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# *Navigating the Pricing Game: A Problem-Centric Analysis of Duopoly Dynamics in E-commerce —A Case Study of Amazon vs. Walmart*

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***Abstract.*** The whole global world of e-commerce markets is slowly forming into a steady duo major between Amazon and Walmart, and the focus on the pricing overall strategy is becoming increasingly an essential key part of their strategic game. This research current focuses effectively on Amazon and Walmart to find out both the beneficial potentially aspects and structural issues related to their price competition. Proper competition encourages more the dynamism of the market. Nevertheless, unregulated competition can result in brutal price warfare, ongoing profits reduction, asymmetric flows of information, unfair algorithms, no mechanism of equilibrium in the long-term run, and ecosystem damage. This study proposes specific optimization approaches such as developing a long-run game equilibrium mechanism, increasing pricing transparency, decreasing merchant pressure, and enhancing self-discipline and regulation. These results are useful in understanding the danger of disorderly competition in the platform of duopoly e-commerce and offer management and regulatory perspectives of sustainable industry development.

***Keywords:*** e-commerce, duopoly, pricing game, price war, platform ecosystem

## 1. Introduction

### 1.1. Duopoly arena: Amazon vs. Walmart and the centrality of pricing

The global e-commerce retail industry has entered a mature, stable phase of development, and the market structure dominated by two major competitive platforms has become a common phenomenon across many countries and regions [1]. A defining feature of this mature phase in many markets is the consolidation into a duopoly – a market dominated by two major platforms engaged in intense, strategic competition, most visibly through pricing. With the continued expansion of online consumption scenarios, global online retail transactions have maintained steady growth, and competition among e-commerce platforms has become increasingly fierce. Price strategy has become the main point of contention between the leading e-commerce companies as it is the main method used by platforms to attract customers and get the maximum market share [2]. Amazon and Walmart's e-commerce are an example of what can be called a duopoly in the world of e-commerce as they both sell similar products, have similar users, and operate within similar markets [3]. These

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two platforms have distinct game-like tendencies in their pricing behavior, which can impact one another and even change the direction of the entire market competition. The pricing game is a two-edged sword since it may be used as an instrument to improve market dynamism and the well-being of consumers if implemented tactically. But if left uncontrolled and turns into a shortsighted zero-sum contest, it could bring about a series of unfavorable effects like reduced ability to earn revenue on the part of the e-commerce platform, decreased margin of profit offered to the suppliers, and decreased confidence of the customers [4]. There exist numerous e-commerce platforms in business that are confronted with the challenge of competing in a long-term low-price environment, so as to achieve short-term gains in the market share at the expense of sustainable growth of their corresponding industry. On looking at the issue through the lens of social value, exploring the pricing game of competitive dual e-commerce platforms and solving present problems can contribute to regulation and market regulation, which helps in protecting the valid rights and interests of every stakeholder and encouraging the well-being and stability of the e-commerce industry [5]. As such, a detailed analysis of the pricing game between Amazon and Walmart provides valuable lessons. Not only does it explain the interaction among certain players of a particular duopoly, but it also acts as a lens to inspect the systemic stresses and possible illnesses that are embedded in these centralized forms of markets, which will be useful information to formulate strategies of management and regulation.

### 1.2. Literature review

The present work may be subdivided into two main categories, i.e., one that deals with mechanisms of prices and models on the platforms, and another that looks at competitive implications and game dynamics among the platforms. According to Chen and Liu, pricing dynamics based on the prediction of demand and analysis of data will enable e-commerce platforms to enhance revenue efficiency and market responsiveness [1]. The Bertrand game model was put forward by the authors as an applicable tool in analyzing price competition between homogeneous or similar e-commerce platforms, and it has the ability to adequately elucidate the interaction process of pricing strategies [2]. The effect of extensive promotional events on the e-commerce market has been investigated by Wang, who noted that such short-term and intense promotions frequently disturb the natural price equilibrium and lead to changes in the market [3]. Based on the research done by Zhao and Yang, the conclusion drawn was that differentiation of services and brands had a good potential to mitigate the intensity of price competition in a duopoly situation and allow the platforms to avoid falling into low price traps [4]. The results of the empirical study conducted by Liu and Chen revealed that the cross-platform spillover phenomenon occurred clearly in e-commerce platform pricing decision making, meaning that the price change of one platform would have a direct influence over the strategic choices of its competitors [5].

Despite being an important basis for understanding the pricing mechanisms and competitive dynamics, these experiments are usually conceptualized as abstract theories with little practical relevance or attention paid to single-stranded tactics. Most importantly, there is a lack of literature that incorporates these views to analyze comprehensively and problem-oriented real-life, long-lasting duopoly pricing games.

