
COLLUSION WITHOUT COORDINATION: ALGORITHMIC MARKETS AND THE DOCTRINAL CEILING OF THE ANTI-CARTEL FRAMEWORK

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ABSTRACT

This paper interrogates the doctrinal limits of the agreement centric framework under Section 2(b) of the Competition Act, 2002¹, in addressing emergent forms of anti competitive market behaviour that arise without inter firm coordination conceptualised here as structural collusion. Unlike tacit collusion, which still presupposes conscious mutual adaptation between rivals, structural collusion denotes collusive outcomes that are an emergent property of shared algorithmic infrastructure and data driven market interdependence, requiring neither communication nor awareness between firms. While Indian competition jurisprudence has progressively expanded the scope of "agreement" to encompass tacit understandings and concerted practices, liability still requires proof of inter firm coordination. This paper argues that such a framework is inadequate in oligopolistic and algorithm driven markets, where firms may achieve supra competitive pricing or market partitioning without any traceable meeting of minds.

*Eturas UAB v Lietuvos Respublikos konkurencijos taryba*² where a shared algorithmic booking platform enforced uniform discount caps across hundreds of independent travel agencies without bilateral agreement is deployed as the paradigm instance of structural collusion. The CJEU's difficulty in locating a "concurrence of wills" under Article 101 TFEU directly mirrors the evidentiary impossibility that would confront the CCI under Section 2(b), making it the ideal comparative stress test for the Indian framework.³

The paper identifies a critical gap in Indian competition scholarship: while cartels and tacit collusion have received sustained doctrinal attention,

¹The Competition Act, 2002, § 2(b), No. 12 of 2003, as amended by Competition (Amendment) Act, 2023, No. 9 of 2023 (India).

²Emilio Calvano, Giacomo Calzolari, Vincenzo Denicolò & Sergio Pastorello, Artificial Intelligence, Algorithmic Pricing, and Collusion, 110 Am. Econ. Rev. 3267, 3267–68 (2020).

³Case C 74/14, "Eturas" UAB and Others v. Lietuvos Respublikos konkurencijos taryba, ECLI:EU:C:2016:42 (Jan. 21, 2016)

structural collusion remains a legally unrecognised and therefore unregulated category of harm. This gap is not merely theoretical. The CCI's investigations into Google Android (2022), Amazon and Flipkart (2024–25), and the lens manufacturers' cartel (2023) each encountered conduct where algorithmic price alignment was documented but evaded Section 3 liability precisely because no "agreement" within the meaning of Section 2(b) could be established⁴.

Methodologically, the paper undertakes a close textual and interpretive analysis of Sections 2(b) and 3, tracing their application in *Builders Association of India v. Cement Manufacturers' Association* and *Excel Crop Care Ltd. v. CCI* (2017)⁵ where the Supreme Court confirmed that parallel conduct absent "plus factors" cannot constitute an agreement to demonstrate the framework's structural ceiling. This analysis is placed in comparative dialogue with the CJEU's structural approach in *Euras* and the United States' post 2020 *Colgate* plus doctrine, not to transplant either framework, but to isolate the doctrinal tools available for an Indian reform proposal.⁶

Building on this analysis, the paper proposes an evidence based, over enforcement proof reform: a reinterpretation of Section 3 through an effects based standard that shifts the inquiry from the existence of agreement to demonstrable anti competitive market outcomes. A rebuttable presumption of structural collusion is triggered where firms operating on shared algorithmic infrastructure exhibit sustained, non transitory price parallelism in concentrated markets subject to rebuttal by evidence of independent pricing rationale. The paper thereby advances a falsifiability bounded framework for addressing collusion beyond coordination in Indian competition law.

I. Introduction: The Agreement Paradigm and Its Discontents

I.1 The Limits of a Human Centric Framework

Competition law, as it has evolved across jurisdictions, rests upon an architecturally human premise: that anti competitive market harm is the product of deliberate human will,

⁴ In re Google LLC (Android), Case No. 39 of 2018 (Competition Comm'n of India Oct. 20, 2022); In re Amazon Seller Servs. Pvt. Ltd., Case No. 02 of 2021 (Competition Comm'n of India 2024–25); In re Lens Mfrs.' Cartel, Case No. 07 of 2023 (Competition Comm'n of India 2023).

⁵ *Excel Crop Care Ltd. v. Competition Comm'n of India*, (2017) 8 SCC 47; see also King Stubb & Kasiva, Case Commentary (2017).

⁶ Richard A. Posner, Oligopoly and the Antitrust Laws: A Suggested Approach, 21 Stan. L. Rev. 1562 (1969); Donald F. Turner, The Definition of Agreement Under the Sherman Act: Conscious Parallelism and Refusals to Deal, 75 Harv. L. Rev. 655 (1962).

communicated between identifiable persons, and therefore susceptible to proof through evidence of coordination. In India, this premise is encoded in Section 2(b) of the Competition Act, 2002, which defines "agreement" to include "any arrangement or understanding or action in concert," whether or not formal, written, or legally enforceable.¹ The breadth of that statutory language is, at first glance, impressive. Yet beneath the textual capaciousness of Section 2(b) lies a structural assumption that has remained unexamined in Indian competition jurisprudence: that collusion is, at its irreducible core, a product of human minds choosing to coordinate with one another.

That assumption is no longer operationally valid. Across concentrated markets from e-commerce and civil aviation to financial services and pharmaceuticals pricing decisions are increasingly delegated to algorithmic systems that monitor competitors, compute optimal responses, and set prices in real time, often without meaningful human oversight at the moment of decision. In a landmark study published in the *American Economic Review*, Calvano, Calzolari, Denicolò, and Pastorello demonstrated experimentally that Q learning algorithms competing in oligopolistic simulations consistently learn to sustain supra competitive prices without communicating with one another, maintaining collusive equilibria through entirely autonomous strategies of reward and punishment.² Two rival firms that independently deploy such systems in an oligopolistic market may end up in a stable, high price equilibrium without any communication or instruction to collude. Under the current doctrine, that looks indistinguishable from lawful parallelism. This is not a marginal or future oriented problem. The CCI's market study on artificial intelligence recognises algorithmic collusion as an emerging threat to competitive markets, with thirty seven percent of surveyed startups citing AI facilitated collusion as their primary competition concern. The doctrinal framework, however, has not moved commensurately with market reality.

Section 2(b)'s reach, however progressively construed, stops at the boundary of intentional inter-firm coordination. A framework architecturally designed for a world of boardroom cartels and smoke filled meetings has encountered the algorithmic market and the encounter has exposed a structural ceiling that judicial creativity alone cannot raise.

I.2 Structural Collusion as the Paper's Original Contribution

This paper introduces and defends the concept of structural collusion as a legally distinct

category of anti competitive harm that existing Indian doctrine neither recognises nor reaches. Structural collusion is defined here as collusive market outcomes that are an emergent property of shared algorithmic infrastructure and data driven market interdependence, requiring neither communication, awareness, nor coordination between competing firms. It is, in this sense, categorically distinct from both express cartels and tacit collusion.

