala v Commission* ECLI:EU:T:2006:216 para. 243 ff.)

enforcement consequence which concerns the different scope of application of arts 101 TFEU and 102 TFUE (and similar provisions). If the latter is considered to be the correct legal framework to be used against conducts committed by algorithms, then no antitrust liability may arise, unless a (collective) dominant position exists and a specific abuse is demonstrated, in addition to the *per se* legal use of a pricing algorithm.

Looking outside the antitrust realm, it is also observed that in virtually every jurisdiction companies' directors are actually under a statutory obligation to pursue shareholders' value.⁵⁰ Directors may even incur liability if they make choices that expose their companies to losses that were reasonably foreseeable when the relevant decision was made.⁵¹ Since algorithms perform many tasks and activities more accurately and with better results than humans (including the task of dynamically updating prices based on the assessment of real-time data on market conditions),⁵² it may be considered negligent for companies' directors not to adopt them, because it is clear that this decision will cause a loss (*i.e.*, less profit) to the company.

It cannot be denied that the fact that algorithms may collude simply because they were designed to maximize profits poses very complex challenges. It is indeed unclear how

⁵⁰ As is well known, the one exploring the purposes of corporations is one of the most venerable questions in company law and economic theory and dates back at least a century (see US Supreme Court of Michigan judgment of 7th February 1919 170 N.W. 668 *Dodge v Ford Motor Co.*). While many hold that companies' directors should act "only for the ratable benefit of all the shareholders" (cf. AA Berle, 'Corporate Powers as Powers in Trust' (1931) *HarvLRev* 1049), many other believe that companies have "a social service as well as a profit-making function" (cf. EM Dodd, 'For Whom Are Corporate Managers Trustees?' (1932) *HarvLRev* 1145, 1148). On the dilemma between shareholder and stakeholder values the literature is endless. For further references, see RJ Rhee, 'A Legal Theory of Shareholder Primacy' (2018) *Minnesota Law Review* 1951; O Hart and L Zingales, 'Companies Should Maximize Shareholder Welfare Not Market Value' (2017) *Journal of Law, Finance, and Accounting* 247; MC Jensen, 'Value Maximization, Stakeholder Theory, and the Corporate Objective Function' (2001) *Journal of Applied Corporate Finance* 8.

⁵¹ Within the Italian legal order, see for example Italian Court of Cassation judgment of 12 August 2009 n. 18231; Italian Court of Cassation judgment of 22 June 2017 n. 15470; Tribunal of Perugia judgment of 17 July 2020 n. 817; Tribunal of Cosenza judgment of 9 December 2019 n. 2508; Tribunal of Perugia judgment of 4 February 2016 n. 446; Tribunal of Rome judgment of 28 September 2015 n. 19198. The principle is accepted also by Commissione Tributaria Regionale of Rome 22 January 2019 n. 178; Commissione Tributaria Regionale of Brescia 6 June 2016 n. 3329. Although the case law is firm in holding that directors enjoy a quite wide margin of discretion and that management decisions falling within that discretionary power cannot be contested, it is also true that the conduct of directors shall always pursue the interest of the company, a concept which is generally understood as meaning the maximization of profits (see Tribunal of S.Maria Capua judgment of 28 February 2014 n. 693).

⁵² Indeed, "[b]ecause of the advent of big data analytics, algorithms can monitor prices more efficiently than human beings and are able to respond to market changes more quickly and accurately" (cf. I Graef, 'Algorithmic Price Fixing Under EU Competition Law: How to Crack Robot Cartels?' (10 May 2016) CITIP Blog www.law.kuleuven.be).

designing an algorithm to act rationally can be qualified as an antitrust offence.⁵³ However, it is submitted that the very idea to compare algorithmic collusion and tacit collusion may prove to be misleading. As it often happens when dealing with the many consequences of the big data revolution, this coupling focuses on the *quantitative* dimension of algorithmic collusion but it fails to take into consideration its *qualitative* dimension.⁵⁴

Data analytics most certainly increases the number of markets subject to tacit collusion, since it eases the monitoring and reaction to competitors' behaviours. However, data analytics also changes the nature of the undertakings' behaviours leading to the collusive outcome. When it decides to design its pricing algorithm to maximize profits (by continuously monitoring and dynamically reacting to competitors' behaviours), while at the same time knowing that information on its own strategies is available online to consumers and competitors (and competitor's algorithms), a company is actually contributing to *create* the conditions under which tacit collusion may occur.

There is a significant difference with the traditional scenario where undertakings act rationally on the basis of *existing* markets conditions. This difference should be relevant to the imputability of such conduct and its scrutiny under antitrust rules. Quite regardless of the fact that, in the digital scenario, undertakings actively contribute to the creation of the conditions allowing their rational algorithms to "tacitly" collude, one cannot deny that undertakings, at the very least, do know that tacit collusion may occur even if they do not design their algorithm to breach art. 101 TFEU.⁵⁵ The (more than) reasonable awareness on the part of undertakings that anticompetitive harm may occur even if algorithms are not asked to collude is a key factor to address the issue of the imputability of algorithms' behaviours.

On the one hand, such awareness seems capable of reducing the cogency of the line of reasoning concerning the (alleged) interruption of the causal link between the conduct of the undertakings and the anticompetitive effects. Within this perspective, it should be considered that undertakings' attempts to escape their antitrust liability based on the argument concerning the causal link (or the lack thereof) are dismissed more often than not by the CJEU. Although regarding private rather than public enforcement, a particularly clear example is represented by the *Kone* case: the Court of Justice confirmed that cartelists may also be held liable for the losses resulting from the higher prices charged to

⁵³ In other words, "it would be hard to deny the existence of a plausible legitimate justification for the adoption of the pricing algorithm thereof in that firms would appear to simply trying to preserve conditions of viability" (cf. P Siciliani, 'Tackling Algorithmic-Facilitated Tacit Collusion in a Proportionate Way' cit. 32).

⁵⁴ For some observations on the need to consider both the quantitative and the qualitative dimensions of the big data revolution see, *inter alia*, A Oddenino, 'Reflections on Big Data and International Law' (2017) *Diritto del Commercio Internazionale* 777.

⁵⁵ In other words, "[b]y simply allowing these bots to go to work, it is easy to imagine an effectively permanent pricing stasis settling over many markets, and not always with procompetitive effects" (cf. DI Ballard and AS Naik, 'Algorithms, Artificial Intelligence, and Joint Conduct' cit. 30).

customers by undertakings that are not part of the illicit agreement because the latter cannot but increase their prices when they intelligently adapt their own conduct to that of their competitors.⁵⁶

On the other hand, the fact that undertakings knowingly contribute to the *creation* of the conditions allowing their rational algorithms to “tacitly” collude seems particularly relevant in order to correctly assess such conduct under antitrust rules. The predictability of the anticompetitive outcome which, under given circumstances, may arise from the decision to design an algorithm to maximize profits arguably entails that algorithmic collusion resembles a concerted practice more than a case of simple tacit collusion.

The term “concerted practice” is designed to catch looser forms of collusion than proper agreements.⁵⁷ According to the case law, a proper agreement exists if two or more undertakings “have expressed their joint intention to conduct themselves on the market in a specific way”.⁵⁸ The notion, therefore, “centres around the existence of a concurrence of wills between at least two parties”.⁵⁹ As long as there is this concurrence of wills, no formal requirements are relevant: oral,⁶⁰ non-binding (such as gentlemen’s agreements)⁶¹ and even agreements still under negotiation⁶² fall within the notion.

By contrast, according to the CJEU, a concerted practice includes every form of coordination among competitors which, regardless of the concurrence of wills between them, has the effect of altering the conditions of the market by replacing competition with

⁵⁶ More specifically, the Court of Justice has established that “[t]he full effectiveness of Article 101 TFEU would be put at risk if the right of any individual to claim compensation for harm suffered were subjected by national law, categorically and regardless of the particular circumstances of the case, to the existence of a direct causal link while excluding that right because the individual concerned had no contractual links with a member of the cartel, but with an undertaking not party thereto, whose pricing policy, however, is a result of the cartel that contributed to the distortion of price formation mechanisms governing competitive markets” (cf. case C-557/12 *Kone and Others* ECLI:EU:C:2014:1317 para. 33).

⁵⁷ Cf. A Jones and B Sufrin, *EU Competition Law* cit. 153. On the distinction between agreements properly so called and concerted practices see, among the most recent rulings, case C-450/19 *Kilpailu- ja kuluttajavirasto* ECLI:EU:C:2021:10 paras 21-22.

⁵⁸ Cf. case T-449/14 *Nexans France and Nexans v Commission* ECLI:EU:T:2018:456 para. 132; joined cases T-117/07 and T-121/07 *Areva and Others v Commission* ECLI:EU:T:2011:69 para. 175.

⁵⁹ Cf. case T-216/13 *Telefónica v Commission* ECLI:EU:T:2016:369 para. 98; case T-655/11 *FSL and Others v Commission* ECLI:EU:T:2015:383 para. 413.

⁶⁰ Cf. case 28/77 *Tepea BV v Commission* ECLI:EU:C:1978:133 para. 41.

⁶¹ Cf. case C-373/14 P *Toshiba Corporation v Commission* ECLI:EU:C:2016:26; case 41/69 *ACF Chemie-farma v Commission* ECLI:EU:C:1970:71.

⁶² See case T-186/06 *Solvay v Commission* ECLI:EU:T:2011:276 paras 85-86.

cooperation.⁶³ A concerted practice is therefore a very different concept than that of agreement to the extent that the working out of an actual plan is irrelevant.⁶⁴

The underlying rationale is that undertakings must never be free to “cooperate with [their] competitors, in any way whatsoever, in order to determine a co-ordinated course of action” because competition rules aim at preventing undertakings from achieving “success by prior elimination of all uncertainty as to each other’s conduct regarding the essential elements of that action”.⁶⁵ The aside “in any way whatsoever” arguably suggests that the notion can (and should) be interpreted extensively and flexibly.

