

# Without Any Prejudice? The Antitrust Implication of the AI Act

Jerome De Cooman<sup>1</sup>

<sup>1</sup> *EU Legal Studies, Liege University, Belgium*

## Abstract

This research paper questions to what extent the AI Act allows for algorithmic regulation and decision-making to take shape in competition law. It first summarises the algorithmicising of competition law proceedings. It then discusses algorithmic decision-making under the AI Act. Annex III of the AI Act qualifies as high-risk AI systems intended to be used by law enforcement authorities in the course of detection, investigation and prosecution of criminal offences. As some EU Member States criminalised competition law, this would mean the AI Act might apply to AI systems used in competition proceedings. Competition law is, however, not qualified as criminal in all Member States. This paper therefore questions the opportunity to use the dichotomic relation between hard core and peripheral law developed by both the European Court of Justice and the European Court of Human Rights. This paper argues, however, that such solution is doomed to failure. A contextual interpretation of the Proposal prevents any application of the AI Act to competition law through the back-door of peripheral criminal law. The paper concludes by imagining the competition landscape after the AI Act. On countries wherein competition law is criminal, national competition authorities will have to take that Regulation into account when developing AI systems that detect, investigate and prosecute competition infringements. As not all EU Member States have criminalised competition law, this would result in an imbalance between domestic legal orders that goes against the prime ambition of the AI Act, *i.e.*, harmonisation.

## Keywords

Competition Law, Algorithmic Screening, Artificial Intelligence, Criminal Law, AI Act

## 1. Introduction

On April 2021, the European Commission published a proposal for a regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain Union legislative acts (hereafter, “AI Act”) [1]. The AI Act is a world premiere in the “race to AI regulation” that opposes numerous countries and supranational organisations around the world [2]. It is currently debated [3, 4], but has been overall applauded [5].

The AI Act is archetypal risk regulation [6]. It prohibits AI systems that raise unacceptable risk (art. 5), imposes mandatory requirements to those that raise high risk (art. 6) as well as specific transparency obligations to certain AI systems that interact with natural persons (art. 52) and suggests non-high risk AI systems voluntarily endorse the requirements through code of conduct (art. 69).

This research paper does not ambition to delve deeper in the scope of application *ratione materiae* of the EU’s Proposal [7]. It will rather question to what extent the Act allows for algorithmic regulation to take shape in competition law. Algorithmic regulation is, as stated by Silicon Valley entrepreneur Tim O’Reilly, “an idea whose time has come”<sup>2</sup> [8]. Karen Yeung defines algorithmic regulation as algorithmic decision-making systems, *i.e.*, “algorithmically generated knowledge systems” executing

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EMAIL: [Jerome.decooman@uliege.be](mailto:Jerome.decooman@uliege.be)

ORCID: 0000-0001-8721-5730



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<sup>2</sup> This claim refers to Victor Hugo who allegedly famously stated that “nothing is more powerful than an idea whose time has come.” As such, this is apocryphal. Correct French citation is: “on résiste à l’invasion des armées ; on ne résiste pas à l’invasion des idées” (Victor Hugo, *Histoire d’un crime* (1877), Chapter 5).

or informing decisions [9, 10]. Governments around the world are enthusiastically incorporating these technologies in public administration [11, 12]. Competition law enforcement is one of the fields in which this potential is being explored currently [13].

Against that background, this research paper analyses the possible impact of the AI Act on algorithmic competition law enforcement. To set the scene, section 2 summarises the algorithmicising of competition law proceedings. Section 3 then discusses algorithmic decision-making under the AI Act and proposes hypotheses regarding its relation with procedural competition law. Section 4 concludes.

## 2. Algorithmic Screening Tools

Cartel takes place “behind a veil of dishonesty” [14] and wear a “cloak of secrecy” [15]. Upshot? In the cat and mouse game played by competition authorities and undertakings, the latter is statistically the winner [16, 17, 18, 19].

Leniency programmes were long perceived as a solution. They break the omerta code among cartel members by offering amnesty to the “first-in-the-door” whistleblowing conspirator [20, 21]. They allow the detection of cartels that would otherwise have remained unnoticed by giving cartelists’ first-hand evidence [22].

There are however controversies in legal and economic scholarship regarding the effectiveness of leniency programmes [23, 24, 25, 26, 27, 28, 29, 30, 31, 32]. Joseph Harrington and Myong-Hun Chang astoundingly demonstrate that “many leniency programs have sparked numerous applications” and that it is possible to identify cases for which such programme “was responsible for the discovery of the cartel and was instrumental in its successful prosecution” [32]. Yet it is “far less clear” whether leniency programmes are truly efficient, as “success is to be measured by a small number of cartels, not a large number of leniency applications” [32]. Margrethe Vestager herself recognised that “what consumers and industry ultimately need is an economy that doesn’t have cartels *in the first place*” and therefore defined cartel deterrence as the prime directive of European Commission<sup>3</sup> [33].

Leniency programmes also face a deterrence gap. There is a risk a cartel remains undisclosed only because the majority of investigations starts after a leniency application [34]. In this regard, if the carrot is the amnesty for the whistle-blower, the stick is a menace coming from the Commission in the form of proactive detection. If the probability of such Sword of Damocles hanging above cartelists is low, then few of them will apply for leniency. On the contrary, if this probability is high, then there will be what is colloquially known as a race to the courthouse<sup>4</sup> [26]. In words dearer to economists, the expected value of penalty should be greater than or equal to the profit driven from cartelisation [35]. The effectiveness of leniency application will only be achieved if “leniency carrots are sweet, and cartel sticks are heavy” [36]. Or, to put it slightly differently, “while there is a recognition that a leniency program is an immensely valuable tool (...) concerns arise when it is the *only* tool” [32].

The problem is, the European Court of Auditors highlighted, in a special report pursuant to article 287(4) TFEU, a reduction of *ex officio* procedures (the stick) related to an increase of cases’ complexity and a reduction of market surveillance capacity [37]. This scissors effect decreases the aforementioned expected value of penalty. This is actually why screening methods are so valuable [38].

In the words of Jean Tirole, there is “conventional wisdom on collusion” that permits the identification of “factors that are supposed to hinder or facilitate” collusive behaviours [39, 40, 41]. It has become a cannon trend in competition literature to distinguish between structural and behavioural approaches. Structural screens imply an analysis of market structure that increase the probability a cartel emerges, *i.e.*, market concentration [42, 43], entry barriers [44], frequency of undertakings’ interaction [45], horizontal [46] and vertical product differentiation [47, 48, 49], innovation and advertisement level [50, 51], demand stability [52], and buyer bargaining power [53]. Behavioural screens propose an observation of either the methods or the outcome of collusion. This concerns low price variance [54], sharp increase in high price-cost margin [55], sharp decline of price followed by sharp increase [38], homogenisation through increased product standardisation and pricing formula [56], decrease of customer-specific prices [57], stabler distribution of market shares [55], stabler customer base [58],

<sup>3</sup> Margrethe Vestager added that “in the end the goal of everything we do is to deter cartels – of all kinds”.

<sup>4</sup> Or, in this case, a race to the European Commission or national competition authorities.

buy-back [19] and compensation scheme [59]. Due to the competition authorities' finite resources, they typically screen for cartel using structural and then behavioural information [46].

Resource scarcity is key to understand the prominence of screening tool. The probability of cartel detection is not exogenous and depends on competition authorities' choices [19]. Yet, the Commission has finite resources and therefore cannot follow up all investigations<sup>5</sup> [60]. This means that the Commission is entitled to give different priority degrees to complaints received, as "setting priorities within the limits prescribed by the law – where those priorities have not been determined by legislature – is an inherent feature of administrative activity."<sup>6</sup> The Commission is therefore free to focus "its enforcement resources on cases where it appears likely that an infringement may be found" [61]. In light of priority and resources allocation, Andreas van Bonin and Sharon Malhi astutely argue that AI systems might be particularly useful in helping the Commission initiate the "right" investigations, and reversely decides "*not* to initiate (or to drop) a particular investigation" [62]. This "algorithmic shift in the fight against cartels" [63] is in fact only the refinement of Regulation 1/2003 ambition of "freeing up resources to focus on serious infringements" [60]. By processing data quicker and more efficiently, AI systems can help identify sooner market deficiencies. They might also allow a shift from reactive claims of competition infringements or leniency applications to proactive interventions.<sup>7</sup> In such scenario, AI systems merely update screening tools. They both draw the sketch of suspicious businesses by identifying the cartelists' recurring characteristics (patterns) [64]. Based on uncovered patterns, AI systems "predict future data, or (...) perform other kinds of decision making under uncertainty" [65, 66, 67, 68]. Algorithmic screening tools therefore constitute what Karen Yeung labels recommender system, *i.e.*, a part of algorithmic regulation that either "direct or guide an individual's decision-making processes in ways identified by the underlying software algorithm as optimal (...) with the human user retaining formal decision-making authority" [9].