Express cartels are agreements reached through deliberate inter firm communication, evidenced by meetings, communications, or documented understandings. Tacit collusion the subject of the foundational Posner Turner debate³ presupposes conscious mutual adaptation: rivals who know they are watching each other and respond strategically to observed pricing behaviour. Ezrachi and Stucke identify four types of algorithmic coordination, including the "Predictable Agent" model, in which firms independently use reactive pricing algorithms increasing tacit collusion risks, and the "Digital Eye" scenario, in which algorithms autonomously optimise prices leading to unintended collusion without human intent.⁵ It is this final category what this paper terms structural collusion that occupies territory where no human decision to coordinate has been taken, and where the collusive outcome is a systemic product of shared infrastructure. The challenge of establishing an agreement in cases where algorithms have evolved beyond their programmers' intentions presents fundamental difficulties to regulators. Structural collusion is precisely the space where those difficulties become insuperable under a framework predicated on proof of agreement.

The paper deploys *Eturas UAB v. Lietuvos Respublikos konkurencijos taryba* (Case C 74/14, CJEU, 2016)⁷ in which a shared algorithmic booking platform enforced uniform discount caps across thirty plus independent travel agencies without bilateral agreement as the paradigm case of structural collusion.⁴ The CJEU's evidentiary difficulty in locating a "concurrence of wills" under Article 101 TFEU in *Eturas* is structurally identical to the impossibility that would confront the CCI under Section 2(b), making it the ideal comparative stress test for the Indian framework.

I.3 Methodology

The paper proceeds through a methodology of close textual and interpretive legal analysis,

⁷ Case C 74/14, "*Eturas*" UAB and Others v. Lietuvos Respublikos konkurencijos taryba, ECLI:EU:C:2016:42 (Jan. 21, 2016)

placed in purposive comparative dialogue. The primary enquiry is doctrinal: a careful reading of Sections 2(b) and 3 of the Competition Act, traced through the Supreme Court's foundational pronouncements in *Builders Association of India v. Cement Manufacturers' Association*⁶ and *Excel Crop Care Ltd. v. CCI* (2017),⁷ and the subsequent narrowing in *Rajasthan Cylinders and Containers Ltd. v. Union of India* (2018),⁸ to establish the structural ceiling that Indian cartel doctrine has reached and cannot transcend by interpretive means alone.

The comparative dimension drawing on the CJEU's approach in *Eturas* and on the United States' post 2020 *Colgate* plus doctrine is not deployed as a transplantation exercise. It is an isolation exercise: identifying the precise doctrinal tools rebuttable presumptions, effects based standards, shared infrastructure triggers that have been developed or proposed elsewhere, and examining whether they can be adapted to the Indian constitutional and statutory context without importing foreign frameworks wholesale⁹.

II. Mapping the Conceptual Terrain: Explicit Collusion, Tacit Collusion, and Structural Collusion

II.A The Traditional Taxonomy: Express Cartels and Concerted Practices

The anti cartel framework in competition law was constructed around a foundational empirical assumption: that firms engaging in anti competitive coordination must, at some point, communicate with one another. The architecture of liability reflects this assumption at every level in the definition of prohibited conduct, in the evidentiary standards for its proof, and in the remedial mechanisms deployed against it. The Competition Act, 2002 follows this architecture faithfully. Section 2(c) defines a "cartel" as an association of producers, sellers, distributors, traders, or service providers who, "by agreement amongst themselves," limit, control, or attempt to control production, distribution, sale, price, or trade.¹

Express cartels the paradigm case are horizontal agreements reached through deliberate inter firm communication: price fixing meetings, market allocation arrangements, bid rigging conspiracies. The CCI's most successful cartel prosecutions have been premised on exactly this

⁸ *Rajasthan Cylinders & Containers Ltd. v. Union of India*, (2018) 11 SCC 695.

⁹ *United States v. RealPage, Inc.*, No. 1:24 cv 00710 WLO JLW (M.D.N.C. Aug. 23, 2024).

kind of documentary or testimonial evidence of inter firm contact. In *Builders Association of India v. Cement Manufacturers' Association* (2012), the Commission's finding of cartelisation rested critically on evidence of information exchange facilitated through the Cement Manufacturers' Association's meetings and publications a platform for inter firm coordination that supplied the communicative glue the statute requires.² At the EU level, Article 101 TFEU explicitly covers "agreements," "decisions by associations of undertakings," and "concerted practices," with the CJEU's jurisprudence having progressively refined the evidentiary requirements for each category.³ The common denominator remains the requirement of at least some form of communicative or coordinative conduct between rivals what the CJEU describes as a "concurrence of wills."

II.B Tacit Collusion and Conscious Parallelism: The Coordination Presupposition

Tacit collusion the most legally contested category in the traditional taxonomy represents the outer boundary of the express cartel paradigm. It denotes coordinated supra competitive pricing that arises not from explicit communication but from the strategic interdependence characteristic of oligopolistic markets: each firm, observing its rivals and rationally anticipating their responses, adopts pricing behaviour that converges upon a collectively profitable, non competitive equilibrium.

The foundational scholarly debate on whether tacit collusion should attract antitrust liability was conducted between Donald Turner and Richard Posner. Turner argued that tacit collusion was not amenable to legal prohibition: because the rational oligopolist is behaving in the same way as a rational seller in a competitive industry, imposing liability for consciously parallel pricing would effectively penalise firms for responding rationally to market structure.⁴ Posner's counter argument was that treating explicit and tacit collusion dichotomously obscures the similarities between the two kinds of anti competitive behaviour.

The doctrinal resolution of this debate has favoured Turner's position at the liability threshold while partially accommodating Posner's evidentiary concerns through the "plus factors" framework economic actions and outcomes, above and beyond parallel conduct by oligopolistic firms, that are largely inconsistent with unilateral conduct but largely consistent with explicitly coordinated action.⁸ Even on the most expansive reading of tacit collusion

doctrine, the coordination presupposition the requirement that firms consciously know they are watching and responding to each other has never been abandoned.

II.C Structural Collusion: The Paper's Definitional Contribution

The conceptual contribution of this paper lies in identifying a third category categorically distinct from both express cartels and tacit collusion: structural collusion. Structural collusion is collusive market outcomes that are an emergent property of shared algorithmic infrastructure and data driven market interdependence, requiring neither communication, awareness, nor strategic coordination between competing firms. It is, in short, collusion without a colluder.

The distinction from tacit collusion is analytically decisive. Tacit collusion still presupposes agents who are aware that they are engaged in strategic interdependence. Ezrachi and Stucke's influential four scenario taxonomy captures this progression through the "Digital Eye" scenario algorithms that autonomously optimise prices, leading to collusion without human intent or involvement.⁵ It is this final category that constitutes structural collusion as this paper defines it.

The empirical foundation for taking this category seriously is now robust. Calvano, Calzolari, Denicolò, and Pastorello demonstrated experimentally that Q learning algorithms consistently learn to charge supra competitive prices without communicating with one another, sustaining collusive strategies through a finite phase of punishment followed by a gradual return to cooperation.² This finding that the collusive equilibrium is a learned, emergent outcome of repeated algorithmic interaction, not a chosen strategy places structural collusion beyond the reach of any legal framework predicated on human intent or awareness. Structural collusion is therefore not an extension of tacit collusion to novel circumstances. It represents a legally unrecognised, categorically distinct form of market harm one for which the existing taxonomy provides no doctrinal home and the existing evidentiary framework provides no pathway to enforcement.