In this vein, according to the case law of the CJEU, “passive modes of participation in [an] infringement”⁶⁶ may also be considered as indicative of collusion and, as such, capable of violating art. 101 TFEU; for example, an undertaking that “tacitly approves of an unlawful initiative [...] encourages the continuation of the infringement and compromises its discovery”, thus breaching art. 101 TFEU.⁶⁷ In highly transparent markets, the use of pricing algorithms (designed to maximize profits by monitoring and dynamically reacting to competitors’ behaviours, which are likely to follow the same pricing strategy) could arguably be qualified as a conduct falling within the notion of passive modes of participation in an infringement of art. 101 TFEU.⁶⁸

While they do not prevent undertakings from adapting to their competitors’ conducts,⁶⁹ it follows that competition rules do strictly preclude any indirect contact between competitors whose effects may be to either influence their conducts on the market or to reciprocally disclose information on their future behaviours.⁷⁰ According to the CJEU, an undertaking may be found to be party to a concerted practice simply because it received information on the commercial activities of its competitors.⁷¹

⁶³ In other words, a concerted practice occurs when undertakings “knowingly substituted for the risks of competition practical cooperation between them, which culminated in a situation which did not correspond to the normal conditions of the market” (cf. joined cases 40 to 48, 50, 54 to 56, 111, 113 and 114-73 *Suiker Unie and Others v Commission* ECLI:EU:C:1975:174 para. 191; case C-8/08 *T-Mobile Netherlands and Others* ECLI:EU:C:2009:343 para. 26).

⁶⁴ Cf. MM Dabbah, *EC and UK Competition Law: Commentary, Cases and Materials* (Cambridge University Press 2004) 72 ff.

⁶⁵ Cf. case 48/69 *ICI v Commission* ECLI:EU:C:1972:70 para. 118.

⁶⁶ Cf. joined cases C-189/02 P, C-202/02 P, C-205/02 P to C-208/02 P and C-213/02 P *Dansk Rørindustri and Others v Commission* ECLI:EU:C:2005:408 para. 143.

⁶⁷ Cf. *inter alia* case C-194/14 P *AC-Treuhand v Commission* ECLI:EU:C:2015:717 para. 31.

⁶⁸ In this vein, see also P Manzini, ‘Algoritmi collusivi e diritto antitrust europeo’ cit. 172.

⁶⁹ Cf. *Suiker Unie and Others v Commission* cit. para. 174.

⁷⁰ Indeed, one of the main purposes of a concerted practice is “to influence their conduct on the market and to disclose to each other the course of conduct with each of the producers itself contemplated adopting on the market” (cf. case T-7/89 *Hercules Chemicals v Commission* ECLI:EU:T:1991:75 para. 259).

⁷¹ Cf. joined cases T-25/95, T-26/95, T-30/95, T-31/95, T-32/95, T-34/95, T-35/95, T-36/95, T-37/95, T-38/95, T-39/95, T-42/95, T-43/95, T-44/95, T-45/95, T-46/95, T-48/95, T-50/95, T-51/95, T-52/95, T-53/95, T-54/95, T-55/95, T-56/95, T-57/95, T-58/95, T-59/95, T-60/95, T-61/95, T-62/95, T-63/95, T-64/95, T-65/95, T-68/95, T-69/95,

Even leaving aside its role as a constituent element of the notion of concerted practices, it is worth noting that private exchange of information between competitors has been *per se* strictly prohibited ever since EU competition law was devised.⁷² Recent case law of the CJEU indeed confirms that private exchanges of sensitive information between competitors are to be qualified and fined as a cartel under art. 101 TFEU.⁷³

NCA's generally follow the same approach.⁷⁴ Although the case law is more ambiguous on the point,⁷⁵ it seems that EU antitrust enforcers also follow a rather strict approach with regard to public exchanges of information (*i.e.*, the disclosure of information to the general public, including competitors and customers),⁷⁶ as confirmed by the

T-70/95, T-71/95, T-87/95, T-88/95, T-103/95 e T-104/95 *Cimenteries CBR v Commission* ECLI:EU:T:2000:77 para. 1852.

⁷² See for example the Communication from the Commission of 29 July 1968 *relativa ad accordi, decisioni e pratiche concordate concernenti la cooperazione tra imprese* (not available in English).

⁷³ Recent case law of the CJEU confirmed that private exchanges of information between competitors may be qualified and fined as a cartel (cf. for example case C-286/13 *P Dole Food and Dole Fresh Fruit Europe v Commission* ECLI:EU:C:2015:184 on which see L Calzolari, 'Il caso Dole: lo scambio di informazioni come restrizione per oggetto ex art. 101 TFUE' (30 May 2015) *Eurojus.it rivista.eurojus.it*; K Hugmark and M Becher, 'Dole v Commission: Exchange of Information, Between Competitors, on Price-Related Parameters' (2015) *Journal of European Competition Law & Practice* 652; L Idot, 'Échanges d'informations et restriction par objet' (2015) *Europe* 22; K Fountoukakos and K Geeurickx, 'Going Bananas – The European Court of Justice Has Confirmed the EU Commission's Approach to Information Exchange Between Competitors' (2015) *Competition Law Insight* 14).

⁷⁴ With regard to the practice of the Italian NCA, see for example the Agenzia Garante della Concorrenza e del Mercato (AGCM) decision of 30 September 2004 n. 13622, *I575 Ras-Generali/Iama Consulting* (on which see F Tirio, 'Fatti e prove nel processo amministrativo antitrust: il caso lama' (2006) *Foro amministrativo – T.A.R.* 968).

⁷⁵ In some instances, the Court of Justice has highlighted the importance of public exchange of information for the purposes of establishing the existence of a concerted practice, noting that "the undertakings [...] announced their intentions of making an increase some time in advance, which allowed the undertakings to observe each other's reactions on the different markets, and to adapt themselves accordingly. By means of these advance announcements the various undertakings eliminated all uncertainty between them as to their future conduct and, in doing so, also eliminated a large part of the risk usually inherent in any independent change of conduct on one or several markets" (see for example *ICI v Commission* cit. paras 100-101). In other cases, the Court of Justice held that price announcements made to users "constitute in themselves market behaviour which does not lessen each undertaking's uncertainty as to the future attitude of its competitors", mainly because "[a]t the time when each undertaking engages in such behaviour, it cannot be sure of the future conduct of the others" (cf. joined cases C-89/85, C-104/85, C-114/85, C-116/85, C-117/85 and C-125/85 to C-129/85 *Ahlström Osakeyhtiö and Others v Commission* ECLI:EU:C:1993:120 para. 64).

⁷⁶ Although only "private exchanges between competitors of their individualised intentions regarding future prices or quantities would normally be considered and fined as cartels because they generally have the object of fixing prices or quantities", it is worth noting that also public exchange of information may be "considered as a restriction of competition by object" if it is carried out "with the objective of restricting competition on the market" (cf. Communication from the Commission of 14 January 2011 *Guidelines on the applicability of article 101 of the Treaty on the Functioning of the European Union to horizontal cooperation agreements* paras 73-74).

Container Shipping case.⁷⁷ The underlying rationale is once again that public exchanges of information may have the effect of reducing the level of uncertainty about the current and future pricing behaviours of the market operators, thus decreasing their incentive to compete against each other.

Bearing the above in mind, one should consider that when an undertaking requires its self-learning algorithm to monitor market conditions (*i.e.*, competitors' prices) in order to set and dynamically update prices, the undertaking is basically asking its algorithm to track the information publicly disclosed online by its competitors in order to reduce the former's uncertainty regarding the current and future behaviours of the latter. Since many – if virtually not all the – undertakings are likely to use similar automatic software programmes for the purpose of adjusting their own prices to those of their competitors, it seems tenable to conclude that algorithms indeed engage in some form of contact – if not proper communication – among themselves which result in the replacement of uncertainty with mutual knowledge.⁷⁸

It is worth noting that, for public exchanges of information to fall within the scope of application of art. 101 TFEU, it is not necessary for the information to be exchanged directly between competitors, nor is it necessary for the competitors to communicate among themselves.⁷⁹ What matters is only that the information is made available to the general public, so that competitors may have access to them.⁸⁰

To sum up, it is submitted that art. 101 TFEU does capture algorithmic collusion because this practice falls within the traditional EU law concept of a concerted practice or, at the very least, because algorithms' monitoring activities represent a mechanism of (public or private) exchange of information among competitors.

⁷⁷ Cf. Decision of the Commission of 7 July 2016 relating to a proceeding under article 101 TFEU, case AT.39850 *Container Shipping*, C(2016) 4215 final (on which see I Rabinovici, 'The Application of EU Competition Rules in the Transport Sector' (2017) *Journal of Competition Law & Practice* 271). The case law of the CJEU, however, is not completely clear on the point.

⁷⁸ In other words, "l'uso di una strumentazione di Ai per segnalare prezzi e modificarli in considerazione delle risposte dei concorrenti modifica la natura della decisione commerciale dell'impresa, la quale va ritenuta come concordata, piuttosto che come indipendente", with the – unavoidable – consequence that such conducts "decise mediante algoritmi, apparentemente autonome, costituiscono in realtà una *explicit collusion*, rientrante nel campo di applicazione dell'art. 101, in quanto pratica concertata" (cf. P Manzini, 'Algoritmi collusivi e diritto antitrust europeo' cit. 171-172).

⁷⁹ See also O Odudu, 'Indirect Information Exchange: The Constituent Elements of Hub and Spoke Collusion' (2011) *European Competition Journal* 205.

