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EU Competition Policy: Algorithmic Collusion in the Digital Single Market

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Abstract

E-commerce promises a digital environment with ‘more perfect’ market characteristics. Although consumers may benefit from digital efficiencies, firms’ exploitation of such benefits may require new policy to regulate in line with the European Commission’s Digital Single Market Strategy. Price-setting algorithms are central to this dichotomy, as faster and more transparent pricing strategies could conceivably maintain algorithmic price-fixing cartels – which Article 101 of the Treaty on the Functioning of the European Union may prove inadequate in tackling. This paper looks to remedy a perceived failure in the literature to appreciate the legal and economic analysis necessary to inform an alternative policy. It will assess the anti-competitive impact of pricing algorithms by contrasting the online and offline economic environments against which policy is set. It will evaluate the effectiveness of current policy in tackling explicit and tacit algorithmic collusion, accounting for its impact upon reasonable business practices, consumer welfare, liability and enforcement, and legal concepts which can be difficult to apply to the digital market. As long-term consumer welfare could be sacrificed by enforcing short-term remedies, it is advised that policy returns to its ordoliberal roots: prioritising the maintenance of healthy competition over current *welfare-first* economics which lack sufficient clarity to regulate algorithms.

1 Introduction

In 2015, the Juncker Commission announced a ‘connected digital single market’¹ (DSM) to promote access to goods, facilitate networks, and maximise economic growth.² Requiring the ‘rapid removal of key differences between the online and offline worlds to break down barriers to cross-border online activity’,³ it looked to promote and protect businesses and consumers. Predictably, competition policy will enjoy a digital transmutation as the free market remains prone to failure.

Pricing algorithms may expedite this failure, as their structural characteristics could facilitate anti-competitive behaviour in e-commerce. An Organisation for Economic Co-operation and Development (OECD) report broadly outlined potential policy directions to protect consumer welfare,⁴ but the literature does not substantively develop legal, economic, and commercial depth. This paper looks to fulfil this gap, to advocate a single policy direction for the European Union.

In Section 2 of this article, the legal and economic definitions of collusion are outlined – applying them to the offline and online economies. It explores their respective characteristics, within which pricing algorithms illustrate and facilitate the latter in being ‘more perfect’. Sections 3 and 4 apply the two relevant models of collusive behaviour: *explicit* and *tacit*. These sections define both models and outline if and how these models should be captured by competition policy, accounting for commercial and consumer welfare and the applicability of existing legal concepts to them. In each case, a relevant policy direction will be proposed.

¹ European Commission, ‘A Digital Single Market Strategy for Europe’ (COM 2015) 192.

² *ibid.*

³ *ibid.*

⁴ OECD, ‘Algorithms and Collusion: Competition Policy in the Digital Age’ (OECD, 2017).

2 The Digital Economic Foundation

As competition lawyers must understand economic concepts, the legal impact of pricing algorithms could not be reasonably analysed without first examining the economic foundations of online and offline markets. The DSM presumes an initial distinction between markets to harmonise, requiring a comparative analysis of them to distinguish how collusion manifests in each instance, and expose the legal challenges to resolve.

2.1 Defining collusion

Article 101 of the Treaty on the Functioning of the European Union (TFEU) prohibits

all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition.⁵

This includes, most importantly for the purposes of this paper, agreements having the object or effect of ‘directly or indirectly fixing ... selling prices’ in the form of price-fixing cartels.⁶ This invites the attention of competition authorities to impose heavy sanctions without the need to prove the existence, or extent, of market impact as a matter of policy.

Nevertheless, collusion is a fundamentally economic policy described by economists as ‘co-ordination ... among competing firms with the objective of raising profits to a higher level than the non-cooperative equilibrium.’⁷ To coordinate in this way, cartelists must agree to a common policy, monitoring their mutual adherence, and consequently

⁵ Treaty on the Functioning of the European Union (entered into force on 1 December 2009), art 101(1).

⁶ *ibid* art 101(1)(a).

⁷ OECD (n 4).

punishing firms who deviate.⁸ Conceptualised by Merrill Flood and Melvin Dresher at the RAND Corporation, this may be understood with reference to the Prisoners' Dilemma:⁹ a game theory model with two separately interrogated prisoners. Each are presented the option to defect, reducing their sentence whilst increasing that of the other, or to cooperate. The caveat is that, if both defect, the sentence will be worse than had they both cooperated.¹⁰ *Figure 1* expresses this.

	Cooperate		Defect	
Cooperate	-1	-1	-3	0
Defect	0	-3	-2	-2

Figure 1. Prisoners' Dilemma

Game theory dictates that as defecting offers a greater reward than cooperating, rational parties will each do so (i.e. a defect–defect scenario). This is defined as the Nash Equilibrium, being the strategy in which neither player is incentivised to deviate from their strategic decision having considered their opponent's likely choice, which we have established is to defect.¹¹ This is considered the dominant strategy. Nevertheless, the cooperate–cooperate scenario is logically the superior choice: the outcome cannot be improved without causing detriment to the other player – known as pareto optimality.¹² This illustrates the achievement of a common, collusive policy. It is apparent that players in a non-oligopolistic market – that is, one not dominated by only a very small number of firms – are unlikely to cooperate 'naturally' at the risk of being worse off – unless they are able to communicate between

⁸ *ibid.*

⁹ Merrill Flood, 'Some Experimental Games' (1958) 5(1) *Management Science* 5.

¹⁰ Albert Tucker, 'The Mathematics of Tucker: A Sampler' (1983) 14(3) *The Two-Year College Mathematics Journal* 228, 228.

¹¹ Flood (n 9) 11–17.

¹² Tucker (n 10).

‘rounds’ of the game to establish this pareto-optimal common policy.¹³ Consequently, the TFEU does not make illegal pareto optimality, but the means by which it is achieved. To this end, in practice, the European Commission has expansively defined communication, the means of forming an agreement contrary to the TFEU, as ‘the existence of a concurrence of wills ... the form in which it is manifested being unimportant so long as it constitutes the faithful expression of the parties’ intention’¹⁴ – significantly broader than its counterpart in contract law.

Cartels are inherently unstable. The Prisoners’ Dilemma demonstrates that by defecting in a cooperate–cooperate scenario, a firm can maximise individual profits in the short-term by decreasing its price to attract consumers.¹⁵ Observing a multiple-round Prisoners’ Dilemma, Rapoport developed the tit-for-tat model to illustrate consequent behaviour. Upon defection from a cooperative equilibrium, co-cartelists will mimic this action by also defecting, causing Nash Equilibrium to be restored (defect–defect) and the cheating party being punished with reduced profits.¹⁶ This creates a punishment scheme to maintain a collusive equilibrium. Accordingly, cartelists will return to the cooperate–cooperate scenario producing the *mutually* more favourable outcome.¹⁷ Nevertheless, competition authorities will typically seek to exploit these transient instabilities: observing them through market changes or expediting defections with the promise of leniency programmes if firms agree to ‘blow the whistle’ on cartel activities.¹⁸

¹³ Flood (n 9) 24–26.

¹⁴ Case T-41/96 *Bayer v Commission* [2000] II-03383 [69].

¹⁵ Jurgen Jaspers, ‘Managing Cartels: how Cartel Participants Create Stability in the Absence of law’ (2016) 23(3) *European Journal on Criminal Policy and Research* 319, 321.

¹⁶ Anatol Rapoport, ‘Escape from Paradox’ (1967) 217(1) *Scientific American* 50, practicably applied in Robert Axelrod, ‘Effective Choice in the Prisoner’s Dilemma’ (1980) 24(2) *The Journal of Conflict Resolution* 3, 7–8.

¹⁷ *ibid.*

¹⁸ Jaspers (n 15) 320.