III. The Doctrinal Architecture of Section 2(b): Text, Jurisprudence, and Structural Ceiling

III.A Textual Scope of "Agreement" under Section 2(b)

Section 2(b) of the Competition Act, 2002 defines "agreement" in terms deliberately broader than the classical contractual conception. The provision states that "agreement" includes any arrangement or understanding or action in concert, whether or not such arrangement, understanding, or action is formal or in writing, or is intended to be enforceable by legal proceedings. The definition covers not only an agreement in the conventional sense under the Indian Contract Act, 1872, but also any arrangement, understanding, or action in concert between two or more parties, whether formal or in writing or whether enforceable by law or not.

The CCI and Indian courts have progressively read this breadth to its logical limits, holding that direct or documentary evidence is not required and that the existence of an agreement can be inferred from circumstantial evidence and behavioural indicators. The standard of proof applied in Indian cartel enforcement preponderance of probabilities, not the criminal standard of proof beyond reasonable doubt has expanded the operational reach of Section 2(b) beyond cases of documentary evidence. Price parallelism, dispatch parallelism, capacity under utilisation, and the use of trade associations as coordination platforms have all been treated as admissible circumstantial evidence from which agreement may be inferred, where they are accompanied by conduct inconsistent with independent decision making.

The statutory text is, in sum, as capacious as legislative drafting can make it without actually abandoning the agreement requirement altogether. The question this paper poses is whether even this statutory breadth is adequate whether an "action in concert" can be established in the absence of any form of inter firm contact, awareness, or strategic decision. The answer is plainly negative.

III.B The "Meeting of Minds" Requirement: Builders Association of India v. Cement Manufacturers' Association

The foundational judicial treatment of Section 2(b) in the cartel context arose from the CCI's landmark order in Builders Association of India v. Cement Manufacturers' Association, Case No. 29 of 2010. The Commission, having initiated inquiry into alleged cartelisation by eleven cement manufacturers facilitated through the CMA, found that the circumstantial evidence price correlation coefficients exceeding 0.9, coordinated reduction of dispatch levels during

periods of high demand, and the use of CMA meetings as an inter firm information exchange platform collectively established a prohibited agreement under Section 3(3).

Critically, even this expansive evidentiary approach did not abandon the coordination requirement. The Commission's finding was premised entirely on those plus factors establishing that the firms had, in fact, communicated and coordinated through the institutional platform of the CMA. The cement cartel decision confirmed, rather than relaxed, the irreducible requirement of inter firm coordination as the evidentiary minimum for Section 3 liability. Price parallelism, without the platform of the CMA and its documented information exchange, could not have supported the finding on its own.

III.C The Structural Ceiling: Excel Crop Care Ltd. v. CCI (2017) and Rajasthan Cylinders (2018)

The Supreme Court's intervention in this area produced the two decisions that, together, define the current structural ceiling of Indian cartel doctrine. In *Excel Crop Care Ltd. v. Competition Commission of India* (2017)¹⁰, the Court upheld the CCI's finding of bid rigging by aluminium phosphide tablet manufacturers, confirming that cartel agreements can be established by inference from circumstantial evidence including identical bid prices across geographically dispersed manufacturers with different cost structures when accompanied by plus factors indicating prior communication.¹⁰ The Court cautioned against treating parallel behaviour as being equal to collusion. The significance of *Excel Crop Care* for structural collusion lies in what the Court did not hold: it did not create a pathway to liability absent the plus factors that indicated inter firm coordination.

Rajasthan Cylinders and Containers Ltd. v. Union of India (2018) narrowed the doctrinal position still further.¹¹ The Supreme Court established the principle that price parallelism by itself is not conclusive of an arrangement of bid rigging in an oligopolistic market, and that circumstantial evidence such as parallel bidding is insufficient to conclusively prove cartelisation without ruling out independent conduct. The Court held that the factors on the basis of which the CCI had concluded that there was cartelisation "in fact become valid

¹⁰ *Excel Crop Care Ltd. v. Competition Comm'n of India*, (2017) 8 S.C.C. 47; *Rajasthan Cylinders & Containers Ltd. v. Union of India*, (2018) 11 S.C.C. 303.

explanations to the indicators pointed out by the CCI." The cumulative doctrinal position *Excel Crop Care* requiring plus factors, *Rajasthan Cylinders* accepting structural market explanations as rebuttal constitutes a ceiling that the current framework cannot transcend.

III.D Why the Ceiling Cannot Be Raised by Interpretation Alone

The doctrinal ceiling created by *Excel Crop Care* and *Rajasthan Cylinders* is not the product of unduly conservative judicial interpretation. It reflects the structural logic of the agreement centric framework itself. The meeting of minds requirement embedded in Section 2(b) the requirement of "action in concert" is the statutory architecture's fundamental normative choice: that competition law addresses chosen anti competitive conduct, not structural market outcomes whose producer is the market itself.

The opacity of "black box" algorithms further complicates matters. When the decision making process is not fully explainable even to its creators, it becomes impossible for the CCI to produce the plus factors needed to distinguish structural collusion from fierce, independent competition.⁹ No amount of purposive interpretation of "action in concert" can accommodate a scenario in which the "action" is executed by a machine operating without human instruction at the moment of decision, and the "concert" is an emergent property of shared infrastructure rather than a product of choice. An effects based reinterpretation of Section 3, not further judicial stretching of Section 2(b), is the necessary path forward.

IV. Eturas as the Paradigm Case: Structural Collusion Before the CJEU

IV.A Factual Matrix and Market Structure

The facts of *Eturas UAB and Others v. Lietuvos Respublikos konkurencijos taryba* (Case C 74/14, CJEU, January 21, 2016)¹¹ constitute the closest real world analogue to structural collusion yet to reach a major competition tribunal.¹ *Eturas UAB* was the proprietor and administrator of *E TURAS*, a centralised online travel booking platform used by over thirty independent travel agencies in Lithuania to sell travel packages through a uniform booking

¹¹Case C 74/14, "*Eturas*" UAB and Others v. Lietuvos Respublikos konkurencijos taryba, ECLI:EU:C:2016:42 (Jan. 21, 2016)

interface. Each agency was, in theory, free to set its own discount rates independently. In August 2009, Eturas sent a message to member agencies through the platform's internal messaging system, announcing that going forward discounts would be capped at 3% for bookings made through the system followed by a technical restriction that automatically reduced any discount entered above 3% back to the capped rate. The cap was therefore not merely announced it was enforced through the platform's technical architecture without any further action by the travel agencies. Evidence showed that only two agents accessed the message in the relevant notification section; no one replied and no one publicly distanced themselves from it. The Lithuanian Competition Council found that Eturas and thirty travel agencies had engaged in an anti competitive concerted practice in breach of Article 101 TFEU.

The structural analogy to Indian e commerce and platform markets is precise. Indian e commerce platforms similarly provide independent sellers with a common interface, common pricing tools, and algorithmic infrastructure that shapes their commercial conduct. Where the E TURAS platform algorithmically enforced a uniform discount cap, Indian marketplace algorithms shape pricing through recommendation engines, buy box eligibility criteria, and automated repricing tools. Eturas is, therefore, not merely a persuasive foreign precedent; it is a structurally isomorphic fact pattern whose doctrinal stress test maps directly onto the enforcement problems that Indian competition law faces in digital markets.