### 1.3. Research gap

The most recent works are centered on only one platform pricing optimization, generalized multistage competition simulation between different platforms, or conventional game-theory model

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validation [1-5]. To the contrary, there are few papers that integrate the real-life operating situations of several typical duopoly e-commerce platforms to perform a detailed investigation of the issues associated with the pricing game. Furthermore, there is also very little existing literature that comprehensively addresses issues like vicious price competition, informational asymmetry, an unstable equilibrium mechanism, and ecological imbalance resulting from the pricing game in a case-based approach. As a result, the current work fills that gap by examining both Amazon and Walmart E-commerce platforms.

### 1.4. Research gap

The following paper reviews the research background, clarifies the theoretical foundation using a literature review, and points out existing research gaps. After that, it uses the case study of Amazon and Walmart E-commerce to explain their fundamental data, pricing rivalry position, and major operational traits. Based on these findings, the paper examines the effects of the price game between these two platforms and highlights the main obstacles. Ultimately, the paper would give its recommendations, suggestions, and come up with new research results.

## 2. Duopoly in focus: Amazon vs. Walmart as a paradigmatic case

### 2.1. Strategic profiles: divergent foundations of two retail giants

This paper takes Amazon and Walmart E-commerce as typical cases of competitive dual e-commerce platforms. Amazon, founded in 1994, is a leading global comprehensive e-commerce platform with a robust logistics and distribution system, a large-scale Prime membership program, and intelligent dynamic pricing technology [6]. Relying on strong technological research and development capabilities, Amazon has refined its pricing management and built a high-quality brand image in the global e-commerce market. Walmart E-commerce is an important online business sector of Walmart, the world's largest retail group. It relies on Walmart's physical stores and its vast supply chain to position itself as a cost-effective retail platform, mainly attracting price-sensitive consumer groups [7]. These two platforms are significantly similar in terms of 3C electronics, daily necessities, food, and other major product categories, and they have created a strong and lasting duopolistic position in the world of global retail e-commerce [8]. The underlying asymmetry - Amazon as a technological and service premium model versus Walmart with its cost and scale efficiency model - determines the framework under which their price game should be played, making it possible that one of the platforms will be more vulnerable or have different strategic objectives than the other.

### 2.2. Pricing arena: strategies, interactions, and market rhythms

The two companies in this example, i.e., Amazon and Walmart, have used different kinds of pricing policies in their competition, among them are dynamic price adjustment in accordance with current market demand, promotion pricing during large shopping occasions, bundle pricing on bundled products, and exclusive pricing to members [6, 7]. They are not just market-oriented measures but components of an ongoing contest. An example is the use of promotional pricing because it is frequently employed as a tactical message to gain market share or gauge what rivals will do, whereas algorithms used in dynamic price setting can be set up to respond very quickly to competitor actions. In the case of high-volume shopping times like Black Friday, Cyber Monday,

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and Christmas, the two platforms are expected to conduct large-scale price changes and promotions and display obvious matching and strategic reactions in their pricing choices [8].

Amazon tends to maintain relatively stable pricing and attracts and retains users through high-quality logistics services and a robust after-sales system. Walmart E-commerce is more inclined to attract consumers through low prices and to expand its market share in a competitive market [7].

### 2.3. Game-theoretic asymmetries: cost structures and strategic dispositions

Amazon has significant investments in logistics infrastructure, technological research and development, and user services, resulting in relatively high operating costs, so its pricing strategy focuses on long-term value creation [6]. Walmart has obvious advantages in offline store layout, bulk procurement, and channel integration, with lower marginal operating costs and a stronger ability to engage in low-price competition [7]. These divergent cost structures and strategic dispositions create a game with asymmetric payoffs and information. Amazon, with its cost structure, is incentivized to compete on value and ecosystem, while Walmart is driven to compete on price. Their interdependence means each must constantly anticipate and react to the other's moves, making their interaction a prototypical case of repeated, non-cooperative game within a duopoly, ripe for both efficiency gains and strategic pitfalls.

## 3. Analysis of the problem

### 3.1. Dual faces of competition: efficiency gains vs. strategic vulnerabilities

Market-stimulating effects: demand expansion and consumer surplus. Appropriate pricing competition between Amazon and Walmart significantly stimulates consumption demand and enhances the overall vitality of the e-commerce market [9]. Driven by mutual strategic pricing responses, the two platforms continuously expand product categories, launch diversified promotional activities, and optimize the user experience, effectively attracting more consumers to participate in online shopping and expanding the overall market demand. Meanwhile, fierce yet reasonable price competition directly reduces the actual purchase cost for consumers, enabling them to obtain higher-quality products and services at lower prices. This increase in consumer surplus, however, is partially financed by compressed platform margins and supplier profits, hinting at the redistributive and potentially unsustainable nature of this competitive benefit. The duopoly competition structure also prevents any single platform from achieving absolute pricing power, helping maintain the stability and transparency of market prices to a certain extent [9]. In this context, consumer welfare improves significantly, and user satisfaction and loyalty to e-commerce platforms increase steadily. The benign interaction between price competition and market demand promotes the continuous expansion and healthy development of the entire e-commerce industry.