Structural and behavioural screening works [69], as does algorithmic screening. It is consensually admitted that AI systems improve decision-making [70]. Human cognitive biases and bounded rationality imply that human decision is not "significantly more accountable than AI" [71]. The fact that recent researches indicate AI screening systems are highly accurate on cartel screening is just the icing on the cake [54, 72]. Algorithms can be used to "boost the functionality of the behavioural screens that have been developing in recent years" [64].

Algorithmic screening tools are, however, not without default. First, they require large digitised datasets to properly work [73]. Yet it has been acknowledged by the OCDE such data are not always available to competition agencies. Data obtained from undertakings are reliable but it is impossible to access the former without tipping the latter off. Publicly available or aggregated data are far less trustworthy [38]. As synthesised by Abrantes-Metz and Sokol, "screens can be very powerful tools when properly developed and implemented [but] if you put garbage in, you get garbage out" [69]. Second, human cognitive biases may not be solved but strengthened by algorithmic screening [74]. This is due to the automation bias, *i.e.*, the irrational tendency to rely on automated decision even when the operator suspect malfunction [75]. None of these issues constitutes a dead-end. Solution to the first is data quality requirement; solution to the second, human agency and oversight. The AI Act epitomised these two requirements (arts. 10 and 14, respectively). The question that therefore comes immediately next is whether algorithmic screening tool falls within the scope of application of the AI Act. This is the topic of the next section.

### 3. Algorithmic Decision-Making under the AI Act

It should be noted at the outset that the AI Act clearly states its content is "without prejudice to the application of Union competition law" [76]. A thinner reading of this document *might* challenge this prolegomenon – conditional used on purpose.

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<sup>5</sup> This holds true for National Competition Authorities that also have "scarce" and "limited" resources.

<sup>6</sup> Judgement of the Court of First Instance of 18 September 1992, *Automec Srl v Commission of the European Communities* [1992] Case T-24/90, ECLI:EU:T:1999:97, §§ 77 and 85.

<sup>7</sup> Reactive tools are however still useful. The 2019 Directive on whistleblowers (Directive (EU) 2019/1937 of the European Parliament and of the Council of 23 October 2019 on the protection of persons who report breaches of Union law, OJ L 305, 26 November 2019, pp. 17-56) places the burden of blowing the whistle on individuals rather than solely on undertakings.

Under the AI Act, an AI system is defined as a software that generates either content, predictions or recommendations given a set of human-defined objectives (art. 3(1) AI Act). As previously hinted, the AI Act distinguishes between unacceptable, high, limited, and non-high risks AI systems. Given the scope of this research paper, it is relevant to only focus on high-risk AI systems.

There are two kind of high-risk AI systems. On the one hand, there are those that are covered by sectorial product legislation listed in Annex II<sup>8</sup> and used as a product or a safety component (art. 6(1)(a) AI Act)<sup>9</sup> for which a third-party conformity assessment is required (art. 6(1)(b) AI Act). On the other hand, there are AI system not covered by sectorial product legislation but still considered as high-risk and as such listed in Annex III (arts. 6(2) and 7 AI Act).<sup>10</sup> Law enforcement activity is pinpointed in the latter category. The AI Act defines law enforcement authority as any public authority (or any other body or entity entrusted by Member State law to exercise public authority and public powers) competent for law enforcement activities, *i.e.*, the prevention, investigation, detection, or prosecution of criminal offences (arts. 3(40) and 3(41) AI Act). Annex III submits to mandatory requirements AI systems used by law enforcement authorities “for predicting the occurrence or reoccurrence of an actual or potential criminal offence based on profiling of natural persons as referred to in Article 3(4) of Directive (EU) 2016/680 or assessing personality traits and characteristics or past criminal behaviour of natural persons or groups” (Annex III(6)(e) AI Act).<sup>11</sup>

In a nutshell, high-risk AI systems related to law enforcement activities solely concern criminal offences and – beside profiling of natural person that is of limited relevance here – the assessment of natural persons or groups’ personality traits and characteristics. This is quite close – if not identical – to the purpose of behavioural cartel screenings. Yet this is restricted to natural person and criminal offences.

Reference to criminal offences raises convoluted issues. Two scenarios are made depending on the classification of competition law as criminal (3.1) or quasi-criminal (3.2). In legal orders that qualify competition law as criminal, algorithmic screening tools would have to comply with the AI Act. On the contrary, the AI Act does not apply in legal orders that do not qualify competition law as criminal (scenario 1). Upshot? The standard of protection will depend on national qualification. This makes no sense as the AI Act is a harmonising regulation. The jurisprudence of both the European Court of Justice (hereafter, “ECJ”) and the European Court of Human Rights (hereafter, “ECtHR”) that consider competition as peripheral criminal law might bring a solution (scenario 2). In the latter case, the question is whether it is relevant to apply a distinction between the hard core and the periphery of criminal law in the context of the AI Act.

### 3.1. Competition Law is Criminal Law

EU competition law is traditionally firm-focused. Yet there is a shift towards individual-focused punishment for cartelisation [77, 78]. In 1998, the OECD published recommendations on cartel enforcement stating that OECD Member States should “ensure that their competition law effectively halt and deter firms *and individuals*” from cartelisation [79]. This document was considered as

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<sup>8</sup> Namely machinery, toys safety, recreational craft and personal watercraft, lifts, equipment and protective systems intended for use in potentially explosive atmospheres (ATEX), radio equipment, pressure equipment, cableway installations, personal protective equipment, gas appliances, medical devices, *in vitro* diagnostic medical devices (Annex II.A. AI Act). It should be added approval and market surveillance of two- or three-wheel vehicles and quadricycles, of agricultural and forestry vehicles, and motors vehicles and their trailers, including systems, components and technical units, with an emphasis on protection of vehicle occupants and vulnerable road users, marine equipment, rail system interoperability, and civil aviation security, including unmanned aircrafts and their engines, propellers, parts and remote-control equipment (Annex II.B AI Act).

<sup>9</sup> Namely a component that fulfils a safety function whose failure or malfunction endangers the health and safety of persons or property (art. 3(14) AI Act).

<sup>10</sup> Namely biometric identification and categorization of natural persons, management and operation of critical infrastructure, education and vocational training, employment, workers management and access to self-employment, access to and enjoyment of essential private services and public services and benefits, law enforcement, migration, Asylum and border control management, and administration of justice and democratic processes.

<sup>11</sup> Directive (EU) 2016/680 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 by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, and repealing Council Framework Decision 2008/977/JHA, OJ L 119, 4 May 2016, pp. 89-131 (defining profiling at article 3(4) as “any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person’s performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements”).

implicitly fostering the criminalisation of competition law [80]. This is not anecdotal. Initially viewed as a non-criminal phenomenon and therefore “lacking a sense of strong moral opprobrium and delinquency,” cartelisation has been vilified and moved “towards criminalization in *fin-de-siècle* (twentieth/twenty-first century) Europe” [80]. It has been argued “prison is the inferno” for the natural person behind the cartelisation that breaks down “conventional risk-reward analysis (...) when the risk is jail” [81].

Criminalisation of competition law is far from anecdotal [82, 83]. Any competition law infringement is tantamount to a criminal offence in Ireland,<sup>12</sup> Estonia,<sup>13</sup> Denmark,<sup>14</sup> Greece,<sup>15</sup> and Slovenia.<sup>16</sup> Specific competition law infringements like bid-rigging [84] are criminalised in Luxembourg,<sup>17</sup> Germany,<sup>18</sup> Poland,<sup>19</sup> Hungary,<sup>20</sup> Austria,<sup>21</sup> Italy<sup>22</sup> [85], Belgium,<sup>23</sup> Spain,<sup>24</sup> Portugal,<sup>25</sup> and Croatia.<sup>26</sup> France,<sup>27</sup> Romania,<sup>28</sup> Czechia<sup>29</sup> and Slovakia<sup>30</sup> criminalise competition law in specific circumstances like fraud, undue influence or thievery. Cyprus provides criminal offences albeit not for competition law infringement but for non-cooperation with the Cyprian Competition Authority or for concealment, destruction or falsification of information.<sup>31</sup> Bulgaria, Finland, Netherlands, Sweden, Malta, Lithuania and Latvia did not criminalise competition law at all [86]. The same goes for EU competition law. Pursuant to article 23(5) Regulation 1/2003 (and its predecessor art. 15(4) Regulation No 17 [87]), fines imposed by the European Commission to sanction infringement of articles 101 and 102 TFEU “shall not be of a criminal nature” [88]. Upshot? Criminal law has partly colonised competition law.

