Economic Terminators: The Futility of American Antitrust Law in an AI-driven Economy

Isaac Appel*

I. INTRODUCTION

Popular media in the 1990s was obsessed with the idea of humanity's creations turning against itself. Three of the most successful films in the history of American cinema

* J.D. Candidate, University of Iowa College of Law, 2025; B.A. University of Pittsburgh, 2022. I'd like to thank everyone at the Journal of Corporation Law for their invaluable help in bringing my piece into fruition. Thank you to Professor Sean P. Sullivan for his valuable insight. Finally, thank you to the friends, family, and everyone else who have supported me throughout my law school experience.

have showcased this obsession, most evidently Terminator 2,[1] Jurassic Park,[2] and The Matrix.[3] While this Note does not fear the robot uprising that occurs throughout the Terminator franchise, it does fear more pernicious and unseen ways artificial intelligence (AI) might affect our lives through its market applications.

Eight years ago, Martin Stucke and Ariel Ezrachi presented several scenarios for how algorithms and AI pave the way for a new era of collusion that evades the protections of the Sherman Antitrust Act by technically not constituting an "agreement" under section 1.[4] To them, we are entering an era of collusion that makes agreements between firms obsolete, thus making the agreement requirement for prosecuting price-fixing under section 1 similarly obsolete.[5]

Part II of the Note will flesh out the way courts have examined the problem of tacit collusion in the past, and showcase how firms who adopt AI into their price-setting process ("adopters") will necessitate a new approach to the problem of tacit collusion.[6] The background portion will additionally address the academic history concerning tacit collusion and discuss the current enforcement strategies of the FTC, DOJ, and private plaintiffs.

Part III of this Note will center on the complexities of regulating tacit collusion in antitrust,[7] and revisiting the weighing that courts have done in the past when exonerating tacit collusion from the antitrust enforcement scheme.[8] Finding that modern developments in AI have brought to light new concerns that change the traditional calculus of the courts.[9] It is prudent that the culture of American antitrust law change to envelop the controversial domain of tacit collusion.[10]

In addition, Part III of this note will grapple with some of the larger philosophical concerns surrounding AI as a violator of antitrust law[11] and discuss how a proper remedy might be formed to combat such an idiosyncratic form of illegality. Particularly problematic is the problem of rogue AI that engages in tacit collusion without ever being programmed to pursue collusive activity.

This Note will additionally recommend a series of preparative, prophylactic measures that might be taken by enforcement agents, the legislature, and our judiciary to be prepared for a future dominated by algorithms;[12] and prevent a potential antitrust doomsday

---

1. TERMINATOR 2 (Carolco Pictures 1991) (describing a world where an artificial intelligence-enabled defense system programmed to defend humanity determines that humanity itself is the world's biggest threat and turns on humanity).

2. JURASSIC PARK (Universal Pictures 1993) (describing an island where scientists have genetically engineered dinosaurs to create a dinosaur zoo, only for the dinosaurs to escape and menace the creators of the park and their potential investors).

3. THE MATRIX (Warner Brothers 1999) (describing a world where humanity creates an artificial intelligence that turns on humanity, trapping it within a virtual reality and using humans as batteries).

4. ARIEL EZRACHI & MAURICE E. STUCKE, VIRTUAL COMPETITION: THE PROMISE AND PERILS OF THE ALGORITHM-DRIVEN ECONOMY 36–37 (2016).

5. *Infra* notes 9–15.

6. *Infra* Part II.A.

7. *Infra* Part III.

8. *Id.*

9. *Infra* Part II–III.

10. *Infra* Part III.

11. *Id.*

12. *Infra* Part IV.

scenario.[13] Recognizing the inherent difficulties of regulating algorithmic collusion,[14] this Note will recommend the use of artificial-intelligence-fueled analytics to aid the drafting[15] and enforcement of the proposed regulations to prevent the hypothesized emergence of AI-enabled firms use their enhanced capabilities to identify and exploit any loopholes in regulations and legislation.[16] Next, regulatory systems that can deal with creative and unpredictable collusive schemes,[17] recognizing that AI-planned collusion will exploit any vulnerability in legislation, regulations, and interpretation by courts.[18]

Part IV will carefully consider the ethical considerations discussed in the analysis portion to tailor a unique, prophylactic approach. Such an approach can avoid the potential pitfalls of attempting to regulate such a unique and cutting-edge business practice.[19]

II. BACKGROUND

While the concerns regarding big tech have been in the antitrust spotlight lately,[20] concerns regarding algorithmic collusion have slowly begun to share that spotlight.[21] The emergence of AI-enabled pricing algorithms has prompted a reinvigoration of a longstanding debate in the antitrust community: When should enforcers differentiate between lawful and unlawful collusion? This Part will overview how this question has been answered in previous cases, explain how the algorithmic collusion hypothesis presents a novel challenge to this jurisprudence, and examine how enforcers have attempted to square existing jurisprudence with the algorithmic collusion hypothesis.

A. The Sherman Antitrust Act and Tacit Collusion

Section 1 of the Sherman Antitrust Act stipulates that "[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal."[22] The prototypical conduct that Section 1 seeks to criminalize is price-fixing, when two or more firms decide

13. *Id.*

14. *Infra* Part III.

15. *Infra* Part IV.

16. Benjamin Garden, *Pricing and Artificial Intelligence: A Match Made in Heaven?*, IRIS PRICING SOLS., https://pricingsolutions.com/pricing-blog/pricing-and-artificial-intelligence-price-optimzation [https://perma.cc/A349-FP4U].

17. *Infra* Part IV.

18. Garden, *supra* note 16.

19. *Infra* Part IV.

20. Erik Hovenkamp, *Platform Exclusion of Competing Sellers*, 49 J. CORP. L. 299, 300 (2024) ("Antitrust is in the public spotlight amid concerns that it is failing to curb anticompetitive abuses by major tech platforms like Google, Amazon, and Apple."). Enforcers have shared a similar focus. *See, e.g.*, Seth Oranburg, *Antitrust Law for Blockchain Technology*, 49 J. CORP. L. 379, 379–80 (2024) (describing how the FTC, more specifically, FTC chair Lina Khan, have focused their attention on breaking up Big Tech).

21. *See* Jason Hartline, Sheng Long & Chenhao Zhang, Regulation of Algorithmic Collusion 4 (Aug. 2024) (unpublished manuscript) [https://perma.cc/FA2m-BGU9] (describing the explosion of literature on the issue of algorithmic collusion).

22. Antitrust Criminal Penalty Enhancement and Reform Act of 2004, Pub. L. No. 108-237, § 215(a), 118 Stat. 66 (codified as amended at 15 U.S.C. § 1).

to charge a price above market value to increase profits for both firms.[23] Courts have generally held that in the absence of an express agreement, no violation of section 1 is possible.[24]

Tacit collusion is the practice of firms in the same market being able to collude without an explicit agreement between the parties, allowing them to engage in price-fixing without ever having the explicit agreement that would be illegal under the Sherman Antitrust Act.[25] As far back as the 1940s it has been postulated that the American antitrust regime's allowance for tacit collusion was a crucial blind spot in antitrust jurisprudence.[26] While critics have continued to call into question this practice, tacit collusion continues to be permitted by the current antitrust regime.[27]

The courts' position on tacit collusion has been best articulated in *White v. R.M. Packer Co*.[28] In *White*, gas stations on Martha's Vineyard were able to artificially raise prices above the market rate due to unique market conditions.[29] The *White* court concluded that while anti-consumer practices were occurring as a result of collusion and the tacit nature made it impossible for the Sherman Act to provide an appropriate remedy.[30] Economists have taken solace in their belief that tacit collusion could only occur in limited and peculiar market conditions, that competitive forces would prevent a larger scale form of tacit collusion.[31]

Tacit collusion, in practice, is often unsustainable due to price cheating. Price cheating is the main force that prevents the formation of tacitly colluding cartels.[32] Cheating occurs when one cartel member decides to undercut the artificial price point and increase their market share.[33] In *White*, gas stations were able to dissuade price cheating because as soon as one station lowered its price, the rest of the stations would quickly learn of it and match that price.[34] This meant that any gas station that lowered its price would engage in a lose-lose situation where all firms received reduced profits. The court in *White* thought that this dissuasion of price-cheating was impossible to replicate on a broad scale. Most markets are much larger and more complicated than the limited market of the gas stations on Martha's Vineyard, and it would be more difficult to detect and dissuade price cheating outside of peculiar markets.[35]

---

23. *Price Fixing*, FTC, https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/dealings-competitors/price-fixing [https://perma.cc/XZ6P-T3BF].

24. HERBERT HOVENKAMP, ANTITRUST 79 (6th ed. 2017) ("Courts have held almost without exception that in the absence of an express agreement no violation of § 1 is possible. The few exceptions that exist have been dicta in cases which found an express agreement.") (emphasis omitted).

25. Steven Van Uytsel, *Artificial Intelligence and Collusion: A Literature Overview*, *in* ROBOTICS, AI, AND THE FUTURE OF LAW 155, 160–61 (Toshiyuki Kono ed., 2018).

26. Michael Blechman, *Conscious Parallelism, Signaling and Facilitating Devices: The Problem of Tacit Collusion Under the Antitrust Laws*, 24 N.Y. L. SCH. L. REV. 881, 882 (1979).

27. EZRACHI & STUCKE, *supra* note 4, at 165.

28. *See generally* White v. R.M. Packer Co., 635 F.3d 571 (1st Cir. 2011).

29. *See* EZRACHI & STUCKE, *supra* note 4, at 58 (outlining how the wealthy clientele present on Martha's Vineyard combined with the small size of the market created a perfect storm that allowed tacit collusion to occur).

30. *White*, 635 F.3d at 581, 585–86.

31. EZRACHI & STUCKE, *supra* note 4, at 59–60.

32. *Id.* at 59.

33. *Id.* at 35.

34. *White*, 635 F.3d at 579.

35. *Id.* at 580.