2.2 Imperfect competition and offline collusion

The traditional conception of perfect competition in an offline market is one in which buyers and sellers each have perfect knowledge and rational decision-making, with businesses maximising profits and consumers maximising utility.¹⁹ This is achieved from a homogenous product market of countless firms individually unable to influence market conditions due to the rapidity at which reactions occur to sustain the equilibrium.²⁰ It is apparent that offline markets are *not* perfect, for which reason regulation exists; but *more* competitive behaviour may be observed from firms competing to lower prices, improve quality and choice, and innovate to attract demand. Consequently, perfect competition may be better framed in terms of maximising allocative and productive efficiency.

Allocative efficiency refers to the point in which it is impossible to benefit any one party without causing detriment to another. If goods are allocated to consumers according to the price they are willing to pay, price equals marginal cost. The supplier will continue to earn more by producing an additional unit of its good until the production cost exceeds the gained revenue. On a supply and demand curve, this would correspond to *supply equals demand*.²¹

Long term, markets must also be productively efficient, with goods produced at the lowest cost. Competitors entering a market may compete by undercutting. The more efficient a business is, the lower it can set its prices until they coincide with average costs.²² At this point, allocative and productive efficiency are equal, indicating perfect competition.²³

¹⁹ Libby Rittenberg, *Principles of Microeconomics* (1st edn, Flat World Knowledge 2008) 140.

²⁰ Nathalie Berta and others, 'On Perfect Competition: Definitions, Usages and Foundations' (2012) 63(2) *Papers in Political Economy* 7, 10–13.

²¹ Richard Whish and David Bailey, *Competition Law* (9th edn, OUP 2018) 5–6.

²² *ibid* 6.

²³ *ibid*.

EU competition policy has demonstrated its preference towards short-term allocative efficiency ‘as a means of enhancing consumer welfare and ensuring an efficient allocation of resources’,²⁴ from which productive efficiencies will presumably derive. Consumer welfare is negatively impacted where goods are allocated and maintained as a collusive equilibrium, above the prices consumers would be willing to pay – resulting in a producer surplus referred to as supra-competitive profits. Accordingly, competition law looks to ensure that firms cannot reach a common price-fixing policy, and instead focuses their attention on individual profits in competition with each other.

2.3 Perfect competition and algorithmic collusion

Pricing algorithms are indicative and symptomatic of the efficiencies presented by the online market. The OECD defines numerous forms of the technology. Pricing algorithms are here understood as automated digital tools able to monitor market data and optimise pricing strategies by reacting faster to changes, thereby incurring lower costs than human agents.²⁵ With the right optimisation, they can be not only reactive, but *anticipatory*.

Two characteristics must be drawn from this: market transparency and reaction speeds. These are conducive to achieving a ‘more perfect’ model of competition according to the types of efficiency mentioned above, taking the form of *dynamic pricing*. On the demand-side, algorithms are able to monitor changes in consumer demand to adjust prices accordingly.²⁶ On the supply side, companies are able to efficiently react to changes – such as availability, capacity, and competitors’ prices – reducing overall costs compared to brick-and-

²⁴ Neelie Kroes, ‘European Competition Policy – Delivering Better Markets and Better Choices’ (Speech/05/512, 15 September 2005) <http://europa.eu/rapid/press-release_SPEECH-05-512_en.htm?locale=en> accessed 5 February 2019.

²⁵ OECD (n 4) 8–12.

²⁶ *ibid* 17–18.

mortar operations.²⁷ Consequently, the online market is brought closer to perfect competition as supply satisfies demand, and equilibrium is maintained in line with changing market conditions.

The facilitation of perfect competition presumes firms' goodwill towards allocative efficiency; supra-competitive profits may still be achieved where a common policy is established between competitors. Indeed, pricing algorithms do nothing to *disincentivise* the establishment of a collusive equilibrium. Rather, they can stabilise cartels by monitoring co-cartelists' adherence to common policy. This enables cartelists to retaliate in real-time to restore or maintain supra-competitive equilibrium.²⁸ Consequently, cartelists can more easily circumvent authorities' market observations. The legal implications of this will be explored with reference to the two relevant models of collusion which are relevant to this paper and competition policy: explicit and tacit.

Consequently, under a formulaic comparison of the online and offline markets, the former seems nearer to 'perfect' market conditions. The characteristics applied via pricing algorithms, which may conceive perfect competition, can easily be exploited towards collusive ends, which may exacerbate existing problems in the offline market. A careful balance between policy that is too stringent or too lax must be struck in order to regulate pricing algorithms. Indeed, the former may negatively impact the functioning and efficiency of the free market and long-term consumer benefit, whilst the latter risks consumer welfare in the short term. This paper will examine each model of collusion, relevant to the behaviour between direct competitors, to discern how the negative impact of each may be mitigated whilst ensuring the dynamic benefits promised to consumers.

²⁷ *ibid* 15–16.

²⁸ *ibid*.

3 Explicit collusion

Judicial treatment of pricing algorithms in the EU has proven tame. The few cases considered by competition authorities and the courts have involved challenges where collusion is *explicitly* apparent. These cases are useful for two reasons, however: they are indicative of current policy in application and they present arguments that call into question the viability of policymakers' discretion. This section will illustrate these limitations and issues with reference to the most relevant case to-date: the UK's Competition and Market Authority's (CMA) investigation into *Trod Ltd*.²⁹

3.1 Judicial review of *Trod Ltd*

Trod Ltd was fined £163,371 for colluding with GB Posters to fix prices on Amazon Marketplace. Discovered only due to the latter's whistleblowing, the case is not controversial in its legal application. Employees from both companies had agreed to not undercut each other's prices, and to "raise maxi posters to £3.94 or 25p below cheapest seller [sic]" and set the 'lowest maxi posters price to £2.59'.³⁰ Soon, they each began to employ third-party pricing algorithms to streamline the process. Communication further demonstrated failures between parties to adhere to their common policy,³¹ and the threat that deviation could be punished by ceasing use of the algorithm to 'go back to square 1 and sell all [of your] posters at a loss'.³² Consequently, it seems that the requirements of supra-competitive equilibrium were present and were easily captured and penalised by the CMA under their otherwise 'offline' competition policy. The ease of this approach veils significant concern – wherein superficial analysis is at odds with the effective enforcement of competition policy for even the most simplistic of algorithmic cartels.

²⁹ Competition and Markets Authority, 'Online Sales of Posters and Frames' (2016) Case 50223.

³⁰ *ibid* [3.58].

³¹ *ibid* [3.82].

³² *ibid* [3.60].

3.2 Agreement and concerted practices

There is no doubting in *Trod* that common policy can be established just as well online as offline. The LIBOR Scandal, which came to its peak in 2008, saw several financial institutions fraudulently manipulate the daily interest rates at which they borrow from each other. As these rates underpin derivatives trading, the banks could profit by artificially inflating or deflating the LIBOR rate – in the process, distorting the market. They did so by communicating over an online chatroom.³³ Consequently, whether firms are communicating in person or online is not an issue, so much as there being evidence that common policy has been explicitly agreed, as it was in *Trod* via email correspondence.

The CMA also perceived in *Trod* ‘a coordination of conduct between them in which they knowingly substituted practical cooperation between them for the risks of competition’.³⁴ Frequently adopting a dual-classification with agreement, *concerted practices* lack individual definition.³⁵ Indeed, it has been treated more as a ‘catch-all’ where ‘the Commission cannot be expected to classify the infringement precisely’.³⁶ Nevertheless, *Suiker Unie v Commission*³⁷ established that a plan is not required, provided there has been sufficient contact that could influence market conduct. Although the dual classification was adopted in *Trod* – suggesting the court errs towards the clarity of ‘agreement’ – the capacity for algorithms to facilitate concerted practices may necessitate its proper definition, or at least an understanding as to when it may apply alone.

³³ Ricardo Cardoso and Yizhou Ren, ‘Antitrust: Commission Fines Crédit Agricole, HSBC and JPMorgan Chase €485 Million for Euro Interest Rate Derivatives Cartel’ (*European Commission*, 7 December 2016) <http://europa.eu/rapid/press-release_IP-16-4304_en.htm> accessed 26 November 2018.