⁸⁰ Such clarification is important because it is held that "in the absence of any communication between competitors, no agreement or concerted practice may be identified as a result of which no violation of Article 101 TFEU can be established either" (cf. I Graef, 'Algorithmic Price Fixing Under EU Competition Law' cit.). Although "it is therefore not obvious that more sophisticated tools through which a firm merely observes another firm's price and draws its own conclusion would qualify as 'communication' for Article 101 purposes", it is also true that "one cannot fully rule out the possibility that more creative and novel types of interactions could in certain situations meet the definition of 'communication'" (cf. OECD, *Algorithms and Collusion – Note from the European Union* cit. para. 33).

In the light of the above, however, it is also submitted that the use of pricing algorithms should be considered as actually capable of establishing a sort of rebuttable presumption of the existence of a concerted practice.⁸¹ In other words, in case pricing algorithms programmed to maximize profits end up colluding, the prohibition enshrined by art. 101(1) TFEU should be deemed to apply without the Commission or NCAs having to prove the undertaking's intention to conspire. It should then be for the undertakings to which said conducts are ascribed to prove that, in the specific case, a concerted practice did not occur or that the efficiency enhancements brought by the algorithms (which, as noted above, perform many tasks better than humans) justify their utilization under art. 101(3) TFEU.⁸²

V. THE LIMITED ROLE PLAYED BY INTENT AND IMPUTABILITY IN THE ANTITRUST REALM: THE CASE OF PARENT COMPANY LIABILITY AND ITS APPLICABILITY BY ANALOGY TO THE RELATION UNDERTAKINGS *VIS-À-VIS* ALGORITHMS

The previous section has tried to show that algorithmic collusion can and should be tackled under current EU competition rules, given that algorithmic collusion is different from traditional tacit collusion and it resembles more a concerted practice falling within the scope of application of art. 101 TFEU. This and the next sections suggest that this conclusion is supported also by other characteristics and principles inherent to the EU competition law system.⁸³

First of all, it is well known that a *quasi*-strict liability regime applies to antitrust offences, so that intent and imputability play a very limited role within this context. EU competition rules do not mention intent as a necessary element to ascertain antitrust

⁸¹ In this vein, “l’adesione, decisa da più imprese in modo unilaterale, ad un sistema che impiega tali algoritmi per condizionare il prezzo delle imprese parti di esso comporta una presunzione *iuris tantum* di partecipazione di ciascuna impresa ad una pratica concordata tramite assenso tacito” (cf. P Manzini, ‘Algoritmi collusivi e diritto antitrust europeo’ cit. 168).

⁸² Indeed, ever since the adoption of the Treaty of Rome, art. 101(3) TFEU (then art. 85(3) EEC) can be applied to those cases “where it is in the public interest or in the interest of an industry to permit restraints on competition” (cf. E Steindorff, ‘Article 85 and the Rule of Reason’ (1984) CMLRev 639, 641-642). In other words, art. 101(3) TFEU “allows reconciliation of several EC Treaty objectives by providing a wide margin of discretion” in the application of EU competition rules, and in particular with regard to the application of art. 101 TFEU (cf. CD Ehlermann, ‘Implementation of EC Competition Law by National Anti-Trust Authorities’ (1996) European Competition Law Review 88, 94).

⁸³ Focusing on traditional legal principles to cope with competitive issues raised by digital innovation, rather than calling for the rethinking of competition law, appears in line with the idea that “the real threat of digital markets is that they may lead to the incorrect conclusion that innovation is also required in relation to legal analysis. The opposite is true. The legal edifice built incrementally over the years, broad and rich in insights, remains not only a useful guide to sound and consistent enforcement, but a valuable safeguard against enforcement errors” (cf. PI Colomo and G De Stefano, ‘The Challenge of Digital Markets: First, Let Us Not Forget the Lessons Learnt Over the Years’ (2018) Journal of European Competition Law and Practice 485, 486).

infringements.⁸⁴ The CJEU case law contains virtually no reference to the role of intent for the application of arts 101 and – particularly – 102 TFEU:⁸⁵ on the few occasions when it had the chance to deal with the issue, the CJEU established that “the intention of the parties is not an essential factor in determining whether a concerted practice is restrictive”⁸⁶ nor “a necessary factor in determining whether an agreement is restrictive”.⁸⁷

The CJEU has thereby confirmed that liability for antitrust violations in fact amounts to strict liability.⁸⁸ After all, competition is not about morality but rather about efficiency and the preservation of the market structure: just as dreaming about becoming a monopolist does not represent a competitive issue but rather fuels economic growth,⁸⁹ so a collusive scenario achieved without the undertakings having wished for it *does* represent a competitive problem.

The case-law on art. 106(1) TFEU, when applied in combination with arts 101 and 102 TFEU,⁹⁰ makes no exception to this principle. Under this legal framework, antitrust liability can be avoided by so-called “privileged undertakings”⁹¹ that are deprived of their autonomy and are *legally* compelled to engage in a conduct that, if autonomously carried out, would be illegitimate under EU competition rules.⁹² This sort of antitrust immunity

⁸⁴ *Inter alia*, see also N Zingales, ‘Antitrust Intent in an Age of Algorithmic Nudging’ (2019) *Journal of Antitrust Enforcement* 386, 390; P Akman, ‘The Role of Intent in the EU Case Law on Abuse of Dominance’ (2014) *ELJ* 31; ME Stucke, ‘Is Intent Relevant?’ (2012) *Journal of Law, Economics and Policy* 801; PL Parcu, ‘Considerazioni sulla rilevanza del movente nella valutazione delle violazioni antitrust’ in AE Raffaelli (ed.), *Antitrust Between EU and National Law IX* (Bruylant-Giuffrè 2011) 289; A Bavasso, ‘The Role of Intent Under Article 82: From Fishing the Turkeys to Spotting Lioness in Regent’s Park’ (2005) *European Competition Law Review* 616.

⁸⁵ In this vein, it is observed that “la violazione degli artt. [101 e 102 TFEU] dà luogo a responsabilità a prescindere dall’esistenza dell’elemento psicologico della colpa”: on the one hand, “né la lettera dell’art. [101 TFEU] né la lettera dell’art. [102 TFEU] fanno riferimento alla colpa mentre, dall’altra parte, più volte la giurisprudenza della Corte di giustizia ha sottolineato la natura oggettiva del concetto di abuso (di posizione dominante)” (cf. S Bastianon, ‘Il risarcimento del danno antitrust tra esigenze di giustizia e problemi di efficienza. Prime riflessioni sul Libro verde della Commissione’ (2006) *Mercato Concorrenza Regole* 321, 336).

⁸⁶ Cf. *T-Mobile Netherlands and Others* cit. para. 27.

⁸⁷ Cf. case C-32/11 *Allianz Hungária Biztosító and Others* ECLI:EU:C:2013:160 para. 37.

⁸⁸ Indeed, the lack of reference to the concept of intent in the case law of the CJEU “means that liability for violation of competition rules in fact amounts to a strict liability” (M Hazelhorst, ‘Private Enforcement of EU Competition Law: Why Punitive Damages Are a Step Too Far’ (2010) *European Review of Private Law* 757, 763).

⁸⁹ Cf. PL Parcu and ML Stasi, ‘The Role of Intent in the Assessment of Conduct Under Article 102 TFEU’ in PL Parcu, G Monti, M Botta (eds), *Abuse of Dominance in EU Competition Law* (Edward Elgar 2017) 12, 14.

⁹⁰ As is well known, art. 106(1) TFEU cannot be applied alone, as it is “a reference provision” (cf. A Pappalardo, ‘State Measures and Public Undertakings: Article 90 of the EEC Treaty’ (1991) *European Competition Law Review* 34).

⁹¹ For the use of this term see for example J Temple Lang, ‘Community Antitrust Law and Government Measures Relating to Public and Privileged Enterprises: Article 90 EEC Treaty’ in BE Hawk (ed.), *Fordham Corporate Law Institute Annual Proceedings* (Juris Publishing 1985) 543.

⁹² On art. 106(1) TFEU see generally JL Buendia Sierra, ‘Article 106 – Exclusive or Special Rights and other Anti-Competitive State Measures’ in J Faull and A Nikpay (eds), *The EU Law of Competition* cit. 809; G Davies, ‘Article 86 EC, the EC’s Economic Approach to Competition Law, and the General Interest’ (2009)

seems to be based on the fact that, by complying with a national measure, in that scenario the “privileged undertakings” do not act either intentionally or negligently. However, it has to be noted that this doctrine only transfers the liability from the “privileged undertakings” to the Member State whose national measures forced⁹³ the former to breach arts 101 or 102 TFEU.⁹⁴ In other words, the rationale beyond the case law on the joint application of arts 106(1) TFEU and EU competition rules is that, as far as possible, liability should be ascribed to the subject (in this case, the Member State) that caused the antitrust violation rather than to the “coerced” infringer. By contrast, it does not follow from the case law on art. 106 TFEU that the lack of intent or negligence can excuse an antitrust infringement if no other subject can be held liable for such violation of arts 101 or 102 TFEU, as is the case with regard to undertakings using pricing algorithms.

By a different token, it should be considered that, under EU competition law, undertakings may be held jointly and severally liable for antitrust infringements committed by

European Competition Journal 549; JL Buendia Sierra, *Exclusive Rights and State Monopolies Under EC Law* (Oxford University Press 1999); L Hancher, ‘Community, State, and Market’ in P Craig and G De Burca (eds), *The Evolution of EU Law* (Oxford University Press 1999) 721; A Gardner, ‘The Velvet Revolution: Article 90 and the Triumph of the Free Market in Europe’s Regulated Sectors’ (1995) *European Competition Law Review* 78; L Hancher and PJ Slot, ‘Article 90’ (1990) *European Competition Law Review* 35; L Gyselen, ‘State Action and the Effectiveness of the EEC Treaty’s Competition Provisions’ (1989) *CMLRev* 3; P Pescatore, ‘Public and Private Aspects of European Community Competition Law’ (1987) *FordhamIntlLJ* 373; P Schindler, ‘Public Enterprises and the EEC Treaty’ (1970) *CMLRev* 57.

