

INVESTIGATIVE REPORT

THE ALGORITHMIC ARCHITECTURE OF CONTROL: AMAZON'S DUAL-USE SURVEILLANCE SYSTEMS

Exploitation and Market Manipulation

Report compiled: August 27, 2026 • For the Dark Side of Algorithms investigative series • Public interest investigation

PUBLIC INTEREST INVESTIGATION
Prepared for review and distribution

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Abstract

This report examines Amazon.com, Inc.'s deployment of algorithmic systems across two distinct but structurally analogous domains: (1) the algorithmic management and surveillance of warehouse workers within its fulfillment center network, and (2) the algorithmic curation of its third-party marketplace through the "Buy Box" mechanism, search ranking bias, and secret pricing algorithms. Drawing on internal documents, federal and state antitrust filings, peer-reviewed ethnographic research, and investigative journalism, this analysis demonstrates that Amazon's algorithmic infrastructure functions as a unified architecture of control—extracting surplus from labor on one front and suppressing competitive pricing on the other. The report situates these practices within ongoing antitrust actions by the Federal Trade Commission (FTC), the European Union's Digital Markets Act, and parallel state-level enforcement, arguing that the company's algorithmic opacity serves as the central mechanism enabling both labor exploitation and market manipulation.

- 1. Introduction

Amazon operates the largest e-commerce marketplace in the United States and one of the most technologically sophisticated logistics networks on Earth. At the center of both operations lies a common infrastructure: algorithmic decision-making systems that monitor, evaluate, rank, reward, and punish human actors—whether hourly warehouse associates or third-party merchants. The company's dominance is not merely a function of scale but of a deliberate architectural choice to embed algorithmic control at every node of its operational graph. This report investigates two faces of that architecture. Part I examines the labor-tracking systems deployed in Amazon fulfillment centers (FCs), including the Associate Development and Performance Tracker (ADAPT) and the Time Off Task (TOT) metric, and analyzes how these systems discipline workers through automated surveillance, quantified objectification, and algorithmically generated termination. Part II turns to Amazon's marketplace algorithms—specifically the Buy Box allocation mechanism, anti-discounting algorithms, and the secret "Project Nessie" pricing tool—to demonstrate how Amazon leverages its gatekeeper position to extract rents from sellers, inflate consumer prices, and foreclose competition.

Part III synthesizes these findings into a unified theoretical framework, arguing that both

systems rely on the same structural logic: asymmetric information, opacity, and the substitution of algorithmic judgment for contested human discretion.

Part I: Algorithmic Management in Amazon Fulfillment Centers

2.1 The ADAPT System and Time Off Task (TOT)

Amazon's warehouse operations are governed by a suite of interlocking algorithmic systems that collectively constitute what labor scholars term "algorithmic management." The most prominent of these is the Associate Development and Performance Tracker (ADAPT), an AI system that monitors each worker's productivity and automatically generates warnings and termination notices without input from human supervisors. ADAPT operates on the basis of proprietary productivity metrics that Amazon has declined to fully disclose, stating only that they are derived from customer demand and warehouse location. The system conducts weekly productivity performance reviews and issues automatically generated warnings. After six warnings, ADAPT can automatically terminate a worker's employment. A critical component of this surveillance apparatus is "Time Off Task" (TOT), which measures gaps in scanner activity. Internal documents reveal that workers are tracked down to the minute: if workers break from scanning packages for too long, the system automatically generates warnings that eventually can lead to firings. Workers have reported that TOT accumulates during bathroom breaks, navigational errors in sprawling warehouses, and even time spent speaking to managers, creating a culture in which workers avoid basic bodily needs to remain compliant with algorithmic quotas.

2.2 The Mechanics of Algorithmic Discipline

The disciplinary power of these systems lies not merely in surveillance but in the automation of consequence. Amazon's system "automatically generates any warnings or terminations regarding quality or productivity without input from supervisors." This removes the mediating function of human judgment from performance evaluation, replacing it with what workers experience as an unaccountable, opaque authority. The granularity of tracking is extreme. Documents filed with the National Labor Relations Board (NLRB) show that Amazon issues workers radio-frequency handheld scanners that record every minute of "time off task," including time spent in the bathroom, talking to other associates, and navigational errors. Managers are required to interrogate the worker with the highest TOT about each "unproductive" timestamp and discipline them when appropriate. The result is what sociologists Steven Vallas and colleagues have termed "techno-economic despotism"—a system in which algorithmic technology is particularly effective at monitoring workers unaccustomed to stable employment and lacking alternative job options.