³⁴ *Trod Ltd* (n 29) [5.17].

³⁵ See, for example, Whish and Bailey (n 21) 532, in which concerted practices are considered only by their dual classification with agreement.

³⁶ *PVC* (Case IV/31.865) Commission Decision 89/190/EEC [1989] OJ L 74/1.

³⁷ Case C-40/73 *Suiker Unie v Commission* [1975] I-01663, 1697–1698.

One example of how concerted practice may arise was noted by the European Commission in its contributory notes to the OECD, noting that signalling pricing strategies to competitors through algorithms may fall within the scope of Article 101.³⁸ This was raised in *Container Shipping*, wherein carriers would issue announcements of their pricing intentions weeks before their implementation. The Commission held that this was of little use to consumers, but ‘may constitute ... a more subtle way for competitors to collude and replace competition with practical cooperation’.³⁹ Having been settled outside of proceedings, the Commission was unable to definitively rule upon this issue, although Camesaca and Grelier argue that this case represents the ‘next step’ in its expansionism towards stricter treatment of price signalling and concertation.⁴⁰

However, Camesaca and Grelier fail to distinguish between public and private pricing transparency. The unilateral nature of public transparency – due to its accessibility by consumers and lack of direct communication between competitors – is difficult to hold as explicit collusion (although will be relevant to tacit collusion).⁴¹ In contrast, encoding and decoding hidden data is a *de facto* bilateral exchange of private information,⁴² removing consumers from the market equation. Thus, whereas Camesaca and Grelier are suspicious of the Commission’s widening regulatory exposure against the tide of previous case law, it is likely that *Container Shipping* merely offers a recalibration of the careful balance to be drawn. Short of conclusions actually being made, its relevance to public price announcements is

³⁸ OECD, ‘Algorithms and Collusion - Note from the European Union’, (OECD, 2017) [27].

³⁹ *Container Shipping* (Case AT.39850) Commission Decision 2016/C 327/04 [2016] OJ C 327/4.

⁴⁰ Peter Camesasca and Laurie-Anne Grelier, ‘Close Your Eyes? Navigating the Tortuous Waters of Conscious Parallelism and Signalling in the European Union’ (2016) 7(9) *Journal of European Competition Law & Practice* 599, 605.

⁴¹ OECD, ‘Unilateral Disclosure of Information with Anticompetitive Effects’ (OECD, 2012) [58].

⁴² *ibid* [33].

questionable. Nevertheless, though public announcements may therefore escape liability, the same cannot be said for covert bilateral exchanges.

This is demonstrable from a US Department of Justice case in 1992: suing eight carriers for price-fixing through digital and algorithmic means. The Airline Tariff Publishing Company collected fare information from the airlines and disseminated it to all other airlines and reservation systems that would serve travel agents.⁴³ As this system was publicly available, from a consumer perspective, at first glance it appears very similar to unilateral transparency. The facts of the case saw airlines communicating through encoded footnote designators, employing algorithms to process presented fare information, monitor competitors' responses, and consequently negotiate higher fares, retaliating against any airlines who would diverge from them. Such communication was relatively costless and could neither be said to present an agreement in the same way as direct communication, nor benefit consumers through public transparency.

Economists refer to this costless, private communication as 'cheap talks'. Evidently, it has been captured under US antitrust policy, so it is not inconceivable that it would be caught by Article 101 TFEU in the same way. Nevertheless, economists disagree as to the extent to which this method in fact engenders collusion. In *T-Mobile Netherlands* it was suggested "that the exchange of information between competitors is liable to be incompatible with the competition rules if it reduces or removes the degree of uncertainty as to the operation of the market in question."⁴⁴ By their nature, cheap talks are costless, non-binding, and unverifiable.⁴⁵ Baliga and Morris therefore suggest that they are self-defeating to the ends of establishing or maintaining coordination. When applied to the Prisoners' Dilemma, cheap talks are likely to be ignored

⁴³ *United States v Airline Tariff Publishing Company* 836 F Supp 9 (1993).

⁴⁴ Case C-8/08 *T-Mobile Netherlands and Others* [2009] I-04529 [35].

⁴⁵ Joseph Farrell, 'Cheap Talk, Coordination, and Entry' (1987) 18(1) *The RAND Journal of Economics* 34, 34.

(resulting in a defect–defect scenario) in favour of Nash Equilibrium. In most instances, there is little to suggest cheap talks will result in collusion, as they fail to reduce uncertainty. Cooper and others note the applicability of cheap talks to the Battle of the Sexes, a coordination game illustrative of the presumption towards collusive behaviour in this scenario. The game imagines that a husband and wife would each prefer a different activity but would rather do something together (i.e. the same activity) than apart (i.e. two different activities). Demonstrated in *Figure 2*, the *two* Nash Equilibria (0,0) demonstrate how cheap talks, as *ex ante* communication, may allow firms to indicate a preferred focus, towards which others are inclined to create a common policy.⁴⁶

	Opera		Football	
Opera	3	2	0	0
Football	0	0	2	3

Figure 2. Battle of the Sexes

Whilst the Battle of the Sexes is a likely model for oligopolistic markets, with few competitors, Farrell notes that parties' motivations in this game would 'apply equally [when] ... bargaining under complete information'.⁴⁷ These conditions are fulfilled with pricing algorithms, as their ability to monitor an increasingly transparent digital market means that cheap talks become more verifiable – and so trusted by would-be cartelists. In this instance, verification would be tantamount to a bilateral exchange. Cooper and others corroborated this. In simulations of the Battle of the Sexes, they had one player express their intentions to the other: suggesting a *focal equilibrium*. The other player would frequently select that option, apparently resolving the coordination problem in the Prisoner's Dilemma. To better simulate the 'real' markets, however, they then allowed *both* players to

⁴⁶ Russel Cooper and others, 'Communication in the Battle of the Sexes Game: Some Experimental Results' (1989) 20(4) *The RAND Journal of Economics* 568, 569.

⁴⁷ Farrell (n 45).

communicate simultaneously. This resulted in some confusion amongst players to establish a focal equilibrium, but after a series of messages to-and-from resulted in consistent coordination.⁴⁸ Where the ECJ in *Dole Food Company*⁴⁹ ruled that behaviour which ‘reduces ... the degree of uncertainty ... of the market’ would be incompatible with competition rules, algorithms’ ability to verify cheap talks would fall well within this threshold. The conduct of competitors cannot be privately foreseeable at the expense of public accessibility.

With offline policy sufficient in most respects, agreement and its dual classification with concerted practices retain their low thresholds for capture. It is the latter, when treated in isolation such as with respect to price signalling, that must be better defined by competition policy. Although unilateral signals are a matter best confined to discussions on tacit collusion, bilateral exchanges of information facilitated by algorithms comply more readily with the economic rationale underpinning Article 101 TFEU and the *Dole Food Company* criterion. Current policy in this respect is adequate, but the procedural issues around detecting such practices remain open to question.

3.3 Agency and liability

*VM Remonts*⁵⁰ extended the single economic unit doctrine from *Becu*,⁵¹ wherein the anti-competitive actions of employees were sufficient to trigger Article 101 as they are incorporated within the same entity, to include independent service providers acting under an undertaking’s direction. Consequently, establishing liability in this instance is uncontroversial *even if* an algorithm were said to be a separate actor to the firm. Nevertheless, the CMA admitted to being unable to determine the extent to which cartelists in *Trod* had benefited due to the

⁴⁸ Cooper and others (n 46).

⁴⁹ Case C-286/13 P *Dole Food and Dole Fresh Fruit Europe v Commission* [2015] ECLI:EU:C 184.

⁵⁰ Case C-542/14 *VM Remonts and Others v Konkurences padome* [2016] ECLI:EU:C [33].