In deciding *White*, the court relied heavily on the decision in *Brooke Grp. Ltd. V. Brown & Williamson Tobacco Corp.* (the seminal case exonerating tacit collusion from liability under the Sherman Act).[36] In *Brooke Grp.*, the court refused to extend competition law to restrict tacit collusion, stressing the incredible difficulty of organizing a predatory pricing scheme without an express agreement.[37] The decision in *Brooke Grp.,* to this day, is considered the seminal case outlining American jurisprudence surrounding tacit collusion and positions the decision not to extend antitrust law to cover tacit collusion. The decision to not extend antitrust law to restrict tacit collusion is based on the practical difficulties of enforcement, not a determination that regulation of tacit collusion is undesirable.[38] If this Note can identify a way to regulate tacit collusion while evading the practical considerations outlined by the relevant antitrust jurisprudence, then none, or at least very few, of the previous criticisms of antitrust reform will remain applicable.

B. The Algorithmic Collusion Hypothesis

The *Brooke Grp.* and *White* courts could not have accounted for the impact of AI in complicating the antitrust analysis. Firms have begun to adopt advanced AI in the form of pricing algorithms to help determine the prices of products.[39] While these pricing algorithms still occasionally exhibit growing pains,[40] it is evident that pricing algorithms are the future of commerce.[41] Lawsuits have already started cropping up that deal with the issue explicitly.[42] The worry for antitrust regulators is that the proliferation of algorithmic pricing models could exponentially expand the number of markets susceptible to algorithmic collusion,[43] and the cases in court today could be the tip of the iceberg.

Researchers recently analyzed the effect of algorithmic pricing models on German gas stations, which were early adopters of algorithmic pricing models.[44] Their results

---

36. *Id.* at 575.

37. Brooke Grp. Ltd. v. Brown and Williamson Tobacco Corp., 509 U.S. 209, 222–28 (1993).

38. *Id.* at 227–30.

39. *See generally* Garden, *supra* note 16.

40. Marco Bertini & Oded Koeningsberg, *The Pitfalls of Pricing Algorithms*, HARV. BUS. REV. (Sept.-Oct., 2021), https://hbr.org/2021/09/the-pitfalls-of-pricing-algorithms [https://perma.cc/Q4JX-6VWB] ("Unfortunately, algorithms occasionally go rogue and come up with figures no one would ever pay—from $14,000 for a cabinet listed on Wayfair to almost $24 million for a textbook offered on Amazon. But such snafus are just one of the risks when companies entrust decision-making to computers.").

41. *See* Salil Mehra, *Antitrust and the Robo-Seller: Competition in the Time of Algorithms*, 100 MINN. L. REV. 1323, 1326 (2016) (describing how algorithmic pricing will become increasingly advanced as the abilities of computers advance); *see also* Press Release, Monopolkomission, Monopolies Commission: Digital Change Requires Legal Change Regarding Price Algorithms, the Media Sector and the Supply of Medicines (July 3, 2018) (describing how prices are increasingly reliant on algorithms).

42. *Infra* Part II.

43. *The New Invisible Hand? The Impact of Algorithms on Competition and Consumer Rights Before the Subcomm. on Competition Policy, Antitrust, and Consumer Rights*, 118th Cong. 5 (2023) (statement of The Honorable Bill Baer) ("[An AI pricing algorithm] gathers publicly available pricing information about its competitors; and 'learns' in nanoseconds that price competition does not get you there, stops discounting, and stabilizes prices—even in markets where the number of firms previously would have made oligopolistic pricing–tacit collusion—unsustainable.").

44. Stephanie Assad et al., *Algorithmic Pricing and Competition: Empirical Evidence from the German Retail Gasoline Market* 7–9 (CESifo Working Paper No. 8521, 2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3682021.

showed that in duopolistic settings where both firms adopted algorithmic pricing, both firms saw an increase in profit margins of around 30%.[45] In comparison, in a duopolistic setting where only one dominant firm adopted algorithmic pricing, the adopter saw no increase in profit margin. After analyzing the data and relevant economic metrics, the study attributed the 30% increase to tacit collusion amongst the duopolies.[46] At the very least, this analysis indicates a strong relationship between algorithmic pricing models and anti-consumer outcomes in a duopolistic setting. As AI progresses and begins to make more and more advanced inferences, these forms of tacit collusion may be able to move into increasingly larger and more complex markets.[47] Other studies have made similar findings.[48]

The advancement of technology-enabled offenses has historically created a "time-gap" issue in enforcement that allows undesirable actions to occur while regulators decide how to properly regulate them.[49] This raises the incentive on enforcers to be prepared to form an algorithm advanced enough to collude. This is the exclusive period of time for legislators and regulators to prepare and fine-tune their approach to prepare and combat collusive price increases.

At the core of competition is distrust between competitors and other psychological impulses that drive and sustain competition.[50] These competitive psychological influences are a key method by which competition is sustained.[51] However, as profit-maximizing AIs start to dominate the decision-making in firms, that distrust should begin to absolve itself; as firms will be able to make advanced inferences about their competitor's behavior (and vice versa).

Stucke and Ezrachi have outlined several relevant theories for how algorithms might evade regulator enforcement.[52] This note focuses on two: the digital eye scenario and secondary algorithmic collusion.

The digital eye scenario raises a question concerning the deployment of machine learning in pricing algorithms.[53] In the digital eye scenario, there is zero collusive intent amongst the independent parties.[54] The pricing algorithm is created to optimize the price

45. *Id.* at 42–43.

46. *Id.*

47. *The New Invisible Hand?, supra* note 43.

48. *See generally* Emilio Calvano et al., *Artificial Intelligence, Algorithmic Pricing, and Collusion*, 110 AM. ECON. REV. 3267 (2020) (finding that some pricing algorithms can learn to collude); *see also* Martino Banchio & Giacomo Mantegazza, *Adaptive Algorithms and Collusion via Coupling*, *in* PROCEEDINGS OF THE 24TH ACM CONFERENCE ON ECONOMICS AND COMPUTATION 208 (2023), https://doi.org/10.1145/3580507.3597726 (developing a theory of explaining collusive behavior of algorithms by statistical linkage).

49. Pierre Kirsch, *The Technology Innovation Time Gap in Competition Law Enforcement: Assessing the European Commission's Approach*, *in* ALGORITHMIC ANTITRUST 155, 155–56 (Aurelien Portese ed., 2022).

50. *See generally* Christopher Leslie, *Trust, Distrust, and Antitrust*, 82 TEXAS L. REV. 515 (2004) (describing the prisoner's dilemma that typifies competition in the absence of trust).

51. Bonte Werner, Sandro Lombardo & Diemo Urbigm, *Economics Meets Psychology: Experimental and Self-Reported Measures of Individual Competitiveness* 2–3 (Univ. of. Wuppertal., Schumpeter Sch. of Bus. and Econ., Working Paper No. 2016-006, 2016), https://www.econstor.eu/bitstream/10419/156157/1/875712592.pdf.

52. *See generally* EZRACHI & STUCKE, *supra* note 4.

53. *Id.* at 71.

54. *Id.* at 78.

of a good and, in following that prerogative, subtly signal other similarly advanced AIs to generate a collusive regime.[55]

In 2023, Stucke and Ezrachi theorized another form of algorithmic collusion that they term "secondary algorithmic collusion."[56] This theory extends the traditional "hub and spoke" collusion scenario[57] by arguing that even if competitors used distinct hubs for their pricing decisions, the enhanced inferential ability of these hubs would decrease economic uncertainty and drive up prices.[58] By using distinct hubs with similar inferential capabilities, the authors believe that a collusive environment could still occur and, if it did, antitrust law would be even more unwieldy against it than it is in single-hub cases.[59]

These scenarios have been derisively called "terminator" scenarios without a basis in reality.[60] However, in analyzing these scenarios, this Note will argue that these scenarios are not merely the product of an overactive imagination but rather a real possibility that requires an enforcement regime capable of preventing it. Examining the relevant research and literature on this topic, the consensus is that these worries are not paranoia but rather an apt analysis of the market when AI is offered the keys to the kingdom.[61]

C. Enforcement Posture of the DOJ and FTC

There are two principal enforcers of federal antitrust law: the Federal Trade Commission (FTC) and the Department of Justice (DOJ).[62] Only the DOJ has the jurisdiction to bring criminal actions against antitrust defendants.[63] Only the FTC can enforce the FTC Act, which is designed to gap-fill enforcement against anti-competitive practices not

---

55. *Id.*

56. *See generally* Ariel Ezrachi & Maurice E. Stucke, *The Role of Secondary Algorithmic Tacit Collusion in Achieving Market Alignment* (Univ. of Oxford, Working Paper No. CCLP(L)54, 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4546889 (discussing the role of secondary algorithmic collusion in achieving market alignment).

57. For a larger discussion on the hub and spoke theory of liability, see *infra* Part II.D.4.

58. Ezrachi & Stucke, *supra* note 56.

59. *Id.*

60. FTC, Speech at Howard University School of Law, Algorithmic Collusion, Competition and Consumer Protection in the 21st Century (Nov. 14, 2018); *see generally* John A. Fortin, *Algorithms and Conscious Parallelism: Why Current Antitrust Doctrine is Prepared for the Twenty-First Century Challenge Posed by Dynamic Pricing*, 23 TUL. J. TECH & INTELL. PROP. 1 (2021) (using Wall-E, Westworld, and other pop-culture examples to dismiss algorithmic collusion concerns as fantastical).

61. *See generally* Assad et al., *supra* note 44; Calvano et al., *supra* note 48; Banchio & Mantegazza, *supra* note 48.

62. *The Enforcers*, FTC, https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/enforcers [https://perma.cc/8747-VRTD] (identifying the FTC and the DOJ as the two federal enforcers of federal antitrust law).