2.3 Worker Resistance and "Work Games"

Despite the apparent totality of algorithmic control, workers are not passive subjects. A two-year ethnographic study conducted across sixteen Amazon fulfillment centers documented what workers themselves call "tricks"—individualized, self-organized resistance tactics designed to game the labor-tracking system. These include manipulating scanner sequences, exploiting system lag, and sharing tactical knowledge in online worker communities. The study found, however, little evidence of collective action or "algoactivism" within the FC context. This absence is attributed to two factors: first, the intensive quantification of individual productivity atomizes workers and pits them against metrics rather than against each other; second, Amazon strictly monitors and thwarts unionization efforts, making organized resistance exceptionally perilous. Workers experience what the researchers term "conditional algorithmic management," in which managerial agency is co-mingled with algorithmic agency. Managers retain the power to intervene in metrics, but this power is exercised arbitrarily, making managers a source of unpredictability rather than protection from algorithmic excess.

2.4 The Weaponization of Algorithmic Management

Perhaps most disturbingly, Amazon has been documented using its algorithmic management infrastructure as a weapon against labor organizing. A 2025 academic study published in the journal *Socius* examined Amazon's anti-union campaign during the 2021 Bessemer, Alabama warehouse election and found that the company "weaponized elements or effects of algorithmic management against unions." The study describes a tactic called "algorithmic slack-cutting"—the temporary softening of algorithmic discipline during union drives to create the illusion of improved working conditions. During the Bessemer campaign, Amazon disabled TOT tracking, allowing workers to take bathroom breaks without accruing punitive minutes. This "electronic whip" was temporarily holstered, not as a genuine policy reform, but as a calculated maneuver to reduce worker grievance and undermine union support. The study also documents how Amazon used its scanner-based surveillance to monitor worker sentiment, presenting workers with coercive multiple-choice questions on workstation displays such as "Does your manager care about you as a person?"—questions workers feared would be used to gauge union sympathies. The 2021 election ultimately resulted in a decisive defeat for the union: 1,798 votes against to 738 in favor, out of 5,867 eligible workers.

2.5 Health, Safety, and the Cost of Speed

The human toll of algorithmic management is measurable. Data from the Occupational Safety and Health Administration (OSHA) cited by the Strategic Organizing Center found approximately six serious injuries per 100 Amazon workers in 2020—nearly double the warehouse industry average of slightly more than three per 100 workers. Workers and labor advocates attribute this injury rate to the company's "obsession with speed," which is algorithmically enforced through rate quotas and TOT monitoring. In June 2021, under intensifying public and regulatory pressure, Amazon announced it would begin averaging TOT "over a longer period" to reduce what the company termed "noise" in the metric. However, the company did not disclose the length of this period, and worker reports suggest that algorithmic monitoring remains pervasive, with some workers claiming they are still being monitored closely despite the policy change.

Part II: The Buy Box and Search Bias

3.1 The Anatomy of the Buy Box Algorithm

The "Buy Box" is the default purchasing interface on Amazon product pages—the prominent "Add to Cart" and "Buy Now" buttons that determine which seller's offer is presented to the consumer. It is not merely a display preference but a market gate: approximately 98% of sales on Amazon occur through the Buy Box. The Buy Box algorithm applies a multi-layered filtering system. According to a 2021 report by the Italian Competition Authority (AGCM), when a consumer searches for an item, the algorithm first applies seven filters to determine which offers are responsive, then applies five additional factors to evaluate which offer should win the Buy Box. Critically, two of these five evaluative factors are structurally biased in favor of Fulfillment by Amazon (FBA) offers. First, whether an offer qualifies for Amazon Prime—FBA offers automatically qualify, while non-FBA sellers face higher barriers to Prime eligibility. Second, the seller performance rating, which is supposed to incorporate consumer reviews and late delivery data, is automatically assigned the maximum value for FBA offers regardless of actual performance. The result is that consumers routinely overpay for items available at lower prices from non-FBA sellers, not because consumers don't care about price, but because Amazon's algorithm has chosen to display the offers from which it will earn the highest fees.