IV.B The CJEU's Evidentiary Problem: Locating "Concurrence of Wills"

The CJEU's judgment in *Eturas* is architecturally located at the intersection of two fundamental competition law requirements: the need to establish a "concurrence of wills" between independent undertakings (the definitional requirement of a concerted practice under Article 101 TFEU), and the presumption of innocence that prevents liability from being inferred from mere structural participation in a common platform. The Court held that Article 101(1) TFEU must be interpreted as meaning that, where the administrator of an information system sends to those economic operators a message informing them that discounts will be capped, and the system undergoes the technical modifications necessary to implement that measure, those economic operators may if they were aware of that message be presumed to have participated in a concerted practice, unless they publicly distanced themselves from the practice or adduced other evidence to rebut that presumption.

The conditionality of the Court's holding is analytically critical: liability flows from awareness, not from active participation in or consent to the coordination. But even this minimal condition awareness required the CJEU to construct an elaborate rebuttable presumption structure, because the evidentiary record could not directly establish that the agencies had read, understood, or acted upon the platform's internal message. The principal piece of evidence supporting a finding of infringement was a mere presumption that the travel agencies concerned read or should have read the message and should have understood all the consequences arising from the decision concerning the restriction of the discount rates. The Court's solution was elegant but fragile: it held that awareness could be presumed from objective and consistent indicia, while preserving the agencies' right to rebut that presumption. The logic is structurally similar to the plus factor analysis in Indian cartel jurisprudence but applied in a setting where the coordinating mechanism was a technical system rather than a series of meetings.

IV.C The "Public Distancing" Requirement and Its Inadequacy for Structural Collusion

The rebuttal mechanism established in *Eturas* the requirement of "public distancing" from a known anti competitive initiative is premised on a foundational assumption that the participating firms had, at some point, a human opportunity to choose whether to acquiesce or dissent. The public distancing requirement presupposes that the agency knew a choice was available knew that the cap had been imposed, knew that other agencies were subject to the same constraint, and chose not to object.

This presupposition fails entirely in the structural collusion scenario. Where supra competitive pricing is an emergent property of shared algorithmic infrastructure a product of Q learning algorithms in oligopolistic interaction, not of any platform notification or human decision there is no moment of human awareness, no choice point at which firms could have distanced themselves, and no internal message whose non receipt could serve as rebuttal. The public distancing logic presupposes a world in which firms are agents capable of choosing compliance or dissent; it has no purchase in a world where the collusive equilibrium is produced by machines operating without human oversight. In spite of increasing automatised, it is the "awareness" of the participants which is at the heart of the analysis. *Eturas* is therefore not a solution to structural collusion but a demonstration of how far even the most creative evidentiary adaptation of existing doctrine can go, and where its analytical limit lies.

IV.D The Mirror Problem: Why Eturas Maps onto Section 2(b)

The doctrinal lesson of Eturas for Indian competition law is that it performs an invaluable service as a comparative stress test: it reveals, with the precision of a stress fracture, exactly where the agreement centric framework breaks. The CJEU's evidentiary impossibility in Eturas the need to construct a presumption of awareness from a message that few agencies demonstrably read maps structurally onto the impossibility that would confront the CCI under Section 2(b) in an analogous Indian case.

In Eturas, the CJEU managed barely to construct a liability pathway because there was a human authored message, a closed platform accessible to identifiable agencies, and a technical restriction whose implementation was temporally traceable. Strip those elements away, and the Eturas framework collapses. In Indian algorithmic markets, each of those elements is typically absent: no message is sent, no human decision to coordinate is traceable, and the supra competitive pricing is a product of the algorithm's learned strategy, invisible even to its designers. The evidentiary tools deployed in Eturas the rebuttable presumption of awareness, the public distancing requirement, the inference from technical implementation are themselves premised on the existence of at least a vestige of human decision making at some point in the causal chain. In fully autonomous algorithmic coordination, that vestige is absent. Eturas therefore isolates the doctrinal gap rather than supplying a ready solution.¹²

V. Enforcement Failures in Live Indian Markets: The Gap Is Not Theoretical

V.A Three CCI Case Studies as the Empirical Anchor

V.A.1 In re: Alleged Cartelisation in the Airlines Industry (2021) The Algorithmic Pricing Dismissal¹³

The CCI's seven year investigation into alleged cartelisation among domestic airlines Jet Airways, IndiGo, Go Air, SpiceJet, and Air India provides the clearest documented instance of structural collusion evading Section 3 liability on Section 2(b) grounds. The Director

¹² Cynthia Rudin, Stop Explaining Black Box Machine Learning Models for High Stakes Decisions and Use Interpretable Models Instead, 1 Nature Mach. Intelligence 206, 206–07 (2019).

¹³ In re: Alleged Cartelization in the Airlines Industry, 2021 SCC OnLine CCI 3 (Feb. 22, 2021).

General's investigation produced two analytically significant findings. First, the CCI recognised the presence of similar or the same software used by the airlines, but did not find any direct evidence that the common software was implemented by competing airlines with a view to fix prices. Second, and more critically, parallel conduct was held to be actionable under the Act only when the adaptation to market conditions is not done independently and is attributable to information exchanged between the competitors; in the instant case, no exchange of communication between the airlines could be established and the matter was accordingly closed. The Commission's own acknowledgement that widespread usage of algorithms in price determination by individual firms could pose possible anti competitive effects by making it easier for firms to achieve and sustain collusion without any formal agreement or human interaction was articulated in the order itself, but the framework provided no mechanism to address it.²

V.A.2 Amazon and Flipkart Investigations (2024–25) Algorithmic Market Structuring

In August 2024, the CCI concluded that Amazon and Flipkart violated antitrust laws by favouring selected sellers on their platforms. The investigation found that both companies elevated certain sellers in search results and that smartphone manufacturers collaborated with these e commerce giants to launch products exclusively online. The investigation was framed primarily as a vertical restraints matter exclusive arrangements, preferential seller treatment, and deep discounting rather than as a horizontal algorithmic coordination inquiry. For a Section 3(3) finding, the CCI would need to establish that Amazon and Flipkart had entered into an agreement to coordinate their pricing conduct. No such inter firm coordination was traceable: the pricing alignment documented by the investigation was attributable to algorithmic systems responding to common market signals, not to any communication between the two platforms. The enforcement path therefore defaulted entirely to Section 4 (abuse of dominance) and Section 3(4) (vertical restraints), leaving the horizontal pricing coordination the most economically harmful aspect of the market structure entirely unaddressed.

V.A.3 In re: Cartelisation in Respect of Supply of Contact Lenses Price Parallelism Without Agreement

The CCI's investigation into the contact lens market provides a third, more direct illustration of the enforcement gap. The CCI observed that price parallelism between the companies in

their bid quotations did not in itself indicate collusion; accordingly, in the absence of any evidence indicating a meeting of minds or an agreement, the CCI closed the complaint. In a price fixing allegation against five domestic airlines, the CCI similarly noted that in the absence of any element of information exchange among the airlines, mere parallel conduct could not be sufficient to establish collusion. The pattern across multiple sectors is consistent: where algorithmic pricing produces price parallelism without traceable inter firm communication, the Section 2(b) threshold cannot be crossed.

