
RETHINKING THE IDEA OF ‘AGREEMENT’ IN SECTION 3 OF THE COMPETITION ACT FOR AN AGE OF PRICING ALGORITHMS

Ayush Agrawal, Adarsh Sahu & Ankul Prajapati,
National Law Institute University, Bhopal

ABSTRACT

This article asks one narrow question. Has the concept of ‘agreement’ that has anchored Section 3 of the Competition Act, 2002 for two decades built on proof of a communicated meeting of minds between economically independent actors remained adequate now that firms can converge on supra-competitive prices through pricing algorithms and platform architecture, without any human ever communicating an intention to collude? The answer defended here is that it has not. The Competition (Amendment) Act, 2023’s codification of hub-and-spoke liability is a necessary and well-designed response to the evidentiary gap exposed in *Samir Agarwal v Competition Commission of India*, but it resolves only one of at least four analytically distinct forms of algorithmically mediated coordination identified in the comparative literature on this subject. It leaves the hardest case autonomous convergence produced by self-learning pricing systems, absent identifiable human facilitation or intent entirely outside the reach of a doctrine still organised around the discovery of a communicated understanding. Building on Ariel Ezrachi and Maurice Stucke’s four-model taxonomy of algorithmic coordination, on the reasoning of the Court of Justice of the European Union in *Eturas*, on the first American criminal prosecution for algorithmic price-fixing, and on India’s own 2023 reforms and its still-pending Digital Competition Bill, this article argues that the correct legislative response lies neither in wholesale transplantation of the European Union’s *ex ante* gatekeeper model nor in continued reliance on *ad hoc* adjudication under an unmodified Section 3, but in a calibrated, rebuttable structural presumption aimed specifically at algorithmically mediated parallel conduct, joined to the institutional capacity to detect and audit it.

I. INTRODUCTION: ALGORITHMIC COORDINATION AND SECTION 3

Competition law exists because markets left to themselves do not reliably produce competitive outcomes. Firms that could compete on price, quality or innovation may instead find it profitable to coordinate, with the resulting harm borne by consumers and more efficient rivals. Section 3 of the Competition Act, 2002 operationalises India's response to this problem by prohibiting agreements that cause or are likely to cause an 'appreciable adverse effect on competition' (AAEC) within India and declaring such agreements void.

A conventional treatment of this subject would survey the horizontal–vertical distinction, the operation of the per se and rule-of-reason approaches, the reforms introduced by the Competition (Amendment) Act, 2023, and recent judicial developments before turning to algorithmic collusion as an emerging concern. This article takes a narrower approach. It examines whether the post-2023 framework of Section 3 is capable of addressing coordination facilitated or produced by pricing algorithms, particularly where competitive harm occurs without conventional communication between competitors or a readily provable meeting of minds.

The question has acquired particular significance following the Supreme Court's decision in *Samir Agarwal v. Competition Commission of India*, the subsequent insertion of an Explanation to Section 3(3) by the 2023 amendment, and the growing international experience with algorithmic pricing. The amendment addresses an important form of coordination involving an intermediary that facilitates communication or coordination between competitors. It does not, however, answer the more difficult question of whether liability can arise where coordination is produced by the independent operation of algorithms rather than by an identifiable human intermediary or express agreement.

This distinction is central to the analysis. Algorithmic coordination may take different forms, ranging from algorithms that merely communicate or implement an existing human agreement to systems capable of adapting their pricing behaviour without direct instructions to coordinate. The legal difficulty increases as the role of human communication and intention recedes. Section 3 is fundamentally structured around the existence of an 'agreement', and the question therefore is whether a doctrine developed principally to identify human coordination can accommodate coordinated outcomes generated through increasingly autonomous computational systems.

The article argues that the 2023 amendment closes a specific gap exposed by *Samir Agarwal*, but does not resolve the broader problem posed by algorithmic coordination. The analysis therefore focuses on the relationship between the statutory requirement of an agreement, the economics of algorithmic pricing, the doctrine of conscious parallelism, and the limits revealed by comparative experience under Article 101 TFEU and the Sherman Act. It also considers whether the institutional reforms introduced in 2023 can meaningfully assist enforcement where the underlying doctrinal basis for liability remains uncertain. The article ultimately examines whether a more specific legislative response is required to address algorithmically mediated parallel conduct without converting independent competitive behaviour into an infringement of Section 3.

II. THE AGREEMENT REQUIREMENT AND THE ARCHITECTURE OF SECTION 3

Section 2(b) of the Competition Act defines ‘agreement’ with conspicuous breadth, including any arrangement, understanding, or action in concert, whether or not formal, in writing, or intended to be legally enforceable.¹ Parliament’s decision to extend liability to informal ‘action in concert’ reflects an informed judgment, shared with the Sherman Act and Article 101 TFEU, that authorities cannot be made to prove a signed contract before acting; it suffices to show a meeting of minds, however informally reached. Section 3(1) casts the prohibition over an unusually wide set of parties – enterprises, associations of enterprises, persons, and combinations thereof – precisely to prevent evasion through corporate or associational structuring.²

The statute then bifurcates its treatment of agreements along a single architectural axis. Section 3(3) targets agreements between competitors, treated as anti-competitive per se once their existence and object are shown, drawing on the logic of *Addyston Pipe & Steel Co v United States*, where the vice was found to lie in the elimination of independent price-setting itself rather than in the reasonableness of any particular price.³ Section 3(4) targets agreements between parties at different levels of the supply chain, subjected instead to the rule of reason articulated in *Standard Oil Co of New Jersey v United States*⁴ and refined in *Board of Trade of*

¹Competition Act 2002, s 2(b).

²Competition Act 2002, s 3(1)–(2).

³*Addyston Pipe & Steel Co v United States* 175 US 211 (1899).