⁵¹ Case C-22/98 *Becu and Others* [1999] I-05665.

algorithms' intermediary position.⁵² Although it was suggested that prices had increased by 20% over the relevant period,⁵³ automation ensured that cartelists need not monitor price changes short of a failure to adhere to their common policy. Although the EU Fines Notice omits the calculation of firms' benefit, it implies a 'profits-plus' approach as disgorging profitability, reflecting seriousness of the infringement, plus a deterrent amount. It was admitted in *KME Germany v Commission* that current turnover-based fines are 'vague and imperfect'.⁵⁴ Nevertheless, it upheld its adequacy, which Riley lambasts: 'turnover is an inadequate proxy for assessing the damage done by price-fixing or the gain acquired by undertakings'.⁵⁵ Indeed, the Commission's approach has been to impose up to 30% of turnover in the relevant markets as the basic fine, which it argues captures cartels' overcharge typically being within a 15–25% 'entry fee'.⁵⁶ Ehmer and Rosati have challenged this estimate, with a breadth of gains significantly above and below these overcharges. They suggest that less-complex cartels may be deterred by lower fines;⁵⁷ but as algorithmic collusion is more complex and more sustainable, higher penalties are required to offset greater profitability and ensure deterrent effect.

Trod's consequent fall into administration may veil the insufficiency of current policy, particularly where proportionality must be considered. It is difficult to suggest what may have occurred under alternative policy, particularly where its basic fine of £50,000–£100,000 enjoyed a

⁵² viz *ibid* [6.2.1]; Mark Tricker and others, 'Online Retailers should Tread Carefully after *Trod*' (*Norton Rose Fulbright Knowledge*, November 2016) <<https://www.nortonrosefulbright.com:443/en-us/knowledge/publications/7e7bdcca/online-retailers-should-tread-carefully-after-trod>> accessed 29 November 2019.

⁵³ *Trod Ltd* (n 29) [6.21].

⁵⁴ Case T-127/04 *KME Germany and Others v Commission* [2009] ECLI:EU:T 142.

⁵⁵ Alan Riley, *Modernising Cartel Sanctions: Effective Sanctions for Price Fixing in the European Union* (2011) 32(11) *European Competition Law Review* 551, 553.

⁵⁶ Neelie Kroes, 'Private and Public Enforcement of EU Competition Law' (IBA Conference, Brussels, March 2009).

⁵⁷ Christian Ehmer and Francesco Rosati, 'Science, Myth and Fines: Do Cartels Typically Raise Prices by 25%?' (2009) 4 *Concurrences* 4, [20].

40–60% reduction, but it inarguably falls victim to a ‘mechanistic’ process.⁵⁸ Nevertheless, accounting for the failures of turnover-based fines, a more forensic, audited approach would treat proportionality holistically. Thus, where an assessment of company assets, liability, equity, income, and cash flows is considered, a more effective framework could be constructed to disgorge supra-competitive profits whilst achieving optimal deterrence within undertakings’ capacities to pay. This retains the spirit of the Fines Notice whilst accounting for the issues of monitoring algorithms’ real-time gains.

Additionally, it brings the Fines Notice under the purview of *certainty*. Current policy sees the basic fine capable of being increased or decreased taking into account gravity, duration, and any other relevant factors. To this end, the ‘assessment of fines, rather than being a mathematical exercise based on an abstract formula, involves a legal and economic appraisal’, lacking a specific methodology by which to justify fines, which are subject to change at any time.⁵⁹ This is not novel; the court’s judgment in *BPB v Commission*⁶⁰ suggests that by wilfully propagating uncertainty, consumer welfare is protected by undertakings’ aversion to an inability to make a cost-benefit analysis. This approach is highly suspect, as risk aversion and consumer welfare are not inextricably linked. A Bank of Greece working paper suggested that uncertainty would see undeterred cartels pricing *higher* than they would have otherwise, whilst others are deterred from socially benign actions for fear of punishment.⁶¹ This would be tantamount to deeming algorithms anti-competitive *suo jure*. Consequently, certainty in punishment is concerning; uncertainty is likely to incentivise algorithmic cartels whilst deterring algorithms’ economic benefits in the DSM.

⁵⁸ Riley (n 55) 554.

⁵⁹ Ivo Van Bael, ‘Fining à la Carte: The Lottery of EU Competition Law’ (1995) 16(4) European Competition Law Review 237.

⁶⁰ Case T-53/03 *BPB v Commission* [2008] II-01333 [336].

⁶¹ Vasiliki Bageri and others, ‘The Distortive Effects of Antitrust Fines Based on Revenue’ (2013) 123(572) The Economic Journal 545, 556.

The suitability of an audited approach to algorithmic cartels cannot be understated. *Trod*'s experience, being the singular example, may prove an effective deterrence. Equally, it may offer authorities a false sense of security in the adequacy of current policy. Companies may tighten their regulatory compliance and promote awareness where initial liability cannot be removed by degrees of separation, but so must legislators more effectively scrutinise cartels to realistically and proportionally deter them. Although *Trod* was an open-and-shut case, current policy may be damned where cartels perfect their separation through more stable algorithms requiring less intervention. If detection and profitability enjoy an inversely proportional relationship, authorities must have the capacity to improve their monitoring of price fluctuations and, to ensure compliance, adopt a penalty framework with a certain cost-benefit analysis, whereby supra-competitive prices are punished.

4 Tacit collusion

As explicit collusion is illegal in the offline markets, this paper could analyse its transplantation to the digital economy with a presumption of illegality. The same cannot be said of tacit collusion. The phenomenon is sufficiently rare that EU competition policy has not been compelled to tackle it: it is presently legal (or not illegal). As pricing algorithms risk tacit collusion becoming a mainstream issue, this paper will explore if, and how, it may be brought within the scope of competition policy. It will do so with reference to the *oligopoly problem* from which tacit collusion derives and which pricing algorithms emulate. It will consider the solutions proposed by academics from various schools of economic thought to resolving this problem. Deeming them insufficient to solving the issue presented by pricing algorithms, however, this paper will advocate an ordoliberal approach to empower both competition authorities and commercial parties. Simultaneously, the burden of proof can be shifted to ensure their structural symmetry in the proposed legal landscape.

4.1 The economics of the oligopoly problem

The OECD outlines that pricing algorithms will widen the scope of tacit collusion from ‘oligopolistic markets with high barriers to entry and a high degree of transparency’ to those for which it would be otherwise unsustainable.⁶² Typically, an oligopolistic market is one characterised by few competitors, naturally reducing competition. This is not problematic *per se*, but their proximity can inform their pricing strategies towards common policy without bilateral communication or concertation – and so, without any agreement or concerted practice, cannot fall within the scope of the TFEU.⁶³ Pricing algorithms emulate oligopolies’ salient features: high transparency resulting in mutual self-awareness and the expectation of swift retaliation. The problem is exacerbated by a market of many interdependent suppliers, in which it may be commercially illogical to not account for competitors’ prices, thus creating an inherent cooperate–cooperate scenario. To ignore competitors’ prices may be tantamount to defection, inviting tit-for-tat fluctuations between profit and loss. Consequently, the market functions as though there were collusion, albeit inadvertently given the absence of an agreement or bilateral process by which to reach it. As pricing algorithms possess these same salient features, the risk is that supra-competitive profits become a ‘normal’ market condition within the DSM.

The inaction and indecision of the law towards the oligopoly problem is due to the lack of viable remedies, being inescapable under present market conditions. The Commission and ECJ have been more prone to *disproving* oligopolies, as a defence, than attaching liability to them.⁶⁴ Although algorithms offer comparable structural concerns, such a widespread issue cannot be ignored, necessitating an appropriate remedial scheme in the DSM.

⁶² OECD (n 4).

⁶³ Whish and Bailey (n 21) 572.