3.2 Anti-Discounting Algorithms and Price Parity

Amazon operates what the FTC and state attorneys general have characterized as an "anti-discounting" algorithm that surveils prices across the entire internet. If Amazon detects that a third-party seller is offering the same product at a lower price on a competing platform or their own direct-to-consumer website, the seller is punished through Buy Box suppression—the removal of their ability to win the Buy Box. For sellers, losing the Buy Box is an existential threat. The FTC's 2023 antitrust complaint notes that sellers "live in fear" of Amazon's price policing and that Amazon told thousands of sellers in

2022 that a "pre-requisite" to winning the Buy Box was ensuring lower prices were never

available off Amazon. This constitutes a de facto price parity requirement, even though Amazon formally repealed its explicit price parity policy years prior. A 2024 Georgetown study found that while the predominant reasons for Buy Box suppression align with Amazon's public explanations, "credible fear of retaliation could still chill the competitive environment" due to years of prior enforcement. The study also found evidence of self-preferencing: Amazon's own product offers appear more prominently in search results even after controlling for price, ratings, shipping, availability, and query relevance.

3.3 Project Nessie: The Secret Pricing Algorithm

The most explosive allegation in the FTC's antitrust case concerns a secret algorithm codenamed "Project Nessie." According to unredacted portions of the complaint reported by The Wall Street Journal, Nessie was designed to test how much Amazon could raise prices in a way that competitors would follow. The algorithm operated by identifying product categories where competitors were likely to match Amazon's price increases. If competitors followed, the higher price stuck; if they did not, Nessie automatically returned the item to its prior price. Amazon allegedly generated more than \$1 billion in excess profits through Nessie before discontinuing the project. Amazon has defended Nessie as a benign tool intended to prevent "unusual outcomes where prices became so low that they were unsustainable," and claims the project was scrapped years ago. However, the FTC alleges that Amazon turned Nessie on and off strategically during periods of increased media scrutiny, suggesting the company was aware of the algorithm's legally perilous nature. A Carnegie Mellon study on algorithmic pricing provides crucial context: when sophisticated AI-driven pricing algorithms compete against simple rule-based "tit for tat" algorithms, the AI algorithms quickly learn that raising prices induces competitors to follow suit, boosting all sellers' profits "at the expense of consumer surplus." Notably, the district court's ruling on Project Nessie marked the first successful "standalone" Section 5 claim under the FTC Act in over 40 years—meaning the court found Amazon's conduct constituted an unfair method of competition even without proving a traditional antitrust violation like price-fixing.

3.4 The FBA-Prime Nexus and Self-Preferencing

At the core of Amazon's marketplace dominance is what the FTC and academic analysts describe as a feedback loop between Fulfillment by Amazon (FBA) and Amazon Prime. Amazon CFO Brian Olsavsky has stated publicly: "Prime and FBA reinforce each other—they are inextricably linked." The mechanism works as follows: FBA adds Prime-eligible selection, which attracts more Prime members; Prime member growth attracts more sellers to FBA; the growing FBA network makes Prime more attractive; and so on. Sellers who do not use FBA face structural disadvantages: they are less likely to qualify for Prime, less likely to win the Buy Box, and less visible in search results. The FTC alleges that Amazon's Seller Fulfilled Prime (SFP) program imposes "onerous eligibility requirements" that render it "an entirely impractical option for most sellers." This creates what the FTC characterizes as an illegal tie: sellers who wish to reach Amazon's 112+ million Prime members effectively must use FBA, paying Amazon fulfillment fees that the FTC alleges consume nearly half of sellers' revenue.