⁴*Standard Oil Co of New Jersey v United States* 221 US 1 (1911).

the City of Chicago v United States,⁵ which asks whether a restraint merely regulates, and perhaps thereby promotes, competition, or whether it suppresses competition altogether. The Supreme Court's own early application of this logic to vertical restraints, in *Tata Engineering and Locomotive Co Ltd v Registrar of Restrictive Trade Agreements*, upheld an exclusive dealership precisely because genuine inter-brand competition persisted and the arrangement plausibly served consumers through reliable servicing and warranty support⁶ an early illustration of the now-standard distinction between tolerable intra-brand restraints and genuinely foreclosive inter-brand restraints that continues to organise vertical-restraint analysis today. The Commission's own guidance in *Automobile Dealers Association v Global Automobiles Ltd* confirms that the Section 19(3) weighing exercise this framework requires is not mechanical but proceeds along lines of commercial prudence appropriate to the facts of each case.⁷ That weighing exercise is itself statutorily enumerated, requiring the Commission to have due regard to factors ranging from the creation of barriers to new entrants to the accrual of benefits to consumers.⁸

This architecture is doctrinally coherent, and this article does not propose to disturb it for conventional cartel and vertical-restraint conduct; its coherence is precisely why Parts IX and X treat institutional refinements to that architecture as instrumental rather than central. What matters for present purposes is a structural feature common to both limbs of Section 3: each presupposes that an identifiable act of communication, or at minimum a demonstrable intention to coordinate conduct with another economic actor, has occurred.

The per se rule dispenses with proof of actual market effect, but it does not dispense with proof of an agreement; the rule of reason widens the inquiry into effects, but again only once an agreement is shown. Both limbs, in other words, are built to answer the question 'did these parties communicate an intention to restrain competition?' and to move from that answer to a judgment about legality. Neither limb was built to answer a logically prior question that pricing algorithms now force upon the law: what happens when convergent, supra-competitive conduct occurs without any communicated intention at all? Part III shows how this prior question first surfaced, unresolved, in Indian law.

⁵Board of Trade of the City of Chicago v United States 246 US 231 (1918).

⁶Tata Engineering and Locomotive Co Ltd v Registrar of Restrictive Trade Agreements (1977) 2 SCR 685 (SC).

⁷Automobile Dealers Association v Global Automobiles Ltd (CCI, 2011).

⁸Competition Act 2002, s 19(3).

III. SAMIR AGARWAL AND THE HUB-AND-SPOKE GAP

In *Samir Agarwal v Competition Commission of India*, the Supreme Court considered, and rejected on the facts, an allegation that the ride-hailing platforms Ola and Uber operated as a ‘hub’ facilitating price coordination among their independent driver-partners.⁹ The Court held that the mere use of a common pricing algorithm by independent drivers did not, without more, establish the meeting of minds necessary to prove an agreement: there was no evidence that the platforms had colluded with each other, or that drivers had colluded amongst themselves through the platform architecture, since drivers competed with each other for rides and each platform’s algorithm merely matched supply to demand independently.

The reasoning is defensible as a matter of first principle, and this article does not join the chorus of commentary that treated the outcome as simply wrong. Parallel conduct several independent actors reaching the same outcome through the same shared conditions has never, in any mature antitrust system, been sufficient by itself to prove concerted action. The American doctrine of conscious parallelism, discussed further in Part VII, was developed precisely to prevent liability from attaching to independently rational responses to a shared market structure, most famously in *Theatre Enterprises, Inc v Paramount Film Distributing Corp*, where the Supreme Court held that business behaviour is admissible circumstantial evidence from which agreement may be inferred, but that such behaviour, without more, does not itself constitute a violation.¹⁰

The same caution appears earlier still in *American Tobacco Co v United States*, where the Court accepted that a conspiracy may be established by circumstantial evidence of parallel conduct only where that conduct cannot plausibly be explained except by concert.¹¹ What *Samir Agarwal* exposed was not an error in that principle but a structural limitation in how Indian law operationalised it: Section 3(3), as it then stood, could reach a hub only by treating the hub as a party to a horizontal agreement among competitors, and a platform is definitionally not a competitor of the drivers who use it. A sophisticated hub-and-spoke arrangement, in which competing spokes never communicate with one another but each independently agrees to abide by terms set by a common intermediary, could therefore escape liability altogether not because no coordination occurred, but because the statute lacked a vocabulary for describing the hub’s

⁹Samir Agarwal v Competition Commission of India, Civil Appeal No 3100 of 2020 (SC, 15 December 2020).

¹⁰Theatre Enterprises, Inc v Paramount Film Distributing Corp 346 US 537 (1954).

¹¹American Tobacco Co v United States 328 US 781 (1946).

role.

The comparative law available to Indian courts and the Commission at the time already supplied that vocabulary, and had supplied it for the better part of a century. American courts recognised as early as *Interstate Circuit, Inc v United States* that a hub-and-spoke conspiracy could be inferred where a distributor circulated identical demands to competing exhibitors, each of whom knew the others had received the same demand and each of whom nonetheless complied, without any exhibitor ever communicating with another.¹² The Seventh Circuit's more recent decision in *In re Text Messaging Antitrust Litigation*, written by Posner J, restated the same 'rimless wheel' or 'hub-and-spoke' theory for the algorithmic age, holding that a horizontal agreement among the spokes, even if mediated entirely through the hub, could be inferred from the totality of circumstantial evidence without proof of any spoke-to-spoke communication.¹³

Under Article 101 TFEU, the Court of Justice reached a structurally similar result in *Dyestuffs*, treating a concerted practice as a form of coordination falling short of a formal agreement but nonetheless knowingly substituting practical cooperation for the risks of competition.¹⁴ India's 2023 legislative response, examined next, imports this vocabulary into Section 3(3) but only this vocabulary, and it is important to be precise about the limits of what that vocabulary can do.