Due to the limited scope of this paper, it is irrelevant to discuss the effectiveness of competition law criminalisation [89]. Nor it is to assess whether these Member States actually use the criminal sanction<sup>32</sup> [90]. It is enough to stress that AI systems aimed at detecting cartel falls under the scope of the AI Act due to Annex III(6)(e) AI Act in legal order that criminalised competition law.

A lot of Member States are concerned by competition law criminalisation and thereby application of the AI Act to competition proceedings. The fact that this is limited to bid rigging in some legal orders is not inconsequential. AI systems are not preprogramed to respond in a certain way whenever they face certain conditions but rather to “learn” the appropriate response (hence the name of machine learning) [91]. Learning requires numerous examples [92]. This explains why public tendering – characterized by a necessary transparency and thereby data availability – is the ideal candidate for the development of algorithmic screening tools [93]. The application of the AI Act in legal orders that criminalise bid-rigging will therefore be far from trivial.

### 3.2. Competition Law is Quasi-Criminal Law

It is concluded from what precedes that the AI Act does not apply *prima facie* to competition law in legal orders that do not qualify competition law infringement as criminal offences. This raises fundamental issues given the AI Act’s prime ambition of harmonisation. Such scenario will lead to a situation whereby an AI system will be submitted, or not, to mandatory requirements depending on the

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<sup>12</sup> Irish Competition Act, 2002.

<sup>13</sup> § 400 Estonian Penal Code.

<sup>14</sup> Section 23 (4) and (6) Danish Competition Act.

<sup>15</sup> Article 44 Greek Law 3959/2011.

<sup>16</sup> Article 225 Slovenian Criminal Code

<sup>17</sup> Article 311 Luxembourg Criminal Code.

<sup>18</sup> Section 298(1) German Criminal Code (bid-rigging).

<sup>19</sup> Article 303 Polish Penal Code (Act of 6 June 1997) (bid-rigging).

<sup>20</sup> Section 420 Hungarian Criminal Code (Act IV of 1978) (bid-rigging).

<sup>21</sup> Section 168b Austrian Criminal Code (bid-rigging).

<sup>22</sup> Article 353 Italian Criminal Code (bid-rigging).

<sup>23</sup> Article 314 Belgian Criminal Code (big-rigging).

<sup>24</sup> Article 262 Spanish Criminal Code (bid-rigging).

<sup>25</sup> Article 230 Portuguese Penal Code (bid-rigging).

<sup>26</sup> Article 254 Croatian Criminal Code (bid-rigging)

<sup>27</sup> Article L420-6 French Commercial Code.

<sup>28</sup> Article 63 Romanian Competition Law no 21/1996.

<sup>29</sup> Section 248 Czechian Criminal Code.

<sup>30</sup> Section 250 Slovakian Criminal Code.

<sup>31</sup> Section 31(11) Cyprian Protection of Competition Law 13(1)/2008.

<sup>32</sup> Albeit legal, criminalization of competition law infringement is rare (so far) in France.

legal orders wherein it operates. This section assesses whether an extensive interpretation of what constitutes criminal law might be a workable solution.

In this regard, it should first be emphasised that the thin line between administrative and criminal law is blurred [94]. In Voltaire's ideal world, administrative and criminal law should harmoniously coexist, complementing and simultaneously enhancing each other. In front of this utopia, the real world is disappointing. Each field chaotically coexists in parallel. The European Court of Human Rights (hereafter, "ECtHR") once endeavoured to bring clarity to this miasma and to erase idiosyncrasies of domestic classification. The landmark *Engel* case defined the three eponym criteria whereby a sanction is to be considered criminal depending on the classification in domestic law (1), the nature of the offence (2) and the severity of the penalty that the person concerned is likely to incur (3).<sup>33</sup> This was subsequently confirmed several times.<sup>34</sup>

Regarding the first criterion, the classification in domestic law seems obvious. Yet it deserves some attention. Even when domestic law does not classify an offence as criminal, the Court has to substantively examine the procedure at stake.<sup>35</sup> It therefore serves as a starting point.<sup>36</sup>

Regarding the second criterion, the nature of the offence gave birth to a prolific jurisprudence that follows a sixfold pronged test.<sup>37</sup> The questions are therefore whether the rule in question "covers all citizens (...) and not a given group with a particular status" (1),<sup>38</sup> whether its purpose is "both deterrent and punitive" rather than merely imposing "pecuniary compensation for damages" (2)<sup>39</sup> [95], whether the proceedings "were brought by a public authority under statutory powers of enforcement" (3),<sup>40</sup> whether the rule at stake seeks to protect "general interests of society" (4),<sup>41</sup> whether the imposition of a penalty is upon a finding of guilt (5),<sup>42</sup> and whether the misconduct at stake "continues to be classified as part of the criminal law in the vast majority of the Contracting States" (6).<sup>43</sup>

Regarding the third and final criterion – long-discussed in legal scholarship [96, 97, 98], the harshness of the sanction is determined by reference to the maximum potential penalty sanctioning the misbehaviour at stake.<sup>44</sup> It is worth noting the fact the offence is not punished by imprisonment does not imply it is not a criminal one.<sup>45</sup> The ECtHR had the opportunity to explain that "the relative lack of seriousness of the penalty at stake cannot divest an offence of its inherently criminal character."<sup>46</sup>

Given these criteria, the ECtHR concluded several times that competition law belongs to the criminal sphere. French competition law was qualified as criminal in *Société Stenuit v France*. The Court applied its well-grounded jurisprudence to cartel infringement and noted (1) that the French classification of competition law as administrative has only informational value (1), that competition law concerns general interest of society usually protected through criminal law (2), and that competition law aims at prevention and deterrence given the severity of the sanction (3). This was confirmed in *Lilly France v France*, albeit this time in relation to a sanction for abuse of dominance.<sup>47</sup> The Court similarly considered Italian, Slovenian and Finnish competition law as criminal in *Menarini v. Italy* (related to

<sup>33</sup> ECtHR, *Engel and Others v. The Netherlands*, [GC] 8 June 1976, §§ 82-83. These three criteria are in theory alternative and not necessarily cumulative. The Court explained "it suffices that the offence in question should by its nature be 'criminal' from the point of view of the Convention" (enlightened by the ECtHR's jurisprudence) or "should have made the person concerned liable to a sanction which, in its nature and degree of severity, belongs in general to the 'criminal' sphere." (ECtHR, *Lutz v. Germany*, [Court, plenary], 25 August 1987, § 55.) A cumulative application may however be adopted whenever none of the criteria "is decisive on its own" and should therefore be "taken together and cumulatively" to assess the criminal nature of the offence at stake (ECtHR, *Öztürk v. Germany*, [GC] 21 February 1984, § 47).

<sup>34</sup> ECtHR, *Weber v. Switzerland*, 22 May 1990; ECtHR *Demicoli v. Malta*, 27 August 1991, ECtHR, *Ravnsborg v. Sweden*, 23 March 1994.

<sup>35</sup> ECtHR, *Gestur Jonsson and Ragnar Halldor Hall v. Iceland*, [GC] 22 December 2020, §§ 77-78 and 85.

<sup>36</sup> ECtHR, *Weber v. Switzerland*, 22 May 1990, § 31.

<sup>37</sup> ECtHR, *Jussila v. Finland*, [GC] 23 November 2006, § 38 (noting "the second criterion, the nature of the offence, is the more important).

<sup>38</sup> ECtHR, *Bendenoun v. France*, [GC] 24 February 1994, § 47. When the rule is directed towards a given group possessing a special status, it is disciplinary law; when it is directed towards all citizens, it is criminal law.

<sup>39</sup> *Ibid.* It is worth noting this argument was initially found in decriminalization of minor criminal offense under German law. While the ECtHR did "not underestimate the cogency of this argument" and recognised decriminalisation is "more than a simple change of terminology," the Court nonetheless held the purpose of the rule was still "both deterrent and punitive." See ECtHR, *Öztürk v. Germany*, [GC] 21 February 1984, § 53.

<sup>40</sup> ECtHR, *Benham v. The United Kingdom*, [GC] 10 June 1996, § 56.

<sup>41</sup> ECtHR, *Produkcija Plus Storitveni Podjetje D.O.O. v. Slovenia*, [Court, fourth section], 23 October 2018, § 42.

<sup>42</sup> ECtHR, *Benham v. The United Kingdom*, [GC], 10 June 1996, § 56.

<sup>43</sup> ECtHR, *Öztürk v. Germany*, [GC] 21 February 1984, § 53.

<sup>44</sup> ECtHR, *Campbell and Fell v. The United Kingdom*, [Chamber], 28 June 1984, § 72; ECtHR, *Demicoli v. Malta* [Chamber], 27 August 1991, § 34.

<sup>45</sup> ECtHR, *Nicoleta Gheorghe v. Romania*, [Court, Third Section], 3 April 2012, § 26.

