

Algorithmic Pricing Agents and Price-Fixing Facilitators: Antitrust Law's Latest Conundrum

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Are machines doing the collaborating that competitors may not?

It is an application of artificial intelligence (“AI”) that many businesses, agencies, legislators, lawyers, and antitrust law enforcers around the world are only beginning to confront. It is also among the top concerns of in-house counsel across industries. Competitors are increasingly setting prices through the use of communal, AI-enhanced algorithms that analyze data that are private, public, or a mix of both.

Allegations in private and public litigation describe “algorithmic price fixing” in which the antitrust violation occurs when competitors feed and access the same database platform and use the same analytical tools. Then, as some allege, the violations continue when competitors agree to the prices produced by the algorithms. Right now, renters and prosecutors are teeing off on the poster child for algorithmic pricing, RealPage Inc., and the many landlords and property managers who use it.

Private and Public Litigation

A Nov. 1, 2023 complaint filed by the Washington, DC, Attorney General’s office described RealPage’s offerings this way: “[A] variety of technology-based services to real estate owners and property managers including revenue management products that employ statistical models that use data—including non-public, competitively sensitive data—to estimate supply and demand for multifamily housing that is specific to particular geographic areas and unit types, and then generate a ‘price’ to charge for renting those units that maximizes the landlord’s revenue.”

The complaint alleges that more than 30% of apartments in multifamily buildings and 60% of units in large multifamily buildings nationwide are priced using the RealPage software. In the Washington-Arlington-Alexandria Metropolitan Area that number leaps to more than 90% of units in large buildings. The complaint alleges that landlords have agreed to set their rates using RealPage.

Private actions against RealPage have also been filed in federal courts across the country and have been centralized in multi-district litigation in the Middle District of Tennessee (*In re: RealPage, Inc., Rental Software Antitrust Litigation* [NO. II], Case No. 3:23-md-3071, MDL No. 3071). The Antitrust Division of the Department of Justice filed a [Statement of Interest](#) and a [Memorandum in Support](#) in

the case urging the court to deny the defendants' motion to dismiss.

Even before the MDL, RealPage had attracted the Antitrust Division's attention when the company acquired its largest competitor, Lease Rent Options for \$300 million, Axiometrics for \$75 million, and On-Site Manager, Inc. for \$250 million.

The Antitrust Division has been pursuing the use of algorithms in other industries, including airlines and online retailers. The DOJ and FTC are both studying the issue and reaching out to experts to learn more.

Journalists and Senators

Additionally, [three senators urged DOJ](#) to investigate RealPage after reporters at *ProPublica* wrote an investigative report in October 2022. The journalists claim that RealPage's price-setting software "uses nearby competitors' nonpublic rent data to feed an algorithm that suggests what landlords should charge for available apartments each day." *ProPublica* speculated that the algorithm is enabling landlords to coordinate prices and in the process push rents above competitive levels in violation of the antitrust laws.

Senators Amy Klobuchar (D-MN), Dick Durban (D-IL) and Cory Booker (D-NJ) wrote to the DOJ concerned that the RealPage enables "a cartel to artificially inflate rental rates in multifamily residential buildings."

[Sen. Sherrod Brown \(D-OH\) also wrote to the Federal Trade Commission with concerns](#) "about collusion in the rental market," urging the FTC to "review whether rent setting algorithms that analyze rent prices through the use of competitors' private data ... violate antitrust laws." The Ohio senator specifically mentioned RealPage's YieldStar and AI Revenue Management programs.

The Europeans

The European Commission has enacted the [Artificial Intelligence Act](#), which includes provisions on algorithmic pricing, requiring algorithmic pricing systems be transparent, explainable, and non-discriminatory with regard to consumers. Companies that use algorithmic pricing systems will be required to implement compliance procedures, including audits, data governance, and human oversight.

The Legal Conundrum

An essential element of any claimed case of price-fixing under the U.S. antitrust laws is the element of agreement: a plaintiff alleging price-fixing must prove the existence of an agreement between two or more competitors who should be setting their prices independently but aren't. Consumer harm from collusion occurs when competitors set prices to achieve their maximum joint profit instead of setting prices to maximize individual profits. To condemn algorithmic pricing as collusion, therefore, requires proof of agreement.

It may be difficult for the RealPage plaintiffs to prove that the RealPage's users agreed among themselves to adhere to any particular price or pricing formula, but not impossible. End users are likely to argue that RealPage's pricing recommendations are merely aggregate market signals that RealPage is collecting and disseminating. The use of the same information service, their argument will go, does not prove the existence of an agreement for purposes of Section 1 of the Sherman Act.