⁹³ The compulsion of the privileged undertakings to abuse their dominant position was considered a necessary requirement in order to apply arts 102 and 106(1) TFEU by the older case law of the CJEU (see for example case C-18/93 *Corsica Ferries v Corpo dei piloti del porto di Genova* ECLI:EU:C:1994:195).

⁹⁴ The CJEU’s approach to the application of arts 102 and 106(1) TFEU, however, significantly changed over time. Firstly, the CJEU also began to apply arts 102 and 106(1) TFEU to national measures that merely induce privileged undertakings to abuse their dominant position, simply by exercising their special rights (see for example case C-41/90 *Höfner and Elser v Macrotron* ECLI:EU:C:1991:161; case C-18/88 *RTT v GB-Inno-BM* ECLI:EU:C:1991:474). At a later stage, the CJEU began to hold that the above provisions may apply even in the absence of any abuse of the privileged undertakings: a risk of a potential abuse of a dominant position by the privileged undertakings suffices to trigger the application of arts 102 and 106(1) TFEU (case C-49/07 *MOTOE* ECLI:EU:C:2008:376; case C-553/12 *Commission v DEI* ECLI:EU:C:2014:2083). For further references see L Calzolari, ‘Pari opportunità tra operatori economici e tutela della struttura del mercato: la creazione di mercati concorrenziali come vincolo all’intervento pubblico nella regolazione imposto dagli artt. 106(1) e 102 TFEU’ (2015) *Diritto dell’Unione europea* 637.

their subsidiaries.⁹⁵ The legal regime for corporate group liability is rooted in the concept of “undertaking”.⁹⁶

Although undertakings are the addresses of arts 101 and 102 TFEU, the concept is not defined in the Treaties or in secondary legislation. The case law firmly holds that the term undertaking should reflect the economic reality rather than the legal one.⁹⁷ Separate legal persons may be considered as a sole “undertaking” for the purposes of EU competition law if they are connected from an economic and managerial perspective.⁹⁸

The theory of the single economic entity⁹⁹ has a number of implications for EU competition law.¹⁰⁰ One of the most interesting ones is that it makes it possible to hold (and actually to presume) parent companies liable for competition law infringements committed by their subsidiaries, as long as the former *can* exercise control over the latter and *did* actually exercise such control during the period when the infringement occurred. If the subsidiaries do not determine their own conduct on the market, there is no doubt

⁹⁵ See generally C Koenig, ‘An Economic Analysis of the Single Economic Entity Doctrine in EU Competition Law’ (2017) *Journal of Competition Law & Economics* 281; B Wardhaugh, ‘Punishing Parents for the Sins of Their Child: Extending EU Competition Liability in Groups and to Subcontractors’ (2017) *Journal of Antitrust Enforcement* 22; M Casoria, ‘L'imputabilità infragruppo delle violazioni antitrust. (Ir)responsabilità e presunzioni’ (2014) *Mercato Concorrenza Regole* 365; F Ghezzi and M Maggolino, ‘L'imputazione delle sanzioni antitrust nei gruppi di imprese, tra “responsabilità personale” e finalità dissuasive’ (2014) *Rivista delle Società* 1060; P Hughes, ‘Competition Law Enforcement and Corporate Group Liability – Adjusting the Veil’ (2014) *European Competition Law Review* 68; NI Pauer, *The Single Economic Entity Doctrine and Corporate Group Responsibility in European Antitrust Law* (Wolters Kluwer 2014); M Bronckers and A Vallery, ‘No Longer Presumed Guilty? The Impact of Fundamental Rights on Certain Dogmas of EU Competition Law’ (2011) *World Competition* 535; A Winckler, ‘Parent’s Liability: New Case Extending the Presumption of Liability of a Parent Company for the Conduct of its Wholly Owned Subsidiary’ (2011) *Journal of European Competition Law & Practice* 231; K Hofstetter and M Ludescher, ‘Fines Against Parent Companies in EU Antitrust Law: Setting Incentives for “Best Practice Compliance”’ (2010) *World Competition* 55; A Montesa and A Givaja, ‘When Parents Pay for Their Children’s Wrongs: Attribution of Liability for EC Antitrust Infringements in Parent-Subsidiary Scenarios’ (2006) *World Competition* 555.

⁹⁶ See A Jones, ‘The Boundaries of an Undertaking in EU Competition Law’ (2012) *European Competition Journal* 301; O Odudu, ‘The Meaning of Undertaking Within Article 101’ (2005) *CYELS* 209; WPJ Wils, ‘The Undertakings as Subject of E.C. Competition Law and the Imputation of Infringements to Natural or Legal Person’ (2000) *ELR* 99.

⁹⁷ Cf. *ex pluribus* case 170/83 *Hydrotherm* ECLI:EU:C:1984:271 para. 11.

⁹⁸ According to the Court of Justice “[t]he authors of the Treaties chose to use the concept of an ‘undertaking’ to designate the perpetrator of an infringement of competition law, who is liable to be penalised pursuant to articles [101 TFEU and 102 TFEU], and not other concepts such as that of ‘companies or firms’ or ‘legal persons’, used in particular in article [54 TFEU]” (cf. joined cases C-231/11 P to C-233/11 P *Commission v Siemens Österreich and Others et Siemens Transmission & Distribution and Others v Commission* ECLI:EU:C:2014:256 para. 41).

⁹⁹ See O Odudu and D Bailey, ‘The Single Economic Entity Doctrine in EU Competition Law’ (2014) *CMLRev* 1721.

¹⁰⁰ For example, it implies that intra-group agreements between different companies cannot breach art. 101 TFEU: although composed by several legal persons, an undertaking is free to choose how to organize itself (cf. case C-73/95 P *Vihov v Commission* ECLI:EU:C:1996:405).

that they form a single economic entity together with the holding companies. Just as a given company is the only entity liable for antitrust offences committed by each of its units and departments, so too an “undertaking” is the only entity liable for the antitrust infringements committed by each of the legal persons of which it is possibly composed.

This system of corporate group liability has been devised to ensure that undertakings cannot escape their antitrust liability simply by setting up subsidiaries to which they “assign the task” to breach competition rules in the interest of the whole group (*e.g.*, by formally entrusting the subsidiary with the task of managing the sales of the parent company and letting it enter into a cartel with the parent company’s competitors). For example, the Commission’s ability to recover fines is protected because the Commission is able to require the parent company to pay the fine should the subsidiary become insolvent or be liquidated.

More interestingly, the Commission is able to impose higher fines to increase the deterrent effect of arts 101 and 102 TFEU: the 10 per cent turnover cap enshrined by art. 23 of the Regulation (EC) n. 1/2003 is calculated on the basis of the overall turnover of the whole group rather than on the basis of the single subsidiary.¹⁰¹ The theory also allows the Commission to broaden the extraterritorial reach of EU competition law.¹⁰² Even when the parent company is based abroad, the circumstance that the subsidiary is established in one of the Member States is enough for the Commission to assert its jurisdiction on the matter as well as for fining the parent company.¹⁰³ Since antitrust infringements committed by any entity belonging to a corporate group are ascribed to the parent company, the risk of – indirect – recidivism of, and repeated infringements by, the latter significantly increases too.

¹⁰¹ Such possibility has been partially limited by the recent case law of the CJEU, according to which “in a situation where the liability of a parent company is purely derivative of that of its subsidiary and in which no other factor individually reflects the conduct for which the parent company is held liable, the liability of that parent company cannot exceed that of its subsidiary” (cf. case C-597/13 P *Total v Commission* ECLI:EU:C:2015:613 para. 38; case C-286/11 P *Commission v Tomkins* ECLI:EU:C:2013:29 para. 43).

¹⁰² See *Imperial Chemical Industries* cit. See F Munari, ‘Sui limiti internazionali all’applicazione extraterritoriale del diritto europeo della concorrenza’ (2016) *RivDirInt* 32; J Scott, ‘The New EU “Extraterritoriality”’ (2014) *CMLRev* 1343; F Wagner Von Papp, ‘Competition Law and Extraterritoriality’ in A Ezrachi (ed.), *Research Handbook on International Competition Law* (Edward Elgar 2012) 21; P De Pasquale, *La tutela della concorrenza oltre i confini comunitari tra applicazione extraterritoriale e cooperazione* (Editoriale Scientifica 2005); EM Fox, ‘Can We Solve the Antitrust Problems of Globalization by Extraterritoriality and Cooperation? Sufficiency and Legitimacy’ (2003) *Antitrust Bulletin* 355.

¹⁰³ Moreover, since one of the companies forming part of the single economic entity is established within the EU, the jurisdiction over the whole entity is based on the nationality principle, *i.e.*, on one of the least controversial connecting factors recognized in public international law (see for further references L Calzolari and MG Buonanno, ‘The Relations Between the European Union and the Swiss Confederation in the Antitrust Field: Between Extraterritoriality and the Recent Agreement Concerning Cooperation on the Application of Their Competition Laws’ in V Salvatore (ed.), *The Free Movement of Persons Between Switzerland and the European Union* (Giappichelli 2016) p. 55).

