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Cleaning and Sharpening Our Antitrust Tools for the Age of AI

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AI is quickly becoming a fixture of our economy. This field of computer science focuses on performing tasks traditionally requiring human intelligence. Although consumer-facing technology like chatbots and self-driving cars dominate the headlines, AI is used across industries in less visible ways, from precision agriculture to medical diagnoses. As its applications grow, a consensus is forming that AI has the potential to speed up innovation, increase productivity and efficiency, promote price competition, and reduce entry barriers. But it may also create or enhance market power, thwart new entrants, raise prices, and foster collusion.

One salient example of AI's promise and perils is machine learning, a subset of AI that uses algorithms and statistical models to make decisions. Firms can use machine learning to fine-tune their pricing and output decisions based on real-time data, making them more responsive to changes in consumer demand. But pricing algorithms can also facilitate collusion, particularly when multiple competitors use the same algorithm.[1]

There is a debate about whether the traditional tools of antitrust are suited to distinguishing between procompetitive and anticompetitive uses of AI, particularly in the context of Section 1 of the Sherman Act. On one hand, the statute was written more than a century ago, and the tools for applying it were developed based on technologies and relationships which seem old-fashioned in the wake of AI. On the other hand, antitrust law has long emphasized function over form, and it is designed to be flexible enough to adapt to new technologies. Anticompetitive agreements facilitated by AI may not look the same as agreements made using older technologies, but they threaten many of the same harms.

This AAI commentary suggests that enforcers and courts can use existing tools to determine whether competitors' use of a common pricing algorithm violates Section 1. It urges courts evaluating allegations of algorithmic collusion to focus functionally on whether the challenged conduct interferes with individual firms' pursuit of their own independent self-interests. It also argues that algorithmic collusion should prompt us to revisit our assumptions about the difficulty of crafting legal remedies to combat oligopoly pricing. Finally, it contends that AI-powered oligopoly

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[1] *See, e.g.*, Sophie Calder-Wang & Gi Heung Kim, *Algorithmic Pricing in Multifamily Rentals: Efficiency Gains or Price Coordination?* (August 16, 2024), *available at* https://ssrn.com/abstract=4403058.

pricing should be treated as a tacit price-fixing agreement when it has collusive effects and is capable of being enjoined.

Antitrust law protects competition by ensuring that firms act in their own independent self-interest

To assess whether the existing tools of antitrust are up to the task of addressing algorithmic collusion, we must first take an inventory of those tools. Antitrust law is premised on the idea that competition is the best method of promoting consumer welfare. In a competitive market, self-interested firms strive to meet demand and attract customers, collectively taking part in a competitive process that tends naturally to drive down prices and maximize output. But this competitive process only works when firms act in their own independent self-interest. When competitors coordinate their decisionmaking instead of acting independently, they undermine the competitive process by increasing their combined economic power, enabling them to decrease output, raise prices, or degrade quality or choice at the expense of consumers.

Based on this understanding, Section 1 of the Sherman Act supports and protects the competitive process by ensuring that firms act in their own independent self-interest. It declares illegal "[e]very contract, combination . . . or conspiracy, in restraint of trade."[2] Courts have interpreted the first part of this language to require an agreement. The law has long recognized that an agreement does not need to be spoken or written down; in many cases, an agreement is a tacit, unspoken understanding that the parties recognize and adhere to.

Because all agreements restrain trade to some extent, courts have interpreted Section 1 to prohibit only those agreements that do so unreasonably. The quintessential Section 1 violation is horizontal price-fixing: an agreement between two competitors not to compete on price. Such an agreement is *per se* unreasonable because it directly undermines the competitive process. Vertical agreements between firms at different levels of a supply chain may also restrain trade unreasonably, but they usually do so indirectly rather than directly. The horizontal/vertical distinction, by itself, does not say anything meaningful about an agreement's reasonableness; what matters is the agreement's actual effects on the competitive process. In the words of the Supreme Court, Section 1 prohibits conduct which "deprives the marketplace of the independent centers of decisionmaking that competition assumes and demands."[3]

Notwithstanding Section 1's agreement requirement, it is well understood that firms can act in tandem to inhibit the competitive process even without an agreement. In an oligopoly, which is a market dominated by only a few firms, one oligopolist may reduce output or raise price, betting that its rivals will follow. And they often do, because each rival can recognize on its own that, if they each raise their prices, they will all benefit from higher prices without losing market share. Such oligopoly pricing is often called "tacit collusion" because it produces collusive effects; it undermines competition and harms consumers just like a horizontal price-fixing agreement would.[4]

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[2] 15 U.S.C. § 1 (2023).