IV. THE 2023 AMENDMENT AND THE LIMITS OF HUB-AND-SPOKE LIABILITY

The Competition (Amendment) Act, 2023 inserts an Explanation to Section 3(3) providing that an enterprise, though not engaged in identical or similar trade with the other parties to an agreement, shall be presumed to have participated in that agreement if it 'participates or intends to participate' in the furtherance of the agreement.¹⁵ This reform traces directly to the recommendations of the Ministry of Corporate Affairs' own Competition Law Review Committee, which had identified the hub-and-spoke gap as a priority area for legislative attention well before *Samir Agarwal* was decided.¹⁶ A hub a platform, a common vendor, or a trade association secretariat that facilitates coordination among competing spokes can now be pursued under Section 3(3) even though it is not itself a competitor of those spokes, provided

¹²*Interstate Circuit, Inc v United States* 306 US 208 (1939).

¹³*In re Text Messaging Antitrust Litigation* 630 F3d 622 (7th Cir 2010).

¹⁴*Case 48/69 Imperial Chemical Industries Ltd v Commission (Dyestuffs)* [1972] ECR 619.

¹⁵Competition (Amendment) Act 2023, s 4, inserting Explanation to Competition Act 2002, s 3(3).

¹⁶Ministry of Corporate Affairs, Report of the Competition Law Review Committee (2019).

the Commission can establish active participation or intention to participate in furthering the anti-competitive object.

This is, on its own terms, a well-targeted reform, and this article endorses it without reservation as far as it goes. But it is essential to be precise about what it targets. The Explanation does not dispense with the requirement of an underlying agreement or concerted practice among the spokes; it clarifies only that the hub itself may be joined as a party to that agreement. It therefore solves exactly the problem that *Samir Agarwal* presented: a case in which coordination is real, but the statute's competitor-to-competitor framing prevented the facilitating intermediary from being captured. It does nothing at all for a materially different, and arguably harder, problem: coordination that requires no facilitating intermediary because it is produced directly by the independent, non-communicating adoption of self-learning pricing technologies by competitors who have no relationship with one another beyond operating in the same market.

In that scenario there is no hub to prosecute, because no single actor's algorithm sits between the competitors; there is no spoke-to-spoke communication to infer, because the convergence arises from each firm's algorithm independently learning, through repeated interaction with rivals' pricing signals, that a supra-competitive equilibrium is more profitable than continued price competition. The 2023 amendment's own drafting choice retaining 'participates or intends to participate' as the operative standard confirms that Parliament addressed the facilitation problem and not the attribution problem that arises in the absence of any facilitator at all.

This is not a criticism of the drafting; a legislature responding to a specific judicially identified gap should be expected to close precisely that gap, and commentators are right to caution that the Commission will still need to demonstrate, on the facts, that a hub's role went beyond independently rational business conduct into active facilitation of a common unlawful design. But a research paper on anti-competitive agreements that treats the 2023 amendment as having 'addressed' algorithmic collusion, rather than having addressed one of at least four distinct species of it, mistakes a partial solution for a complete one. Part V sets out the full taxonomy that this article's central claim requires.

V. THE FOUR MODELS OF ALGORITHMIC COORDINATION AND SECTION 3

The most analytically rigorous taxonomy of algorithmic coordination in the comparative literature is Ariel Ezrachi and Maurice Stucke's four-model framework, developed in *Virtual*

Competition: The Promise and Perils of the Algorithm-Driven Economy and subsequently adopted, with variation, by the United Kingdom's Competition and Markets Authority in its 2018 economic working paper on pricing algorithms and by the OECD in its 2017 report on algorithms and collusion.¹⁷ The four models are worth setting out precisely, because Indian scholarship on this subject has tended to compress them into three, a compression that obscures exactly the doctrinal gap this article identifies.

A. The Messenger.

In the messenger scenario, competitors reach a conventional human agreement to fix prices and then use an algorithm purely as the mechanism of implementation and enforcement, to detect deviation and coordinate responsive price changes at a speed no human could match. This is, doctrinally, the easiest case: the algorithm is evidence of a cartel, not a substitute for one, and liability follows from the underlying human agreement in the ordinary way.

The paradigmatic illustration is *United States v Topkins*, the first criminal prosecution brought by the United States Department of Justice's Antitrust Division specifically targeting e-commerce conduct: David Topkins and competing sellers of posters on Amazon Marketplace engaged in direct human discussions to fix prices and then implemented that agreement by adopting a common pricing algorithm designed to detect and match a designated competitor's price.¹⁸ No novel doctrine was required to convict Topkins under Section 1 of the Sherman Act; the algorithm was simply the instrument of a conventional price-fixing conspiracy. Indian law requires nothing new for this scenario either: Section 3(3)(a), read with Section 2(b)'s broad definition of agreement, captures it directly,¹⁹ and the Commission's own market study of e-commerce in India already treats algorithmic price parity and most-favoured-nation clauses as practices warranting close scrutiny for precisely this reason.²⁰

B. The Hub-and-Spoke.

In the hub-and-spoke scenario, competing spokes never communicate directly with one another

¹⁷A Ezrachi and M E Stucke, *Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy* (Harvard University Press 2016); Competition and Markets Authority, *Pricing Algorithms: Economic Working Paper on the Use of Algorithms to Facilitate Collusion and Personalised Pricing* (CMA94, 8 October 2018); OECD, *Algorithms and Collusion: Competition Policy in the Digital Age* (2017).

¹⁸*United States v David Topkins*, No 3:15-cr-00201-WHO (ND Cal, criminal information filed 6 April 2015; guilty plea 30 April 2015).

¹⁹Competition Act 2002, s 3(3)(a).

²⁰Competition Commission of India, *Market Study on E-commerce in India: Key Findings and Observations* (8 January 2020).

but each independently relies on a common intermediary – a shared algorithm provider, a platform, or a data aggregator – whose design or operation facilitates parallel pricing outcomes across the spokes. The Court of Justice’s judgment in *Eturas* remains the leading illustration: a common online travel-booking system used by numerous Lithuanian travel agencies imposed a technical cap on the discounts agencies could offer, and the Lithuanian competition authority found that the agencies had engaged in a concerted practice under Article 101 TFEU by not opposing the cap once it was communicated through the system, since their continued use of the system without objection amounted to tacit assent.²¹ The Court of Justice held that mere participation in such a system does not itself establish a concerted practice; what must be shown, through objective and consistent evidence, is that participants actually knew of the restriction and tacitly acquiesced in it, and it warned against a presumption that dispatch of a system message, by itself, proves such knowledge given the presumption of innocence.