Corporate group liability has raised several controversial and much-debated issues mainly because, according to the case law, it is not necessary for the Commission to prove that parent companies are actually involved or aware of the violations of arts 101 and 102 TFEU planned or committed by their subsidiaries in order to hold them accountable for such infringements. Especially if parent companies hold nearly the entire capital of their subsidiaries,¹⁰⁴ an almost irrebuttable presumption that they exercise decisive influence on the commercial policy of the subsidiaries applies.¹⁰⁵

In theory, parent companies may rebut such a presumption of control over their wholly owned subsidiaries by submitting evidence that the subsidiaries act autonomously of, and receive no instructions from, the parent companies. In practice, however, such requirement of proof amounts to a so-called *probatio diabolica*: in order to prove the complete autonomy of their subsidiaries, parent companies are essentially requested to submit evidence capable of refuting an abstract possibility, being impossible to adduce direct and irrefutable evidence of the independence of the subsidiaries' conduct on the market.¹⁰⁶

It is not surprising that there are virtually no cases in which parent companies did succeed in arguing that they did not exercise decisive influence over a wholly owned subsidiary.¹⁰⁷ One of the clearest examples of the rather strict approach applied to the

¹⁰⁴ See for example case T-299/08 *Elf Aquitaine v Commission* ECLI:EU:T:2011:217 and case C-508/11 P *Eni v Commission* ECLI:EU:C:2013:289.

¹⁰⁵ Indeed, “[i]n the specific case of a parent company holding 100% of the capital of a subsidiary which has committed an infringement, there is a simple presumption that the parent company exercises decisive influence over the conduct of its subsidiary” (cf. case C-97/08 P *Akzo Nobel and Others v Commission* ECLI:EU:C:2009:536 para. 60).

¹⁰⁶ See F Amato, A Della Negra and F Liberatore, ‘La responsabilità della capogruppo per le violazioni al diritto antitrust europeo commesse dalle controllate: presunzione relativa o, di fatto, assoluta?’ (2014) *Contratto e Impresa Europa* 334; B Leupold, ‘Effective Enforcement of EU Competition Law Gone too Far? Recent Case Law on the Presumption of Parental Liability’ (2013) *European Competition Law Review* 570; J Joshua, J Botteman and L Atlee, “‘You Can’t Beat the Percentage’ – The Parental Liability Presumption in EU Cartel Enforcement’ (2012) *Global Competition Review* 3; S Thomas, ‘Guilty of A Fault One Has not Committed. The Limits of the Group-Based Sanction Policy Carried out by the Commission and the European Courts in EU-Antitrust Law’ (2012) *Journal of European Competition Law & Practice* 11; A Svetlicinii, ‘Parental Liability for the Antitrust Infringements of Subsidiaries: A Rebuttable Presumption or *Probatio Diabolica*?’ (2011) *European Law Reporter* 288. It is worth noting that this line of criticism has been dismissed by the case law, according to which “il suffit de relever qu’il n’est pas exigé des parties concernées qu’elles rapportent une preuve directe et irréfutable de l’autonomie de comportement de la filiale sur le marché mais uniquement qu’elles produisent des éléments de preuve susceptibles de démontrer cette autonomie [...]”. En outre, la circonstance que la requérante n’a pas en l’espèce produit des éléments de preuve de nature à renverser la présomption d’absence d’autonomie ne signifie pas que ladite présomption ne peut en aucun cas être renversée” (cf. case T-168/05 *Arkema v Commission* ECLI:EU:T:2009:367 para. 82).

¹⁰⁷ One of the few exceptions is represented by case T-24/05 *Alliance One International and Others v Commission* ECLI:EU:T:2010:453 on which see L Idot, ‘Groupe de sociétés et imputabilité du comportement – Le tribunal rappelle une nouvelle fois que la possibilité d’imputer le comportement d’une filiale à la société mère est fondée sur l’existence d’une entreprise unique’ (2010) *Europe* 33; C Hummer, ‘Alliance One:

matter is that of purely financial investors: indeed, even private equity firms have been held liable pursuant to the presumption of decisive influence.¹⁰⁸ The fact that the only business activity carried out by an undertaking was that of acquiring distressed companies in order to restructure and sell them to third parties has been considered a circumstance supporting – rather than denying – the exercise of decisive influence by the acquiring company over the target one.¹⁰⁹ The very same approach has also been deemed to apply when a subsidiary disregards express instructions received from its parent company:¹¹⁰ indeed, the presumption of liability of the parent company cannot be rebutted merely because the participation of the subsidiary in an antitrust infringement is “in blatant contradiction with the explicit instructions” given by the parent company to that subsidiary “not to participate in any anticompetitive practices in a given market”.¹¹¹

Just as the autonomous decision of a subsidiary to blatantly disregard the instruction not to collude received from its parent company does not entail that the latter can avoid liability under art. 101 TFEU, it is submitted that the same conclusion may (and should) hold true also with regard to the autonomous decision to collude taken by algorithms that were not instructed to participate in an anticompetitive infringement but were rather designed to maximize profits.¹¹² After all, the case law already supports the conclusion that, as a result of their power of supervision, parent companies have “a responsibility to ensure that [their] subsidiary complies with the competition rules”,¹¹³ and not only a responsibility to instruct them to do so.

The CJEU case law on the irrelevance of intent and on parent company liability for antitrust violations committed by subsidiaries arguably makes it possible to interpret the notion of imputability so that undertakings may be held responsible for the autonomous decisions to collude made by their own algorithms,¹¹⁴ even if the latter were not designed

General Court Overturned Parental Liability of a Pure Financial Holding Company (2011) *Journal of European Competition Law & Practice* 126.

¹⁰⁸ See for example Decision of the Commission of 2 April 2014 relating to a proceeding under article 101 TFEU, case AT.39610 – *Power Cables C*(2014) 2139 final.

¹⁰⁹ Cf. case T-395/09 *Gigaset v Commission* ECLI:EU:T:2014:23.

¹¹⁰ Indeed, “the existence of an express instruction given by a parent company to its subsidiary not to participate in any anticompetitive practices in a given market can be a strong indication of the actual exercise of decisive influence by the parent over the subsidiary” (cf. case C-155/14 P *Evonik Degussa and AlzChem v Commission* ECLI:EU:C:2016:446 para. 40).

¹¹¹ *Ibid.* paras 39-40.

¹¹² The rationale is that “regardless of whether there exists an alternative plausible and legitimate justification for the unilateral adoption of a pricing algorithm, firms should refrain from doing so to the extent that the common adoption may facilitate tacit collusion” (cf. P Siciliani, ‘Tackling Algorithmic-Facilitated Tacit Collusion in a Proportionate Way’ cit. p. 32).

¹¹³ Cf. case T-77/08 *Dow Chemical v Commission* ECLI:EU:T:2012:47 para. 101.

¹¹⁴ In this vein, it has been observed that it is necessary “not to underestimate the flexibility allowed by the CJEU’s case law in EU antitrust cases”, considered that the CJEU “has identified unlawful collusion as a consequence of the disclosure of sensitive information from one undertaking to another and has also

to conspire. In any case, it seems reasonable that undertakings should ensure that the algorithms that they freely decide to use do not engage in conduct that would be qualified as illicit if committed by humans.

For example, just as undertakings should organize a compliance programme to prevent breaches of EU competition law by their employees,¹¹⁵ so they should design their algorithms to prevent such infringements.¹¹⁶ If this occurs (or cannot be avoided from the technical viewpoint), it seems just as much reasonable that undertakings should be the ones that have to bear the negative externalities of their algorithms' behaviours (including harm caused to consumers or to the market structure)¹¹⁷ even if they did not wish or even expect such externalities to occur:¹¹⁸ if only because they are the subjects that benefit from the very same – undesired or unexpected – conducts until (if ever) an antitrust authority detects them.¹¹⁹

allowed for the establishment of infringements in the absence of anticompetitive intent", so that "even self-learning pricing algorithms could be caught by the prohibition of Article 101 TFEU" (cf. J Blockx, 'Antitrust in Digital Markets in the EU: Policing Price Bots' (Paper for the 2017 Radboud Economic Law Conference) 11).

¹¹⁵ As is well known, undertakings are liable for the actions of their employees acting within the scope of their employment even if the latter have not been authorised or instructed to collude since "action by a person who is authorised to act on behalf of the undertaking suffices" (cf. case C-68/12 *Slovenská sporiteľňa* ECLI:EU:C:2013:71 para. 25).

¹¹⁶ Cf. OECD, Algorithms and Collusion – Note from the European Union cit. para. 28, where the Commission notes that "[i]t is up to the firms using algorithms to ensure that their algorithms do not engage in illegal behaviour". Indeed, it has been argued that "undertakings can be liable for the actions of the (self-learning) algorithms they create or use. Undertakings have a positive obligation to ensure compliance with the EU antitrust rules and cannot plead ignorance of what their employees or price bots are doing" (cf. J Blockx, 'Antitrust in Digital Markets in the EU' cit. 11). Indeed, "[i]n a world where employees (*i.e.*, humans) alone made the decisions about pricing, promotions, competition, output, and capacity it makes sense that compliance programs focus on sensitizing the marketing and sales teams to the antitrust laws. But when those same decisions are delegated to or aided by complex and self-evolving algorithms, the approach should broaden. These technologies learn (quickly) and require regular monitoring for compliance with their initial purposes. So, the audience for antitrust compliance discussions has to expand to include AI developers and the dialog must be tailored to this new audience" (cf. T Snyder, K Fayne and K Silverman, 'Antitrust Intelligence: Six Tips for Talking to AI Developers About Antitrust' (2019) Competition Law & Policy Debate 36).

¹¹⁷ Cf. OECD, Algorithms and Collusion – Note from the European Union cit. para. 2, where the Commission observes that "humans – and, through them, legal entities – must be held accountable for the consequences of the algorithms they choose to use, including in the area of competition policy".

¹¹⁸ In other words, "[o]nce companies code or implement what may be considered virtual assistants, they must be fully accountable for the anticompetitive outcomes that might derive from their performance on the market", since "[p]rice bots are to be seen as a fully integrated part of a business, implemented by companies to boost pre-existing or future pricing strategies, monitor the market and detect deviation in hypothetical collusive scenarios in the same manner as a particularly skilful employee might do through ordinary means" (cf. N Colombo, 'Human Liability *Vis-A-Vis* Artificial Intelligence's Anticompetitive Behaviours' cit. 16).