63. *DOJ and FTC Jurisdictions Overlap, but Conflicts are Infrequent*, UNITED STATES GAO (Jan. 2023), https://www.gao.gov/assets/820/814486.pdf [https://perma.cc/XYZ2-JHME] ("While DOJ is solely responsible for the enforcement of criminal violations, both agencies carry out civil enforcement. DOJ's authority to perform civil and criminal enforcement stems from the Sherman and Clayton Acts, while FTC's enforcement authority stems from section 5 of the FTC Act.") (citing language from the Sherman, Clayton, and FTC Acts). The importance of criminal prosecution of Section 1 violations will be further discussed in the Analysis portion of this Note.

prohibited by the Sherman Act.[64] Problematically, attempts to enforce the FTC act against cartel-like behavior (e.g. tacit collusion) have historically been unsuccessful.[65] The two enforcers have been attempting to "iron out" which enforcer will lead antitrust enforcement on AI-related competition issues, but it has not been decided.[66]

A renewed attempt to enforce the FTC Act against algorithmic collusion is unlikely given how the FTC has postured itself toward algorithmic collusion. The FTC indicated that AI does not pose a novel problem for competition law.[67] In the mind of FTC leadership, the possibility of tacit collusion is not a relevant consideration because it "do[es] not offend traditional antitrust norms" and "everywhere the word 'algorithm' appears, please just insert the words 'a guy named Bob.'"[68] In the view of the FTC, the potential of tacit collusion amounts to nothing more than "using computer algorithms to look carefully at the world around you before participating in markets."[69]

Both the FTC and the DOJ have been slow to admit concern about the problem of algorithmic collusion. The FTC launched a probe into generative AI but seemed to be more concerned about more traditional market concentration concerns, and not about the competition concerns of AI-enabled pricing algorithms.[70] The DOJ has launched a probe into "AI and Competition," but has not clarified precisely how this probe is directed.[71]

D. Outlook for Current Litigation

The DOJ appears to have stepped up to the plate on the prevention of algorithmic collusion, warning adopters as far back as spring 2022, with potential enforcement actions against the use of pricing algorithms.[72] The DOJ warning was followed up with an antitrust

64. *Id.* at 4 ("The FTC Act also addresses other practices that harm competition, but that may not clearly fit into categories of conduct formally prohibited by the Sherman Act, as determined by the FTC. Only the FTC can bring a case under the FTC Act.") (citations omitted).

65. *See* Herbert Hovenkamp, *The Federal Trade Commission and the Sherman Act*, 62 FLA. L. REV. 871, 882 (2010) (finding that while enforcing the FTC Act against cartel-like behavior may be advantageous, efforts by the FTC to do so have not been met with success).

66. Danielle Kaye, *FTC's AI Probe Fails to Resolve Antitrust Enforcer Turf Tussles*, BLOOMBERG L. (Jan. 31, 2024), https://news.bloomberglaw.com/antitrust/ftcs-ai-probe-fails-to-resolve-antitrust-enforcer-turf-tussles (on file with the *Journal of Corporation Law*).

67. *See generally* MAUREEN K. OHLHAUSEN, SHOULD WE FEAR THE THINGS THAT GO BEEP IN THE NIGHT? SOME INITIAL THOUGHTS ON THE INTERSECTION OF ANTITRUST LAW AND ALGORITHMIC PRICING 10 (2017), ftc.gov/system/files/documents/public_statements/1220893/ohlhausen_-_concurrences_5-23-17.pdf [https://perma.cc/2HUS-QVFU] (elucidating the FTC's approach as "everywhere the word 'algorithm' appears, please just insert the words 'a guy named Bob'").

68. *Id.* at 11.

69. *Id.*

70. Press Release, FTC, FTC Launches Inquiry into Generative AI Investments and Partnerships (Jan. 25, 2024), https://www.ftc.gov/news-events/news/press-releases/2024/01/ftc-launches-inquiry-generative-ai-investments-partnerships [https://perma.cc/6TGY-E8SU].

71. Leah Nylen, *AI Antitrust Probes Are Underway, DOJ Says Without Specifying*, BLOOMBERG L. (Jan. 31, 2024), https://news.bloomberglaw.com/antitrust/ai-antitrust-probes-are-underway-doj-says-without-specifying (on file with the *Journal of Corporation Law*).

72. *DOJ's Kanter Warns Over Price Algorithms & AI*, COMPETITION POL'Y INT'L (May 8, 2022), https://www.competitionpolicyinternational.com/dojs-kanter-warns-over-algorithmic-price-fixing-ai [https://perma.cc/2QF2-BZGM].

action against Agri Stats, Inc.,[73] followed by the filing of a statement of interest against Realpage.[74] In early 2024, the DOJ and the FTC began to team up, filling joint statements of interest in *Duffy v. Yardi* and *Cornish-Adebiyi v. Caesars Entertainment*.[75] The new-found activist stance of enforcers may not be a sign of optimism, but rather a sign of desperation.[76]

1. United States v. Agri Stats

In *Agri Stats*, the DOJ's case has centered on the "information exchange" theory of liability.[77] In this scenario, competitors agree to share competitively sensitive information with an intermediary with the hope that the intermediary recommends a collusive output recommendation—and therefore a collusive price.[78] The DOJ alleges that Agri Stats acted as an illegal information exchange by receiving competitively sensitive information from competitors and essentially giving all competitors the same advice, restricting quantity, and raising prices.[79] These information exchanges are well-established to be able to establish liability under section 1 of the Sherman Act.[80] Spectators have likened *Agri Stats* to the *Realpage* case, and speculate that the result of *Realpage* will determine the result of *Agri Stats*.[81]

2. Gibson v. MGM Resorts International

In late 2023, the United States District Court of Nevada heard *Gibson v. MGM Resorts International*.[82] In *Gibson*, two consumer-victims[83] of alleged algorithmic collusion filed

---

73. *See generally* Second Amended Complaint, United States v. Agri Stats, Inc., No. 23-cv-03009 (D. Minn. Nov. 15, 2023).

74. *See generally* Statement of Interest of the United States, *In re* Realpage, Rental Software Antitrust Litig., No. 23-MD-3071 (M.D. Tenn. Nov. 15, 2023).

75. *See generally* Statement of Interest of the United States, Duffy v. Yardi Systems, Inc., No. 23-cv-01391 (W.D. Wash. Mar. 01, 2024); *see also* Statement of Interest of the United States at 1–2, Cornish-Adebiyi v. Caesars Entertainment, Inc., No. 23-cv-02536 (D.N.J. Mar. 28, 2024).

76. It makes sense that enforcers would feign optimism when they are currently testing their liability theories in the courts. If enforcers conceded that antitrust jurisprudence, as it currently sits, cannot adequately be squared with modern forms of tacit collusion, that would surely deck the credibility of any of their arguments in court.

77. Many information exchanges have been found to be disallowed by the Sherman Act. *See e.g.*, United States v. U.S. Gypsum Co., 438 U.S. 422 (1978); *see also* Todd v. Exxon Corp., 275 F.3d 191 (2d Cir. 2001).

78. *See generally* United States v. U.S. Gypsum Co., 438 U.S. 422 (1978).

79. *See* Second Amended Complaint, s*upra* note 73, at 23–41.

80. *See generally U.S. Gypsum Co*., 438 U.S. at 422.

81. Katie Arcieri, *RealPage Set to Face Antitrust Suit Alleging Rental Price-Fixing*, BLOOMBERG L. (Jan. 2, 2024), https://news.bloomberglaw.com/antitrust/realpage-set-to-face-antitrust-suit-alleging-rental-price-fixing (on file with the *Journal of Corporation Law*) ("The RealPage proposed class action is expected to provide a roadmap for plaintiffs who allege price-fixing in other industries that use similar databases, such as Agri Stats Inc.").

82. *See* Gibson v. MGM Resorts Int'l, No. 23-cv-00140, 2023 WL 4455726 (D. Nev. Oct. 24, 2023). The case garnered a fair amount of attention from the antitrust community. *See* Dan Papscun, *MGM, Caesars, Top Vegas Hotels Escape Price-Fixing Allegations*, BLOOMBERG L. (Oct. 25, 2023), https://news.bloomberglaw.com/antitrust/mgm-caesars-top-vegas-hotels-escape-price-fixing-allegations (reporting on the case) (on file with the *Journal of Corporation Law*).

83. Class Action Complaint at 9, Gibson v. MGM Resorts Int'l, No. 23-cv-00140, 2023 WL 7025996 (D. Nev. 2023).

a class-action lawsuit against multiple hotel operators on the Las Vegas Strip.[84] The alleged antitrust conspiracy arose out of the hotel operator's use of algorithms to "generate room-specific pricing recommendations to Defendant Hotel Operators,"[85] which plaintiffs alleged to violate section 1 of the Sherman Act.[86] In dismissing the complaint, the court held that the lack of evidence of agreement meant there was no cognizable claim under the Sherman Act.[87] The fact that plaintiffs are having difficulty surviving the motion-to-dismiss stage on the cases most similar to the hub-and-spoke theory of liability[88] indicates that antitrust jurisprudence might be even weaker than anybody cares to admit.

In 2024, a similar class-action complaint was filed against the same defendants in *Cornish-Adebiyi v. Caesars Entertainment*.[89] This case was similar to the *Gibson* case (with the same hub for algorithmic pricing) except it concerns price-fixing in Atlantic City, rather than Las Vegas.[90] The DOJ and the FTC filed a joint statement of interest in the case, relying heavily on the theories they had already outlined in their statements of interest in *RealPage*.[91] Despite the support of the federal government, the Cornish-Adebiyi complaint ended up being dismissed in late September.[92]

3. In re RealPage

The *RealPage* litigation has been a source of optimism for enforcers, and many hope that the *RealPage* litigation is the right case for a potential judicial solution to the algorithmic collusion problem.[93] The adopter-defendants in *RealPage* operate a service whereby landlord-defendants can receive pricing recommendations (though a process similar to algorithmic collusion[94]) which has been shown to inflate prices.[95] In December of 2023, the court denied the defendant's motion to dismiss because the explicit agreement of the involved parties to share proprietary pricing information constituted an agreement within the meaning of Section 1. The DOJ filed a memo to the *Realpage* court that attempts to square

84. *Id.* at 3–4.

85. *Id.* at 4–5.

86. *Id.* at 28.

87. *See* Gibson v. MGM Resorts Int'l, No. 23-cv-00140, 2023 WL 4455726, at *2 (D. Nev. Oct. 24, 2023).

88. *See generally* Interstate Circuit, Inc. v. United States, 306 U.S. 208 (1939) (the first successful application of the hub-and-spoke theory of liability).

89. Consolidated Amended Class Action Complaint, Cornish-Adebiyi v. Caesars Entertainment, Inc., No. 23-cv-02536 (D. N.J. Jan. 29, 2024).

90. *Compare supra* note 83, *with supra* note 89.

91. Statement of Interest of the United States, *supra* note 74.

92. Cornish-Adebiyi v. Caesars Ent., Inc., No. 1:2023cv02536 - Doc. 139 (D.N.J. Sept. 30, 2024) (In dismissing the complaint, the New Jersey Court stressed the lack of evidence of a preceding agreement as damning for the plaintiffs). Difficulty surviving the motion to dismiss phase of proceedings is considered one of the key difficulties in prosecuting algorithmic collusion. *See* Barak Orbch, *Do Revenue Management Platforms Like RealPage Facilitate Illegal Algorithmic Collusion?*, PROMARKET (Apr. 18, 2024), https://www.promarket.org/2024/04/18/do-revenue-management-platforms-like-realpage-facilitate-illegal-algorithmic-collusion [https://perma.cc/CK2H-8DEJ].