⁶⁴ Case 48-69 *Imperial Chemical Industries Ltd v European Commission* [1972] ECLI:EU:C 70; Case C-89/85 *Ahlström Osakeyhtiö and Others v Commission* [1994] I-00099; Case C-359/01 *British Sugar plc v European Commission* [2004] I-04933.

4.2 Proposals from the Harvard and Chicago schools

It is unsurprising that Salil Mehra cautions that '[b]lack-letter law's *blind spot* ... may become a cloaking device behind which algorithmic price coordination can readily hide'.⁶⁵ This necessitates the expansion of 'agreement', as contained in Article 101 TFEU, to deny this exploit. Unsurprisingly, this has been met with increasing resistance from liberal economists. Professor Donald Turner argued that interdependence is an inescapable truth of oligopolistic – or, as it applies to this case, algorithmic – market structures. A 'rational [party] ... simply takes one more factor into account – the reactions of his competitors to any price change that he makes'.⁶⁶ This is defensible on two grounds: firstly, it ensures commercial freedom, and secondly, enforcement would be infeasible. Generally, this approach aligns with Chicagoan economics, conceiving a free market which, as Read describes, has 'its own rationality',⁶⁷ so should enjoy *laissez-faire* non-interventionism from the state.

Consequent 'neoliberal' thought celebrates the rationality of economic agents to 'produce' and 'consume', and views freedom to contract as an extension of their rights to private property.⁶⁸ Indeed, Demsetz empirically demonstrated that firms' 'positive correlation between profit rates and concentration ... should be expected from a workable incentive system that rewards superior performance'.⁶⁹ Accordingly, it is natural that as rational-choice efficiency increases economic performance, it will be taken. The *effect* is therefore collusive, but the

⁶⁵ Salil Mehra, 'Antitrust and the Robo-Seller: Competition in the Time of Algorithms' (2016) 100(4) *Minnesota Law Review* 1323, 1351.

⁶⁶ Donald Turner, 'The Definition of Agreement under the Sherman Act: Conscious Parallelism and Refusals to Deal' (1962) 75(4) *Harvard Law Review* 655, 665.

⁶⁷ Jason Read, 'A Genealogy of Homo-Economicus: Neoliberalism and the Production of Subjectivity' (2009) 6 *Foucault Studies* 25, 27.

⁶⁸ *ibid.*

⁶⁹ Harold Demsetz, 'The Market Concentration Doctrine: An Examination of Evidence and a Discussion of Policy' (1st edn, American Enterprise Institute for Public Policy Research 1973) 20 in Mark Glick and Eduardo Ochoa, 'Classical and Neoclassical Elements in Industrial Organization' (1990) 16(3) *Eastern Economic Journal* 197, 205.

means are entirely inadvertent, if not unavoidable. Short of wilful communication, the state lacks the necessary justification to intervene. In doing so, Turner admits, it would be tantamount to requiring firms to ignore their competitors' prices,⁷⁰ with the line between collusive and rational decisions seemingly blurred. The irrationality of this approach is clearly undesirable: it is unfeasible and, by curtailing economic performance, would impact the welfare benefits achieved through innovation in the pursuit of profit. To do so would be, at best, unwarrantedly optimistic and, at worst, negligent. Consequently, a stronger economic framework is desirable to establish the bounds of rationality, for fear that unabated and/or inadvertent enterprise risks collusive equilibria.

Turner's stance suggests the Harvard Structure → Conduct → Performance (SCP) paradigm may offer a viable remedy to the oligopoly problem. In this, the conduct and consequent performance of firms cannot be faulted, it being an issue of market structure. The three are causally linked.⁷¹ By introducing *ex ante* structural remedies to prevent oligopolies from forming, therefore, the problem may be avoided.⁷² Whilst not disagreeable, its applicability to algorithmic collusion is imperfect. As the requirement that there are few market players to engender tacit collusion is not necessarily true of algorithmic markets, the problem is less structural than behavioural. The two may not be mutually exclusive, however. The SCP paradigm may be applied, if not to the market, then to algorithms themselves, suggesting that their conduct is an encoded, structural attribute which leads to tacitly collusive outcomes.

Harrington supports this conclusion, arguing that 'collusion by autonomous agents is the use of pricing rules that embed a reward-punishment scheme which supports supra-competitive prices'.⁷³ The

⁷⁰ Turner (n 66) 669.

⁷¹ Joe Bain, *Barriers to New Competition* (1st edn, Harvard University Press 1956).

⁷² Turner (n 66) 671.

⁷³ Joseph Harrington, 'Developing Competition Law for Collusion by Autonomous

concept of ‘agreement’, therefore, is supplanted by encoded behaviour to prompt effective price-fixing. He suggests that authorities audit the coding of algorithms to ascertain the programme which would punish another firm for deviating from the presumptive common policy of a highly transparent market (i.e. the oligopoly problem).⁷⁴ In theory, this would reduce transparency as algorithms would not be monitoring and reacting to competitors’ strategies, making tacit cartels inherently unstable. Indeed, it may promote confidence in evidentiary standards: that certain encoded behaviours are *per se* illegal. Its viability, however, is doubtful; as *Trod* demonstrated, algorithms may fail to collude even where common policy had been explicitly agreed.⁷⁵ Consequently, whilst appreciative of such *ex ante* recourse, imposing algorithmic intent is difficult to justify.

Alternatively, Ezrachi and Stucke propose an imposed ‘time lag’ to limit the speed of algorithms’ price changes.⁷⁶ This approach indirectly disincentivises reward–punishment schemes, bypassing the weaknesses of Harrington’s proposal whilst also slowing the achievement of a stable supra-competitive equilibrium. This strategy was adopted by the Austrian Fuel Price Fixing Act 2009 (Spritpreisverordnung) where commercial fuel aptly illustrates conscious parallelism in practice.⁷⁷ Evanthia and Karsten conclude that the Act, which restricted fuel stations’ price increases to once per 24 hours, was a success as consumers’ search costs were reduced due to less price volatility.⁷⁸

Artificial Agents’ (2018) 14(3) Journal of Competition Law & Economics 331.

⁷⁴ *ibid.*

⁷⁵ *Trod Ltd* (n 29).

⁷⁶ Ariel Ezrachi and Maurice Stucke, *Virtual Competition: the Promise and Perils of the Algorithm-driven Economy* (1st edn, Harvard University Press 2016) 239–240.

⁷⁷ Attempts to litigate conscious parallelism in this sector have similarly failed: ‘plus factors’ such as high profits and prices, price uniformity, and parallel changes are deemed consistent with competition in this market structure, *White v RM Packer Co* 635 F3d 571 (1st Cir 2011).

⁷⁸ Evanthia Fasoula and Karsten Schweikert, ‘Price Regulations and Price Adjustment Dynamics: Evidence from the Austrian Retail Fuel Market’ (Hohenheim Discussion Papers in Business, Economics and Social Sciences, Working Paper 08, 2018).

There are two issues with this approach, however: it would directly limit pro-competitive dynamic pricing by indirectly limiting anti-competitive behaviour; and it would reduce consumer choice and information in deciding from whom to purchase.⁷⁹ Indeed, as algorithms actively monitor consumer demand, the welfare costs attached to price volatility are less relevant. Altogether, this proposal would simultaneously reduce pro-competitive effects and induce unwarranted, state-sponsored inefficiencies.

Rejecting *ex ante* remedies as infeasible, Judge Posner – an American jurist, economist, and critic of Turner – argued that interdependence does not so much explain how sellers establish supra-competitive prices as why. He describes tacit collusion as ‘not an unconscious state’ but analogous to a unilateral contract, ‘treated by the law as a contract rather than as individual behaviour’.⁸⁰ Consequently, proper economic discovery may legitimise judicial enforcement. To a limited extent, this has already been reflected in *Suiker Unie*, wherein the ECJ admitted that

...although it is correct to say that this requirement of independence does not deprive economic operators of the right to adapt themselves ... [it precludes disclosing] the course of conduct which they themselves have decided to adopt or contemplate adopting.⁸¹

Notably, it indicates the expansion of agreement would include price leadership which, in practice, may include public price announcements. Thus, although *Shipping Containers* failed to meet the threshold for explicit collusion, its unilateralism may be relevant to tacit scenarios.