¹¹⁹ Indeed, "since any gains resulting from illegal activities accrue to the shareholders, it is only fair that those who have the power of supervision should assume liability for the illegal business activities of their subsidiaries" (cf. *Dow Chemical v Commission* cit. para. 101).

VI. BIG DATA ANALYTICS DOES CREATE COMPETITIVE CONCERNS: SHOULD THE COMMISSION AND NATIONAL COMPETITION AUTHORITIES COMMIT TO TACKLING ALGORITHMIC COLLUSION?

Algorithmic collusion may trigger the application of EU competition law, whether or not formally qualified as a concerted practice. Indeed, EU competition rules may be enforced even without ascertaining any actual antitrust infringement.

Formalizing a long-standing practice of informal settlement,¹²⁰ art. 9 of the Regulation (EC) n. 1/2003 allows the adoption of commitment decisions if the remedies proposed by undertakings resolve the Commission's *competitive concerns* in a given scenario.¹²¹ Art. 12 of the Directive (EU) n. 1/2019 has recently established that commitment decisions must also be available at the national level.¹²²

As is well known, there are no clear procedural rules or specific limits for the use of commitments.¹²³ The Commission enjoys a broad margin of discretion in relation to the choice, the design and the proportionality of this remedy.¹²⁴ In theory, commitments should be offered at their initiative by the undertakings to which the Commission has already sent a Statement of Objections or, more often, a preliminary assessment of the case.¹²⁵ Although the preliminary assessment needs to indicate the reasons why the

¹²⁰ Cf. H Schweitzer, 'Commitment Decisions under Article 9 of Regulation 1/2003: The Developing EC Practice and Case Law' in CD Ehlermann and M Marquis (eds), *European Competition Law Annual 2008: Antitrust Settlements Under EC Competition Law* (Oxford University Press 2010) 547, 548. In other words, "[a]rticle 9 of Regulation 1/2003 formally introduced the possibility of closing proceedings with a commitment decision, codifying the Commission's previous administrative practice" (cf. S Martínez Lage and R Allendesalazar, 'Commitment Decisions ex Regulation 1/2003: Procedure and Effects' in CD Ehlermann and M Marquis (eds), *European Competition Law Annual 2008* cit. 581).

¹²¹ One could observe that it seems to be a certain degree of inconsistency in asserting that, on the one hand, algorithmic collusion should be treated as a *per se* violation of art. 101 TFEU (if only as a form of exchange of information between competitors) and, on the other hand, suggesting that they should be tackled through the commitment instrument. However, although one may disagree with this policy choice of the Commission which may decrease the deterrent effect of EU competition law, the practice shows that commitment decisions have been indeed used in respects of practices that, if proved, would have represented serious infringements of arts 101 and 102 TFEU (cf. A Jones and B Sufirin, *EU Competition Law* cit. 946).

¹²² Cf. Directive (EU) 2019/1 of the European Parliament and of the Council of 11 December 2018 to empower the competition authorities of the Member States to be more effective enforcers and to ensure the proper functioning of the internal market. On the so-called "ECN+ directive", see *inter alia* L Calzolari, *Il sistema di enforcement delle regole di concorrenza dell'Unione europea* (Giappichelli 2019).

¹²³ Indeed, a "rather obscured path leading to the issuance of a commitment decision by a competition authority" (cf. P Moullet, 'How should Undertakings Approach Commitment Proposal in Antitrust Proceedings' (2013) *European Competition Law Review* 86).

¹²⁴ Cf. D Rat, 'Commitment Decisions and Private Enforcement of EU Competition Law: Friend or Foe?' (2015) *World Competition* 527, 529. On the proportionality issue, see also case C-441/07 P *Commission v Alrosa* ECLI:EU:C:2010:377 and, more recently, case T-76/14 *Morningstar v Commission* ECLI:EU:T:2016:481.

¹²⁵ Although "[t]he power to take a commitment decision arises only where the Commission otherwise intends to adopt a termination decision under Article 7", it is observed that "[t]his does not mean that it

investigated practices could violate competition law, thus explaining the competitive concerns of the Commission,¹²⁶ the document does not establish an infringement.¹²⁷

The case practice shows that the Commission often contacts the undertakings involved and informally notifies them of its interest in receiving commitment proposals.¹²⁸ Although commitments cannot be designed by the Commission and imposed upon the undertakings if the latter are unwilling to propose them,¹²⁹ it follows that there is room for considerable negotiation between the Commission and the undertakings with regard to the content of the commitments before the moment in which they are formally “offered” by the latter to the former.¹³⁰

Indeed, the analysis of the Commission’s practice suggests that the preliminary assessment is often issued only when (and if) the actual adoption of a commitment decision

has to have sent a statement of objections (SO) before taking an Article 9 decision”, since the only “requirement is that the Commission has made a ‘preliminary assessment’” of the case (cf. A Jones and B Sufrin, *EU Competition Law* cit. 983). Conversely, “if the Commission has issued an SO, it can opt either for an Article 7 or an Article 9 decision. By contrast, if it has only reached a preliminary assessment but, instead of proceeding under Article 9 it intends to adopt an infringement decision, it would first have to prepare and serve to the defendant a formal [Statement of Objections]” (cf. S Martínez Lage and R Allendesalazar, ‘Commitment Decisions ex Regulation 1/2003’ cit. 590).

¹²⁶ Cf. PI Colomo, ‘Three Shifts in EU Competition Policy: Towards Standards, Decentralization, Settlements’ (2013) *Maastricht Journal of European and Comparative Law* 363, 378.

¹²⁷ Indeed, “[t]he preliminary legal assessment in Article 9 decisions lacks the evidential depth and rigor of prohibition decisions” (cf. R Subiotto, DR Little and R Lepetska, ‘The Application of Article 102 TFEU by the European Commission and the European Courts’ (2017) *Journal of European Competition Law & Practice*, 263, 264).

¹²⁸ Cf. A Gautier and N Petit, ‘Optimal Enforcement of Competition Policy: The Commitments Procedure Under Uncertainty’ (CORE Discussion Papers 63/2014) 1, 2. Indeed, “[t]he chronology of some of the cases decided by the Commission clearly shows that the commitments in these cases were negotiated before the proceedings were formally initiated” (cf. S Martínez Lage and R Allendesalazar, ‘Commitment Decisions ex Regulation 1/2003’ cit. 588), so that “[i]t is thus evident that sometimes the negotiations over the proposed commitments may take place de facto well before the notification of the preliminary assessment” (cf. P Cavicchi, ‘The European Commission’s Discretion as to the Adoption of Article 9 Decisions: Lessons from Alrosa’ (Hamburg Institute for European integration Discussion Paper No. 3/2011) 1, 6).

¹²⁹ Conversely, the Commission has “a right and not an obligation to accept commitments” (cf. D Rat, ‘Commitment Decisions and Private Enforcement of EU Competition Law’ cit. 531) and it indeed enjoys “complete discretion as to whether it accepts these commitments, which can be, as in art. 9 commitment decisions, behavioural or structural in nature” (cf. AL Hinds and S Eaton, ‘Commitment Issues: New Developments in EU and Irish Competition Law’ (2014) *European Competition Law Review* 33, 38). Since undertakings are not entitled to a committed decision, even if they offer commitments in order to meet the Commission’s concerns, the latter maintains it right to refuse the proposed (and negotiated) remedies and to revert to the traditional route with a view to adopt an infringement decision ex art. 7 of the Regulation (EC) n. 1/2003 cit. (cf. A Gautier and N Petit, ‘Optimal Enforcement of Competition Policy’ cit. 2).

¹³⁰ Cf. N Dunne, ‘Commitment Decisions in EU Competition Law’ (2014) *Journal of Competition Law & Economics* 399, 403.

is not only envisaged but also considered likely as the result of the negotiation already carried out by the Commission and the undertakings involved in the procedure.¹³¹

In addition to this enhanced role of the undertakings in this procedure,¹³² what matters is that the discussions between the Commission and the undertakings do not focus on the past conduct of the latter but rather on the design of the prospective remedies that need to be devised and agreed upon in order to resolve the Commission's competitive concern.¹³³ Pursuant to recital 13 of the Regulation (CE) n. 1/2003, if it accepts the commitments proposed by the undertakings, the Commission cannot establish, in its art. 9 decision, whether or not there was a violation of arts 101 or 102 TFEU.¹³⁴

On the one hand, the Commission¹³⁵ therefore has no incentive to invest its (limited) resources in proving that the investigated practice could actually constitute an antitrust infringement.¹³⁶ On the other hand, the parties have no incentive to challenge the validity of the legal arguments advanced by the Commission in the preliminary assessment, as

¹³¹ Cf. E De Smijter and A Sinclair, 'The Enforcement System under Regulation 1/2003' in J Faull and A Nikpay (eds), *The EU Law of Competition* cit. 91, 132. Therefore, the possibility to achieve a "settlement via Article 9 is a mechanism for managing risk", since the undertaking involved "gains control over the remedies implemented, as opposed to the unilateral imposition of remedies (typically, high fines) under an infringement decision" (cf. N Dunne, 'Commitment Decisions in EU Competition Law' cit. 405).

¹³² The case law confirms that "the mechanism introduced by Article 9 of Regulation No 1/2003 enables the undertaking concerned to participate fully in the procedure, by putting forward the solutions which appear to it to be the most appropriate for addressing the Commission's concerns and preventing the Commission from making a formal finding of infringement of Article 101 TFEU or Article 102 TFEU" (cf. case T-342/11 *CEEES and Asociación de Gestores de Estaciones de Servicio v Commission* ECLI:EU:T:2014:60 para. 55). Therefore, "[t]he company will have the possibility of proposing to the Commission remedies which it knows can operate in practice; furthermore, it can fine-tune its proposal to meet the Commission's preliminary concerns while disrupting its business practices as little as possible" (cf. S Martínez Lage and R Allendesalazar, 'Commitment Decisions ex Regulation 1/2003' cit. 584).