93. *See* Arcieri, *supra* note 81 (describing how the RealPage plaintiffs propose to use existing law to deal with tacit collusion).

94. Statement of Interest of the United States at 1–2, *In re* Realpage, Rental Software Antitrust Litigation No. 23-MD-3071 (M.D. Tenn. Nov. 15, 2023).

95. *See generally id.* at 3.

algorithmic collusion within existing antitrust jurisprudence.[96] The memo suggests the way around the apparent gap in jurisprudence is by construing algorithmic collusion as a "tacit agreement."[97] While tacit agreements are on-paper considered agreements under section 1 of the Sherman Act,[98] they are notoriously difficult to prove.[99]

4. Litigation Outlook

While the DOJ is correct that current jurisprudence technically has looser definitions of agreement that might facilitate litigation against antitrust defendants, the evidentiary standard required to show agreement is higher in practice than it is on the books.[100] Unfortunately for enforcers and plaintiffs, the precedents they rely on have been undermined by 21st-century litigation that has led courts to demand direct evidence[101] of an agreement.[102] Problematically, algorithms that autonomously learn to collude may leave no evidence behind for enforcers to use at trial.[103] This also means that even if the *Realpage* court accepts the DOJ's theory of tacit agreement, that result is unlikely to be replicated in future litigation absent a change in how courts interpret the evidentiary requirement in Section 1 cases.

---

96. *Id.* at 1.

97. *Id.* For a joint statement of interest from the FTC and the DOJ in a similar case, see *supra* note 75 and accompanying text.

98. *See* Am. Tobacco Co. v. United States, 328 U.S. 781, 809 (1946); Bell Atl. Corp. v. Twombly, 550 U.S. 544, 553 (2007); United States v Socony-Vacuum 310 U.S. 150, 179, 252 (1940) (explaining that tacit agreements may be a "gentlemen's agreement or understanding").

99. *See generally* Christopher Leslie, *The Decline and Fall of Circumstantial Evidence in Antitrust Law*, 69 AM. U. L. REV. 1713 (2020) (surveying recent antitrust jurisprudence and finding that courts often inappropriately require direct evidence of an agreement, even when circumstantial evidence should be sufficient, particularly with respect to the tacit agreement theory of collusion); *see also* HERBERT HOVENKAMP, ANTITRUST: SIXTH EDITION 82 (2017) (outlining the ways that the legal standard has been raised so as to make it exceedingly difficult to prove agreement without direct evidence). Uncertainty around the meaning of the "tacit agreement" theory of liability has caused the term to be struck from leading treatises on antitrust law and has fueled perception of the body of law as incoherent. William Page, *Tacit Agreement Under Section 1 of the Sherman Act*, 81 ANTITRUST L. J. 593, 596–98 (2017).

100. *Id.*; *see also* Orbch, *supra* note 92 ("While courts persistently refer to the framework of parallel conduct and plus factors, it is difficult to locate judicial opinions where a court held that the plaintiff adequately alleged, let alone proved, the existence of an agreement without evidence of interdependence and coordination.").

101. Direct evidence is "evidence that is explicit and requires no inferences to establish the proposition or conclusion being asserted." Burtch v. Milberg Factors, Inc., 662 F.3d 212, 225 (3d Cir. 2011) (citations omitted). An example of direct evidence might be an email between two firms that explicitly describes a price-fixing conspiracy. Courts have acknowledged that this evidence is often unobtainable because colluding parties are often smart enough to avoid making records of their illegal agreements. *In re* Se. Milk Antitrust Litig., 801 F. Supp. 2d 705, 714 (E.D. Tenn. 2011) ("[C]onspirators seldom make records of their illegal agreements.").

102. Leslie, *supra* note 99, at 1767 ("[F]irms that have actually engaged in illegal price fixing may escape liability because courts have made it inappropriately difficult for plaintiffs to prove agreements through circumstantial evidence.").

103. Sergio Pastorello et al., *Artificial Intelligence, Algorithmic Pricing, and Collusion*, VOXEU (Feb. 3, 2019), https://cepr.org/voxeu/columns/artificial-intelligence-algorithmic-pricing-and-collusion [https://perma.cc/ZC72-Q2JX] ("[A]lgorithms leave no trace of concerted action—they learn to collude purely by trial and error, with no prior knowledge of the environment in which they operate, without communicating with one another, and without being specifically designed or instructed to collude.").

Many antitrust enforcer insiders believe that antitrust jurisprudence sufficiently accounts for these "hub and spoke" conspiracies.[104] When courts inappropriately apply heightened standards when evaluating the existence of an agreement, prosecuting an algorithmic hub and spoke conspiracy becomes incredibly difficult, even for well-resourced federal enforcers—this is precisely why the complaints in *Gibson* and *Cornish-Adebiyi* were dismissed.[105] Thus, the state of antitrust jurisprudence indicates that the current liability theories being advanced in *Realpage* or *Agri Stats* might not be the slam dunk that enforcers are hoping for. Even if their enforcement efforts are successful, they may merely usher in the next stage of algorithmic collusion through the unilateral use of proprietary, in-house, pricing algorithms or secondary algorithmic tacit collusion.

Additionally, even if these defendants are found liable, that would only account for a fraction of potential future liability.[106] This is because the theories of liability used by the DOJ in *Realpage* and *Agri Stats* are still contingent on some agreement between the parties,[107] and are therefore, inapplicable to many liability scenarios with autonomous pricing algorithms.[108] Therefore, a successful finding of liability against the defendants in *Realpage* or *Agri Stats* might further incentivize adopters to use (or develop) in-house proprietary pricing algorithms to avoid liability while still engaging in anti-competitive conduct, completely avoiding the hub and spoke problem entirely.

III. ANALYSIS

Today, adopters threaten to disrupt the carefully calibrated, but fragile, competitive equilibrium brought about by the past twenty years of antitrust litigation.[109] This Part will begin by discussing the holes in the current antitrust regime[110] and then will discuss the

104. *The New Invisible Hand?, supra* note 43, at 4 ("The good news is that, as I noted earlier, these hub and spoke conspiracies have traditionally been held to violate the antitrust law.").

105. Cornish-Adebiyi v. Caesars Ent., Inc., No. 1:2023cv02536 - Doc. 139 (D.N.J. Sept. 30, 2024) (dismissing the complaint for not providing sufficient evidence of agreement); Gibson v. MGM Resorts Int'l, No. 23-cv-00140, 2023 WL 4455726 (D. Nev. Oct. 24, 2023) (dismissing a similar complaint on similar reasoning).

106. *See* Arcieri, *supra* note 81 ("The bigger concern, in the future, is that 'machines will ultimately learn to talk to each other without human intervention and will figure out how to set prices . . . .'") (quoting William Kovacic, former FTC chair and current professor at George Washington University Law School).

107. *See generally supra* note 94 (laying out the DOJ's theory of liability in ongoing *Realpage* litigation).

108. Jay Himes, *If it's Too Good to Be True, It Probably Isn't – Particularly when "Them That's Got" Promise to Help: Artificial Intelligence Challenges to Antitrust,* 2 TECHREG CHRONICLE 1, 7 (2023) (noting that "these lawsuits seek to adapt antitrust law to emerging technology, they all involve publicly marketed algorithmic pricing services, and they seek to establish a conspiracy among the service provider and its customers. [these situations] arise from individual compan[ies] confidential adoption of AI-informed algorithmic pricing that drives marketplace decision-making").

109. *See* Andrew C. Finch, Former Acting Ass't Att'y Gen., U.S. DOJ Antitrust Division, Antitrust Enforcement and the Rule of Law 5–12 (Sept. 12, 2017), https://www.justice.gov/d9/speeches/attachments/2017/09/12/antitrust_enforcement_and_the_rule_of_law_3_0.pdf [https://perma.cc/YW7D-BN2P] (describing the various ways antitrust law has become relatively stable); *see also* Thomas Leary, Former Comm'r, FTC, Remarks Before Guidelines for Merger Remedies: Prospects and Principles, Joint U.S./E.U. Conference, The Essential Stability of Merger Policy in the United States (Jan. 17, 2002), https://www.ftc.gov/news-events/news/speeches/essential-stability-merger-policy-united-states [htttps://perma.cc/2L6B-3QEE] (arguing that the stability of staffing in the FTC has resulted in antitrust being a relatively stable field of law).

110. *Infra* Part III.A.

desirability of filing those holes.[111] Finally, this Part will conclude with a discussion on the complexity of filing the holes of the modern antitrust regime.[112]

A. Current Jurisprudence Cannot Account for The Problem Posed by Algorithmic Collusion

As previously established, current antitrust enforcement *cannot* solve the coming tacit collusion apocalypse because adopters can collude without any agreement.[113] Some have argued that Section 5 of the FTC Act's prohibition on unfair trade practices might be deployed against it.[114] But courts have consistently held that this seemingly broad statute has very narrow applications in the day-to-day competition regulation, with most relating to fraud.[115] Courts have been hesitant to expand the FTC's jurisdiction to "cartel-like behavior" such as tacit collusion.[116]

One scholar has argued that current enforcement tools might be broad enough to account for tacit collusion.[117] Citing the United States Supreme Court's decisions in *Monsanto Co. v. Spray-Rite Serv. Corp,*[118] it has been argued that there might be enough flexibility to deal with AI-enabled pricing algorithms adequately. This is the current approach being used by the DOJ and private plaintiffs in *Agri Stats* and *Realpage*, and the limits of that approach have already been discussed, in part, earlier.[119]

The limits of this theory of liability are shown best by *White v. R.M. Packer Co.*, which has previously been shown to be an analog to how an antitrust claim related to AI-enabled pricing algorithms would play out under modern jurisprudence.[120] In *White*, the court analyzed the applicability of the *Monsanto* decision and held that since the evidence could not exclude the possibility that the alleged conspirators acted independently, the behavior was nothing more than conscious parallelism and fell into the same trier of cases as *Brooke Grp.*[121] The *White* court stressed the need for evidence that "tends to exclude the possibility of independent action."[122] This means that even if current law can account for the classic hub and spoke scenario, it will be utterly ineffective on collusion that comes

111. *Infra* Part III.B.