Public price announcements exist in a controversial grey area between

⁷⁹ OECD, ‘Competition Assessment Toolkit: Volume 1’ (OECD, 2017).

⁸⁰ Richard Posner, ‘Oligopoly and the Antitrust Laws: A Suggested Approach’ (1968) 21 *Stanford Law Review* 1562, 1576.

⁸¹ *Suiker Unie* (n 37) [174].

anti-competitively revealing future prices to competitors and pro-competitively reducing consumer search costs. Capobianco argues that, whilst current jurisprudence is at a balance teetering between them, practices would fall more determinately where they include ‘an invitation to collude’.⁸² This approach is simplistic, even accounting for Posner’s argument: whilst Capobianco’s criteria may be demonstrative of anti-competitive practices and price leadership, an invitation is unlikely, if at all necessary. Public price announcements may require nothing more than the announcing party’s good reputation for competitors to adopt consciously parallel behaviour – the ‘acceptance’ of the unilateral ‘offer’ to collude. Dibadj is proactive in recognising the threat of conscious parallelism and the facilitatory role of public price announcements. In favour of the econometric methods developed by Posner, he suggests a ‘menu of remedies’, namely injunctions and structural remedies.⁸³ The latter has been discounted already, with reference to the SCP paradigm. Alternatively, injunctions could prove beneficial to establishing tolerable and predictable bounds to the rational conduct of firms in the free market. In the digital economy, however, this is unlikely to apply. Price signalling is conducive to achieving a common policy as it exposes intention; but as algorithms monitor the markets and react in real-time, the transparency those injunctions seek to resolve is effectively redundant. Injunctive remedies, therefore, make little headway in resolving the oligopoly problem of an algorithmic market.

4.3 Post-Chicago: ‘Welfare first’ principles

It is for these reasons that Posner admitted the infeasibility of state interventionism, which is particularly relevant to the difficulties attributable to the online market.⁸⁴ Kaplow, however, continues to

⁸² Antonio Capobianco, ‘Unilateral Disclosure of Information with Anticompetitive Effects’ (OECD, 2012) [61]. (Emphasis in the original.)

⁸³ Reza Dibadj, ‘Conscious Parallelism Revisited’ (2010) 47(3) *San Diego Law Review* 589, 630.

⁸⁴ Richard Posner, ‘Review of Competition Policy and Price Fixing’ (2014) 79 *Antitrust Law Journal* 761, 763.

lambast judicial reliance upon communication, as exonerating cases ‘on the ground that they involve mere interdependence are those that involve the greatest rather than the least social harm’.⁸⁵ Mehra notes that the ‘robo-seller shifts the balance’ towards this Post-Chicagoan approach, given the expansion of tacit collusion.⁸⁶ Whilst Posner sought to expand the definition of communication, therefore, Kaplow deems it dispensable, proposing a ‘direct approach’ which identifies a social problem, detects cartelist’s activities, and applies sanctions.⁸⁷ This ‘welfare first’ approach risks casting the antitrust net too widely, at the expense of judicious enforcement against firms and the dynamic nature of the market.

On the matter of detection, Kaplow argues that market patterns (price elevations, maintenance, and drops) and market structure inherently imply the presence of tacit collusion.⁸⁸ Although these econometric suggestions are not dissimilar to Posner’s or Dibadj’s, his suggestion to ‘combin[e] complementary types of evidence and [assign] different weights to each’⁸⁹ is a highly arbitrary and pendulous reversal of the Chicagoan approach. Consequently, whilst Kaplow’s disaffection towards self-regulation as ‘one shoe fits all’ is well-founded, necessitating closer scrutiny of a complex market, his approach threatens to do more harm than good in casting the antitrust net too wide.

The reason for this is that Kaplow identifies the social issue as preliminary. His approach ensures that ‘competition policy concerned with consumer [welfare] should optimally be more aggressive’, to

⁸⁵ Louis Kaplow, ‘On the Meaning of Horizontal Agreements in Competition Law’ (2011) 99(3) *California Law Review* 683, 689.

⁸⁶ Mehra (n 65) 1343.

⁸⁷ Louis Kaplow, ‘Direct Versus Communications-based Prohibitions on Price Fixing’ (2011) 3(2) *Journal of Legal Analysis* 449, 455.

⁸⁸ *ibid* 468–470.

⁸⁹ Louis Kaplow, *Competition Policy and Price Fixing* (Princeton University Press 2013) 248.

capture even smaller price elevations.⁹⁰ This demonstrably risks commercial freedoms as his apparent objection towards allocative inefficiencies errs towards Hutt's so-called 'sovereignty of the consumer'. This idea holds that 'the sphere of freedom and power is that of the consumer, while the sphere of obedience and restriction is that of the producer', which will, therefore, achieve market stability through consumers' freedom of choice.⁹¹ Two issues may be illustrated from this: consumer sovereignty establishes, firstly, a continued intolerance of firms' autonomy and, secondly, overzealous market control.

Persky attempts to dilute the consumer sovereignty model by better defining production as the means and consumption as the end.⁹² Superficially, this does not appear wholly controversial; Pareto optimality is not dispensed with as, according to market forces, we may illustrate that it is supply that must meet demand – being the first to move. Although this may generally be the case, Gintis argues that social outcomes are the 'reflection of individual preferences, constrained by available resources and knowledge of technologies'.⁹³ The foresight of this approach, presumably, did not stretch to the concept of pricing algorithms, but adequately explains the relationship between 'consumer sovereignty' and a framework within which it exists, but no further than the bounds of supply-side efficiencies (or inefficiencies). Were we to treat Hutt's suggestion as true, it would be tantamount to assuming an inelasticity of supply: price being determined only by the movement of demand. Firms would be little more than vehicles for social output, without incentive to innovate or provide economic growth.

⁹⁰ *ibid* 220.

⁹¹ William Hutt, 'The Concept of Consumers' Sovereignty' (1940) 50(1) *The Economic Journal* 50, in Joseph Persky, 'Retrospectives: Consumer Sovereignty' (1993) 7(1) *Journal of Economic Perspectives* 183, 187.

⁹² Persky (n 91) 188.

⁹³ Herbert Gintis, 'Behavior and the Concept of Sovereignty: Explanations of Social Decay' (1972) 62(1) *The American Economic Review* 267, 267.

This argument rests upon the assumption that regulators, as conduits of consumer welfare, understand how best to maximise it. Regulating overzealously would see firms' bondage to production; indicative of neo-Keynesian interventionism supporting the enforcement of a static, allocative equilibrium.⁹⁴ This sets a dangerous precedent for short-termism where algorithms' predictive effects would have dynamic prices reflecting long-term efficiencies.⁹⁵ Indeed, Gintis argues that 'technology ... is constrained to those compatible with the reproduction of the social relations of capitalist production'.⁹⁶ Consequently, consumer sovereignty is not absolute: it is limited to means also in the interest of the producer. Where consumer welfare is protected too readily according to short-term inelasticity, firms will enjoy little incentive to develop supply-side efficiencies or technologies to create long-term price reductions. The causal relationship between supply and demand rejects the sovereignty of either. Instead, supply-side efficiencies present a framework to expand and accommodate consumer demand. Focusing so overtly upon short-term consumer protections would, therefore, jeopardise and restrict future efficiency and scope.