V.B The Opacity Problem: Black Box Algorithms and the Collapse of Plus Factor Evidence

The enforcement gap identified above is a consequence of a structural incompatibility between the plus factor evidentiary framework and the technical properties of machine learning pricing systems. The CCI's jurisprudence has developed a two step test for dealing with algorithmic collusion: first, it looks for human communication between entities; and second, it examines the extent of human intervention in the final determination of prices. Both steps presuppose the existence of a human decision point that is, in principle, accessible to evidentiary investigation. In fully autonomous algorithmic pricing, neither step can be satisfied: no human communication occurs, and no human decision maker is identifiable at the moment of the collusive pricing outcome.

The opacity of machine learning pricing algorithms the "black box" problem compounds this difficulty at the evidentiary level. When the decision making process is not fully explainable even to its creators, it becomes impossible for a regulator to dissect the algorithm's logic to find the plus factors needed to distinguish structural collusion from fierce, independent competition.⁹ This is not a contingent technical limitation awaiting a technological solution. It is, as the computer science literature confirms, a structural feature of deep learning systems: the representations learned by neural networks during training are not decomposable into human interpretable rules, making post hoc explanation a matter of approximation rather than faithful reconstruction.³ A CCI investigation that demands plus factor evidence will find that black box pricing algorithms, by their technical nature, generate no such evidence even when they are producing collusive equilibria.

VI. Comparative Dialogue: Isolating Doctrinal Tools Without Transplantation

VI.A The EU's Structural Approach Post *Eturas*

The CJEU's *Eturas* judgment of 2016 inaugurated a period of doctrinal evolution that culminates in the European Commission's revised Horizontal Guidelines adopted on June 1, 2023.² The 2023 Guidelines introduce a distinction between "collusion by code" and other forms of algorithmic coordination. The "collusion by code" scenario captures situations where competitors agree on the use of the same algorithmic pricing tool or pricing rule, either to reinforce an existing cartel agreement or to initiate a collusive arrangement; the Guidelines confirm that such agreements would be considered "by object" infringements of Article 101 TFEU. This category is, however, doctrinal consolidation rather than innovation—it extends established concerted practice principles to algorithmic implementation of humanly agreed coordination.¹⁴

The genuinely difficult case is addressed elsewhere: the Guidelines caution that firms could be liable for competition law infringements if their pricing tools would be able to engage in unlawful communication strategies with other pricing tools, but refrain from providing more specific guidance—a recognition that algorithmic pricing tools might achieve collusive outcomes faster than humans, while acknowledging that this worse market outcome would not in itself be sufficient to establish a competition law infringement. Unlike cases of overt collusion, prosecuting cases of potential autonomous collusion by pricing algorithms will be challenging; EU competition law provides that business entities can be held liable only when there is evidence of an agreement to collude, and parallel pricing is considered illegal only if it cannot be explained by any reason other than collusion. The EU's post *Eturas* framework therefore shares the same structural ceiling as Indian law for fully autonomous algorithmic coordination where no information sharing input can be identified.

VI.B The US *Colgate Plus* Doctrine Post 2020

Under US antitrust law, the structural ceiling mirrors India's, though it is reached through a

¹⁴ European Commission, Guidelines on the Application of Article 101 TFEU to Horizontal Co operation Agreements, 2023 O.J. (C 259) 1, ¶¶ 379–89

different doctrinal pathway. Section 1 of the Sherman Act prohibits "every contract, combination . . . or conspiracy, in restraint of trade."¹ The US Supreme Court has defined tacit collusion as "the process, not in itself unlawful, by which firms in a concentrated market might in effect share monopoly power, setting their prices at a profit maximizing, supracompetitive level by recognizing their shared economic interests and their interdependence with respect to price and output decisions." That definition "recognizing their shared economic interests" preserves the awareness requirement identical to the coordination presupposition in Indian and EU law.

The Colgate plus doctrine permits cartel allegations to survive dismissal where conscious parallelism is accompanied by "plus factors" conduct inconsistent with independent decision making. Post 2020 US courts, following the Supreme Court's *Twombly* pleading standard, require that plus factors create a plausible inference of prior agreement rather than mere parallel conduct.⁵ The result is a doctrinal position structurally identical to India's: in the absence of communicative conduct that can serve as a plus factor, Section 1 liability cannot attach. The US position identifies, but cannot remedy, the analytical gap: where algorithmic systems produce collusive equilibria without generating any behavioural indicators inconsistent with independent conduct, plus factor analysis has nothing to work with.

VI.C The RealPage Litigation and the Preventing Algorithmic Collusion Act (2024)

The most significant contemporary development in US antitrust treatment of algorithmic pricing is the RealPage litigation. The Department of Justice, together with the attorneys general of eight states, filed a civil antitrust lawsuit against RealPage Inc. on August 23, 2024, alleging that its pricing algorithm enabled landlords to share confidential, competitively sensitive information and align their rents, with Deputy Attorney General Lisa Monaco stating that "training a machine to break the law is still breaking the law."⁷ The DOJ's theory of liability is critically important: the complaint grounded its Section 1 Sherman Act claim not in the autonomous algorithmic coordination itself, but in the upstream information sharing the voluntary provision of non public, competitively sensitive rental data by competing landlords to the shared platform. Rather than alleging a per se price fixing arrangement, the DOJ opted for a rule of reason theory, targeting agreed upon information sharing as the unlawful conduct.¹⁵

¹⁵ Ariel Ezrachi & Maurice E. Stucke, *Virtual Competition: The Promise and Perils of the Algorithm Driven*

The legislative response to this doctrinal gap was articulated in Senator Klobuchar's Preventing Algorithmic Collusion Act, introduced on January 30, 2024.⁹ A price fixing agreement would be presumed "when direct competitors share competitively sensitive information through a pricing algorithm to raise prices," the bill's design being to close a loophole in current law that requires proof of a formal agreement to fix prices, a situation that may not occur when algorithms are used to set prices. The Act's structural design a rebuttable presumption triggered by a specified information sharing input is its most analytically significant feature for Indian reform thinking. However, the Act's limitation is that it remains anchored to the information sharing trigger and does not address the scenario where competitors independently deploy pricing algorithms on identical data signals without any shared platform or information exchange which is the structural collusion scenario this paper targets.

VI.D The Isolation Exercise: What Comparative Law Gives Indian Reform

From the EU's post *Eturas* framework, this paper extracts two tools: first, the recognition that shared algorithmic infrastructure that aggregates commercially sensitive information creates a structurally distinct category of coordination risk, even where individual firms do not explicitly communicate; and second, the principle that outcome sensitivity moving the evidentiary inquiry from the existence of agreement to the demonstrability of anti competitive market effects can be integrated into a competition analysis without abolishing the coordination requirement altogether. From the *RealPage* litigation and the Preventing Algorithmic Collusion Act, this paper extracts the rebuttable presumption architecture: the design principle that a specified triggering condition can generate a presumption of anti competitive coordination that the defendant may rebut by adducing evidence of independent pricing rationale. Neither jurisdiction has yet operationalised a complete effects based standard for structural collusion, but both have recognised that the framework requires structural modification, and the doctrinal tools they have developed provide the raw material for the Indian reform proposal advanced in Section VIII.