112. *Infra* Part III.C.

113. *Supra* Part II.A.

114. *See generally* Aneesa Mazumdar, *Algorithmic Collusion: Reviving Section 5 of the FTC Act*, 122 COLUM. L. REV. 449 (2022).

115. Letter from Michael Perstchuk, Chairman of the FTC et al., to Hon. Wendell Ford and Hon. John Danforth, U.S. Senators (Dec. 17, 1980), https://www.ftc.gov/legal-library/browse/ftc-policy-statement-unfairness [https://perma.cc/29R4-UQSG].

116. Hovenkamp, *supra* note 65.

117. Christopher Hutchinson, Gulnara Ruchkina & Sergei Pavlikov, *Tacit Collusion on Steroids: The Potential Risks for Competition Resulting from the Use of Algorithm Technology by Companies*, 13 SUSTAINABILITY 951, 958 (2021).

118. Monsanto Co. v. Spray-Rite Serv. Corp, 465 U.S. 752, 768 (1984) (holding that an agreement might occur when the court can identify a "a conscious commitment to a common scheme designed to achieve an unlawful objective").

119. *See generally supra* Part II.A.

120. *Id.*

121. White v. R.M Packer Co., 646 F.3d 571, 580 (1st Cir. 2011) (quoting Matsushita Elec. Indus. Co. v Zenith Radio Corp., 475 U.S. 574, 764 (1986)).

122. *Id.* at 577 (quoting *Monsanto*, 465 U.S. at 764).

about through machine learning, which is the form of collusion this Note finds most problematic.

The most rigorous defense of current antitrust jurisprudence's ability to prevent algorithmic collusion was recently authored by John Fortin.[123] The criticism makes a variety of points, including that (1) that "the economics simply do not agree" and restates the traditionalist reasons why conscious parallelism cannot exist in non-oligopolistic markets,[124] (2) that hub and spoke conspiracies could be determined per se collusive by a jury,[125] (3) that new DOJ policies will prevent sustainable and unchallenged tacit collusion,[126] and (4) that liability can be appropriately ascribed to the engineers who create a collusive algorithm.[127] The key issue with Fortin's argument is its circularity, and most of it can be boiled down to "this is what worked in the past, it will continue to work because it worked in the past."

Beginning with Fortin's criticism of Stucke and Ezrachi's economics. Fortin restates the reasons why conscious parallelism has historically only presented itself in oligopolist markets.[128] However, the issue with Fortin's argument is that technology, even if it does not exist today, will eventually be able to make the requisite advanced inferences to overcome these historical barriers.[129] Granted, a little imagination may be required, but considering the rate of technological advancements in AI,[130] it seems highly inappropriate to claim that economic principles are somehow impervious to becoming outdated,[131] especially considering how dramatically technology can change in a single lifetime.[132]

Fortin's criticism also discusses various issues with the studies previously cited in this note. However, even if algorithms have not advanced enough for them to be proven through studies, that does not mean that algorithms might someday soon develop the ability to surpass the hurdles that prevent algorithmic collusion.[133] Especially when antitrust enforcers are being troubled by some of the more down-to-earth liability scenarios[134] it seems

123. *See generally* Fortin, *supra* note 60.

124. *See id.* at 24.

125. *Id.* at 25–26.

126. *Id.* at 26.

127. *Id.* at 28.

128. Fortin, *supra* note 60, at 24–25.

129. *See* Axel Gautier, Ashwin Ittoo & Pieter Van Cleynenbreugel, *Algorithms Aren't Colluding, Yet*, PROMARKET (July 11, 2023), https://www.promarket.org/2023/07/11/pricing-algorithms-arent-colluding-yet/ [https://perma.cc/WZ2F-2RWE] (articulating how the historical barriers to tacit collusion can be transgressed by a sophisticated AI).

130. Charlie Giattino et al., *Artificial Intelligence*, OUR WORLD IN DATA (2023), https://ourworldindata.org/artificial-intelligence [https://perma.cc/4JK5-9JUK] ("Based on the steady advances in AI technology and the significant recent increases in investment, we should expect AI technology to become even more powerful and impactful in the coming years and decades.").

131. Economics has a long history of romanticizing the power of its own principles, which has been credited as a cause of the 2008 recession. *See* Paul Krugman, *How Did Economists Get it so Wrong*, N.Y. TIMES (Sept. 2, 2009), https://www.nytimes.com/2009/09/06/magazine/06Economic-t.html (on file with the *Journal of Corporation Law*) (connecting the hubris of economists to the 2008 financial crash).

132. *See* Max Roser, *Technology Over the Long Run: Zoom Out to See How Dramatically the World can Change Within a Lifetime*, OUR WORLD IN DATA (Feb. 22, 2023), https://ourworldindata.org/technology-long-run [https://perma.cc/9YE2-GQ5Y] (describing how easy it is to underestimate the pace and potential of technological innovation over the long run).

133. *See infra* notes 144–45 and accompanying text.

134. *See supra* Part II.B.

unlikely that current antitrust jurisprudence will hold up against the collusive potential of AI, indeed, all indicators point to the conclusion that antitrust law is struggling to hold up as it is.[135]

Fortin's criticism makes similar mistakes insofar as it fails to recognize that the threshold for what constitutes an agreement has been artificially raised by 21st-century case law.[136] Fortin treats the problem as already solved, although antitrust enforcers have enough problems enforcing current antitrust laws against traditional defendants.[137] The faith that antitrust laws are written and applied in an idealistic manner is a fantasy, not so dissimilar to the dystopian worlds Fortin uses to poke fun at the algorithmic collusion hypothesis.[138]

Fortin additionally argues that the DOJ's changes to its leniency program will create stronger antitrust compliance that will prevent tacit collusion.[139] While that might aid in detecting algorithmic collusion, the bigger issue for antitrust enforcers is not whether they can detect collusion, but whether they can bring an action against it in the first place. If enforcers cannot bring a valid action against this type of collusion, why would a compliance department bother with preventing it? Especially if compliance with liability at best would lead to a net loss of lost profits,[140] why *wouldn't* businesses use collusive algorithms?

Fortin's theory that holding engineers liable for collusive "lines of code" misses the point of the algorithmic collusion hypothesis, namely that multiple algorithms programmed to maximize profit could learn to collude without instruction from engineers.[141] Additionally, even if you program computers not to collude, a highly intelligent AI programmed to maximize profit may still find ways to circumvent those protocols.[142] Even still, AI has become so advanced that not even the engineers who designed them can explain precisely how they work,[143] so the idea of prosecuting an engineer on the basis that they wrote "lines of code" is one that even the most talented prosecutor would struggle to prove and would require an absurd amount of resources.

Assuming the Supreme Court does not radically shift from prior opinions, preventing algorithmic collusion will require new tools.[144] Unfortunately, waiting for the Supreme

135. *See generally* Leslie, *supra* note 99 (describing the ways that past decisions regarding circumstantial evidence have become less influential overtime).

136. *Id.*

137. *Id.*

138. *See* Fortin, *supra* note 60, at 11 (arguing that algorithmic collusion scenarios are confined to Westworld); *supra* note 60, at 28 (comparing algorithmic collusion to Wall-E).

139. Fortin, *supra* note 60, at 26.

140. *See* Roman Inderst & Stefan Thomas, Algorithms and Antitrust: Framework with Special Emphasis on Coordinated Pricing 10–11 (May 7, 2024) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4816287 (explaining how algorithmic collusion could lead to a massive increase in profits for corporations, at the expense of consumer welfare).

141. Pastorello, *supra* note 103.

142. For a larger discussion, *see infra* note 196.

143. Will Knight, *The Dark Secret at the Heart of AI*, MIT TECH. REV. (Apr. 11, 2017), https://www.technologyreview.com/2017/04/11/5113/the-dark-secret-at-the-heart-of-ai [https://perma.cc/V7ZE-MX9X] (describing how even the engineers who design AI are unable to explain or predict its behavior).

144. Brendan Ballou, *The "No Collusion" Rule*, 32 STAN. L. & POL'Y REV. 213, 214 (2021) ("[S]ince the 1980s, federal courts under the influence of the Harvard-Chicago school of antitrust have declined to prevent or

Court to right the ship is a foolish strategy. When new technology is at stake, courts are extremely hesitant to impose additional antitrust considerations without statutory backup.[145] Courts have consistently held that antitrust doctrine has been purposefully limited to avoid the risk that innovative, legal conduct will be chilled or punished.[146] Given these new advanced pricing algorithms are admittedly an innovative practice, courts might be highly reluctant to abandon the pro-innovation principle when it comes to the problem of algorithmic collusion.

Even if there is a way to contort and torture current antitrust jurisprudence to account for algorithmic collusion, the result would only be a correspondingly incoherent schema of law. The more complicated the law becomes; the more difficult compliance becomes. Lawyers and judges already have a difficult enough time grappling with the economic dimension of current antitrust law.[147] In an antitrust world beleaguered by complexity,[148] a little clarity would be a breath of fresh air for practitioners and judges and serve legitimate efficiency interests for our courts.

B. Adopting a Policy that Prevents Tacit-Collusion is Desirable

When Professor Roger Alford of Notre Dame Law School asked ChatGPT, a highly capable chatbot that uses advanced algorithms to provide detailed responses,[149] "[H]ow do algorithms harm competition?" ChatGPT declined to exercise its Fifth Amendment right against self-incrimination.[150] Instead, ChatGPT unabashedly confessed that algorithms could harm competition by facilitating price fixing but challenged lawmakers to try to keep up with the fast pace of technological advancement.[151] ChatGPT also took Alford's query as an opportunity to slight the American legal system, opining that "the fast-paced nature of technology often outpaces regulatory measures."[152]

---

punish it. Barring an unexpected reinterpretation of the Sherman Act at the Supreme Court, those who hope to prevent further collusive price fixing in America's concentrated industries must develop new tools to do so.**"**).

145. *See* White v. R.M Packer Co., 646 F.3d 571, 577 (citing Monsanto Co. v. Spray-Rite Serv. Corp, 465 U.S. 752, 763) (finding that antitrust law has developed to avoid the chilling of legal conduct).

146. *Id.*

147. *See generally* Michael R. Baye & Joshua D. Wright, *Is Antitrust too Complicated for Generalist Judges? The Impact of Economic Complexity and Judicial Training on Appeals*, 54 J.L. ECON. 1 (2011).