[3] *Copperweld Corp. v. Indep. Tube Corp.*, 467 U.S. 752, 769 (1984).

[4] Although some commentators have confused "tacit collusion" with "tacit agreement," the terms reflect an important distinction: "tacit collusion" refers to collusive conduct (such as oligopoly pricing) which may not satisfy Section 1's agreement requirement; "tacit agreement" refers to an unspoken agreement, which does.

Whether oligopoly pricing should be construed as a type of tacit agreement subject to Section 1 liability is much debated. Judge Richard Posner and other leading antitrust thinkers have argued that it should, because it has all the elements of an agreement: the initial price increase by one oligopolist is an implicit offer, the matching of the increase by the remaining oligopolists is implicit acceptance, and the collective maintenance of supracompetitive prices is performance. There is a "meeting of the minds" because each oligopolist understands the mutual benefits of meeting their rivals' price increases.

Other scholars, including former DOJ Antitrust Division head Donald Turner, have contended that oligopoly pricing alone, without more, should not be treated as a tacit agreement. Turner emphasized that there is no effective legal remedy for oligopoly pricing because there is no discernable act that an antitrust court could enjoin. Judges are not equipped to set and regulate "reasonable" market prices, and they obviously cannot order firms not to react to their competitors' prices. Courts have tenuously resolved this debate by inferring a tacit agreement only when the defendants engage in communication, information sharing, or other conduct that can be enjoined.[5] The contours of this debate are useful for thinking about whether and how to impose antitrust liability for algorithmic pricing.

Because they are illegal, anticompetitive agreements are usually well hidden. Tacit agreements, by definition, are not openly acknowledged, and even express agreements are generally kept secret. This means that illegal agreements usually can be uncovered only by looking carefully at the parties' behavior. Accordingly, Section 1 plaintiffs can plausibly allege an agreement by showing that defendants behaved in a coordinated way and that their conduct is accompanied by certain "plus factors" that support an inference of a tacit or express agreement.

Some of these plus factors are the preconditions under which an agreement is possible, such as the competitors having the opportunity to communicate or to share confidential information with each other. Other plus factors logically suggest an agreement, such as competitors acting in ways that would be contrary to their own self-interest in the absence of agreement, or that can be explained only by the existence of an agreement. Because the way firms collude is constantly changing as markets and technologies evolve, there is no exhaustive list of plus factors, and no one plus factor is required.

AI enables firms to form tacit agreements to collude without communicating or sharing data

AI presents a challenge for Section 1 enforcement because it enables firms to make and carry out tacit agreements to collude without any of the preconditions of a traditional agreement. Machine-learning algorithms can standardize inputs and outputs, making complex decisions based on large inputs of segregated data. This enables firms to make decisions based on each other's data without ever communicating or sharing their data with each other. And the algorithms constantly update their outputs in real time based on each new input, meaning that firms can benefit from each other's data even when they start using the algorithm years apart, and without monitoring each other's behavior.

[5] For a concise summary of the debate, *see* ANDREW I. GAVIL, WILLIAM E. KOVACIC & JONATHAN B. BAKER, Sidebar 3-2: The Turner/Posner debate on Conscious Parallelism, in ANTITRUST LAW IN PERSPECTIVE: CASES, CONCEPTS AND PROBLEMS IN COMPETITION POLICY 302–05 (5th ed. 2024).