<sup>46</sup> ECtHR, *Öztürk v. Germany*, [GC] 21 February 1984, § 54 (reference omitted). This was subsequently confirmed. See ECtHR, *Lauko v. Slovakia*, [Chamber] 2 September 1998, § 58; ECtHR, *Ziliberberg v. Moldova*, [Court, Fourth Section] 1 February 2005, § 34.

<sup>47</sup> ECtHR, *Lilly France S.A. v. France*, [Court, Second Section], 3 December 2002, § 1.

cartel)<sup>48</sup>, *Produkcija v Slovenija* (related to the imposition of a fine for the obstruction during a dawn raid)<sup>49</sup> [99], and *SA-Capital v Finland* (related to cartel).<sup>50</sup> As the EU is (not yet) part of the European Convention of Human Rights (hereafter, “ECHR”), the ECtHR has never ruled on the criminal law nature of EU competition law.<sup>51</sup>

Historically, the ECJ was caught between a rock and a hard place. On the one hand, the ECtHR’s jurisprudence drastically extended criminal law beyond its original sphere. On the other hand, regulation No 17 (now 1/2003 [88]) textually stated that competition law offences “shall not be of a criminal nature” [87]. Black-letter law unsurprisingly prevailed over jurisprudence and except in exceptional occasions<sup>52</sup> the ECJ concluded competition law is not criminal in nature.<sup>53</sup>

The ECtHR, however, introduced some nuance in *Jussila*. The Court acknowledged the autonomous interpretation of what is a criminal offence has “underpinned a gradual broadening of the criminal head to cases not strictly belonging to the traditional categories of the criminal law.”<sup>54</sup> The Court argued there are criminal offences “of different weight” and that some “criminal cases do not carry any significant degree of stigma.”<sup>55</sup> The Court therefore introduced a distinction between “the hard core” and the “periphery” of criminal law.<sup>56</sup>

Some Advocate General at the ECJ seized this opportunity to rethink the nature of competition law.<sup>57</sup> This occurs in the context of *ne bis in idem* [100]. Article 52(3) of the EU Charter of Fundamental Rights (hereafter, “Charter”) states that “in so far as this Charter contains rights which correspond to rights guaranteed by the Convention for the Protection of Human Rights and Fundamental Freedoms, the meaning and scope of those rights shall be the same as those laid down by the said Convention.” As both the Charter and the ECHR establish the *ne bis in idem* principle as a fundamental right, ECtHR’s jurisprudence percolated in EU law.<sup>58</sup> Advocate General Sharpston concluded in this regard that competition law enforcement “falls under the ‘criminal head’ of article 6 ECHR,” but also emphasised that it does not constitute “the hard core of criminal law.”<sup>59</sup> Advocate General Kokott shares this opinion in *Schenker*, noting that “although antitrust law is not part of the core area of criminal law, it is recognised as having a character similar to criminal law.”<sup>60</sup> Advocate General Bot similarly noted that

<sup>48</sup> ECtHR, *A. Menarini Diagnostic S.R.L. v. Italy*, [Court, Second Section], 27 September 2011, §§ 39-44. See also ECtHR, *Société Stenuit v. France*, [Court, Chamber], 27 February 1992.

<sup>49</sup> ECtHR, *Produkcija Plus Storitveni Podjetje D.O.O. v. Slovenija*, [Court, fourth section], 23 October 2018, §§ 45-46.

<sup>50</sup> ECtHR, *SA-Capital OY v. Finland*, [Court, first section], 14 February 2019, § 65 (criminal qualification was not dispute by Finnish government).

<sup>51</sup> *Connolly v. 15 Member States of the European Union*, Application No 73274/01, admissibility decision of 9 December 2008.

<sup>52</sup> Judgement of the Court (sixth Chamber) of 8 July 1999, *Hüls AG v Commission of the European Communities*, C-1999/92, ECLI:EU:1999:358 (holding that “given the nature of the infringements in question and the nature and degree of severity ensuing penalties, the principle of the presumption of innocence applies to the procedures relating to infringement of competition rules”).

<sup>53</sup> Judgement of the Court (Sixth Chamber) of 18 September 2003, *Volkswagen AG v Commission of the European Communities*, C-338/00, ECLI:EU:C2003:473 (noting in §96 that fines “imposed in undertakings which have participated intentionally or through negligence in the infringement (...) are not of a criminal nature”). Similar conclusion was reached in Judgement of the Court of First Instance (Fourth Chamber) of 1 July 2008, *Compagnie maritime belge SA v Commission of the European Communities*, T-276/04, ECLI:EU:T:2008:237 (noting in § 65 that “the applicant’s argument that substantive Community competition law is criminal in nature and that the Commission was therefore required to take into account in the contested decision the evolution in such law which is alleged to be favourable to the applicant must also be rejected”).

<sup>54</sup> ECtHR, *Jussila v. Finland*, [GC] 23 November 2006, § 43. Before *Jussila*, the ECtHR already recognized some minor offences did not require an application of the Convention in its full stringency. See ECtHR, *Fejde v. Sweden*, [Court, Plenary], 29 October 1991.

<sup>55</sup> *Ibid.* It is worth noting social stigma was one of the criteria identified by Herbert L. Packer in his classical study on criminal law (*The Limits of the Criminal Sanction*, Stanford University Press, Stanford (1968)).

<sup>56</sup> *Ibid.*

<sup>57</sup> Opinion delivered by Advocate General Mazak on 25 May 2012 in Case C-457/10, *AstraZeneca AB and AstraZeneca plc v European Commission*, ECLI:EU:C:2012:293, § 50 (explaining that applying criminal standards to EU competition law is impossible as Regulation 1/2003 textually closed that door).

<sup>58</sup> Article 50 of the Charter is tantamount to article 6 CEDH.

<sup>59</sup> Opinion of Advocate General Sharpston delivered on 10 February 2011 in Case C-272/09 P, *KME v. European Commission*, ECLI:EU:C:2011:63, §§ 64 and 67. The Court however did not hold on that point and respond to the arguments of the parties related to the Commission’s discretionary power stating that “the review of legality is supplemented by the unlimited jurisdiction [that] empowers the Courts, in addition to carrying out a mere review of the lawfulness of the penalty, to substitute their own appraisal for the Commission’s” and therefore conclude there was no infringement of the principle of effective judicial protection without discussing the criminal nature of Union law. Judgement of the Court (Second Chamber) of 8 December 2011, *KME Germany AG, KME France SAS and KME Italy SpA v European Commission*, Case C-272/09 P, ECLI:EU:C:2011:810, §103

<sup>60</sup> Opinion of Advocate General Kokott delivered on 28 February 2013 in Case C-681/11, *Bundeswettbewerbshörde and Bundeskartellanwalt v Schenker & Co. AG and Others*, ECLI:EU:C:2013:126. See similarly Opinion of Advocate General Kokott delivered on 14 April 2011 in Case C-109/10 P, *Solvay SA v European Commission*, ECLI:EU:C:2011:256, § 256 (noting that “it must also be borne in mind, with respect to competition law, that the ECtHR itself does not regard that area of law as a traditional category of criminal law; outside the ‘hard core’ of criminal law, the ECtHR assumes that the criminal-law guarantees (...) will not necessarily apply with their full stringency”). The Court however did not discuss the criminal nature of competition law in Judgement of the Court (Grand Chamber), 18 June 2013,

while competition law procedure “is not strictly speaking a criminal matter it is none the less quasi-penal in nature.”<sup>61</sup> Advocate General Wahl interestingly qualified competition law as falling “somewhere in the grey area between criminal and administrative law.”<sup>62</sup> Advocate General Bobek explained the “Engel-multiplication”, *i.e.*, the broadening of what constitutes a criminal offence, induces that “many rules and procedures that were in the past perceived on a conceptual level as being administrative, are now considered to be criminal.”<sup>63</sup> He added that competition law proceedings “led to the imposition of sanctions that are criminal in nature.”<sup>64</sup> In the end, the ECJ embraced the Engel criteria and recognised several times that an administrative offence may be requalified as criminal.<sup>65</sup> This also concerns sanction under competition law,<sup>66</sup> as it was very recently held in *bpost v Autorité Belge de la concurrence*.<sup>67</sup>

Upshot? To borrow Bobek’s metaphor, criminal law qualified as such in legal orders only constitutes “the proverbial tip of the iceberg.”<sup>68</sup> The ECtHR and ECJ’s jurisprudence imply “that more lurks beneath the surface, and that much more needs to be uncovered in order to fully appreciate the real size of the iceberg.”<sup>69</sup> As a result of the then-chameleonic qualities of criminal offences, neither legal theory nor practice undoubtedly circumscribe the criminalisation of competition law. Competition law does not purely leave the administrative sphere to enter the criminal one. On the contrary, competition law is stranded somewhere in the middle like “an isolated meteorite straying amidst the orbits of the administrative and criminal law planets” [101]. The ECJ emphasised “the boundary between criminal and administrative penalties is a fluid one.”<sup>70</sup> Sometimes it is an “intuitive sense” that distinguishes between administrative and criminal offenses, “yet it is by no means easy to explain why” [102]. A part of legal scholarship therefore argues some sanctions are chimera by nature, part criminal and part administrative [103]. This paved the way for an “administrative criminal justice system” [104, 105] and the development of “quasi-criminal enforcement mechanisms” [106]. Antoine Bailleux explains this “criministrative” law lies between “white” administrative and “black” criminal law [101]. He argued, quite convincingly, that in the “foggy grey” zone of peripheral criminal law, competition law proceedings belong “to the darkest” as “they share more similarities with the prosecution of robbery than with the enforcement of administrative obligations” [101].