Eturas is therefore doctrinally significant for a reason distinct from its facts: it shows a mature comparative jurisdiction reasoning its way toward a rebuttable evidentiary presumption participation in a common system that transmits a restrictive signal shifts an evidentiary burden onto the participant to show independent, non-acquiescent conduct – as the appropriate tool for hub-and-spoke liability, rather than either abandoning the concerted-practice requirement altogether or requiring conventional proof of bilateral communication.

India’s 2023 amendment achieves a structurally similar, though not identical, result through its Explanation to Section 3(3), and the CMA’s 2018 working paper confirms that a third-party algorithm provider may function as precisely this kind of ‘unwitting hub’ even without any anti-competitive intent on the provider’s own part, a possibility the ‘participates or intends to participate’ language of the Indian amendment may not fully capture and to which this article returns in Part XII.²²

C. The Predictable Agent.

In the predictable agent scenario, each competitor independently adopts its own algorithm, and there is no common hub, but each algorithm is designed to react predictably and continuously to observable changes in rivals’ prices – for example, an algorithm instructed to match or slightly

²¹*Eturas UAB and others v Lietuvos Respublikos konkurencijos taryba*, Case C-74/14, EU:C:2016:42, judgment of 21 January 2016.

²²Competition and Markets Authority (n 18).

undercut the lowest visible competing price in real time. No single firm's algorithm is unlawful in isolation, and no communication of any kind occurs between competitors, yet the market-wide effect of several such algorithms operating simultaneously in a transparent, oligopolistic market is to remove the incentive to deviate that ordinarily disciplines tacit coordination, because any price cut is matched within seconds, eliminating its competitive benefit before it can attract custom.

This scenario sits at the outer edge of what conventional 'agreement' analysis, even as expanded by hub-and-spoke doctrine, can reach, because the coordination-facilitating design choice belongs to each firm individually and is not shared or communicated. The CMA's working paper treats this as a genuine, if presently marginal, risk factor, and the OECD's 2017 report similarly identifies real-time algorithmic price-matching as a mechanism that can stabilise tacit collusion in already-concentrated markets without any additional element of human coordination beyond the initial, independent, and individually lawful decision to deploy such an algorithm.²³

D. The Autonomous Machine.

In the fourth and hardest scenario, competing firms deploy self-learning algorithm systems that are not programmed with an explicit rule such as 'match the lowest price' but instead learn, through repeated interaction with the market and with each other's pricing behaviour, which pricing strategy maximises long-run profit. Reinforcement-learning research on this problem has shown that such algorithms can converge on supra-competitive, tacitly collusive pricing strategies purely through repeated interaction, without having been instructed to collude, without communicating with one another in any sense a human observer would recognise as communication, and in some cases without their human operators being able to explain, after the fact, precisely why the algorithm settled on the strategy it did.²⁴

In such cases the requirement of an 'agreement', however broadly defined, finds no natural foothold at all: there is no messenger, because no human negotiated anything; there is no hub, because no common intermediary facilitated anything; and there is no predictable, individually chosen reactive rule that a regulator could point to as the proximate cause of the coordinated outcome, because the strategy itself was learned rather than designed. It is this scenario, not

²³Competition and Markets Authority (n 18); OECD (n 18).

²⁴Ezrachi and Stucke (n 18).

algorithmic collusion generically, that constitutes the genuine doctrinal frontier, and it is this scenario that neither Section 3 as originally enacted, nor the 2023 amendment, nor equivalent provisions of the Sherman Act or Article 101 TFEU, presently resolves.

The analytical value of disaggregating these four models, rather than treating ‘algorithmic collusion’ as a single undifferentiated concern, is that it shows precisely how much of the problem India’s 2023 reform actually solves. The messenger scenario required no reform and had none directed at it because none was needed. The hub-and-spoke scenario is the one the 2023 amendment was designed for, and it does its job. The predictable-agent scenario sits in genuinely contested territory, arguably reachable through an expansive reading of ‘concerted practice’ if a court is prepared to treat the individual, unilateral choice to deploy a price-matching algorithm as itself evidence of an intention to facilitate parallelism a question no Indian tribunal has yet had occasion to decide.

The autonomous-machine scenario is not readily accommodated within any plausible reading of the current statute. The difficulty is more fundamental than a drafting deficiency capable of being addressed through an amendment modelled on the 2023 reform. It arises from the conceptual limits of organising liability around the existence of an ‘agreement’. Before examining that problem further, however, it is necessary to consider a prior question that doctrinal discussions often overlook: why do only some markets create conditions in which algorithmic coordination is capable of emerging?

VI. THE STRUCTURAL CONDITIONS OF ALGORITHMIC COORDINATION

A structural presumption of the kind this article ultimately proposes cannot be built on the observation that algorithms exist; it must be built on an understanding of when algorithmic pricing is actually capable of sustaining supra-competitive outcomes, because algorithms deployed in the wrong market structure pose no coordination risk at all and a doctrine indifferent to that distinction would chill ordinary, welfare-enhancing dynamic pricing along with the conduct it is meant to catch. The economic literature on tacit collusion, on which both the CMA’s working paper and the OECD’s report draw heavily, identifies three structural conditions that recur across both the pre-algorithmic and algorithmic accounts of coordinated pricing: concentration, transparency, and homogeneity.²⁵

²⁵Competition and Markets Authority (n 18); OECD (n 18).

Concentration matters because tacit coordination, whether reached by human judgment or by machine learning, requires that each participant's deviation be individually detectable and individually worth punishing; in a fragmented market with dozens of competitors, no single firm's algorithm can plausibly track, and no single firm's retaliation can plausibly discipline, the pricing behaviour of every rival, so the coordination simply dissolves into noise.