The parties and courts embroiled in the RealPage litigation are constrained to live under the law as it presently exists, so the solution proposed by Michal Gal, Professor and Director of the Forum on Law and Markets at the University of Haifa, is out of reach. In her 2018 paper, “Algorithms as Illegal Agreements,” Professor Gal confronts the agreement problem when algorithms set prices and concludes that it is time to “rethink our laws and focus on reducing harms to social welfare rather than on what constitutes an agreement.” Academics have been critical of the agreement element of Section 1 for years, but it is unlikely to change anytime soon, even with the added inconvenience it poses where competitors rely on a common vendor of machine-generated pricing recommendations.

Nonetheless, there is some evidence that autonomous machines, just like humans, can learn that collusion allows sellers to charge monopoly prices. In their December 2019 paper, “[Artificial Intelligence, Algorithmic Pricing and Collusion](#),” Emilio Calvano, Giacomo Calzolari, Vincenzo Denicolo, and Sergio Pastorello at the Department of Economics at the University of Bologna showed with computer simulations that machines autonomously analyzing prices can develop collusive strategies “from scratch, engaging in active experimentation and adapting to changing environments.” The authors say indications from their models “suggest that algorithmic collusion is more than a remote theoretical possibility.” They find that “relatively simple [machine learning] pricing algorithms systematically learn to play collusive strategies.” The authors claim to be the first to “clearly document the emergence of collusive strategies among autonomous pricing agents.”

The Agreement Element in the Machine Pricing Case

For three main reasons, the element of agreement need not be an obstacle to successfully prosecuting a price-fixing claim against competitors that use a common or similar vendor of algorithmic pricing data and software.

First, there is significant precedent for inferring the existence of an agreement among parties that knowingly participate in a collusive arrangement even if they do not directly interact, sometimes imprecisely referred to as a “rimless wheel hub-and-spoke” conspiracy. For example, in *Toys “R” Us, Inc. v. F.T.C.*, 221 F.3d 928 (9th Cir. 2000), the court inferred the necessary concerted action from a series of individual agreements between toy manufacturers and Toys “R” Us in which the manufacturers promised not to sell the toys sold to Toys “R” Us and other toy stores to big box stores in the same packaging. The FTC found that each of the manufacturers entered into the restraint on the condition that the others also did so. The court found that Toys “R” Us had engineered a horizontal boycott against a competitor in violation of Section 1, despite the absence of evidence of any “privity” between the boycotting manufacturers.

The *Toys “R” Us* case relied on the Supreme Court’s decision in *Interstate Circuit v. United States*, 306 U.S. 208 (1939), in which movie theater chains sent an identical letter to eight movie studios asking them to restrict secondary runs of certain films. The letter disclosed that each of the eight were receiving the same letter. The Court held that a direct agreement was not a prerequisite for an unlawful conspiracy. “It was enough that, knowing that concerted action was contemplated and invited, the distributors gave their adherence to the scheme and participated in it.”

The analogous issue in the algorithmic pricing scenario is whether the vendor’s end users know that their competitors are also end users. If so, the inquiry can consider the agreement element satisfied if the algorithm does, in fact, jointly maximize the end users’ profits.

The second factor overcoming the agreement element is related to the first. Whether software that recommends prices has interacted with the prices set by competitors to achieve joint profit

maximization—that is, whether the machines have learned to collude without human intervention—is an empirical question. The same techniques used to uncover machine-learned collusion by simulation can be used to determine the extent of interdependence in historical price setting. If statistical evidence of collusive pricing is available, it is enough that the end users knowingly accepted the offer to set its prices guided by the algorithm. The economics underlying the agreement element in the first place lies in prohibition of joint rather than individual profit maximization, so direct evidence that market participants are jointly profit maximizing should obviate the need for further evidence of agreement.

A third reason the agreement element need not stymie a Section 1 action against defendants engaged in algorithmic pricing is based on the Supreme Court’s decision in *American Needle v. NFL*, 560 U.S. 183 (2010). In that case the Court made clear that arrangements that remove independent centers of decision-making from the market run afoul of Section 1, if the net effect of the algorithm is to displace individual decision-making with decisions outsourced to a centralized pricing agent, the mechanism should be immaterial.

The rimless wheel of the so-called hub-and-spoke conspiracy is an inadequate analogy because the wheel in these cases *does* have a rim, *i.e.*, a connection between the conspirators. In the scenarios above in which the courts have found Section 1 liability i) each of the participants knew that its rivals were also entering into the same or similar arrangements, ii) the participants devolved pricing authority away from themselves down to an algorithmic pricing agent, and iii) historical prices could be shown statistically to have exceeded the competitive level in a way consistent with collusive pricing. These elements connect the participants in the scheme, supplying the “rim” to the spokes of the wheel. If the plaintiffs in the RealPage litigation can establish these elements, they will have met their burden of establishing the requisite element of agreement in their Section 1 claim.

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National Law Review, Volumess XIII, Number 324

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