The question is, do we need to take into account the “criministrative” nature of competition law regarding the AI Act? Or, to put it slightly differently, do the “criminal offences” of the AI Act refer to hard core or peripheral criminal law?

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*Bundeswettbewerbsbehörde and Bundeskartellamt v Schenker & Co. AG and Others*, Case C-681/11, ECLI:EU:C:2013:404 and Judgement of the Court (Grand Chamber) of 25 October 2011, *Solvay SA v European Commission*, Case C-109/10/P, ECLI:EU:C:2011:256.

<sup>61</sup> Opinion delivered by Advocate General Bot on 26 October 2010 in Case C-201/09 and C-216/09, *ArcelorMittal Luxembourg SA v European Commission and European Commission v ArcelorMittal Luxembourg SA and Others*, ECLI:EU:C:2010:634, § 41. The Court however did not discuss the criminal nature of competition law in Judgement of the Court (Grand Chamber) of 29 March 2011, *ArcelorMittal Luxembourg SA v European Commission and European Commission v ArcelorMittal Luxembourg SA and Others*, Joined Cases C-201/09 P and C-216/09 P, ECLI:EU:C:2010:634.

<sup>62</sup> Opinion delivered by Advocate General Wahl on 29 November 2018 in Case C-617/17, *Powszechny Zakład Ubezpieczeń na Życie S.A. w Warszawie v Prezes Urzędu Ochrony Konkurencji i Konsumentów*, ECLI:EU:C:2018:976, §19 (opinion followed by the Court in Judgement of the Court (Fourth Chamber) of 3 April 2019, *Powszechny Zakład Ubezpieczeń na Życie S.A. v Prezes Urzędu Ochrony Konkurencji i Konsumentów*, Case C-617/17, ECLI:EU:C:2018:976.

<sup>63</sup> Opinion delivered by Advocate General Bobek on 2 September 2021 in Case C-117/20, *bpost SA v Autorité belge de la concurrence*, ECLI:EU:C:2021:680, § 2 (Opinion followed by the Court on this point in Judgement of the Court (Grand Chamber) of 22 March 2022, *bpost SA v Autorité belge de la concurrence*, C-117/20, ECLI:EU:C:2022:202, §§ 25-27).

<sup>64</sup> *Ibid.*, §35.

<sup>65</sup> Judgement of the Court (Grand Chamber) of 5 June 2012, *Lukasz Marcin Bonda*, C-489/10, ECLI:EU:C:2012:319, §37; Judgement of the Court (Grand Chamber), 26 February 2013, *Åklagaren v Hans Åkerberg Fransson*, C-617/10, ECLI:EU:C:2013:105; Judgement of the Court (Grand Chamber) of 20 March 2018, *Luca Menci*, C-524/15, ECLI:EU:C:2018:197; Judgement of the Court (Grand Chamber) of 20 March 2018, *Garlsson Real Estate SA and Others v Commissione Nazionale per le Società e la Borsa (Consob)*, C-537/16, ECLI:EU:C:2018:193; Judgement of the Court (Grand Chamber) of 20 March 2018, *Enzo Di Puma v Commissione Nazionale per le Società e la Borsa (Consob)*, and *Commissione Nazionale per le Società e la Borsa (Consob) v Antonio Zecca*, joined case C-596/16 and C-596/17, ECLI:EU:C:2018:192.

<sup>66</sup> Judgement of the Court (Fifth Chamber) of 18 July 2013, *Schindler Holding Ltd and Others v European Commission*, C-501/11, ECLI:EU:C:2013:522.

<sup>67</sup> Judgement of the Court (Grand Chamber) of 22 March 2022, *bpost SA v Autorité belge de la concurrence*, C-117/20, ECLI:EU:C:2022:202, §§ 25-27. See similarly Judgement of the Court (Grand Chamber) of 22 March 2022, *Bundeswettbewerbsbehörde v. Nordzucker AG, Südzucker AG, Agrana Zucker GmbH*, C-151/20, ECLI:EU:C:2022:203.

<sup>68</sup> Opinion delivered by Advocate General Bobek on 2 September 2021 in Case C-117/20, *bpost SA v Autorité belge de la concurrence*, ECLI:EU:C:2021:680, §37.

<sup>69</sup> *Ibid.*

<sup>70</sup> Opinion of Advocate General Stix-Hackl delivered on 27 November 2001 in Case C-210/00, *Käserei Champignon Hofmeister GmbH & Co. KG v. Hauptzollamt Hamburg-Jonas*.

Several elements seem to indicate what is targeted by criminal offences is hard core criminal law (or, again differently, to criminal law that is qualified as such). A contextual approach enlightens what “criminal offences” means under the AI Act. This approach derives the meaning of this expression by replacing it into context as “words, like people, take their colour from their surroundings” [107]. In this regard, the Commission Staff Working Document and Explanatory Memorandum refer to “criminal matters” in the context of predictive policing<sup>71</sup> [108, 76], judicial risk assessment for sentencing taking into account the risk of reoffending<sup>72</sup> [109], and “classic” criminal law infringement like domestic violence [108]. In addition, the AI Act emphasised that “AI systems specifically intended to be used for administrative proceedings by tax and customs authorities should not be considered high-risk AI systems used by law enforcement authorities for the purposes of prevention, detection, investigation and prosecution of criminal offences” (Recital 38, *in fine*, AI Act). As both the ECtHR<sup>73</sup> and the ECJ<sup>74</sup> recognise tax and customs law belongs to peripheral criminal law, an argument of coherence would induce that the AI Act similarly but tacitly discards competition law proceedings from its scope of application.<sup>75</sup>

Upshot? Whilst an extensive interpretation of what constitute criminal law might be a workable solution to a differentiated application of the AI Act to competition law, a contextual interpretation of the AI Act closes this back-door.

#### 4. Conclusion: Imagining the Competition Landscape after the AI Act

Annex III suggests AI systems intended to be used by law enforcement authorities in the course of detection, investigation and prosecution of criminal offences raise high-risk and are therefore submit to mandatory requirements. In legal orders that qualify competition law as criminal, this means algorithmic screening tools would have to comply with the AI Act. On the contrary, the AI Act does not apply in legal orders that do not qualify competition law as criminal. As the AI Act is a harmonising regulation, keeping different standards of protection depending on national qualification makes no sense. A possible solution might be found in the jurisprudence of both the ECJ and the ECtHR that consider competition as peripheral criminal law. However, a contextual analysis of the AI Act seems to indicate it targets hard core criminal law. This jurisprudence is therefore unhelpful; competition law escapes the application of the AI Act in legal orders that do not expressly qualify it as criminal.

In legal orders that do qualify competition law as criminal, however, the AI Act applies to competition law proceedings. At first glance, this seems incompatible with the AI act’s preliminary note that it is “without prejudice to the application of Union competition law” [76]. It is however conceivable to reconcile them. The prolegomena whereby the AI Act is without any prejudice to the application of EU competition law should therefore be read as without any prejudice to *substantive* competition law. What should be understood is therefore that the AI Act has no impact on articles 101 and 102 TFEU, but on the proceedings under which they are enforced. If the latter hypothesis had to be correct, this would mean the AI Act chooses not to delve within the controversies regarding algorithmic collusion and price discrimination [110, 111, 112, 113, 114, 115, 116].

The paper will not discuss in-depth the question whether the AI Act *should* apply to competition law proceedings on purpose. Instead, it will call for a clarification of its impact on competition law. This is a call for legal certainty. As the AI Act is still a proposal at this time, EU law- and policymakers still have the opportunity to decide whether the AI Act apply or not to competition law. In case of a negative answer, an exclusion clause like Recital 38 concerning tax and customs law might be useful. Whatever the option chosen, EU law- and policymakers should take into account the fragmented classification of

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<sup>71</sup> The Commission Staff Working Document accompanying the AI Act refers to European Parliament Draft Report, Artificial intelligence in criminal law and its use by the police and judicial authorities in criminal matters, 2020/2016(INI) and notes that “predictive policing systems exist in a number of Member States” (pp. 6 and 20).