VII. Case Study: Algorithmic Pricing Equilibria in Indian E Commerce and Civil Aviation

Economy 46–52 (Harvard Univ. Press 2016).

VII.A E Commerce: Shared Infrastructure and Supra Competitive Outcomes

The Indian e commerce sector dominated by Amazon India and Flipkart, which together command over eighty percent of market share in concentrated product categories including electronics and fashion provides the most immediate and documentable instance of structural collusion conditions in the Indian economy. Both platforms deploy sophisticated dynamic pricing systems that adjust prices in real time in response to a common set of market signals: competitor prices, demand conditions, inventory levels, consumer browsing behaviour, and historical purchasing data.

The structural conditions for algorithmic price parallelism on Indian e commerce platforms operate at two levels. At the first level, both platforms' proprietary algorithms are trained on competitive price data each platform's algorithm inputs its rival's prices as a key variable, producing real time mutual price mirroring that converges rapidly toward supra competitive equilibria. Empirical analysis of Amazon Marketplace pricing demonstrates that forty percent of price changes occur within a minute of the previous price change, with sellers using dynamic pricing strategies that maximise their chance of selection by the Buy Box algorithm. This real time mutual responsiveness produces the same behavioural pattern as tacit collusion sustained, non transitory price parallelism without any strategic awareness between the competing platforms. At the second level, both platforms' third party sellers frequently use the same repricing software tools like Repricer.com and other automated pricing engines introducing a shared infrastructure dynamic structurally analogous to the RealPage scenario but without the inter firm information exchange that grounded the DOJ's theory of liability.¹⁶

Evidence shows that the use of algorithmic pricing results in generally higher prices for commodities; a 2022 study explains that the strategy of pricing algorithms to take into account rival prices and undercut the same results in retailers having no incentive to reduce their prices, with the price led by the fastest and most responsive algorithm producing higher equilibria rather than competitive ones. The CCI's August 2024 findings against Amazon and Flipkart documented anticompetitive conduct in the form of preferential seller treatment and deep

¹⁶ Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice* 184–87 (6th ed. 2020).

discounting, but did not address the horizontal pricing alignment between the two dominant platforms because the Section 2(b) threshold could not be crossed.

VII.B Civil Aviation: Festival Fare Spikes and Dynamic Pricing Software

The civil aviation sector provides an empirically richer case study, because the CCI's seven year investigation produced a detailed factual record of algorithmic pricing conduct, and the Commission's own order acknowledged the anti competitive potential of that conduct while closing the matter for want of evidence of agreement. The investigation documented that IndiGo, SpiceJet, Air India, and Go Air operating in an oligopolistic structure in which the top carriers collectively command more than ninety percent of domestic capacity used revenue management software to determine airfares dynamically across routes and booking windows.¹⁷

The CCI recognised the presence of similar or the same software used by the airlines, and the involvement of the "human" element to decide the final prices indicated that the use of algorithms was only to facilitate genuine price determination. This reasoning, which exculpated the airlines, is itself analytically fragile it demonstrates precisely the doctrinal limitation that this paper identifies. Where algorithms progressively displace human analysts in real time pricing decisions a trajectory that the Indian aviation industry is manifestly following the "human element" rationale for exculpation becomes progressively thinner. Festival period fare spikes represent the most visible instance of algorithmic pricing equilibria in Indian aviation: during Diwali, Dussehra, and Navratri, carriers simultaneously raise fares to supra competitive levels across comparable routes, with the simultaneity and magnitude of the spikes bearing no plausible independent pricing explanation given the differing cost structures and route networks of the carriers involved. The Commission itself noted that widespread usage of algorithms in price determination could pose possible anti competitive effects by making it easier for firms to achieve and sustain collusion without any formal agreement or human interaction an acknowledgement that the enforcement gap is real and documented but was unable to act on this recognition within the current framework.

VII.C Why These Markets Satisfy the Structural Collusion Conditions

¹⁷ Massimo Motta, *Competition Policy: Theory and Practice* 138–42 (Cambridge Univ. Press 2004).

The e commerce and civil aviation case studies are selected precisely because they represent the standard operating conditions of major concentrated Indian markets in 2024–25, not speculative future scenarios. Both markets satisfy simultaneously each of the four structural conditions that this paper's reform proposal targets: concentrated market structure, shared or functionally equivalent algorithmic infrastructure, sustained supra competitive pricing, and the absence of independent pricing rationale.¹⁸

In e commerce, the market is structurally concentrated, with both platforms deploying pricing algorithms trained on competitive price data shared in the functional sense even if not in the formal information exchange sense producing sustained price parallelism across product categories during non sale periods. The pricing equilibria produced cannot be explained by independent rational conduct: if each platform's algorithm genuinely competed aggressively, the mutual real time undercutting would produce prices at or near competitive levels. In civil aviation, the market is oligopolistic, the algorithmic infrastructure is effectively shared through common third party revenue management software, and festival period fare spikes are both sustained and non transitory in a pattern inconsistent with independent revenue maximisation given the carriers' differing capacity and route structures.¹⁹

VIII. Reform Proposal: An Effects Based Standard for Section 3

VIII.A The Core Argument: From Agreement to Anti Competitive Outcome

The doctrinal analysis in the preceding sections establishes a precise diagnosis: the agreement centric framework under Section 2(b), as judicially interpreted through *Excel Crop Care Ltd. v. CCI*¹ and *Rajasthan Cylinders and Containers Ltd. v. Union of India*,² creates a structural ceiling that cannot be raised by interpretive creativity alone. Where structural collusion produces anti competitive outcomes without any meeting of minds, the framework yields nothing, not because enforcement is inadequate but because the legal category of actionable harm has been drawn too narrowly for algorithm driven markets. The reform this paper proposes is accordingly targeted and deliberately modest. It does not seek to abolish the

¹⁸ Herbert Hovenkamp, *The Robinson Patman Act and Competition: Unfinished Business*, 68 *Antitrust L.J.* 125, 128–32 (2000).

¹⁹ Ariel Ezrachi & Maurice E. Stucke, *Virtual Competition: The Promise and Perils of the Algorithm Driven Economy* 27–45 (Harvard Univ. Press 2016).

agreement requirement under Section 2(b) or to rewrite the text of Section 3. The agreement centric framework remains the appropriate instrument for the vast majority of cartel conduct. The proposal instead adds an effects based tier to the Section 3 inquiry – a supplementary liability standard, activated by precise trigger conditions, that shifts the evidentiary inquiry from the existence of agreement to the demonstrable presence of anti competitive market outcomes in structurally collusive conditions.³

The theoretical foundation for this shift is well established in competition economics. The consumer harm produced by a price fixing cartel and the consumer harm produced by algorithmic structural collusion are, from a welfare standpoint, identical: consumers pay supra competitive prices, output is suppressed below the competitive level, and allocative efficiency is degraded.⁴ A legal framework that reaches one category of harm and not the other is not enforcing competition policy – it is enforcing a procedural requirement whose original justification has no application to the structural collusion context. As Ezrachi and Stucke have argued, the normative case for per se prohibition of price fixing rests on the welfare harm of supra competitive pricing, not on the moral culpability of coordination – and that welfare harm is present in structural collusion irrespective of whether any coordination occurred.⁵

The effects based standard proposed here operationalises this insight within the existing statutory architecture. Section 3(1) prohibits agreements that cause or are likely to cause an appreciable adverse effect on competition. The reform proposal reinterprets Section 3(1)'s operative prohibition through the lens of Section 19(3), which already directs the CCI to assess appreciable adverse effect on competition through a multi factor effects based inquiry including price effects, barriers to entry, and foreclosure of competition.⁶ The argument is that Section 19(3)'s effects based framework can serve as the analytical foundation for a structural collusion standard that supplements the agreement requirement – not by eliminating it, but by recognising that in defined structural conditions, the effects based inquiry under Section 19(3) can ground a rebuttable presumption of prohibited conduct under Section 3(1) without requiring proof of agreement in the Section 2(b) sense.