These proposals from various economic schools have raised no justifiable conclusions. At risk of the oligopoly problem being exacerbated by pricing algorithms, policy must be reformulated. Every argument, however, has revolved around ideas of consumer welfare – being either too strong or too weak, with little commonality to find a middle ground. To this end, this paper proposes removing consumer welfare from immediate consideration. A seemingly radical proposal, Behren differentiates consumer welfare from consumer choice, replacing long-term speculation and short-term apprehension with

⁹⁴ John Hicks, 'Mr Keynes and the "Classics", A Suggested Interpretation' (1937) 5(2) *Econometrica* 147, 157.

⁹⁵ Tony Curzon Price and Mike Walker, 'Incentives to Innovate v Short-term Price Effects in Antitrust Analysis' (2016) 7(7) *Journal of European Competition Law & Practice* 475, 475.

⁹⁶ Gintis (n 93) 267.

‘economic freedom of market agents within the framework of a market structure which is not constricted by producers at the expense of the alternatives.’⁹⁷ Indeed, competition policy is framed by a static ‘snapshot’ of allocative efficiency, to which ends pricing algorithms are both panacea and anathema – where it should appreciate long-term dynamic efficiencies. By escaping this consumer welfare paradigm, the protection of competition for the sake of competition should be reasserted – an approach indigenous to European policy in the form of ordoliberalism.

4.4 Returning to ordoliberalism

Ordoliberalism ‘advocates a state-regulated competitive process as a necessary instrument for the protection of individual economic freedom’.⁹⁸ This is a model of social-liberalism through which strong macroeconomic rules ensure and protect microeconomic free-market competition.⁹⁹ This philosophy informed the TFEU as an economic constitution which ‘defines the rules of the game under which economic activities can be carried out’.¹⁰⁰ Indeed, the Commission has reflected this need ‘to protect ... the structure of the market and, in so doing, competition *as such*’.¹⁰¹

Ordoliberalism is not without detractors. Reflecting the Commission’s ‘more-economic approach’, it is deemed overly formalistic,¹⁰² with

⁹⁷ Peter Behrens, ‘The “Consumer Choice” Paradigm in German Ordoliberalism and its Impact upon EU Competition Law’ (Institute for European Integration, Discussion Paper, 2014) 33.

⁹⁸ Ignacio Herrera Anchustegui, ‘Competition Law through an Ordoliberal Lens’ (2015) 2(2) Oslo Law Review 139, 139.

⁹⁹ Werner Bonefeld, ‘Freedom, Crisis and the Strong State: On German Ordoliberalism’ (2012) 17(5) New Political Economy 1, 1.

¹⁰⁰ Anchustegui (n 98) 147.

¹⁰¹ Case C-501/06 P *GlaxoSmithKline Services and Others v Commission and Others* [2009] ECR I-09291 [63]. (Emphasis added.)

¹⁰² Pinar Akman, ‘Searching for the Long-Lost Soul of Article 82 EC’ (CCP Working Paper, 2007) 3 in Elias Deutscher and Stavros Makris, ‘Exploring the Ordoliberal Paradigm: The Competition-Democracy Nexus’ (2016) 11(2) The Competition Law Review 181, 182.

established rules preventing a case-by-case economic analysis.¹⁰³ This is, in part, true, but, in both respects, conducive to effectively countering algorithmic cartels. Anchustegui observes that ordoliberalism is not mutually exclusive with the Commission's economic analysis, but 'shapes and sets the rules of an institutional framework' rather than being the policy in itself.¹⁰⁴ Consequently, ordoliberalism does not lack efficiency considerations, but recognises firms' competitive output within that institutional framework rather than presuming that case-by-case micro-economic inefficiencies are reflective of the macro-level.¹⁰⁵ It therefore escapes the lack of short-term differentiation between algorithms' pro- and anti-competitive effects, as this paper will express how long-term economic insights may complement the formalistic application of Article 101(1).

A second criticism arises from an apparent scepticism towards accumulated market power. Indeed, Miksch conceptualised competition *as-if*, requiring 'that firms refrain from conduct that would be unavailable to them if they had no monopoly power'.¹⁰⁶ It may be argued that Article 102 TFEU, which prohibits 'abuse by one *or more* undertakings',¹⁰⁷ could be applied to firms' collective dominance. In *Piau v Commission*, the court explicitly outlined its potential use to remedy tacit collusion; but neither the case nor Commission Guidelines voice how.¹⁰⁸ Indeed, where barriers are low, 'collective' dominance could refer to potentially hundreds of firms, none of which boast

¹⁰³ Doris Hildebrand, 'The European School in EC Competition Law' (2002) 25(1) World Competition 3, 4.

¹⁰⁴ Anchustegui (n 98) 165.

¹⁰⁵ Behrens (n 97) 27.

¹⁰⁶ As observed by Flavio Felice and Massimiliano Vatiero, 'Ordo and European Competition Law' in Luca Fiorito, Scott Scheall, and Carlos Eduardo (eds), *Research in the History of Economic Thought and Methodology* vol 32 (Emerald Publishing Ltd 2014) 147, 156.

¹⁰⁷ TFEU art 102.

¹⁰⁸ European Commission, 'Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings' [2009] OJ C 45/02.

sizeable market shares but all of which enjoy the same transparency and reactionary mechanisms to maintain a tacitly supra-competitive status quo.

More broadly, however, second-wave ordoliberal thought has substituted competition as if for ‘competition as a discovery procedure’, as put forward by Hayek.¹⁰⁹ This approach reaffirms static efficiencies as inadequate, instead favouring longer term realisations of consumer welfare. This will likely involve a process of creative destruction:¹¹⁰ provided barriers to entry are not infeasibly high, algorithms’ development of dynamic prices will create market power, attracting innovative entrants who will erode incumbents’ market shares. In the medium-to-long term, consumers would benefit from the rational behaviour of economic parties in the free market as capacity expands and prices are lowered.

This does not solve the problem, but outlines that market structures are undeserving of an anti-competitive presumption.¹¹¹ Consequently, Article 101 should be mobilised where broader economic discovery suggests firms may be making supra-competitive profits by algorithmic means. The expansion of Article 101(1), however, is not disconnected from earlier conclusions rejecting the short-termism of state intervention. Whilst price-fixing is *per se* illegal in US antitrust law, irrespective of contextual factors, EU policy offers a defence within the bifurcated architecture of the TFEU, under Article 101(3).¹¹² This makes Article 101(1) inapplicable where an agreement or concertation ‘contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a

¹⁰⁹ Friedrich Hayek, ‘Competition as a Discovery Procedure (translated by Marcellus Snow)’ (2002) 5(3) *The Quarterly Journal of Austrian Economics* 9, 9.

¹¹⁰ Joseph Schumpeter, *Capitalism, Socialism and Democracy* (5th edn, Routledge 1994) 81–86.

¹¹¹ Kaplow (n 87).

¹¹² Commission, ‘Guidelines on the application of Article 81(3) of the Treaty’ [2004] OJ C 101/08.

fair share of the resulting benefit' without imposing restrictions on the firms which are not indispensable to these benefits and do not afford the 'possibility of eliminating competition in respect of a substantial part of the products in question'.¹¹³ Colombo therefore supports the expansion of this defence in line with broader enforcement powers, as this paper has already recognised the potential for pricing algorithms to realise the criteria of the defence through long-term price reductions, lower search costs, and by accounting for capacity constraints.¹¹⁴ This is objectively valuable to the DSM's facilitating digital services: offering the most pertinent legal landscape to publicly justifying the pro-competitive effects of algorithms whilst not, in the process, deterring their development and application. Price increases are not anti-competitive *per se*, but may indicate long-term dynamic effects benefitting consumer and commercial parties – maximising digital growth.

Regulation 1/2003 impedes this reform. Through its 'self-assessment' regime, firms bear the onus of ascertaining their own adherence to competition law.¹¹⁵ Bailey observes the consequent deficiency of Article 101(3), resulting in its infrequent, and negative, application.¹¹⁶ Scant guidance suggests that it establishes a presumption firmly against firms allegedly breaching Article 101(1),¹¹⁷ but whilst risk management is to be expected, it cannot substitute the positive application. Indeed, firms may actively inform the economic constitution and efficiencies by justifying their long-term position and market behaviour. Accordingly, Article 101(3) may expand the state's market comprehension, to be mobilised after Article 101(1) is invoked –

¹¹³ Treaty on the Functioning of the European Union, art 101(3).