Because of these novel features, courts are struggling to identify AI-facilitated agreements using the traditional plus factors. Four recent cases alleging the use of algorithms to facilitate price-fixing—two in local hotel markets and two in multi-family housing markets—illustrate this struggle. In each case, plaintiffs alleged that competitors gave a common algorithm access to their non-public pricing and occupancy data, that the algorithm used that data to make pricing recommendations to each competitor, and that each competitor adopted those recommendations in most cases, leading to higher prices and more vacant units.

Each court addressed the allegations as a "hub-and-spoke" conspiracy, with express vertical "spoke" agreements between the algorithmic software provider and its customers and a tacit horizontal "rim" agreement among the customers. In the hotel cases, both district courts found that there were not sufficient plus factors to infer a horizontal rim agreement between the hotels because they started using the common algorithm years apart, did not directly share data with each other, and did not promise to accept the algorithm's recommendations in all cases.[6] In contrast, the courts in the housing cases inferred a tacit horizontal rim agreement because the landlords acted against their self-interest in two ways: by giving non-public pricing and occupancy data to a third party they knew was making pricing recommendations to their competitors, and by raising prices even when doing so meant leaving housing units unoccupied.[7]

Both courts in the housing cases found that the lack of other plus factors was not controlling in light of how the algorithms work. Because the algorithm recommends prices to each landlord based on the non-public information of the others, it did not matter that the landlords did not share information directly with each other; they still benefited from each other's non-public information through their use of the algorithm. And although they were not bound to adopt the algorithms' recommendations, they adopted them most of the time, and frequently enough to reduce output and raise prices above competitive levels. Although the courts did not specifically address the timing of when each landlord started using the algorithm, the fact that they were spread out over years also was not controlling.

AI-powered collusion invites a reexamination of traditional assumptions

These cases provide an important example of how courts should assess plus factors functionally, not formalistically. Distinguishing between procompetitive and anticompetitive applications of AI requires a practical approach, taking into account how the technology actually works. Courts should not assume that AI-powered collusion looks the same as collusion using older technologies.

These cases also present an opportunity to revisit Turner's argument that oligopoly pricing defies administrable remedies. The alleged schemes readily lend themselves to injunctive relief: the hotels and landlords can be enjoined from using the same algorithmic pricing provider. Of course,

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[6] *Gibson v. Cendyn Grp.*, No. 2:23-cv-00140-MMD-DJA, 2024 U.S. Dist. LEXIS 83547 (D. Nev. May 8, 2024), *appeal docketed*, No. 24-3576 (9th Cir. June 7, 2024); *Cornish-Adebiyi v. Caesars Ent. Inc.*, No. 1:23-cv-02536-KMW-EAP, 2024 U.S. Dist. LEXIS 178504 (D.N.J. Sept 30, 2024), *appeal docketed*, No. 24-3006 (3rd Cir. Oct. 29, 2024).

[7] *In re RealPage, Inc. (Rental Software Antitrust Litig. (No. II))*, 709 F. Supp. 3d 478 (M.D. Tenn. 2023); *Duffy v. Yardi Systems, Inc.*, No. 2:23-cv-01391-RSL, 2024 U.S. Dist. LEXIS 219629 (W.D. Wash. Dec. 4, 2024).

more complicated problems may arise, such as when two or more pricing algorithms learn to collude with each other. But contemporary research suggests that the threat of separate algorithms learning to collude is less immediate than the threats of collusive effects from horizontal competitors sharing a common algorithm.[8] In the case of competitors' use of a common algorithm, at least, we should not assume that AI-facilitated oligopoly pricing is incapable of being remedied under Section 1. We should recognize it as a tacit price-fixing agreement when it has collusive effects and can be enjoined.

As AI's applications proliferate, our antitrust laws will continue to be tested. Now is the time to clean and sharpen our tools. We must protect the competitive process, ensuring that AI is not used in ways that deprive the marketplace of independent centers of economic decisionmaking. This means revisiting traditional assumptions about what tacit agreements look like and how tacit collusion may be addressed.

[8] *See, e.g.*, Ibrahim Abada, Joseph E. Harrington Jr., Xavier Lambin & Janusz M Meylahn, *Algorithmic Collusion: Where Are We and Where Should We Be Going?* (July 10, 2024), *available at* https://ssrn.com/abstract=4891033.