¹³³ Indeed, "[o]ne of the major differences between Article 7 (enforcement) decisions and Article 9 (commitment) decisions is that the focus of discussion in Article 7 enforcement decisions is the proof of the (past) violation whereas in Article 9 commitment decisions the focus of discussion is the adequacy of the remedy to meet – in the future – the concerns of the Commission"; in other words, "[t]he issue is no longer what the parties did but what the Commission wants" (cf. F Jenny, 'Worst Decision of the EU Court of Justice: The Alrosa Judgment in context and the Future of Commitment Decisions' (2015) *FordhamIntLJ* 701, 762-763).

¹³⁴ Indeed, "the Commission is actually forbidden from discharging its burden of proof in relation to Articles 101 or 102 TFEU in this context, to the extent that doing so results in a formal finding of breach" (cf. N Dunne, 'Commitment Decisions in EU Competition Law' cit. 424).

¹³⁵ According to the case law, "the Commission is not required to demonstrate to the requisite legal standard that the conditions of Article 101 TFEU or Article 102 TFEU are satisfied and is therefore able to provide a more rapid solution to the problems which it has identified" (cf. *CEEES and Asociación de Gestores de Estaciones de Servicio v Commission* cit. para. 55).

¹³⁶ Therefore, "[t]he depth and the quality of the substantive analysis are in no way comparable to that found in decisions formally establishing a breach of Articles 101 and 102 TFEU" (cf. PI Colomo, 'Three Shifts in EU Competition Policy' cit. 378).

long as they are able to convince the Commission to close the proceeding by accepting commitments that do not affect their core business.¹³⁷

It follows that commitment decisions are essentially “shielded” from judicial review:¹³⁸ neither the Commission nor the undertakings have any interest in seeking the annulment of a decision they have agreed upon. Moreover, as far as the viewpoint of the undertakings is concerned, the fact that commitment decisions ascertain no antitrust offences means, on the one hand, that no public fines are attached to them and, on the other hand, that follow-on actions are less likely to be brought by aggrieved individuals.¹³⁹

For these reasons, the diffusion of commitment decisions has been linked with manifold negative consequences for the sound development of EU competition law: for example, commitment decisions are deemed to be capable of harming legal certainty and the evolution of the antitrust legal doctrine (e.g., by reducing the number of

¹³⁷ Indeed, “[s]o long as the requested concession does not go too close to the heart of its business model, a negotiated settlement involving a quantifiable sacrifice of business freedom will be more attractive than defending itself robustly” (cf. *inter alia* I Forrester, ‘Creating New Rules? Or Closing Easy Cases? Policy Consequences for Public Enforcement of Settlements under Article 9 of Regulation 1/2003’ in CD Ehlermann and M Marquis (eds), *European Competition Law Annual 2008* cit. 637, 645). For example, it has been observed that “there is too much pressure on the defence to settle, even though the Commission’s case is not correct and goes too far in some way. The idea is straightforward. Proceedings can take ages. Fines can be colossal. The diversion of resources to defend cases may be very significant in time and expense. Companies also want to avoid bad publicity. All of this may lead to considerable incentives on defendants to settle” (cf. J Ratliff, ‘Negotiated Settlements in EC Competition Law: The Perspective of the Legal Profession’ in CD Ehlermann and M Marquis (eds), *European Competition Law Annual 2008* cit. 305, 306). In other words, “[t]he fact that an undertaking voluntarily changes its behaviour or agrees to divest itself of assets as a result of a Commission investigation cannot, in itself, be normative as to the law: undertakings may choose to offer commitments for a range of reasons, and not necessarily because they agree with the Commission’s legal argument against them, and indeed it is sometimes recorded in a commitment decision that the undertaking or undertakings do not agree with its analysis” (cf. R Whish, ‘Motorola and Samsung: An Effective Use of Article 7 and Article 9 of Regulation 1/2003’ (2014) *Journal of European Competition Law & Practice* 603).

¹³⁸ Indeed, “[c]ommitment decisions *de facto* withdraw a large part of the Commission’s competition law practice from judicial review” (cf. H. Schweitzer, ‘Commitment Decisions in the EU and in the Member States: Functions and Risks of a New Instrument of Competition Law Enforcement Within a Federal Enforcement Regime’ (2 August 2012) 2 papers.ssrn.com). Although “[a]n Article 9 decision can always be appealed by the addressee, even if the decision is based upon agreements freely entered into”, it is obvious that “this circumstance will undoubtedly make it difficult to appeal such decision successfully” (cf. M Siragusa and E Guerri, ‘Antitrust Settlements Under EC Competition Law: The Point of View of the Defendants’ in CD Ehlermann and M Marquis (eds), *European Competition Law Annual 2008* cit. 192).

¹³⁹ Indeed, one of “the main incentive[s] for an undertaking to give a commitment is the avoidance of any admission of liability that might lead to follow-up private enforcement” (cf. MT Richter, ‘The Settlement Procedure in the Context of the Enforcement Tools of European Competition Law – a Comparison and Impact Analysis’ (2012) *European Competition Law Review* 537, 540). Follow-on actions are nevertheless allowed (see case C-547/16 *Gasorba and Others* ECLI:EU:C:2017:891).

binding judicial precedents),¹⁴⁰ as well as to allow the transformation from the traditional adversarial enforcement system of arts 101 and 102 TFEU to a regime of so-called regulatory competition.¹⁴¹

The first concern is often raised with regard to the leaning shown by the Commission toward the use of commitment decisions in novel cases where the law is not well-settled,¹⁴² but it is not unanimously shared. Considering that commitment decisions are an enforcement instrument and not an instrument for providing legal certainty to undertakings, nor a substitute for exemption decisions,¹⁴³ many believe that so-called art. 9 decisions are particularly useful in novel, technological and fast-moving markets.

On the one hand, by reducing the duration of the administrative (and judicial) procedure through procedural efficiencies, they make it more likely that the decision will be

¹⁴⁰ Cf. H Schweitzer, 'Commitment Decisions under Article 9 of Regulation 1/2003' cit. 577. More specifically, "[t]he potential absence of legal certainty stems from the fact that commitments decisions find solely that there are no grounds for EC's action without concluding whether or not there has been or still is an infringement" (cf. D Rat, 'Commitment Decisions and Private Enforcement of EU Competition Law' cit. 532). Indeed, "the fact that no final decision on liability is reached in commitments decisions robs the competition regime – and businesses – of potentially important legal precedent and clarity about how competition laws apply to particular behaviour" (cf. P Marsden, 'Towards an Approach to Commitments that is "Just Right"' (2015) *Competition Law International* 71, 73). In other words, "the absence of any legal determination regarding the validity of the theory of competition harm advanced or whether the necessary elements are made out on the facts can result in ambiguity as to the legal status of the underlying competition case, thus creating uncertainty as to the parameters of the law" (cf. N Dunne, 'Commitment Decisions in EU Competition Law' cit. 415-416).

¹⁴¹ It is widely believed that "the EU law enforcement system has moved from a regime of *ex-post* assessment of competition law violations under the (weak) supervision of the Courts to a regulatory approach whereby the Commission is more concerned by the design of remedies which will improve the competitive situation of a market than by the characterization of a competition law violation and its elimination" (cf. F Jenny, 'Worst Decision of the EU Court of Justice' cit. 763). Indeed, under given circumstances, "commitments have in essence a regulatory flavour, and they may not be easily justified on competition law grounds. They are likely to be disproportionate. Indeed, the Commission could be tempted to use commitment proceedings to deal with unclear cases or regulate markets according to its own vision" (cf. M Siragusa and E Guerri, 'Antitrust Settlements Under EC Competition Law' cit. 191). By the same token, it has been observed that "[c]ommitment decisions may be adopted in sectors where the Commission pursues a specific vision of how markets are to be restructured in order for them to function well, and may then become a substitute for regulation" (cf. H Schweitzer, 'Commitment Decisions in the EU and in the Member States' cit. 3). In other words, "the Commission may seek to attach 'collateral conditions' to a decision, *i.e.*, obligations which are not strictly related to the competition issue, but which are added in pursuit of some broader competitive agenda (such as, classically, to create openings in a context of liberalisation" (cf. J Ratliff, 'Negotiated Settlements in EC Competition Law' cit. 311).

¹⁴² Many support the idea that "novel cases are poor candidates for Article 9 decisions" (cf. I Forrester, 'Creating New Rules?' cit. 647) mainly because avoiding judicial review in cases based on new (or much debated) theories of harm is clearly not optimal for the sound development of EU competition law (cf. R Whish, 'Motorola and Samsung' cit. 603; C Pesce, *I nuovi strumenti di public enforcement. Commissione europea e «antitrust» nazionale a confronto* (Editoriale Scientifica 2012) 87).

¹⁴³ Cf. E De Smijter and A Sinclair, 'The Enforcement System Under Regulation 1/2003' cit. 128).

issued before the new market or new technology has already changed and the initial harm to competition has gone unaddressed. On the other hand, commitments can be modified and, in any case, they expire after a given period of time, thereby enabling the Commission to recalibrate its intervention on the market, without locking in new technologies or new business models.¹⁴⁴ Indeed, the case practice shows that the Commission is particularly willing to accept commitments in cases concerning new markets and new technologies, as seen *inter alia* in the *Samsung*,¹⁴⁵ *IBM*,¹⁴⁶ *Apple*,¹⁴⁷ *Amazon*,¹⁴⁸ and the *Credit default swap*¹⁴⁹ cases, and as was vigorously attempted by the Commission in the *Google Shopping* case.¹⁵⁰

To conclude, what can be inferred from the above analysis is that the Commission has made large use of the possibility to enforce EU competition rules even without ascertaining any actual antitrust infringement. Commitment decisions have been widely used in order to tackle new legal issues that emerge in new markets, allowing the Commission to play a role that resembles that of a regulatory authority rather than that of an antitrust enforcer. This is possible because, pursuant to art. 9 of the Regulation (EC) n. 1/2003, a competitive concern suffices for the Commission to issue a preliminary assessment and to adopt a binding decision.