<sup>72</sup> The Commission Staff Working Document accompanying the AI Act refers to *Loomis v. Wisconsin*, 881 N.W.2d 749 (Wis 2016).

<sup>73</sup> See for instance ECtHR, *Jussila v. Finland*, [GC] 23 November 2006 (tax surcharges proceedings) and ECtHR, *Salabiaku v. France*, [Court, Chamber], 7 October 1988 (customs law).

<sup>74</sup> Judgement of the Court (Grand Chamber), 26 February 2013, *Åklagaren v Hans Åkerberg Fransson*, C-617/10, ECLI:EU:C:2013:105; Judgement of the Court (Grand Chamber) of 20 March 2018, *Luca Menci*, C-524/15, ECLI:EU:C:2018:197 (both in VAT).

<sup>75</sup> This argument could be reversed: as the AI Act textually excludes tax law, it could be argued the AI Act would have done the same for competition law if this was the purpose.

competition law as (quasi-)criminal in the AI Act. If not, it might fail its key objectives of harmonisation and protection of fundamental rights.

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## 6. References

- [1] European Commission, Proposal for a regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain Union legislative acts, COM(2021) 206 final, April 21, 2021, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206>.
- [2] Nathalie A. Smuha, “From a ‘race to AI’ to a ‘race to AI regulation’: Regulatory competition for artificial intelligence”, *Law, Innovation and Technology* 13(1), 57-84 (2021).
- [3] Michael Vaele and Frederik Zuiderveen Borgesius, “Demystifying the Draft EU Artificial Intelligence Act”, *Computer Law Review International* 4, 97-112 (2021).
- [4] Nathalie Smuha et al., “How the EU can achieve Legally Trustworthy AI: A Response to the European Commission’s Proposal for an Artificial Intelligence Act”, SSRN, 5 August 2021, <http://dx.doi.org/10.2139/ssrn.3899991>.
- [5] Meeri Haataja and Joanna J. Bryson, “Reflections on the EU’s AI Act and How we Could Make It Even Better”, *Competition Policy International*, 24 March 2022, <https://www.competitionpolicyinternational.com/reflections-on-the-eus-ai-act-and-how-we-could-make-it-even-better/>.
- [6] Julia Black, “The role of risk in regulatory processes”, in Robert Baldwin et al., *The Oxford Handbook of Regulation*, Oxford University Press, Oxford (2010).
- [7] Jerome De Cooman, “Humpty Dumpty and High-Risk AI Systems: The Ratione Materiae Dimension of the Proposal for an EU Artificial Intelligence Act”, *Competition & Market Law Review* 6(1) in press (2022).
- [8] Tim O’Reilly “Open Data and Algorithmic Regulation” in Brett Goldstein and Lauren Dyson (eds), *Beyond Transparency: Open Data and the Future of Civic Innovation*, Code for America Press, San Francisco (2013), 291.
- [9] Karen Yeung, “Algorithmic regulation: A critical interrogation”, *Regulation & Governance* 12(4), 505-523 at 507 (2018).
- [10] Mireille Hildebrandt, “Algorithmic regulation and the rule of law”, *Philosophical Transactions of the Royal Society* 376(2128), 2 (2018).
- [11] David Restropo Amariles, “Algorithmic Decision Systems: Automation and Machine Learning in the Public Administration”, in Woodrow Barfield (ed.), *The Cambridge Handbook of the Law of Algorithms*, Cambridge University Press, Cambridge (2020), 251-272.
- [12] Jorge Gallego, Gonzalo Rivero and Juan Martinez, “Preventing rather than punishing: An early warning model of malfeasance in public procurement”, *International Journal of Forecasting* 37(1), 360-377 (2021).
- [13] Thibault Schrepel, “Computational Antitrust: An Introduction and Research Agenda”, *Stanford Computational Antitrust* 1 (2021).
- [14] Margrethe Vestager, “Speech at the Fordham Competition Conference”, October 8<sup>th</sup>, 2020, [https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-fordham-competition-conference\\_en](https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-fordham-competition-conference_en).
- [15] OECD, “Using Leniency to Fight Hard Core Cartels”, OECD Policy Brief, September 2001, retrieved from <https://www.oecd.org/daf/ca/1890449.pdf>.
- [16] Peter G. Bryant and E. Woodrow Eckard, “Price Fixing: The Probability of Getting Caught”, *The Review of Economics and Statistics* 73(3), 531-536 (1991).

- [17] Emmanuel Combe, Constance Monnier and Renaud Legal, “Cartels: The Probability of Getting Caught in the European Union”, SSRN, 20 September 2007 (last revised 2 October 2008), retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1015061](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1015061).
- [18] Peter L. Ormosi, “A Tip of the Iceberg? The Probability of Catching Cartels”, *Journal of Applied Econometrics* 29(4), 549-566 (2013).
- [19] Emmanuel Combe, *Economie et politique de la concurrence*, 2<sup>nd</sup> ed., Dalloz, Paris (2020).
- [20] Nicolo Zingales, “European and American Leniency Programmes: Two Models Towards Convergence?”, *Competition Law Review* 5(1), 5-60 (2008).
- [21] Nathan H. Miller, “Strategic Leniency and Cartel Enforcement”, *American Economic Review* 99(3), 750-768 (2009).
- [22] Andreas Stephan, “The Direct Settlement of EC Cartel Cases”, *International & Comparative Law Quarterly* 58(3), 627-654 (2009).
- [23] Patrick Rey, “Towards a Theory of Competition Policy”, in Mathias Dewatripont, Lars Peter Hansen and Stephen J. Turnovsky (eds.), *Advances in Economics and Econometrics: Theory and Application, Eighth World Congress, Vol. II*, Cambridge University Press, Cambridge (2003), 82-132.
- [24] Cécile Aubert, Patrick Rey and William E. Kovacic, “The impact of leniency and whistle-blowing programs on cartels”, *International Journal of Industrial Organization* 24(6), 1241-1266 (2006).
- [25] Joe Chen and Joseph E Harrington, Jr, “The Impact of the Corporate Leniency Program on Cartel Formation and the Cartel Price Path” in Vivek Ghosal and Johan Stennek (eds.), *The Political Economy of Antitrust, Contributions to Economic Analysis Vol. 282*, Emerald Group Publishing, Bingley, (2007) 59–80.
- [26] Joseph E. Harrington, Jr., “Optimal Corporate Leniency Programs”, *The Journal of Industrial Economic* 56(2), 215-246 (2008).
- [27] Giancarlo Spagnolo, “Leniency and Whistleblowers in Antitrust”, in Paolo Buccirossi, *Handbook of Antitrust Economics*, The MIT Press, Cambridge (2008) 259-304.
- [28] Joseph E. Harrington, Jr. and Myong-Hun Chang, “Modeling the Birth and Death of Cartel with an Application to Evaluating Competition Policy”, *Journal of the European Economic Association* 7(6), 1400-1435 (2009).
- [29] Yassine Lefouili and Catherine Roux, “Leniency programs for multimarket firms: The effect of Amnesty Plus on cartel formation”, *International Journal of Industrial Organization* 30(6), 624-640 (2012).
- [30] Zhijun Chen and Patrick Rey, “On the Design of Leniency Programs”, *The Journal of Law & Economics* 56(4), 917-957 (2013).
- [31] Leslie M. Marx and Claudio Mezzetti, “Effects of antitrust leniency on concealment effort by colluding firms”, *Journal of Antitrust Enforcement* 2(2), 305-332 (2014).
- [32] Joseph E. Harrington, Jr. and Myong-Hun Chang, “When Can We Expect a Corporate Leniency Program to Result in Fewer Cartels?”, *The Journal of Law & Economics* 58(2), 417-449 (2015).
- [33] Margrethe Vestager, “A new era of cartel enforcement”, Speech at the Italian Antitrust Association Annual Conference, October 22<sup>nd</sup>, 2021, retrieved from [https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-m-vestager-italian-antitrust-association-annual-conference-new-era-cartel-enforcement\\_en](https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-evp-m-vestager-italian-antitrust-association-annual-conference-new-era-cartel-enforcement_en).
- [34] Adeline Archimbaud, “Les programmes de clémence européens et les actions privées de concurrence: Les liaisons dangereuses”, *Concurrences : Revue des droits de la concurrence (Competition Law Review)*, n°3-2020, retrieved from <https://www.concurrences.com/en/review/issues/no-3-2020/articles/les-programmes-de-clemence-europeens-et-les-actions-privées-de-concurrence-les-en>.
- [35] Marc Deschamps and Frederic Marty, “Détection et sanction des ententes anticoncurrentielles : l’éclairage de l’analyse économique du droit”, *Revue économique et sociale* 4, 71-82 (2006).
- [36] Eric Van Ginderachter, during the 2018 International Competition Network (ICN) Cartel Workshop from October 15 to 18, 2018, In Tel Aviv, Israel, quoted in Christian Ritz and Lorenz Marx, “Leniency Carrots and Cartels Sticks – A Practitioners’ View on Recent Trends and Challenges Presented by the EU Leniency Program”, *CPI Antitrust Chronicle*, January 2019,

retrieved from <https://www.competitionpolicyinternational.com/leniency-carrots-and-cartel-sticks-a-practitioners-view-on-recent-trends-and-challenges-presented-by-the-eu-lenieny-program/>.