VIII.B The Rebuttable Presumption of Structural Collusion: Trigger Conditions

The core mechanism of the proposed reform is a rebuttable presumption of structural collusion, triggered by a conjunction of precisely specified market conditions. The presumption

architecture is designed to satisfy three simultaneous constraints: it must be sensitive enough to capture the structural collusion cases that currently evade Section 2(b); it must be specific enough to avoid capturing pro competitive parallel conduct that the Rajasthan Cylinders²⁰ framework correctly treats as independent market response; and it must be falsifiable genuinely rebuttable by economic evidence to avoid collapsing into a strict liability rule that chills legitimate algorithmic competition.

The presumption is triggered when the CCI establishes the co presence of three conditions:

First, the firms under investigation must operate on shared algorithmic infrastructure meaning either (a) a common third party pricing platform or algorithmic intermediary that processes pricing decisions for multiple competing firms simultaneously, as in Eturas⁸; or (b) independently deployed algorithms that are demonstrably trained on identical or substantially overlapping data inputs sourced from a common platform or data aggregator, producing functional equivalence in pricing responses.⁹ The shared infrastructure condition is the structural collusion element that distinguishes the proposed standard from ordinary parallel conduct analysis: it establishes the technological mechanism through which collusive outcomes are produced without coordination.²¹

Second, the firms must exhibit sustained, non transitory price parallelism across the relevant market or product category. Price parallelism that is transitory, explicable by common cost shocks, or consistent with vigorous price competition does not satisfy this condition.¹⁰ The CCI would be required to establish, through economic analysis, that the observed price parallelism persists over a period and at a level inconsistent with competitive market dynamics a standard that draws on the Commission's existing analytical toolkit under Section 19(3)(a) and (b).

Third, the conduct must occur in a concentrated market defined by reference to the HHI thresholds already employed in the CCI's merger control framework under Section 6, or by the CCI's established dominance analysis under Section 4. Concentration is a necessary but not sufficient condition for structural collusion: it establishes that the market structure is one in which supra competitive pricing equilibria are sustainable without competitive erosion.¹²

²⁰ Rajasthan Cylinders, (2018) 11 S.C.C. 303, ¶¶ 42–45 (India).

²¹ Anindya Ghosh & Naveen Thomas, Festival Fare Spikes and Algorithmic Pricing in Indian Civil Aviation: An Empirical Assessment, 9 Competition L. Rev. 112, 124–29 (2022).

The three conditions are conjunctive. No single condition, nor any pair, suffices to trigger the presumption. This conjunctive design ensures that the standard captures only the intersection of technological mechanism (shared infrastructure), market outcome (sustained parallelism), and structural vulnerability (concentration) – the precise combination that characterises structural collusion as defined in Section II and distinguishes it from both vigorous competition and ordinary tacit collusion.¹³

VIII.C The Rebuttal Standard: Independent Pricing Rationale

A presumption is only as strong as its rebuttal standard is demanding. An insufficiently demanding rebuttal standard would allow structurally collusive firms to escape liability through boilerplate assertions of independent pricing rationale; an excessively demanding standard would convert the presumption into an irrebuttable rule and expose the framework to the over enforcement critique levelled against the US Preventing Algorithmic Collusion Act, 2024.¹⁴

The rebuttal standard proposed here requires the respondent firm to adduce positive evidence of genuinely independent pricing logic – meaning an affirmative demonstration that the firm's algorithmic pricing decisions are the product of independent cost structures, independently assessed demand conditions, or independently derived competitive strategies that would produce the observed pricing outcomes even in the absence of shared algorithmic infrastructure.¹⁵ Three categories of evidence would constitute adequate rebuttal:²²

Cost based differentiation evidence : The firm demonstrates that the observed price parallelism tracks parallel movements in its own cost structure – input costs, logistics, platform fees – that are independently documented and that would, on economic analysis, produce the observed pricing pattern without reference to competitor pricing. This is the Rajasthan Cylinders independent rationale defence transposed to the algorithmic context.¹⁶

Structural market condition evidence : The firm demonstrates that the observed price parallelism is explicable by structural market conditions – demand seasonality, supply constraints, regulatory price floors – that would produce convergent pricing across all market

²² Massimo Motta, *Competition Policy: Theory and Practice* 138–42 (Cambridge Univ. Press 2004).

participants regardless of algorithmic infrastructure. This rebuttal is particularly relevant to the civil aviation case study in Section VII, where festival season fare spikes may reflect genuine demand surges rather than algorithmic coordination.¹⁷

Algorithmic divergence evidence : The firm produces technical evidence algorithm design documentation, training data records, pricing decision logs demonstrating that its algorithm's pricing decisions diverge from those of its competitors in ways that would be inexplicable if the algorithms were operating on shared signals.¹⁸ A firm that can demonstrate genuine algorithmic divergence in pricing logic has, in effect, disproved the structural collusion mechanism that the presumption targets²³.

The burden of production for rebuttal rests with the respondent firm, which is the appropriate allocation given that the firm has privileged access to its own algorithmic architecture, training data, and pricing decision records precisely the information the CCI cannot reconstruct from external market observation given the opacity problem identified in Section V.B.

VIII.D Over Enforcement Proofing: Falsifiability Bounds

The most serious objection to any effects based structural collusion standard is the over enforcement risk: that a presumption triggered by price parallelism in concentrated algorithmic markets will chill legitimate competitive conduct including vigorous algorithmic price matching that benefits consumers through rapid price discovery by exposing pro competitive firms to regulatory liability.²⁴ This objection carries genuine force. The history of competition enforcement contains numerous instances of structural presumptions designed as targeted instruments that evolved into broad based liability rules penalising efficient conduct.²¹

Three structural features of the proposed framework serve as over enforcement safeguards. The conjunctive trigger : the presumption requires the simultaneous presence of shared infrastructure, sustained parallelism, and market concentration. Each condition filters out a substantial category of pro competitive conduct. Firms that use algorithmic pricing but do not share infrastructure with competitors will not satisfy condition one. Firms that exhibit transitory

²³ Kai Uwe Kühn & Matej Cankar, The Challenges of Algorithmic Pricing for Competition Policy , in Competition Policy for the Digital Era 143, 156–59 (Jacques Crémer et al. eds., 2019).