Transparency matters because an algorithm, whether predictable-agent or autonomous-machine, can only respond to a rival's price if that price is observable in something close to real time; the same platforms and comparison tools that benefit consumers by lowering search costs also lower the cost of algorithmic monitoring, which is precisely why the OECD's report treats price-comparison infrastructure as a double-edged sword rather than an unambiguous good.²⁶

Homogeneity matters because coordination is far easier to sustain over a single, easily compared price than over a bundle of differentiated attributes where a rival's apparent discount might simply reflect a difference in quality, service or specification that the coordinating firms cannot verify.

The significance of isolating these three conditions is doctrinal, not merely descriptive: they supply the objective, verifiable, and litigable factual predicate on which a structural presumption can safely rest, precisely because they are the same conditions economists already use to distinguish genuine tacit coordination from ordinary oligopolistic rivalry, and because they are conditions a market either exhibits or does not, independent of anyone's state of mind.

A presumption keyed to these conditions therefore avoids two opposite failure modes that a cruder rule would risk. It would not sweep in every firm that uses dynamic pricing software in a competitive, fragmented, or highly differentiated market, where algorithmic pricing merely performs functions that human pricing managers have long performed. At the same time, it would not require the Commission to wait for direct evidence of algorithmic intent before intervening evidence that may be difficult, and in some cases impossible, to establish where pricing decisions are generated through increasingly autonomous systems. The relevant structural conditions would instead provide the basis for intervention while preserving

²⁶OECD (n 18).

sufficient safeguards against treating ordinary algorithmic pricing as anti-competitive conduct.

VII. CONSCIOUS PARALLELISM AND AUTONOMOUS ALGORITHMIC COORDINATION

American antitrust law has, since at least *Theatre Enterprises*, drawn a sharp line between unlawful concerted action and lawful conscious parallelism: independent firms that observe each other's prices and rationally respond to them are not colluding merely because their responses produce a common, and even supra-competitive, outcome, because oligopolistic interdependence each firm's rational recognition that its pricing decisions will affect and be affected by its rivals' decisions is a lawful, indeed unavoidable, feature of concentrated markets.²⁷

The Court of Justice reached a structurally comparable position in *Woodpulp II*, holding that parallel conduct cannot by itself be regarded as furnishing proof of concertation unless concertation constitutes the only plausible explanation for it, since an oligopolistic market may independently generate parallel pricing simply because each undertaking rationally adapts to the conduct of its competitors.²⁸ Indian law has imported this same logic, requiring proof of a meeting of minds precisely so that liability does not attach to independently rational conduct that merely happens to look coordinated from the outside. This is a sound and necessary limiting principle: without it, competition authorities could condemn the very outcome firms responding rationally to publicly observable market signals that a competitive market is supposed to produce.

The difficulty autonomous machine convergence presents is that it does not fit comfortably on either side of this line. It is unlike classic conscious parallelism because the mechanism producing the convergence is not each firm independently exercising commercial judgment in response to public price signals; it is each firm's algorithm running millions of simulated interactions and learning, through a process no human directly supervises, that sustained higher pricing is more profitable than competing on price a process that more closely resembles tacit coordination through repeated interaction than it does an isolated, independent business judgment. Yet it is equally unlike classic concerted action because there is no communicated

²⁷Theatre Enterprises (n 11).

²⁸Joined Cases C-89/85, C-104/85, C-114/85, C-116/85, C-117/85 and C-125/85 to C-129/85, *Ahlström Osakeyhtiö v Commission (Woodpulp II)* [1993] ECR I-1307.

understanding of any kind for a tribunal to infer, however circumstantially: the closest analogue is not a phone call or a trade-association meeting but two competing chess engines that, through self-play, independently discover the same optimal strategy without either having been told what the other was doing.

The Court of Justice's own test in *T-Mobile Netherlands*, that a concerted practice requires the elimination of uncertainty as to a competitor's future conduct through direct or indirect contact, presupposes exactly the kind of contact that autonomous convergence dispenses with entirely.²⁹ Terrell McSweeney and Brian O'Dea, writing on this question from within the United States Federal Trade Commission, have observed that existing antitrust concepts 'presuppose quintessentially human mental states' and 'may prove less useful in dealing with computer software and hardware' a description this article adopts as an accurate diagnosis rather than a resolution, since diagnosing the inadequacy of the 'agreement' concept is not the same as supplying its replacement.³⁰

Two competing responses to this diagnosis exist in the international literature, and Indian law must choose, deliberately, between them rather than allow the choice to be made by default through inaction.

The first, which this article terms the design-liability response, would hold that a firm which deploys a self-learning pricing algorithm in a market structurally conducive to tacit collusion concentrated, transparent, with relatively homogeneous products has made a unilateral business decision for which it bears responsibility if that decision foreseeably produces coordinated outcomes, regardless of whether it intended, or could have predicted with precision, the specific strategy the algorithm would learn. Ezrachi and Stucke themselves have pressed a version of this view, arguing that the difficulty of attributing intent to a learning algorithm should not itself immunise the firm that chose to deploy it in a vulnerable market.³¹

On this view, the relevant 'agreement' is not between the competing firms but is constituted by each firm's decision to accept the risk of algorithmically mediated coordination as a

²⁹Case C-8/08 *T-Mobile Netherlands BV v Raad van Bestuur van de Nederlandse Mededingingsautoriteit* [2009] ECR I-4529.

³⁰T McSweeney and B O'Dea, 'The Implications of Algorithmic Pricing for Coordinated Effects Analysis and Price Discrimination Markets in Antitrust Enforcement' (2017) 32(1) *American Bar Association Antitrust* 75.