¹⁴⁴ Cf. P Marsden, 'Towards an Approach to Commitments that is "Just Right"' cit. 72. Indeed, commitment decisions not only allow "enforcement authorities to secure the effectiveness of their intervention in highly dynamic markets on the basis of a 'preliminary assessment'", but also permit "to reopen formal proceedings in case of 'material change' in the market context in question", according to art. 9(2) of the Regulation (EC) n. 1/2003 cit. (cf. DMB Gerard, 'Negotiated Remedies in the Modernization Era: The Limits of Effectiveness' in P Lowe, M Marquis and G Monti (eds), *European Competition Law Annual 2013: Effective and Legitimate Enforcement* (Hart 2014).

¹⁴⁵ Cf. Commission decision of 29 April 2014 relating to a proceeding under article 102 TFEU, case AT.39939 – *Samsung* C(2014) 2891 final.

¹⁴⁶ Cf. Commission decision of 13 December 2011 relating to a proceeding under article 102 TFEU, case COMP/39.692 – *IBM Maintenance Services* C(2011) 9245 final.

¹⁴⁷ Cf. Commission decision of 12 December 2012 relating to a proceeding under article 101 TFEU, case COMP/39.847 – *E-books (Apple)* C(2013) 4750 final.

¹⁴⁸ Cf. Commission decision of 4 May 2017 relating to a proceeding under article 102 TFEU, case AT.40153 – *E-book MFNs and related matters (Amazon)* C(2017) 2876 final. More generally see A Giannaccari, 'Apple, Amazon e gli e-book. Una storia illecita, pro-competitiva' (2016) *Mercato Concorrenza Regole* 79; B Kirkwood, 'Collusion to Control a Powerful Customer: Amazon, E-Books, and Antitrust Policy' (2014) *University of Miami Law Review* 36; I Iglezakis, 'Competition and Antitrust Issues with Regard to E-Books' (2013) *European Competition Law Review* 249.

¹⁴⁹ Cf. Commission decision of 20 July 2016 relating to a proceeding under article 101 TFEU, case AT.39745 – *CDS Information Market (ISDA)* C(2016) 4583 final and Commission decision of 20 July 2016 relating to a proceeding under article 101 TFEU, case AT.39745 – *CDS Information Market (Markit)* C(2016) 4585 final.

¹⁵⁰ Cf. Commission decision of 27 July 2017 relating to a proceeding under article 102 TFEU, case AT.39740 – *Google Search (Shopping)* C(2017) 4444. For further references, see L Calzolari, 'Preliminary Comments on the Google Case: Bridging the Transatlantic Digital Divide by Widening the Antitrust One' (14 July 2017) SIDI blog www.sidiblog.org.

As already discussed, the diffusion of algorithmic collusion would make affected markets appear to be competitive (many players, low entry barriers, no search costs, etc.) but the market mechanism would actually be lessened or even “replaced” by big data analytics. The replacement of the “invisible hand” with big data and artificial intelligence arguably meets the threshold required by art. 9 of the Regulation (EC) n. 1/2003 allowing the Commission to intervene and somehow begin to regulate data driven markets. Moreover, just as any form of tacit collusion, algorithmic collusion affects the competitive market structure having the same negative effects of a cartel, reducing social welfare by means of either higher prices or lower output.

On the contrary, the relevance of questions such as whether *i)* algorithmic collusion may be considered as a concerted practice rather than an example of tacit collusion and therefore be tackled under art. 101 TFEU as well as whether *ii)* the lack of intent may preclude algorithms’ behaviours from being ascribed to the undertakings involved is significantly lessened. Indeed, even if they do not agree with the theory of harm elaborated by the Commission or with the possibility of being considered liable for the practice under investigation, undertakings have very limited incentives to challenge the preliminary assessment drafted by the Commission and to refuse to discuss with the Commission the possibility to close the proceeding by proposing commitments. Undertakings’ best strategy is indeed that of accepting to engage in the negotiation process with the Commission in order to draft commitments that do not alter their activities too much while allowing them to avoid public fines and to reduce the possibility of civil liabilities.¹⁵¹

Moreover, it is worth noting that recital 13 of the Regulation (EC) n. 1/2003 clarifies that commitments meeting the Commission’s concerns can be made binding on the undertakings *concerned*, a notion that does not necessarily refer to the question of imputability and that therefore arguably includes undertakings whose algorithms triggered the Commission’s competitive concerns.

VII. CONCLUSIONS

Algorithmic collusion can be tackled under current competition rules. Firstly, algorithmic collusion is different from tacit collusion. In the traditional and analogic scenario, when they tacitly collude, undertakings act rationally on the ground of *existing* market conditions. When designing their algorithms to maximize profits, undertakings are *contributing* to the conditions that allow “tacit” collusion to occur. This difference should be considered when dealing with the imputability of algorithms’ behaviours. For this reason, algorithmic collusion should be qualified as a concerted practice falling within the scope of application of current competition rules. On this view, the use of algorithms that

¹⁵¹ See Directive 2014/104/EU of the European Parliament and of the Council of 26 November 2014 on certain rules governing actions for damages under national law for infringements of the competition law provisions of the Member States and of the European Union.

autonomously decide to conspire is caught by art. 101(1) TFEU unless the undertakings to which the conduct is ascribed succeed in proving that, in the specific case, a concerted practice did not occur or that the conditions listed by art. 101(3) TFEU for so-called “efficiency defences” are met.

Secondly, a *quasi*-strict liability regime applies to antitrust offences, so that intention and imputability already play a limited role. This is clearly shown by the fact that under EU competition law undertakings may be held – and to some extent, presumed – jointly and severally liable for antitrust infringements committed by their subsidiaries. It would be appropriate, we submit, to extend this notion of strict liability to the context of algorithmic collusion.

Thirdly, competition rules may be enforced even without ascertaining any antitrust infringement. *Competitive concerns* are enough to warrant to the Commission the possibility of adopting a commitment decision. Just like any form of tacit collusion, algorithmic collusion affects the competitive market structure, and it has the same negative effects that are caused by a cartel. Regardless of the question concerning the possibility to ascribe algorithms’ behaviours to the undertakings involved, the reduction of social welfare meets the threshold required for the Commission to initiate a proceeding under art. 9 of the Regulation (EC) n. 1/2003. Although not clearly defined, there is no doubt that the concept of “competitive concerns” is wider than that of “infringement”, the latter being the relevant legal standard under art. 7 of the Regulation (EC) n. 1/2003. Moreover, as mentioned, in the context of commitments procedures the focus is on the future (the remedies) rather than on the past (the undertaking’s conduct):¹⁵² the Commission can therefore issue a preliminary assessment even in unclear cases, with regard to which a violation of arts 101 or 102 TFEU could be difficult (or impossible) to establish.¹⁵³

In this perspective, the question of whether or not algorithmic collusion is different from analogic tacit collusion is of little relevance: if it so wishes, the Commission would be free to use the legal framework of art. 9 of the Regulation (EC) n. 1/2003 even in cases of mere oligopolistic interdependence in order to negotiate with the oligopolists a remedy capable of addressing the competitive concerns raised by any form – analogic or algorithmic – of tacit collusion (higher prices and/or lower output). The above of course does not entail that tacit collusion falls *per se* within the scope of application of art. 101 TFEU, but only that the legal standard applicable under art. 9 of the Regulation (EC) n.

¹⁵² In other words, “negotiated procedures are entirely driven by the nature and scope of remedies, rather than by an attempt to apply the law to the facts” (cf. DMB Gerard, ‘Negotiated Remedies in the Modernization Era’ cit.)

¹⁵³ Indeed, the Commission “riesce ad ottenere immediatamente un risultato concreto [...], anche nell’ipotesi in cui non è del tutto sicuro che i comportamenti da essa perseguiti siano effettivamente illeciti” or, in other words, “riesce ad ottenere più di quanto potrebbe conseguire se alla fine non fosse in grado di provare l’illecito, e talvolta più di quanto sarebbe in grado di ottenere in assoluto”, moreover “senza alcun rischio di insuccesso istruttorio” (cfr. LG Radicati Di Brozolo and F Russo, ‘Decisioni di accettazione degli impegni e private enforcement del diritto antitrust’ (2011) *Diritto del Commercio Internazionale* 1047, 1055).

1/2003 grants to the Commission a relatively large amount of room for discretionary enforcement and decision making. The ball would then be in the court of the undertakings, which would have to stand up to the high pressure of settling the case which, as mentioned, inherently characterizes commitment procedures. As shown by the case practice, it is likely that in several cases the undertakings do not have sufficient incentives to defend the case and take the risk that the Commission will shift to the ordinary procedure: in the light of the above, algorithmic collusion may be a practice with regard to which the Commission could attempt – and succeed – to adopt a so-called quasi-regulatory approach to EU competition law.¹⁵⁴

¹⁵⁴ Although in a different perspective, it is worth noting that the use of commitment decisions in order to regulate digital markets is also expressly envisaged under the so-called Digital Market Act (cf. Proposal COM (2020) 842 final for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sectors), art. 23, proposed by the Commission in December 2020 (see P Manzini, 'Il digital market act decodificato' in P Manzini and M Vellano (eds), *Unione europea 2020. I dodici mesi che hanno segnato l'integrazione europea* (Wolters Kluwer and CEDAM 2021) 317).