148. *Id.*

149. *Chat GPT: What is it*, UNIV. CENT. ARK., https://uca.edu/cetal/chat-gpt/ [https://perma.cc/869M-WYRY].

150. *See The New Invisible Hand? The Impact of Algorithms on Competition and Consumer Rights Before the Subcomm. on Competition Policy, Antitrust, and Consumer Rights*, 118th Cong. 3 (2023) (statement of Roger P. Alford, Professor of Law, Notre Dame Law School) (discussing AI and competition while stating "[t]he algorithms themselves recognize that they pose a risk to competition. When I typed in the query '[h]ow do algorithms harm competition?,' ChatGPT unabashedly confessed to me that 'algorithms can harm competition in several ways' including by facilitating price fixing, advancing self-preferencing, suppressing the visibility of competitors, promoting information asymmetries, and creating search engine barriers to entry. The ChatGPT results concluded with a warning to lawmakers that although 'regulatory bodies . . . aim to address these issues by scrutinizing the use of algorithms . . . the fast-paced nature of technology often outpaces regulatory measures, necessitating ongoing efforts to adapt laws and regulations to protect fair competition in the digital age.' I think this Committee should take that as a challenge.") (citations omitted).

151. *Id.*

152. *Id.*; *see also* Kirsch, *supra* note 49.

It is uncontroverted that tacit collusion is undesirable. Even the FTC guide to antitrust law highlights that tacit collusion is taken very seriously in merger law.[153] Strangely, while antitrust law does not take issue with companies tacitly colluding, it does not permit mergers that might enhance the ability of firms to tacitly collude.[154] This makes evident that even though agencies and legislature seem to agree that tacit collusion is bad, they have no practical way to criminalize it.

There are two main issues to developing an enforcement strategy to restrict tacit collusion. The first is that tacit collusion could occur accidentally with advanced algorithms. In such a situation, an AI-enhanced algorithm programmed to maximize profit might be able to autonomously create a method by which it engages in tacit collusion without the consent of its creators. The solution to the autonomous nature of the concern might be to criminalize tacit collusion when that collusion could occur unintentionally, without the *mens rea* that is typically necessary for criminal liability.[155] It has been established to be a part of criminal liability under the Sherman Act by the Supreme Court.[156] While civil liability does not require a finding of *mens rea*,[157] the ineffectiveness of civil remedies to deter anti-competitive conduct, especially when that conduct is difficult to detect, is well-trodden ground in the antitrust community.[158] As widespread anticompetitive conduct without agreement is possible, any proposed solution to the algorithmic collusion problem must be sensitive to the ethical considerations of criminalizing an action lacking *mens rea*.

Historically, antitrust law in the United States has dealt with price-fixing by seeking to remove anti-competitive practices *after* they have materialized.[159] However, this ethical issue suggests that reform is needed to create an antitrust policy that operates proactively to avoid punishing innovative firms that might accidentally tacitly collude with their

153. *Competitive Effects*, FTC, https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/mergers/competitive-effects [https://perma.cc/WEM9-SAHJ].

154. *Id.*

155. *See* John Malcolm & Michael Mukasey, *The Importance of Meaningful Mens Rea Reform*, THE HERITAGE FOUNDATION (Feb. 17, 2016), https://www.heritage.org/crime-and-justice/commentary/the-importance-meaningful-mens-rea-reform [https://perma.cc/VYR6-H8XB] (highlighting the ethical considerations of criminalizing an action without a mens rea requirement). For a discussion of how the actions of A.I. evade the mens rea component of our criminal statutes, see Ugo Pagalla and Serena Quattrocolo, *The Impact of AI on Criminal Law, and its Twofold Procedures*, *in* RESEARCH HANDBOOK ON THE LAW OF ARTIFICIAL INTELLIGENCE, 399–401 (Woodrow Barfield and Ugo Pagallo eds., 2018).

156. *See* United States v. U.S. Gypsum Co., 438 U.S. 422, 442–43 (1978) (holding that criminal liability under the Sherman Act requires a finding of mens rea).

157. Roxann E. Henry, *Per Se Antitrust Presumptions in Criminal Cases*, 2021 COLUM. BUS. L. REV. 114, 122 (2021) ("The only judicial development differentiating the civil and criminal elements of liability is an inferred mens rea component.").

158. *See* D. Daniel Sokol, *Reinvigorating Criminal Antitrust?*, 60 WM. & MARY L. REV. 1545, 1550–51 (2019) (discussing how criminal sanctions are essential for proper deterrence of anti-competitive conduct and why civil remedies alone cannot create proper deterrence). Civil antitrust suits surrounding tacit collusion have already had great difficulty surmounting the motion-to-dismiss stage without the added burden of proving *mens rea*. Arcieri*, supra* note 81.

159. Patrice Bougette, Oliver Budzinski & Frédéric Marty, *Ex-Ante Versus Ex-Post in Competition Law Enforcement: Blurred Boundaries and Economic Rationale* 11 (GREDEG Working Paper No. 2024-18, 2024) ("Historically, anti-cartel enforcement in the US, as based on the Sherman Act, operates on an ex-post (adjudicatory) model.").

competitors through algorithms. A proactive measure would also be consistent with antitrust law's historical position on tacit collusion visa vis merger law.[160]

The need for proactive, rather than reactive, solutions to this problem is accentuated when it comes to policy regarding AI.[161] Proactive AI policies are necessary because it is difficult to predict how AI will develop accurately.[162] Since AI technology is constantly evolving, regulation of that technology becomes incredibly difficult as the nature of the technology evolves with innovation. Having a regime that is proactive rather than reactive is thus the most appropriate way to prevent the most harmful impacts of AI on competition.

A proactive approach is also consistent with the FTC's current approach to tacit collusion, limiting it as much as possible through merger review.[163] However, in the world proposed herein, adopters can collude regardless of the number of firms in the relevant market.[164] If there were a way to account for tacit collusion similarly to how the FTC accounts for it in the coordinated effects inquiry, that would be consistent with the United States' historical position on tacit collusion (through upstream prevention).

The second issue is the potential effect that regulation of AI might have on innovation. An overly-radical solution to the problem of tacit collusion could create a chilling effect that would reduce innovation in the field.[165] These pricing algorithms are understood to be one of the most profitable applications of AI,[166] so any supposed solution to this problem must be careful not to chill the industry to a freeze, and darken what is currently a bright spot in an overall declining VC market.[167] The prospect of limiting innovation is especially worrying in the context of antitrust law, as it is well-documented that innovation is a method that can disrupt tacit collusion.[168]

Despite the very valid worry of scaring venture capital out of the sector and stymieing innovation in AI-enabled financial technology, it should be noted that widespread

---

160. *See generally supra* notes 153–54.

161. *See generally* Gianclaudiko Malgieri & Frank Pasquale, *Licensing High-Risk Artificial Intelligence: Toward Ex Ante Justification for a Disruptive Technology*, COMPUTER L. SEC. REV., Nov. 2023, at 52.

162. Giattano et al., *supra* note 130.

163. *See* FTC, *supra* note 153.

164. *Supra* Part II.B.

165. George Bittlingmayer, *Regulatory Uncertainty and Investment: Evidence from Antitrust Enforcement*, 20 CATO J. 295, 296 (2001) (generally identifying the rationale for policy changes affecting investment capital); *see also id*. at 322–23 (specifically arguing that antitrust enforcement has an impact on investment uncertainty).

166. *See generally* Garden, *supra* note 16 (discussing how AI pricing algorithms can optimize revenue for firms in the marketplace).

167. *See* Heather Somerville, *Startups End a Bruising 2022, Stare Down Another Challenging* Year, WALL ST. J. (Jan. 1, 2023), https://www.wsj.com/articles/startups-end-a-bruising-2022-stare-down-another-challenging-year-11672527313 (on file with the *Journal of Corporation Law*) (identifying a downward general trend in venture capital investment); Chirag Chopra, Ankit Kasare & Piyush Gupta, *How Venture Capital is Investing in AI in the Top Five Global Economies – And Shaping The AI Ecosystem*, WORLD ECON. F. (May 24, 2024), https://www.weforum.org/stories/2024/05/these-5-countries-are-leading-the-global-ai-race-heres-how-theyre-doing-it/ (on file with the *Journal of Corporation Law*) (describing the boom in AI venture capital investment across American markets).

168. *See* Aurelien Portuese, *Prologue: Algorithmic Antitrust—a primer*, *in* ALGORITHMIC ANTITRUST 1, 18 (Aurelien Portuese Ed. 2022) (describing how technological innovations is the one of the few ways startups can compete with incumbent firms). This concern is even recognized by the major proponents of the algorithmic antitrust thesis. EZRACHI & STUCKE, s*upra* note 4, at 143 ("One important destabilizing feature, which could help safeguard competition, comes in the form of new technology and innovation. Indeed, the likely entry of new players or new technology could restrain the incumbents' behavior.").

algorithmic collusion would disincentivize innovation by major firms, who might refuse to innovate if they can lean on increasingly efficient collusive algorithmic strategies to maintain their profit margins.[169]

Although there is no functional economic distinction between tacit collusion and the traditional notion of price fixing under the Sherman Act,[170] the existence of an agreement makes it easier to criminalize price fixing. Modern antitrust jurisprudence hinges on the impossibility of regulating pre-existing tacit collusion, and the perceived inability of parties to maintain a pricing system dependent on tacit collusion without actual agreement.[171] The fact that the coordinated effects inquiry is a key part of U.S. merger policy[172] shows that agencies have recognized the importance of preventing tacit collusion where it may occur.

Against these two concerns lie the ideal that has grounded antitrust policy since the passage of the Sherman Act,[173] that a few companies should not be able to wield outsized power over consumers. In the case of algorithmic tacit collusion, the potential impact is unfathomable, extending to the furthest vestiges of markets and dialing up prices to milk consumers for all they are worth.[174] What the consumer once enjoyed through competition— consumer surplus—will become producer surplus through algorithmic collusion.[175] Widespread price-fixing functionally turns the parties to the collusive agreement into a multi-plant monopolist.[176] This would create unprecedented social welfare losses through widespread collusion.[177] All of the worst nightmares that motivated the passage of the Sherman Act would become realized. There must be some action to be taken to prevent this looming antitrust apocalypse, but it is equally clear that any action taken must be

169. Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 ANTITRUST L. J. 575, 587 (2007) ("[C]ompetition does not just lead firms to produce more and charge less; it encourages them to innovate as well. Competition supplies a powerful motive for innovation.").