- [37] European Court of Auditors, “The Commission’s EU merger control and antitrust proceedings: a need to scale up market oversight”, Special Report n°24, November 2020, <https://op.europa.eu/webpub/eca/special-reports/eu-competition-24-2020/en/>.
- [38] Directorate for financial and enterprise affairs – Competition committee, “Ex Officio cartel investigations and the use of screens to detect cartels”, OECD Competition Law & Policy Roundtables, DAF/COMP(2013)27, 7 July 2014, retrieved from <https://www.fne.gob.cl/wp-content/uploads/2014/07/2013-Ex-officio-cartels-investigation-3569-KB1.pdf>.
- [39] Jean Tirole, *The Theory of Industrial Organisation*, The MIT press, Cambridge (1988) (seventh printing 1994), p. 239.
- [40] Frederic M. Scherer, *Industrial Market Structure and Economic Performance*, Rand McNally & Company, Chicago (1970).
- [41] Robert C Marshall and Leslie M. Marx, *The Economics of Collusion: Cartels and Bidding Rings*, The MIT Press, Cambridge (2012).
- [42] Arthur G. Fraas and Douglas F. Greer, “Market Structure and Price Collusion: An Empirical Analysis”, *Journal of Reprints for Antitrust and Economics* 10(1), 465-490 (1979).
- [43] Margaret C. Levenstein and Valerie Y. Suslow, “What Determines Cartel Success?”, *Journal of Economic Literature* 44(1), 43-95 (2006).
- [44] Joseph J. Harrington, Jr., “Some Thoughts on Why Certain Markets are More Susceptible to Collusion”, OECD – Global Forum on Competition – “serial Offenders”, 29-30 October 2015, retrieved from [https://joeharrington5201922.github.io/pdf/Harrington\\_OECD\\_10.15.pdf](https://joeharrington5201922.github.io/pdf/Harrington_OECD_10.15.pdf).
- [45] Maria Bigoni, Jan Potters and Giancarlo Spagnolo, “Frequency of interaction, communication and collusion: an experiment”, *Economic Theory* 68(4), 827-844 (2019).
- [46] Paul A. Groutt and Silvia Sonderegger, “Structural Approaches to Cartel Detection”, in Claus-Dieter Ehlermann and Isabela Atanasiu (eds.), *European Competition Law Annual 2006: Enforcement of Prohibition of Cartels*, Hart Publishing, Oxford, retrieved from <https://danielmorochoruiz.files.wordpress.com/2018/02/paul-groutt-structural-approaches-to-cartel-detection.pdf>.
- [47] Jonas Häckner, “Collusive pricing in markets for vertically differentiated products”, *International Journal of Industrial Organization* 12(2), 155-177 (1994).
- [48] Iwan Bos and Marco A. Marini, “Cartel stability under quality differentiation”, *Economic Letters* 174, 70-73 (2019).
- [49] Iwan Bos, Marco A. Marini and Riccardo D. Saulle, “Cartel formation with quality differentiation”, *Mathematical Social Sciences* 106, 36-50 (2020).
- [50] George Symeonidis, “Cartel stability in advertising-intensive and R&D intensive industries”, *Economic Letter* 62(1), 121-129 (1999).
- [51] Georges Symeonidis, “In Which Industries Is Collusion More Likely? Evidence from the UK”, *The Journal of Industrial Economics* 51(1), 45-74 (2003).
- [52] Marc Ivaldi et al., “The Economics of Tacit Collusion”, Final Report for DG Competition, European Commission, 2003, retrieved from [https://ec.europa.eu/competition-policy/system/files/2021-04/the\\_economics\\_of\\_tacit\\_collusion\\_2003.pdf](https://ec.europa.eu/competition-policy/system/files/2021-04/the_economics_of_tacit_collusion_2003.pdf).
- [53] Christopher M. Snyder, “A Dynamic Theory of Countervailing Power”, *The RAND Journal of Economics* 27(4), 747-769 (1996).
- [54] Martin Huber and David Imhof, “Machine learning with screens for detecting bid-rigging cartels”, *International Journal of Industrial Organization* 65, 277-301 (2019).
- [55] Joseph E. Harrington, Jr, “Detecting Cartels”, in Paolo Buccirossi (ed.), *Handbook of Antitrust Economics*, The MIT Press, Cambridge (2008), 213-258 at 232.
- [56] Christian Lorenz, “Screening markets for cartel detection: Collusive markers in the CFD cartel-audit”, *European Journal of Law and Economics* 26(2), 213-232 (2008).

- [57] Patrick Rey, “On the Use of Economic Analysis in Cartel Detection”, in Claus-Dieter Ehlermann and Isabela Atanasiu (eds.), *European Competition Law Annual: 2006*, Hart Publishing, Oxford (2007), 69-82.
- [58] Elisabetta Iossa, Simon Loertscher, Leslie M. Marx and Patrick Rey, “Collusive Market Allocations”, Working Paper, 26 March 2020, retrieved from <https://faculty.fuqua.duke.edu/~marx/bio/papers/MarketAllocation.pdf>.
- [59] Joseph E. Harrington, Jr, “How Do Cartels Operate?”, *Foundation and Trends in Microeconomics* 2(1), 1-105 (2006).
- [60] Commission of the European Communities, “Commission Staff Working Paper accompanying the Communication from the Commission to the European Parliament and Council: Report on the Functioning of Regulation 1/2003”, COM(2009)206 final, 29 April 2009
- [61] Commission Notice on best practices for the conduct of proceedings concerning Articles 101 and 102 TFEU, OJ C 308, 20 October 2011, pp. 6-31, §13.
- [62] Andreas von Bonin and Sharon Malhi, “The Use of Artificial Intelligence in the Future of Competition Law Enforcement”, *Journal of European Competition Law & Practice* 11(8), 468-471 at 469 (2020).
- [63] Nathalie de Marcellis-Warin, Frederic Marty and Thierry Warin, “Vers un virage algorithmique de la lutte anticartels? Explicabilité et redevabilité à l’aube des algorithmes de surveillance”, *Revue Internationale d’éthique sociétale et gouvernementale* 23(2), 1-20 (2021).
- [64] Albert Sanchez-Graells, ““Screening for Cartels’ in Public Procurement: Cheating at Solitaire to Sell Fool’s Gold?”, *Journal of European Competition Law & Practice* 10(4), 199-211 (2019).
- [65] Kevin P. Murphy, *Machine Learning: A Probabilistic Perspective*, The MIT Press, Cambridge (2012).
- [66] Keith Frankish and William M. Ramsey (eds.), *The Cambridge Handbook of Artificial Intelligence*, Cambridge University Press, Cambridge (2014).
- [67] David Lehr and Paul Ohm, “Playing with the Data: What Legal Scholars Should Learn About Machine Learning”, *UC Davis Law Review* 51(2), 653-717 (2017).
- [68] M. Emre Celebi and Kemal Aydin, “Preface” in M. Emre Celebi and Kemal Aydin (eds.), *Unsupervised Learning Algorithms*, Springer, Cham (2016).
- [69] Rosa M. Abrantes-Metz and D. Daniel Sokol, “The Lessons from Libor for Detection and Deterrence of Cartel Wrongdoing”, *Harvard Business Law Review Online* 3, 10-16 (2012).
- [70] Nathalie De Marcellis-Warin and Thierry Warin, “Les mégadonnées entre possibilités et risques : à la recherche d’un nouvel équilibre”, *Gestion* 42(1), 72-75 (2017).
- [71] Daryl Lim, “Can Computational Antitrust Succeed?”, *Stanford Computational Antitrust* 1, 38-51 (2021).
- [72] Douglas Silveira et al., “Won’t Get Fooled Again: A supervised machine learning approach for screening gasoline cartels”, *Energy Economics* 105 (2022), Article 105711, retrieved from <https://doi.org/10.1016/j.eneco.2021.105711>.
- [73] David Danks, “Learning” in Keith Frankish and William M. Ramsey (eds.), *The Cambridge Handbook of Artificial Intelligence*, Cambridge University Press, Cambridge (2014), 151-167.
- [74] Brian J. Fogg, *Persuasive Technology: Using Computers to Change What We Think and Do*, Morgan Kaufmann Publishers, San Francisco (2003).
- [75] Kate Goddard, Abdul Roudsari and Jeremy C. Wyatt, “Automation bias: a systemic review of frequency, effect mediators, and mitigators”, *Journal of the American Medical Informatics Association: JAMIA* 19(1) 121-127 (2012).
- [76] European Commission, Proposal for a regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain Union legislative acts, COM(2021) 206 final, April 21, 2021, Explanatory Memorandum.
- [77] Caron Beaton-Wells and Christine Parker, “Justifying criminal sanctions for cartel conduct: a hard case”, *Journal of Antitrust Enforcement*, 1(1), 198-219 (2013).
- [78] Peter Whelan, *The Criminalization of European Cartel Enforcement: Theoretical, Legal, and Practical Challenges*, Oxford University Press, Oxford (2014).