³¹A Ezrachi and M E Stucke, 'Artificial Intelligence & Collusion: When Computers Inhibit Competition' (2017) *University of Illinois Law Review* 1775.

foreseeable consequence of the technology it chose to deploy a theory with some resonance in the Department of Justice's stated post-*Topkins* position that intermediaries and firms alike bear responsibility for algorithmic pricing conduct, but one that stretches the concept of 'agreement' considerably further than any existing Indian or comparative authority has yet sanctioned.

The second, which this article terms the structural-presumption response, and which this article ultimately endorses, does not attempt to relabel autonomous convergence as a species of agreement at all. It instead treats demonstrated algorithmically mediated parallel conduct in a market with specified structural characteristics as a distinct, statutorily defined basis for a rebuttable finding of AAEC, shifting the evidentiary burden onto the firms to establish an independent business justification, without requiring the Commission to first characterise the conduct as an 'agreement' in the Section 2(b) sense at all. This approach mirrors, without duplicating, the evidentiary logic the Court of Justice developed in *Eturas* for the hub-and-spoke scenario.

VIII. COMPARATIVE LESSONS FOR INDIAN COMPETITION LAW

A useful comparative analysis must do more than catalogue how different jurisdictions have approached algorithmic coordination. The more important question is which elements of those approaches can be adapted to the Indian framework, which rest on institutional premises that do not readily translate, and which require modification before they can address the particular difficulties created by algorithmic pricing.

The most useful doctrinal contribution comes from the Court of Justice of the European Union's decision in *Eturas*. The Court did not dispense with the requirement of concerted conduct, but neither did it insist upon conventional proof of bilateral communication between every undertaking involved in the coordination. Where undertakings participated in a common system through which a restrictive signal was communicated, and the surrounding circumstances provided objective and consistent indications of their awareness of that signal, the evidentiary burden could shift to the undertaking to demonstrate that it had not acquiesced in the restriction or had taken steps to distance itself from it.³² The significance of *Eturas* lies in this intermediate approach. It preserves the requirement of coordination while recognising

³² *Eturas* (n 21).

that the evidentiary manifestations of coordination may differ where a common technological system mediates the conduct. A similar rebuttable evidentiary presumption could have considerable value in India, particularly where structural and technological circumstances provide reliable evidence of participation in a system capable of facilitating coordinated conduct.

The Digital Markets Act presents a different proposition. Its *ex ante* regime is directed principally at designated gatekeepers and imposes specified obligations before an infringement of competition law has to be established in an individual case.³³ The approach reflects the European Union's assessment that certain forms of entrenched digital market power may be sufficiently persistent to justify regulation in advance rather than relying exclusively upon conventional *ex post* enforcement.³⁴ That regulatory logic should not, however, be transplanted wholesale into the law governing algorithmic coordination between competing firms. The autonomous use of pricing algorithms by several competitors does not necessarily involve a gatekeeper, a dominant platform, or the type of structural power that the DMA is designed to regulate. A group of competitors operating in a concentrated market may therefore fall outside a gatekeeper-based regime even though their simultaneous reliance on adaptive pricing systems creates a genuine risk of coordinated outcomes.

India's own emerging digital competition framework illustrates why the distinction matters. The Committee on Digital Competition Law recognised the need for an *ex ante* framework for certain systemically important digital enterprises, while also proposing thresholds and India-specific criteria for identifying the enterprises to which such obligations would apply.³⁵ That approach may be relevant to platform conduct and entrenched digital market power, but it does not by itself resolve the narrower problem of algorithmic coordination among competing firms. For that problem, market-level characteristics such as concentration, transparency of pricing information, product homogeneity and the frequency with which competitors interact may be more relevant than the size or designation of any individual undertaking. The regulatory response should therefore distinguish between the problems of gatekeeper power and algorithmically facilitated coordination rather than treating them as manifestations of the same

³³ Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector (Digital Markets Act) [2022] OJ L265/1.

³⁴ European Commission, Competition Policy for the Digital Era (Report of the Special Advisers Cr  mer, de Montjoye and Schweitzer, 2019).

³⁵ Ministry of Corporate Affairs, Report of the Committee on Digital Competition Law (27 February 2024).

form of market failure.

The United States offers a different lesson. American enforcement has largely retained the traditional requirement of proving an agreement between competitors. The prosecution of algorithmic pricing in *United States v Topkins* is illustrative: the algorithm was used to implement an arrangement that had already been reached through human communication. The technology altered the means through which the agreement was carried out, but did not itself supply the agreement.³⁶ This experience demonstrates both the adaptability and the limitation of traditional antitrust doctrine. Existing rules can readily accommodate the use of algorithms as instruments for implementing conventional cartel arrangements. They provide considerably less assistance where the alleged coordination arises from the independent operation of algorithms without evidence of prior human communication.

The appropriate lesson for India is therefore not to replicate either model in its entirety. *Eturas* demonstrates how evidentiary doctrine can respond to technological intermediation without abandoning the underlying requirement of coordinated conduct. The DMA demonstrates the distinct utility of ex ante regulation where the concern is entrenched platform power, but its gatekeeper-based architecture is not naturally suited to autonomous coordination among competing firms. American enforcement, meanwhile, shows that traditional agreement doctrine remains effective where algorithms implement an existing human arrangement, while leaving unresolved the more difficult case in which coordination emerges from the interaction of independently deployed systems.

These distinctions are important because the legal problem presented by algorithmic coordination is not simply one of choosing between European and American models. It is one of determining how far the existing concept of agreement can reasonably extend before the law begins to regulate coordinated outcomes without a sufficient basis for attributing coordination to the firms concerned. Any Indian reform must therefore preserve the distinction between legitimate independent use of pricing technology and conduct in which technological systems materially contribute to the suppression of competitive independence.

³⁶ Statement of Richard A Powers, Deputy Assistant Attorney General, Antitrust Division, US Department of Justice (2020).

IX. INSTITUTIONAL REFORMS AND ALGORITHMIC ENFORCEMENT

The Competition (Amendment) Act, 2023 introduced three further reforms beyond hub-and-spoke liability: a settlement and commitment mechanism under new Sections 48A and 48B; a ‘leniency plus’ regime under revised Lesser Penalty Regulations; and structured penalty guidelines under a new Section 64-B.³⁷ Each is treated here only insofar as it bears on the central question, and no further, because none of the three alters the doctrinal reach of Section 3 itself.