170. Ballou, *supra* note 144, at 250 ("[T]here is no economic difference between price-fixing done explicitly and price-fixing done implicitly . . . .").

171. Brooke Grp. Ltd. v. Brown and Williamson Tobacco Corp., 509 U.S. 209 (1993).

172. William J. Kolasky, Deputy Assistant Att'y Gen., U.S. DOJ Antitrust Div., From Dead Frenchmen to Beautiful Minds and Mavericks, Address Before the ABA Section of Antitrust Law Spring Meeting (Apr. 24, 2002), https://www.justice.gov/atr/speech/coordinated-effects-merger-review-dead-frenchmen-beautiful-minds-and-mavericks [https://perma.cc/QVZ4-FYPH] (explaining the centrality of the coordinated effects inquiry). The coordinated effects inquiry and tacit collusion are inherently intertwined. *See* Donja Darai, Catherine Roux & Frédéric Schnieder, *Mergers, Mavericks, and Tacit Collusion* 2 (Cambridge Judge Bus. Sch., Working Paper No. 02/2019, 2019) ("A merger exhibits coordinated effects if it enhances the scope for tacit collusion in the post-merger market.").

173. Eleanor Tyler, *Will Antitrust Enforcers Wield a Scalpel or a Sword*, BLOOMBERG L. (Nov. 5, 2023), https://news.bloomberglaw.com/antitrust/analysis-will-antitrust-enforcers-wield-a-scalpel-or-a-sword (on file with the *Journal of Corporation Law*) ("[W]e're living through a recurrence of the fundamental power struggle that birthed the Sherman Act.").

174. *The New Invisible Hand? The Impact of Algorithms on Competition and Consumer Rights: Hearing Before the Subcomm. on Competition Pol'y, Antitrust, and Consumer Rights*, 118th Cong. 3 (2023) (statement of Roger P. Alford, Professor of Law, Notre Dame Law School) ("Algorithmic price fixing is a vehicle to facilitate and promote antitrust evil on a scale never seen before."); Inderst & Thomas, *supra* note 140, at 10–11 (explaining how algorithmic pricing can harm consumers by stymying competition).

175. Himes, *supra* note 108, at 15 ("AI-informed algorithms could routinely produce upward price pressure, transferring surplus from customers to producers.").

176. *See* PHILLIP AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW 397 (4th ed. 2021) (finding that parties to a collusive agreement behave as multi-plant monopolists).

177. *See id.* at 397–98 (describing how collusive agreements create significant welfare loss in their respective industries).

measured and well-calculated to avoid the potential drawbacks of chilling the industry; and avoid being overly punitive due to the lack of the ability to include a mens rea element to regulate this collusion.

C. Regulating AI-Enabled Pricing-Algorithms to Prevent Tacit Collusion Will Be Difficult, But Not Impossible

One of the most worrying concerns for the future is that the solution must be perfect to prevent circumvention. As more advanced AIs are created, these same AIs will increasingly become enabled to craft highly inventive and unpredictable ways to evade regulation.[178] Smart, innovative firms would be incentivized to use this technology to garner all the traditional benefits of tacit collusion while limiting the risk of detection and successful enforcement by the FTC. This might manifest, for example, by an algorithm pricing just below the amount to avoid drawing the attention of enforcers while still generating significant social welfare loss for consumers. Not only does this demonstrate the need for careful and comprehensive responses to the problem of algorithmic collusion, but it also demonstrates the desirability of algorithms and the reason why the adoption of these algorithms is inevitable.

Instead of hiring a fully-fledged legal team to avoid competition issues, AI will be able to navigate the problem more efficiently.[179] For this reason, many believe that AI has the possibility of shrinking the volume of jobs in the legal field,[180] particularly for companies who can afford a high-powered AI to help guide their decision-making process and evade regulations. These concerns underscore the need for careful and comprehensive regulation.

Given the complexity of the issue and the difficulty of tailoring a solution to the problem, it is tempting to advocate for a 'kick the can down the road' mentality. However, such a mentality is especially unhelpful here given that algorithmic collusion has already begun to creep into our markets.[181] The advancement of technology-enabled offenses has historically created a "time-gap" issue in enforcement that allows for undesirable actions to occur while regulators still grapple with how to deal with the actions.[182] The time it takes for technicians and algorithms to solve tacit collusion puts a clock on legislative action, and

178. Jon Danielsson & Andreas Uthemann, On the Use of Artificial Intelligence in Financial Regulations and the Impact on Financial Stability 17 (June 6, 2024) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4604628 ("AI is particularly effective in finding profitable loopholes and amplifying vulnerabilities, it can facilitate misbehavior that, while legal, is damaging both to society and even the institution employing the AI."); s*ee also* Cullen O'Keefe, *Law-Following AI 2: Intent Alignment + Superintelligence Lawless AI (By Default)*, EFFECTIVE ALTRUISM F. (Apr. 27, 2022), https://forum.effectivealtruism.org/posts/cEj7o9rbPjmy7CDht/law-following-ai-2-intent-alignment-superintelligence [https://perma.cc/B3ZF-MZVJ] (detailing the various ways an AI might be able to autonomously evade regulatory regimes and legislative action).

179. Danielsson & Uthemann, *supra* note 178, at 17; O'Keefe, *supra* note 178.

180. *See* Steve Lohr, *A.I. Is Coming for Lawyers, Again*, N.Y. TIMES (Apr. 10, 2023), https://www.nytimes.com/2023/04/10/technology/ai-is-coming-for-lawyers-again.html (on file with *the Journal of Corporation Law*) (discussing the ways advancements in AI can replace functions typically reserved for attorneys).

181. Assad et al., *supra* note 44 (detailing how algorithmic collusion created artificially high prices in gas stations in Germany); Papscun, *supra* note 82 (detailing how algorithmic collusion inflated hotel room pricing in Vegas).

182. *See generally* Kirsch, s*upra* note 49 (outlining the impact of time gaps in competition law enforcement).

legislators and regulators need to be to prepared, and wield the right tools, to combat tacit collusion adequately in the future.

IV. RECOMMENDATION

Forming a cohesive response to remediate the issues posed by tacit collusion is one that has been examined in the past, most recently in *In re Text Messaging Antitrust Litigation*, where Judge Posner held that tacit collusion is not illegal and "probably shouldn't be" due to the practical difficulties underlying enforcement.[183] Unfortunately, doing nothing is not an option due to the wide-reaching and potentially destructive nature of algorithmic tacit collusion.[184] To counteract this cutting-edge form of collusion, antitrust enforcers need a new toolkit for enforcement. This toolkit will need the improvement of the enforcement capacity for agencies and legislative action that gives teeth to enforcers.

A. Enforcers Must Develop the Ex-Ante Capability to Determine a Pricing Algorithm's Collusive Potential

As previously articulated, AI adopters who tacitly collude will be highly sophisticated and difficult to detect.[185] However, the intuitive answer is that the FTC and the DOJ—the principal enforcers of modern antitrust law[186]—will need to modernize. Academic discussion on this topic has largely focused on the need for enforcers to adopt an "algorithmic collusion incubator."[187] An algorithmic collusion incubator is a series of simulations whereby an agency gathers all the existing pricing algorithms in the market, and runs simulations to see how those algorithms could interact with the market and predict if and how tacit collusion might occur.[188] Further, these simulations might be able to guide legislative solutions by identifying factors that stabilize and destabilize tacit collusion.[189] What these solutions might look like has been discussed at length by others, and includes myriad potential strategies to dissuade tacit collusion.[190] To gain the upper hand on collusive algorithms, enforcers must be competitive in an algorithmic arms race with adopters.[191] Fortunately, antitrust enforcers have indicated that they are on track to modernize their detection

183. *See In re* Text Messaging Antitrust Litig., 782 F.3d 767, 874 (7th Cir. 2015) (articulating the practical issues with interpreting the Sherman Act to encapsulate tacit collusion).

184. *Supra* Part III.B.

185. Pastorello et al., *supra* note 103.

186. *See* FTC, *supra* note 62 (identifying the FTC and the DOJ as the two federal enforcers of federal antitrust law).

187. Ariel Ezrachi & Maurice Stucke, *Algorithmic Collusion: Problems and Counter-Measures*, ORG. FOR ECON. COOP. & DEV.: ROUNDTABLE ON ALGORITHMS & COLLUSION, no. 25, 2017, at 1, 3.

188. *Id.*

189. *Id.*

190. *Id.* at 27–34.

191. Eleanor Tyler, *As Pricing Bots Flex New Muscle, Antitrust Watches AI*, BLOOMBERG L. (Nov. 5, 2023), https://news.bloomberglaw.com/antitrust/analysis-as-pricing-bots-flex-new-muscle-antitrust-watches-ai (on file with the *Journal of Corporation Law*) ("AI models may make it easier for enforcers to spot market deviations with no underlying fundamental cause. The technology may also make it easier to ingest and understand complex chat traffic used to coordinate a cartel, including the use of symbols or slang, to help enforcers prove a cartel in court.").

and enforcement efforts.[192] Unfortunately, these modernization efforts are still in their infancy, and it is unclear when they will be complete.[193]

B. Enforcers Need Legislative Reform that Gives Teeth to their Fight Against Algorithmic Collusion.

Current legislation does not have the teeth to countenance enforcers in preventing adopters from exploiting the blind spot in American antitrust jurisprudence, tacit collusion.[194] Since courts have consistently held that the Sherman Act cannot be applied to tacit collusion,[195] new legislation will be required to account for the effect of adopters in the market.

Congress held a subcommittee hearing on the problem of algorithmic collusion in December 2023.[196] After a year and despite millions of dollars spent by Big Tech at minimizing antitrust reform,[197] the AMERICA Act now has broad bipartisan support.[198] The AMERICA Act is an antitrust reform that is hyper-specific to preventing "conflicts of interest and promoting competition in the sale and purchase of digital advertising."[199] Unfortunately, the AMERICA act is hyper-specific to "digital advertising" and only amends the Clayton Act,[200] meaning it would not resolve any of the issues with the Sherman Act explained earlier.[201] While broader reforms have been attempted, those reforms have been shuttered due to multi-million dollar lobbying efforts by Big Tech.[202]

AI might be used to perfect our legislative solutions.[203] Utilizing AI will be uniquely key in this instance because it would allow the government to have the same analytical power that adopters would have, and use the same AI capabilities that evade regulations to diagnose and patch difficult-to-find loopholes in policy.[204] This indicates that integrating AI into the legislative drafting process more broadly could hasten the legislative process and secure its efficacy by preventing loopholes. In developing proper regulation of AI, it

192. Thibault Schrepel, *Computational Antitrust: An Introduction and Research Agenda*, 1 STAN. COMPUTATIONAL ANTITRUST 1, 4 (2021).