3.5 Antitrust Scrutiny: FTC, EU, and State Actions

The FTC and 17 states (now 19) filed a major antitrust suit against Amazon in September 2023, alleging violations of Section 2 of the Sherman Act and Section 5 of the FTC Act. On October 7, 2024, the district court denied Amazon's motion to dismiss the federal antitrust claims, allowing the case to proceed to discovery. Parallel actions have been brought by the State of Arizona, which alleges that Amazon's Buy Box algorithm violates the Arizona Consumer Fraud Act by deceptively favoring Amazon's own profits over consumer welfare, and by the State of California, which targets similar anti-competitive conduct. In Europe, the European Commission resolved its Amazon Buy Box and Prime investigation in December 2022 through binding commitments rather than a prohibition decision. Amazon agreed to treat all sellers equally in Buy Box rankings and to display a second competing offer when sufficiently differentiated on price or delivery. Amazon also committed to non-discriminatory Prime qualification criteria and allowing Prime sellers to choose their own carriers. These commitments are now reinforced by the EU Digital Markets Act (DMA), which entered into force in March 2024 and prohibits gatekeepers from ranking their own services more favorably than those of third parties. However, civil society organizations have criticized Amazon's DMA compliance as weak and full of loopholes, and the European Commission continues to monitor implementation.

Part III: The Structural Logic — A Unified Theory of Algorithmic Control

4.1 Data as the Common Infrastructure

What unites Amazon's warehouse labor control and its marketplace manipulation is a shared dependence on comprehensive data extraction. In fulfillment centers, handheld scanners, workstation displays, and algorithmic trackers convert embodied human labor into discrete data points—scans per hour, seconds of "time off task," units picked. In the marketplace, web crawlers, pricing algorithms, and seller surveillance networks convert commercial transactions into data on competitor prices, consumer willingness to pay, and seller dependency. In both cases, data is not merely collected; it is weaponized. Worker data becomes the basis for automated termination. Seller pricing data becomes the basis for Buy Box suppression. Consumer browsing data becomes the basis for personalized price discrimination.

4.2 Asymmetric Power and Information

A second commonality is the deliberate cultivation of information asymmetry. Warehouse workers do not know their real-time TOT scores, cannot access the proprietary metrics that determine their "rate," and cannot meaningfully contest algorithmic disciplinary actions. Similarly, third-party sellers do not know the precise weighting of Buy Box factors, cannot audit Amazon's price surveillance crawlers, and cannot verify whether their competitors are receiving preferential treatment. The opacity of the algorithm is not a bug but a feature—it ensures that subjects of algorithmic power cannot strategically resist it.

4.3 The Feedback Loop of Control

Finally, both systems generate self-reinforcing dependencies. Workers who survive the algorithmic gauntlet become physically depleted but economically dependent on Amazon's wages in job-scarce labor markets. Sellers who build businesses on Amazon's marketplace become locked into FBA and Prime, unable to diversify to competing platforms without sacrificing access to the customer base that generates 98% of their sales. Amazon CFO Brian Olsavsky's description of Prime and FBA as "inextricably linked" applies with equal force to the relationship between algorithmic worker surveillance and the broader labor market. Both are flywheels—systems designed to accelerate dependency and foreclose exit.

• 5. Conclusion

This report has documented two distinct but structurally homologous systems of algorithmic control operated by Amazon. In its fulfillment centers, the ADAPT system, Time Off Task metrics, and algorithmic management infrastructure subject workers to quantified surveillance, automated discipline, and the weaponization of performance data against labor organizing. In its marketplace, the Buy Box algorithm, anti-discounting surveillance, and Project Nessie subject sellers to rent extraction, price suppression, and secret price-fixing by algorithm. The evidence suggests that these are not isolated abuses but manifestations of a deeper corporate strategy: the deployment of opaque algorithmic systems to extract maximum surplus from all participants in Amazon's ecosystem—workers, sellers, and consumers—while externalizing the costs onto those same participants in the form of injuries, bankruptcies, and inflated prices. The ongoing FTC litigation, state enforcement actions, and EU regulatory framework represent the first serious attempts to dismantle this architecture. Whether they succeed will depend not merely on legal outcomes but on the willingness of regulators and the public to recognize that algorithmic opacity is not a technical problem to be managed but a political problem to be contested.

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Report compiled: August 27, 2026

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Editorial note

This rebuilt edition preserves the supplied report text while applying a consistent, print-ready visual system: colored section hierarchy, improved spacing, readable typography, and page-level navigation.