The settlement and commitment mechanism has limited relevance to algorithmic coordination because Parliament has excluded Section 3(3) horizontal agreements from its scope, while permitting it for Section 3(4) vertical restraints and Section 4 abuse of dominance. Algorithmic coordination under Section 3(3) must therefore ordinarily be established through contested proceedings. This places greater importance on the Commission’s ability to obtain and interpret technical evidence capable of demonstrating coordination and attributing it to the undertakings concerned.

The leniency plus regime is instrumentally significant because algorithmic cartels of the messenger type are, almost by definition, detected principally through insider disclosure rather than through observable market conduct, since the algorithm itself conceals rather than reveals the underlying human agreement to a third-party observer; a regime that rewards a leniency applicant already inside the process for disclosing an entirely separate, undetected cartel therefore has particular value in surfacing algorithmically implemented cartels that conventional market surveillance would struggle to detect.³⁸

The structured penalty guidelines matter instrumentally for a narrower but important reason specific to digital markets: the 2023 amendment’s extension of the relevant-turnover principle first articulated in *Excel Crop Care Ltd v Competition Commission of India* to global rather than purely domestic turnover³⁹ ensures that a multinational platform’s algorithmic pricing conduct in India cannot be under-penalised by reference to a narrow domestic revenue base, a design choice of particular relevance given that the firms most likely to deploy sophisticated

³⁷Competition (Amendment) Act 2023, s 35, inserting Competition Act 2002, ss 48A–48B; Competition Commission of India (Lesser Penalty) Regulations 2024; Competition Commission of India (Determination of Monetary Penalty) Guidelines 2024 (notified 6 March 2024, under Competition Act 2002, s 64-B).

³⁸Competition Commission of India (Lesser Penalty) Regulations 2024 (notified 20 February 2024).

³⁹*Excel Crop Care Ltd v Competition Commission of India* (2017) 8 SCC 47 (SC).

self-learning pricing technology are, at present, multinational enterprises operating across several jurisdictions simultaneously.⁴⁰

Institutional reforms cannot create liability where the substantive law provides none. Leniency cannot encourage disclosure of conduct that is not unlawful, nor can penalty guidelines operate where no contravention is established. These mechanisms may strengthen enforcement, but they cannot substitute for resolving the substantive limits of Section 3.

X. TESTING SECTION 3 AGAINST RECENT INDIAN JURISPRUDENCE

The Supreme Court's decision in *Competition Commission of India v Kerala Film Exhibitors Federation* is relevant principally for what it confirms about the breadth of the Commission's remedial powers. The Court restored the CCI's findings under Section 3(1) read with Section 3(3)(b) and reinstated directions restricting the involvement of the concerned office-bearers in the affairs of the association.⁴¹ The case itself concerned a conventional collective boycott, not algorithmic coordination. Its significance here is narrower: Section 27 is capable of supporting behavioural remedies alongside monetary penalties where the circumstances of the infringement warrant them. This provides an existing remedial basis for measures directed at technology-mediated conduct, should such conduct eventually fall within Section 3 for example, requirements concerning the operation or modification of a pricing system. The more difficult question remains the substantive basis on which such conduct can first be found unlawful.

The WhatsApp/Meta litigation illustrates a different aspect of the problem. The CCI proceeded under Section 4, rather than Section 3, in addressing WhatsApp's 2021 privacy policy and the resulting data-sharing practices. NCLAT's November 2025 decision substantially upheld the CCI's findings and the ₹213.14 crore penalty, while setting aside the five-year restriction on data sharing for advertising purposes.⁴² The case therefore does not establish liability for algorithmic coordination. Its relevance lies instead in demonstrating how digital-platform conduct can implicate competition through mechanisms that do not fit neatly within traditional conceptions of market conduct. For the present inquiry, however, the distinction between unilateral conduct under Section 4 and coordinated conduct under Section 3 remains important.

⁴⁰ Competition (Amendment) Act 2023, s 19, amending Competition Act 2002, s 27.

⁴¹ Competition Commission of India v Kerala Film Exhibitors Federation 2025 INSC 1167 (SC).

⁴² Competition Commission of India, Order against WhatsApp LLC and Meta Platforms Inc (18 November 2024).

The difficulty addressed in this article arises precisely where coordinated market outcomes cannot readily be attributed either to a conventional agreement or to the unilateral conduct of a dominant enterprise.

XI. A REBUTTABLE-PRESUMPTION FRAMEWORK FOR ALGORITHMIC COORDINATION

This article proposes the insertion of a new Explanation to Section 3(3), modelled structurally on the Explanation introduced by the 2023 amendment for hub-and-spoke arrangements, but directed at a different problem. The proposed provision would create a rebuttable presumption of an agreement causing an appreciable adverse effect on competition where the Commission establishes, on a balance of probabilities, four conditions.

First, two or more competing enterprises must have deployed pricing algorithms, whether shared, interoperable or independently developed, that determine or materially influence the prices of substantially similar goods or services. Second, the enterprises' prices must have converged on, or persistently remained at, a level demonstrably above that expected under competitive conditions, established through appropriate economic benchmarking. Third, the relevant market must exhibit structural conditions conducive to sustained coordination, including significant concentration, pricing transparency and product homogeneity. Fourth, the concerned enterprises must be unable to demonstrate an independent commercial justification for the pricing outcome that does not depend upon the parallel operation or interaction of the algorithms.

The presumption would operate in addition to the existing Explanation to Section 3(3) and would not displace the latter where a facilitating intermediary can be identified. Its purpose would be to address cases in which coordination may arise from the interaction of pricing systems without a conventional intermediary or demonstrable communication between competitors. Once the specified conditions are established, the evidentiary burden would shift to the respondent enterprises to demonstrate that the observed outcome resulted from independent competitive conduct. The provision would therefore avoid requiring the Commission to establish that an autonomous algorithm itself entered into an “agreement”, while still subjecting demonstrably coordinated market outcomes to competition-law scrutiny.