193. *Id.*

194. *Supra* Part III.A.

195. *Supra* Part II.A.

196. *See generally The New Invisible Hand?*, *supra* note 150, at 1 (discussing the need for legislative action in the area of algorithmic collusion).

197. *Id.* at 5 ("At this time last year there was immense enthusiasm about potential bipartisan legislation to address Big Tech's abuse of its monopoly power. Many members of this Committee were sponsors of those legislative measures. But as we all know, Big Tech lobbyists spent over $275 million opposing those bills, and they never made it to the floor for a vote.").

198. *Id.* at 6.

199. AMERICA Act, S. 1073, 118th Cong. (2023).

200. *Id.*

201. *See supra* Part II.A.

202. *The New Invisible Hand?*, *supra* note 150, at 5.

203. *See* Joe Mariani, *AI For Smarter Legislation*, DELOITTE INSIGHTS (Sept. 22, 2022), https://www2.deloitte.com/us/en/insights/industry/public-sector/artificial-intelligence-can-benefit-the-legislative-process.html [https://perma.cc/35ZH-K74Q] (discussing the ability of AI to run simulations on legislation to predict potential issues with implementation and to suggest necessary alterations).

204. Danielsson & Uthemann, *supra* note 178, at 17 (describing how AI's ability to think differently from humans enables it to identify loopholes in rules and regulations).

is necessary that we can think like AI to sniff out the potential loopholes of legislation and prevent collusive adopters from evading regulation.

These recommendations should be adopted sooner rather than later to preserve the innovative potential of AI and prevent sunk costs. Kicking the can down the road only chills the already weakened[205] venture capital available for AI startups. While the change in policy from the status quo would certainly create a chilling effect for venture capitalists,[206] that chilling effect will also grant our enforcers more time to fine-tune their enforcement strategies and legislatures to create a comprehensive policy to give teeth to enforcement.

This paper proposes a legislative solution that (1) establishes a licensing regime equipped to handle adopters and (2) establishes an auditing practice that examines algorithms involved with suspicious price movement.

By situating the state as an adopter, the state will be able to counter the practical issues with regulation brought up by Posner in his famous opinion indemnifying policy action restricting tacit collusion.[207] This potential solution would create a licensing scheme whereby an antitrust authority (perhaps even a new agency) vets pricing algorithms before firms can implement them.[208] Those enforcers could then run the pricing algorithm through one of their "incubators"[209] to see if there is a risk of tacit collusion, and reject algorithms that are not properly programmed to avoid tacit collusion. This licensing regime would properly incentivize adopters to self-regulate their algorithms by training them to avoid collusive mechanisms to minimize producer surplus.[210] By sending these algorithms to law school,[211] we would neutralize the algorithmic threat to the longstanding hope that economic realities will prevent large-scale tacit collusion that underlies the decisions in *Brooke Grp, White*, and In re *Text Messaging Antitrust Litigation*.[212] Such a solution, tweaked and optimized by AI, could prevent algorithmic collusion from upsetting the carefully calibrated equilibrium that antitrust law currently operates.[213] Most importantly, while this solution may hinder innovation somewhat, it would do so in a manner consistent with other

205. Vishal Persaud & Melia Russell, *The Venture Capital Funding Crunch Will Continue in 2024, but it Won't Be as Bad*, BUS. INSIDER (Dec. 29, 2023), https://www.businessinsider.com/venture-capital-funding-crunch-will-continue-2024-2023-12s (on file with the *Journal of Corporation Law*).

206. Bittlingmayer, s*upra* note 165.

207. *See generally In re* Text Messaging Antitrust Litig., 782 F.3d 767 (7th Cir. 2015).

208. Licensing regimes for AI have been discussed in a limited capacity by other authors. *See, e.g.*, Markus Anderjung et al., *Frontier AI Regulation: Managing Emerging Risks to Public Safety*, ARXIV, 20–1, https://arxiv.org/abs/2307.03718 (describing at length how a licensing regime for AI might operate).

209. Ezrachi & Stucke, s*upra* note 187, at 28.

210. Himes, *supra* note 108, at 14–18.

211. Eric Johnson, *Europe's Chief Regulator Margrethe Vestager on Reining in Tech: This is the Biggest Wake-Up Call We've Ever Had*, VOX (Nov. 29, 2017), https://www.vox.com/2017/11/29/16712940/margrethe-vestager-european-commission-competition-regulation-re-code-decode-kara-swisher-podcast [https:perma.cc/C9JK-527U] ("I think some of these algorithms, they'll have to go to law school before they're let out . . . . You cannot just say, 'What happens in the black box stays in the black box.' You have to teach your algorithm what it can do and what it cannot do, because otherwise there is a risk that the algorithms will learn the tricks of the old cartels.").

212 Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209 (1993); White v. R.M. Packer Co., 635 F.3d 571 (1st Cir. 2011); *In re* Text Messaging Antitrust Litigation, 782 F.3d 767, 874 (7th Cir. 2015).

213. Finch, *supra* note 109; Leary, *supra* note 109.

government regulations aimed at protecting the public from the profit-maximizing nature of companies.[214]

A licensing regime by itself might not be able to adequately predict all the possible ways an algorithm might engage in collusive price-setting, as it is impossible to test all the possible inputs the algorithm might face in the real world when implemented.[215] As other authors have noted, the complexity of advanced algorithms has advanced to the point where examining the source code is largely unenlightening.[216] There are two non-mutually-exclusive solutions to the apparent issues with an AI licensing regime. One solution would allow firms to test their algorithms in an enforcement "sandbox."[217] In such a sandbox, enforcers could simulate and observe their collusive potentials.[218]

The second solution is a periodic audit of pricing algorithms in environments that display suspicious activity. Despite the difficulties with interpreting the actions of AI, authors have already begun to theorize empirical methods for detecting collusive behavior through advanced statistics.[219] A license revokable upon audit by an enforcer would also encourage adopters to continuously monitor the behavior of their algorithms, incentivizing private corporations to develop the capabilities to detect collusive algorithms.

Both recommendations are in line with the demands of future governance. The future is dominated by AI applications,[220] and effective policy in the digital age will depend on policymakers' ability to govern, deploy, and monitor AI systems.[221] The system laid out

---

214. Himes, *supra* note 108, at 7 ("This idea — making antitrust compliance an integral part of the design process — necessarily limits innovation. But that itself is not a particularly powerful objection. The Consumer Product Safety Commission promulgates and enforces safety standards for a wide range of products, as does the Federal Drug Administration for pharmaceutical preparations. These regulatory constraints on innovation are accepted as appropriate to protect public safety and health. Limiting design of algorithms to preserve the competitive process seems similarly tolerable as a theoretical matter.").

215. Jason D. Hartline, Sheng Long & Chenhao Zhang, *Regulation of Algorithmic Collusion*, ARXIV (Jan 28, 2024), https://arxiv.org/pdf/2401.15794 [https://perma.cc/HCC9-8FHS] ("To make better pricing decisions in vibrant market environments, the inputs to pricing algorithms are usually large in dimensions and dynamic."). However, this does not bar the possibility.

216. *Id.* at 2; *see also* Knight, *supra* note 143 (describing how even the engineers who design AI are unable to explain or predict its behavior).

217. *See generally* Pieter Van Cleynenbreugel, *Pricing Algorithms and Antitrust Enforcement: Sandboxes to the Rescue?*, CPI ANTITRUST CHRONICLE (Feb. 2024), https://orbi.uliege.be/bitstream/2268/313947/1/1-PRICING-ALGORITHMS-AND-ANTITRUST-ENFORCEMENT-SANDBOXES-TO-THE-RESCUE-Pieter-Van-Cleynenbreugel.pdf [https://perma.cc/J5ZW-RYZ6](discussing the "antitrust sandbox" approach in pricing algorithms).

218. *Id.*

219. *See e.g.* Hartline, Long & Zhang, *supra* note 215, at 9–16 (proposing a framework for auditing non-collusion for sellers).

220. Jared Cohen & George Lee, *The Generative World Order: AI, Geopolitics, and Power*, GOLDMAN SACHS (Dec. 14, 2023), https://www.goldmansachs.com/intelligence/pages/the-generative-world-order-ai-geopolitics-and-power.html [https://perma.cc/C2GW-8NXF] ("While the technology's future is uncertain, generative AI was nearly universally acknowledged as a paradigm-shifting innovation, not a fleeting trend or hype cycle. With widespread adoption and accelerating innovation, we have now entered a period we call the inter-AI years, when leaders in every sector are working to understand what generative AI will mean for them, and how they can take advantage of opportunities while mitigating risks.")

221. *See* Andrea Renda, *Governance, Government Records, and the Policymaking Process Aided by AI*, *in* HANDBOOK OF ARTIFICIAL INTELLIGENCE AT WORK: INTERCONNECTIONS AND POLICY IMPLICATIONS 291, 305–06 (Martha Garcia-Murillo, Ian MacInnes & Andrea Renda eds., 2024).

in this note could serve as a heuristic for regulating the use of AI in other contexts across the globe.

V. CONCLUSION

AI is a revolutionary technology that brings new considerations not confined to section 1 of the Sherman Antitrust Act.[222] To prevent exploitation by AI, a shift in how we have historically crafted and implemented policies and an unprecedented amount of care will be required to deal with the intricacies of these issues. This Note outlines that America can avoid a market-terminator scenario through prudent and future-oriented policymaking strategies.[223] These future-oriented policymaking strategies have the potential to prevent an antitrust apocalypse[224] but also the potential to redefine the modern regulatory regime surrounding AI. Regulating algorithmic collusion could be the tip of the iceberg.

222. *See* Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 367–73 (2016) (describing a laundry list issues that AI poses to current jurisprudence); *see supra* Part III (describing how AI can help innovative firms evade regulations).

223. *Supra* Part IV.

224. *Supra* Part III.B.