- [79] Organisation for Economic Co-operation and Development (OECD) Council, Recommendation of the Council concerning effective action against hard core cartels, adopted by the Council at its 921<sup>st</sup> Session on 25 March 1998, C(98)35/Final, p. 3, [https://one.oecd.org/document/C\(98\)35/FINAL/en/pdf](https://one.oecd.org/document/C(98)35/FINAL/en/pdf).
- [80] Christopher Harding and Joshua Joshua, *Regulating Cartels in Europe: A Study of Legal Control of Corporate Delinquency*, Oxford University Press, Oxford (2003).
- [81] Donald I. Baker and Barbara A. Reeves, “The Paper Label Sentences: Critique”, *Yale Law Journal* 86(4) 619-644 at 630-631 (1977).
- [82] Keith Jones and Farin Harrison, “Criminal Sanctions: An Overview of EU and National Case Law”, *Concurrence Bulletin*, Art. No. 64713, <https://www.concurrences.com/fr/bulletin/special-issues/criminal-sanctions/ententes/criminal-sanctions-an-overview-of-eu-and-national-case-law-64713>.
- [83] Kane Abry-Diaw de Baye, “EU: The Criminalisation of Competition Law Breaches – Another Attempt to Square the Circle?”, *Concurrence Review*, No. 1-2020, retrieved from <https://www.concurrences.com/en/review/issues/no-1-2020/international/kane-abry-diaw-de-baye>.
- [84] Albert Sanchez-Graells, “Competition and Public Procurement”, *Journal of European Competition Law & Practice* 9(8), 551-559 (2018).
- [85] Lucio D’Amario, Giorgio Gian Battista Valoto, “The Trenitalia Bid Rigging Judgement and the Use of Criminal Evidence in Antitrust Case”, *Journal of European Competition Law & Practice* 10(5), 317-321 (2019).
- [86] Katalin Cseres, “Relationship between EU Competition Law and national competition laws”, in Ioannis Lianos and Damien Geradin (eds.), *Handbook on European Competition Law: Enforcement and Procedure*, Edward Elgar, Cheltenham (2013) 539–557.
- [87] Regulation No 17 First Regulation implementing Articles 85 and 86 of the Treaty, OJ 13, 21 February 1962, pp. 204-211.
- [88] Council Regulation (EC) No 1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty, OJ L 1, 4 January 2003, pp. 1-25.
- [89] Terry Calvani and Kaethe M. Carl, “The Competition Act 2002, ten years later: lessons from the Irish experience of prosecuting cartels as criminal offences”, *Journal of Antitrust Enforcement* 1(2), 296-324 (2013).
- [90] Robert Saint-Esteben, “Une repénalisation du droit de la concurrence en France ? À propos de l’utilisation de l’article 40 du Code de procédure pénale par les services d’instruction de l’Autorité”, *Concurrences*, No. 2-2019, 54-65 (2019).
- [91] John Zerilli and Adrian Weller, “The Technology”, in Matt Hervey and Matthew Lavy (eds.), *The Law of Artificial Intelligence*, Sweet & Maxwell, London (2021).
- [92] Ira S. Rubinstein, “Big Data: The End of Privacy or a New Beginning?” *International Data Privacy Law* 3(2), 74-87 (2013).
- [93] Albert Sanchez-Graells, ““Screening for Cartels’ in Public Procurement: Cheating at Solitaire to Sell Fool’s Gold?”, *Journal of European Competition Law & Practice* 10(4), 199-211 (2019).
- [94] Vanessa Franssen, “La notion ‘pénale’: mot magique ou critère trompeur? Réflexions sur les distinctions entre le droit pénal et le droit quasi pénal”, in Delphine Brah-Thiel (ed.), *Existe-t-il un seul non bis in idem aujourd’hui ?*, L’Harmattan, Paris, (2018) 57-91.
- [95] H. M. Hart, “The Aims of the Criminal Law”, *Law and Contemporary Problems* 34(3), 401-441 (1958).
- [96] Joel Feinberg, *Doing & Deserving: Essays in the Theory of Responsibility*, Princeton University Press, Princeton (1970).
- [97] R. Antony Duff, *Trials and Punishment*, Cambridge University Press, Cambridge (1986).
- [98] Douglas Husak, *Overcriminalization: The Limits of the Criminal Law*, Oxford University Press, Oxford (2008).
- [99] Pascal Bergue, “Recent Developments in the Case-Law of the ECtHR on the Right to a Fair Trial in Competition Proceedings”, *Journal of European Competition Law & Practice* 10(8), 485-490 (2019).

- [100] Pieter Van Cleynenbreugel, “Le non bis in idem en droit de la concurrence : un monde de différence avec le pénal ?”, in Delphine Brach-Thiel (ed.), *Existe-t-il encore un seul non bis in idem aujourd’hui*, L’Harmattan Paris (2018) 171-207.
- [101] Antoine Bailleux, “The fiftieth shade of grey: Competition law, ‘criministrative law’ and ‘fairly fair trials’”, in Anne Weyemberg and Francesca Galli (eds.), *Do Labels still matter? Blurring boundaries between criminal and administrative law. The influence of the EU*, Editions de l’Université de Bruxelles, Brussels (2014), 137-152 at 138.
- [102] Georges P. Fletcher, *Rethinking Criminal Law*, Oxford University Press, Oxford (2000) 412.
- [103] John A. E. Vervaele, *The Europeanisation of Criminal Law and the Criminal Law Dimension of European Integration*, Brugge, College of Europe, Research Paper in Law 3/2005 (2005) 10.
- [104] Ronald Wright and Marc Miller, “Honesty and Opacity in Charge Bargains”, *Stanford Law Review* 55(4), 1409-1417 at 1415 (2003).
- [105] Vanessa Franssen and Solène Vandeweerd, “Supranational Administrative Criminal Law”, *Revue Internationale de Droit Pénal* 90(2), 13-83 (2019).
- [106] Vanessa Franssen and Christopher Harding (eds.), *Criminal and Quasi-criminal Enforcement Mechanisms in Europe*, Hart Publishing, Oxford (2022).
- [107] John Willis, “Statutory Interpretation in a Nutshell”, *Canadian Bar Review* 16(1), 1-27 at 6 (1938).
- [108] European Commission, Commission Staff Working Document Impact Assessment, Annexes Accompanying the Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts, SWD(2021) 84 Final, Part 1/2.
- [109] European Commission, Commission Staff Working Document Impact Assessment, Annexes Accompanying the Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts, SWD(2021) 84 Final, Part 2/2.
- [110] Ariel Ezrachi and Maurice E. Stucke, *Virtual Competition: The promise and perils of the algorithm-driven economy*, Harvard University Press, Cambridge (2016).
- [111] Ariel Ezrachi and Maurice E. Stucke, “Artificial Intelligence & Collusion: When computers inhibit competition”, *University of Illinois Law Review* 2017(5), 1775-1810 (2017).
- [112] Suzanne Rab, “Artificial intelligence, algorithms and antitrust”, *Competition Law Journal* 18(4), 141-150 (2019).
- [113] Luca Calzolari, “The Misleading Consequences of Comparing Algorithmic and Tacit Collusion: Tackling Algorithmic Concerted Practices under Art. 101 TFEU”, *European Papers* 6(2), 1193-1228 (2021).
- [114] Ashwin Ittoo and Nicolas Petit, “Algorithmic Pricing Agent and Tacit Collusion: A Technological Perspective”, in Hervé Jacquemin and Alexandre de Streel (eds.), *L’Intelligence Artificielle et le Droit*, Larcier, Brussels (2017) 241-258.
- [115] Ulrich Schwalbe, “Algorithms, Machine Learning, and Collusion”, *Journal of Competition Law & Economics* 14(4), 568-607 (2018).
- [116] Axel Gautier, Ashwin Ittoo and Pieter Van Cleynenbreugel, “AI algorithms, price discrimination and collusion: a technological, economic and legal perspective”, *European Journal of Law and Economics* 50 (2020), 405-435.