The legislative change would need to be accompanied by limited institutional measures. The

Commission would require adequate economic and technical capacity to examine pricing algorithms, market data and the conditions in which coordinated outcomes emerge. This may require specialised recruitment and technical expertise in addition to conventional investigative powers. The Commission should also develop appropriate protocols for obtaining and examining algorithmic evidence while protecting commercially sensitive information.

The emerging digital competition framework should likewise remain distinct from the proposed Section 3 presumption. Rules directed at dominant digital platforms and gatekeepers address a different form of market power and should not be treated as a substitute for rules governing coordination among competitors. Similarly, existing leniency and settlement mechanisms should continue to operate according to their statutory limits, while their effectiveness in algorithm-related cases should be assessed as enforcement experience develops.

Finally, effective application of the proposed rule would require greater technical understanding within the Commission and the adjudicatory system. Decision-makers would need to distinguish algorithmically facilitated coordination from legitimate parallel pricing resulting from common market conditions. The proposed presumption is therefore intended not to regulate the use of algorithms as such, but to provide a legal basis for intervention where algorithmic pricing operates within identifiable structural conditions and produces outcomes that cannot reasonably be explained by independent competitive conduct.

XII. TESTING THE PROPOSED FRAMEWORK AGAINST ITS STRONGEST OBJECTIONS

A proposal to impose liability without proof of a conventional agreement raises three principal objections. Each bears directly on the legitimacy and administrability of a structural presumption.

The first is that such a presumption may penalise successful competition rather than collusion. Firms operating in concentrated and transparent markets may independently arrive at similar prices because of common costs, demand conditions or efficiencies. A presumption based merely on parallel pricing would therefore risk treating lawful competitive conduct as an infringement. This concern supports making the presumption rebuttable rather than conclusive. The Commission would first have to establish the specified structural and market conditions,

together with evidence that the observed pricing pattern is inconsistent with plausible independent explanations. The concerned firms would then have an opportunity to demonstrate legitimate commercial reasons for their conduct, including changes in input costs, capacity constraints or efficiency gains. The purpose of the presumption would thus be to shift the evidentiary burden once objective conditions giving rise to a credible coordination concern are established, rather than to treat parallel pricing as conclusive proof of infringement.⁴³

The second objection concerns the difficulty of attributing conduct to firms where pricing decisions are generated by complex or self-learning systems. An undertaking may not always be able to explain the precise process through which an algorithm arrived at a particular pricing decision. The proposed approach need not, however, require an undertaking to reconstruct the algorithm's internal reasoning. The relevant inquiry can instead focus on evidence within the firm's control: the data made available to the system, the parameters governing its operation, its use of competitor information, and the persistence of the pricing pattern when relevant inputs change. Such evidence may help distinguish independent algorithmic optimisation from pricing behaviour that is responsive to, and sustained by, interaction with competitors. Where these matters cannot be adequately examined, the case for greater transparency and technical scrutiny becomes correspondingly stronger.

The third objection is that liability based on anything less than proof of communication between competitors could discourage legitimate investment in dynamic pricing technologies. That concern can be addressed by keeping the presumption narrowly confined to markets exhibiting the structural characteristics that make sustained algorithmic coordination plausible. Concentration, pricing transparency and product homogeneity, taken together, provide a more meaningful threshold than the mere use of algorithmic pricing software. Firms operating in fragmented markets, markets characterised by substantial product differentiation, or markets lacking the transparency necessary for effective algorithmic monitoring would therefore fall outside the presumption merely because they employ sophisticated pricing tools. The object of the rule would not be to regulate algorithmic pricing as such, but to identify circumstances in which its use materially increases the risk of coordinated conduct.

⁴³ Bharatiya Sakshya Adhiniyam 2023, s 109; cf Indian Evidence Act 1872, s 106 (burden of proving fact especially within knowledge).

XIII. CONCLUSION: RECONCEPTUALISING SECTION 3 FOR ALGORITHMIC COORDINATION

Two decades after its enactment, Section 3 of the Competition Act, 2002 remains the principal statutory framework governing anti-competitive agreements in India. Its distinction between horizontal and vertical restraints, together with the different approaches applicable to each, has proved sufficiently adaptable to conventional forms of cartel and vertical conduct. The emergence of algorithmic pricing, however, exposes a more fundamental difficulty. The 2023 amendment addressed the problem of hub-and-spoke coordination by recognising the role of an intermediary in facilitating an agreement. It does not resolve the more difficult case in which competing firms, acting without an identifiable facilitator or communication, arrive at sustained supra-competitive outcomes through the interaction of pricing algorithms. That is not merely a problem of proving facilitation; it is a problem of attribution.

The comparative experience does not yet provide a complete solution. *Eturas* demonstrates that evidentiary rules can adapt to technologically mediated coordination without abandoning the requirement of concerted conduct, while *Topkins* illustrates the continuing capacity and limits of traditional agreement doctrine where an algorithm implements an existing human arrangement. Neither approach, however, provides a clear basis for addressing genuinely autonomous convergence. The experience of the European Union and the continuing development of India's digital competition framework likewise suggest that platform regulation and algorithmic coordination cannot simply be treated as the same problem.

A narrowly drawn rebuttable presumption offers one possible response. By linking intervention to identifiable market conditions, persistent pricing outcomes and the absence of credible independent explanations, such a provision could address coordination that cannot readily be traced to conventional communication while preserving a distinction between ordinary algorithmic pricing and anti-competitive conduct. Its success would ultimately depend on careful statutory drafting, sound economic evidence and effective technical scrutiny. The objective should not be to treat algorithmic pricing itself as unlawful, but to ensure that the absence of human communication does not, by itself, place coordinated anti-competitive conduct beyond the reach of Section 3.