¹¹⁴ Niccolò Colombo, 'Virtual Competition: Human Liability vis-à-vis Artificial Intelligence's Anticompetitive Behaviours' (2018) 2(1) European Competition and Regulatory Law Review 11, 18–20.

¹¹⁵ Council Regulation (EC) 1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty [2002] OJ L1/1, s 8.

¹¹⁶ David Bailey, 'Reinvigorating the Role of Article 101(3) under Regulation 1/2003' (2016) 81(1) Antitrust Law Journal 111, 130.

¹¹⁷ Commission (n 112).

necessitating Commission-published guidance to this effect.

4.5 The burden of proof and presumptions of innocence

Article 2 of Regulation 1/2003 outlines the burden of proof for Article 101(1) as resting upon the authority alleging the infringement, and that the undertaking(s) must then bear the burden of proving the defence is adequately fulfilled.¹¹⁸ In *MasterCard v Commission* the court held that there was not ‘an excessive burden of proof on the applicants by requiring empirical proof to be adduced’ *vis-à-vis* Article 101’s bifurcated architecture between clause (1) and (3).¹¹⁹ At first glance, this approach appears reasonable: undertakings may challenge authorities’ claims of an anti-competitive impact with pro-competitive, to neutral net-effect.¹²⁰ This is superficial, however. Jones and Suftrin observe the court’s wide deference towards authorities’ use of lighter, qualitative factors to discharge their burden,¹²¹ provided they are factually accurate and conclusions may be drawn,¹²² where firms must objectively quantify their defence.¹²³ Although the limbs of Article 101 are structurally balanced, therefore, they are substantively imbalanced. As the burden of proof funnels to firms only at second instance, it is inherently restrictive and imposes a presumption of guilt, in contravention of the *in dubio pro reo* principle.

¹¹⁸ Council Regulation (n 115) art 2.

¹¹⁹ Case T-111/08 *MasterCard and Others v European Commission* [2012] ECLI:EU:T 260 [40].

¹²⁰ *ibid* [85].

¹²¹ Such as consumer responses and documentary evidence, *viz* Case T-342/07 *Ryanair Holdings plc v European Commission* [2010] II-03457 [163].

¹²² Alison Jones and Brenda Suftrin, *EU Competition Law: Text, Cases, and Materials* (6th edn, OUP 2016) 251.

¹²³ Alfonso Lamadrid de Pablo, ‘The Double Duality of Two-sided Markets’ (Presentation at Pros and Cons Conference, Stockholm, 28 November 2014) <<https://chillingcompetition.com/2014/11/28/the-double-duality-of-two-sided-markets/>> accessed 28 April 2019, 12.

Although the Commission generally holds claims to a standard of proof on the balance of probabilities,¹²⁴ Article 101(1) requires ‘evidence to support the firm conviction’.¹²⁵ Consequently, competition policy seemingly errs towards a criminal standard, which accentuates the need for due process and for an assumption of innocence to apply to commercial parties. This supports Kaliniti’s proposal that the entire burden of proof rests upon competition authorities – leaving undertakings with only an evidential burden. Rationalised with ordoliberal proposals, the expanded definition of agreement would be tempered by an active and complimentary approach towards firms’ economic evidence within the framework of legal formalism – promoting a more cautious approach which eschews a funnelling relationship between Articles 101(1) and 101(3) and consequent over-enforcement.¹²⁶ This ensures an effective balance towards firms’ respective and long-term dynamic-pricing and, where this is doubted, scope for authorities to mobilise the economic constitution at risk of not discharging their burden.

5 Conclusion

Pricing algorithms do not necessitate vast swathes of reform in EU competition policy. Neither can they be left entirely unregulated for fear of consumer welfare being undermined. This paper has established that, in the case of explicit collusion, current policy has proven adequate at least to the extent that it is clearly captured by Article 101 TFEU – as demonstrated by the case of *Trod Ltd*. The broad definition of agreement may be transplanted with little confusion from the offline ‘smoke-filled room’ to online correspondence. It has demonstrated, even, that less direct communication such as ‘cheap talk’ enjoys

¹²⁴ This is not explicitly stated, though may be inferred from the ‘neutral’ net effect and there being no reason to suspect otherwise, *Napp Pharmaceuticals Holdings Ltd v Director General of Fair Trading* [2002] CAT 1 [112].

¹²⁵ Case T-67/00 *JFE Engineering v European Commission* [2004] II-02501 [57].

¹²⁶ Andriani Kalintiri, ‘The Allocation of the Legal Burden of Proof in Article 101 TFEU Cases: A ‘Clear’ Rule with Not-So-Clear Implications’ (2015) 34(1) *Yearbook of European Law* 232, 253.

stronger economic rationale for legal intervention as a concerted practice under current policy.

Nevertheless, Trod offers telling lessons. Although the technology failed to maintain the algorithmic cartel at times, such imperfections may be remedied in future. It was only due to parties' correspondence that the veil could be (partially) lifted on the ongoing collusion. As pricing algorithms facilitate increasing concertation in lieu of agreement, current policy may have difficulty in detecting and capturing cartels. This will require the European Commission to better define concerted practices as a classification in its own right, where it is presently dually classified with agreement at the expense of clarity. More significantly, however, the degree(s) of separation between human agents and the collusive effects of algorithms has demonstrated the inadequacy of the EU Fines Notice in disgorging the extent to which cartelists benefit. This risks a failure to deter algorithmic cartels and, in fact, incentivises cartels' higher supra-competitive equilibria. This paper therefore calls for a reformulation of the current approach. It proposes one which forensically audits cartelists' accounts to ascertain and disgorge supra-competitive profits, thereby ensuring certainty in the sanctions against them as an effective deterrent. Altogether, this suggests that algorithmic cartels are not so comfortably captured by current policy but sitting at its Rubicon – inviting policymakers' attention to tackle future instances of explicit collusion.

The most precipitous issue presented within this paper, however, is the ability of algorithms to promote tacit collusion as a rational business decision. Emulating the oligopoly problem, they risk expanding it from markets of just a few competitors to those of many. The literature reveals no remedial consensus, as proposals are torn between biases on market structure and efficiency and, more intolerably, consumer welfare at the expense of proper economic consideration. These proposals fail to account for the distinction between algorithms' pro- and anti-competitive effects, which are behavioural in nature. Consequently, this paper proposes removing these issues from the

equation. By dismissing ‘welfare first’ economics as undesirably short term, it promotes an ordoliberal approach to escape the impasse. This approach would maintain and protect healthy competition for the sake of competition: framing firms’ conduct within an economic constitution at first instance, but protecting consumer welfare as a consequence at second instance.

An ordoliberal approach must be implemented predictably and judiciously. As the TFEU is a product of early ordoliberal sentiment in the EU, however, the groundwork already exists in current policy. Consequently, a proper economic constitution must afford competition authorities broader powers to capture perceived anti-competitive behaviour by expanding the breadth of Article 101(1). To differentiate the pro- and anti-competitive impacts of algorithms, however, Article 101(3) must be reconceptualised as a viable defence to Article 101(1) to justify long-term market behaviour and rational economic decisions with pro-competitive effects. As a result, whilst competition authorities must retain their ability to bring initial claims, they should bear the onus of the entire burden of proof to ensure that firms are not subject to presumptions against them for rational conduct within the free market. To this end, a cautious but complementary approach balancing authorities’ shorter term concerns with firms’ long-term efficiencies may be produced: curtailing over-enforcement, maintaining the presumption of innocence, and not rewarding wanton interventionism by the state.