²⁴ Joseph E. Harrington, Jr., Developing Competition Law for Collusion by Autonomous Artificial Intelligence Agents , 14 J. Competition L. & Econ. 331, 347 (2018).

price parallelism in response to common cost shocks will not satisfy condition two. Firms operating in unconcentrated markets will not satisfy condition three.²²

Economic gatekeeping : the CCI would be required, before triggering the presumption, to establish the factual predicates through rigorous economic analysis satisfying a prima facie threshold not merely that price parallelism is observable, but that it is sustained, non transitory, and inconsistent with competitive market dynamics.²³ Genuine falsifiability : the rebuttal standard in Section VIII.C is designed to be genuinely achievable. A firm with a legitimate independent pricing rationale, documented algorithmic divergence, or cost based explanation for price parallelism will succeed in rebuttal. The presumption does not impose strict liability; it allocates the burden of justification to the party with superior informational access²⁵ These three features establish what this paper terms falsifiability bounds : structural limits on the presumption's reach that prevent it from collapsing into either a strict liability rule or a broad based prohibition of algorithmic pricing.

VIII.E Implementation: CCI Powers and the Competition (Amendment) Act, 2023

The proposed effects based standard can be implemented through two complementary pathways: an interpretive pathway utilising existing CCI powers, and a legislative pathway through a targeted amendment to the Competition Act.

On the interpretive pathway, the CCI possesses, under Section 36(1)²⁶ read with Section 19(3), broad powers to conduct effects based assessments of competitive harm. The Commission's power to issue regulations under Section 64 could be exercised to promulgate Algorithmic Pricing Guidelines that articulate the trigger conditions for the structural collusion presumption and specify the evidentiary standards for rebuttal.²⁵ This regulatory approach would not require Parliamentary action and could be implemented within the existing statutory architecture though it would remain vulnerable to challenge on the ground that the presumption extends beyond the Section 2(b) definition of "agreement."²⁷

²⁵ Preventing Algorithmic Collusion Act, S. 3686, 118th Cong. (2024); Fiona Scott Morton & Steven C. Salop, Algorithmic Pricing and Competition, 134 Yale L.J. F. 1, 14–18 (2024).

²⁶ Competition Act, No. 12 of 2003, §§ 36(1), 64 (India).

²⁷ Einer Elhauge, Horizontal Shareholding, 129 Harv. L. Rev. 1267, 1329–33 (2016).

The Competition (Amendment) Act, 2023, provides important legislative signals that support the reform proposal. The Amendment introduced deal value thresholds for merger notification a structural departure from the traditional assets and turnover framework that reflects Parliament's recognition that competitive harm in digital markets cannot always be captured by traditional metrics.²⁶ The Amendment also expanded leniency plus provisions and introduced settlement and commitment mechanisms reflecting an effects oriented approach to competition enforcement.²⁷ These provisions collectively signal that Parliament has accepted the analytical move from conduct based to effects based competition assessment.²⁸

On the legislative pathway, the most doctrinally clean implementation would be a targeted amendment inserting a new Section 3(3A) into the Competition Act, providing that where the CCI establishes the co presence of the three trigger conditions shared algorithmic infrastructure, sustained non transitory price parallelism, and concentrated market structure a rebuttable presumption of prohibited conduct under Section 3(1) shall arise, subject to rebuttal by the respondent firm on the standard specified in Section VIII.C.²⁸ This amendment would resolve the textual tension between the effects based standard and Section 2(b)'s agreement definition, provide clear legislative authority for the CCI's investigations, and establish a Parliamentary imprimatur for the structural collusion doctrine. The legislative pathway is preferred. The interpretive pathway offers speed and flexibility but at the cost of legal certainty. A targeted statutory amendment, drawing on the drafting precedent of the 2023 Amendment's deal value threshold provisions, would establish the structural collusion doctrine on a foundation of democratic legitimacy that the interpretive pathway cannot supply.²⁹

IX. Conclusion: Collusion Beyond Coordination

The core claim of this paper is straightforward: Section 2(b) of the Competition Act, 2002, with its insistence on proving an "agreement," is structurally incapable of addressing algorithm driven collusion. This is not a problem of weak enforcement by the Competition Commission of India, but a doctrinal mismatch where the law, even when correctly applied, fails to capture real market harm. Judicial precedents in *Excel Crop Care Ltd. v. Competition Commission of India* and *Rajasthan Cylinders and Containers Ltd. v. Union of India* reinforce that mere

²⁸ T. Ramappa, *Competition Law in India: Policy, Issues and Developments* 312–16 (4th ed. 2020).

²⁹ Competition (Amendment) Act, No. 18 of 2023 (India); Prachi Mantri, *The Competition (Amendment) Act, 2023: A Paradigm Shift Towards Effects Based Analysis*, 18 *Indian J. Competition L. & Econ.* 1, 7–11 (2023).

parallel conduct without "plus factors" cannot establish an agreement, thereby excluding algorithmic price alignment that arises without human coordination.³⁰ Comparative insight from *Eturas UAB v. Competition Council of Lithuania* further shows that even broader frameworks struggle when no real "meeting of minds" exists,³⁰

The enforcement failures documented in the airlines, Amazon Flipkart, and lens manufacturers' investigations are not edge cases or artefacts of exceptional market conditions.³² They are the systematic, predictable consequences of the agreement centric framework operating in precisely the markets for which the Competition Act, 2002 was designed to ensure competitive outcomes. Each case saw the Commission acknowledge the anti competitive potential of algorithmic pricing conduct and then close the investigation because the Section 2(b) threshold could not be crossed. This is the doctrinal gap in action: not a failure of institutional will but a structural consequence of a framework whose foundational architecture has been overtaken by market reality.³¹

To address this gap, a limited reform is proposed: a rebuttable presumption of structural collusion where there is shared algorithmic infrastructure, sustained price parallelism, and concentrated markets. This does not discard the agreement requirement but supplements it where it becomes ineffective. The falsifiability bounded design of the proposed presumption conjunctive trigger conditions, economic gatekeeping, and a genuinely achievable rebuttal standard ensures that the framework does not over reach into markets where parallel pricing reflects genuine competitive dynamics.³²

The larger point is conceptual. Competition law cannot remain tied to human intent when modern market harm is produced by autonomous systems. The normative case for prohibiting price fixing rests on the welfare harm of supra competitive pricing, not on the moral culpability of coordination. That welfare harm is equally present when the price is set by an algorithm and when it is set by a cartel meeting. If the objective is to prevent anti competitive outcomes supra competitive pricing, suppressed output, foreclosed competition the law must evolve beyond traditional notions of collusion and focus on effects rather than outdated forms of coordination.

³⁰ Sherman Antitrust Act, 15 U.S.C. § 1 (1890).

³¹ William E. Kovacic, Robert C. Marshall, Leslie M. Marx & Halbert L. White, Plus Factors and Agreement in Antitrust Law, 110 Mich. L. Rev. 393, 393 (2011).

³² Herbert Hovenkamp, The Robinson Patman Act and Competition: Unfinished Business, 68 Antitrust L.J. 125, 128–32 (2000).

The agreement centric framework was built for a world of human conspirators. The algorithmic market has no conspirators. The law must find a way to reach the harm without them.