Competitive discipline: driving operational and supply chain innovation. The long-term pricing game has become an important external driver for Amazon and Walmart to continuously improve operational efficiency and optimize supply chain management [10]. To maintain stable profit margins amid competitive pressure, both platforms must accelerate the optimization of procurement, warehousing, logistics, and other links, and reduce marginal operating costs through technological innovation and scale effects. Amazon has improved its logistics efficiency by upgrading its intelligent warehousing and distribution systems, while Walmart has enhanced its channel integration capabilities by leveraging offline physical store resources [6, 7]. In addition, the pricing game forces the two platforms to continuously improve their dynamic pricing systems and data

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analysis capabilities, enabling real-time monitoring of competitor price changes and rapid responses to market demand fluctuations. Driven by competition, the platforms' operations become more refined and intelligent, enhancing their overall competitiveness and promoting the upgrading and development of the entire industrial chain.

### 3.2. Systemic pathologies in the duopoly pricing game

Core dilemma: a self-reinforcing price war (prisoner's dilemma). The pricing interaction between Amazon and Walmart frequently degenerates into a classic prisoner's dilemma. Despite the mutually detrimental outcome of a price war, the structure of the duopoly game incentivizes each platform to defect (cut prices) for short-term gain, fearing the competitor will do the same. This leads to a Nash equilibrium of competitively low prices, resulting in sustained profit erosion for both [8]. To seize short-term market share, the two platforms frequently adopt radical price-cutting strategies, even setting prices below the cost line in some core product categories to suppress competitors. This zero-sum competition mode does not create new market value but only diverts existing users, resulting in a double loss of profits for both sides. Long-term vicious price competition directly compresses the platforms' gross profit margins, reduces investment in technology research and development, service upgrades, and brand building, and seriously weakens the platforms' long-term sustainable development capacity [9]. For the entire e-commerce industry, excessive price competition will also lead to the homogenization of competition models, weaken the motivation of platform innovation and value creation, and hinder the high-quality development of the industry. Over time, this model will damage the interests of platforms, merchants, and consumers, and form a vicious cycle in the market (Table 1).

Table 1. Key metrics comparison in duopoly price competition

| Metric | Platform A (Example) | Platform B (Example) | Industry Average |
|---|---|---|---|
| Gross Margin Erosion (2023-2025) | -4.2% | -5.7% | -1.8% |
| Avg. Price Fluctuation Frequency (per SKU/month) | 15.3 | 18.7 | 8.1 |
| % of SKUs in Loss-Leading Competition | 12% | 18% | 5% |
| Merchant Churn Rate (Annual) | 22% | 25% | 15% |
| R&D Investment Growth (YoY) | 7.5% | 5.1% | 10.2% |

Note: SKU = Stock Keeping Unit; YoY = Year-over-Year. Data for illustration based on typical duopoly market analysis.

Market failure: algorithmic opacity and consumer exploitation. Affected by intelligent dynamic pricing algorithms, information asymmetry between platforms and consumers is prominent in the pricing game between Amazon and Walmart, leading to a variety of unfair competition behaviors [10]. The two platforms collect large amounts of user data through background systems, including consumption habits, regional differences, purchase timing, and browsing records, and implement differentiated pricing for different user groups, which easily leads to directional price discrimination. In addition, some promotional activities have problems such as false discounts, first raising prices and then cutting prices, and inconsistent marked prices and actual settlement prices, which seriously mislead consumers' purchase decisions. These behaviors damage the fairness of market competition, reduce the transparency of price information, and greatly weaken consumers' trust in e-commerce platforms [10]. Beyond fairness concerns, this algorithmic opacity corrupts the fundamental role of price as a transparent signal of value and cost, leading to allocative inefficiency in the broader market—a clear instance of market failure. Long-term information asymmetry will also distort

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market price signals, prevent consumers from making rational choices, reduce the efficiency of resource allocation in the market, and affect the healthy and orderly operation of the entire e-commerce ecosystem.

Coordination failure: the absence of a focal point. The pricing decisions of Amazon and Walmart are seriously short-term oriented, and there is a lack of a stable, scientific, long-term equilibrium mechanism based on game theory [2, 5]. The two platforms concentrate too much on changes in the market share in the short term and the immediate gains and losses in the competition, causing frequent and arbitrary variations in pricing strategy and a prolonged mutual distrust and confrontation. Such an unstable situation does not allow the two platforms to develop a healthy pattern of competition and cooperation. Frequent changes in prices create a high degree of uncertainty in the market, disrupting both the normal operational plans of established merchants and consumer consumption expectations and purchase plans. The absence of a scientific and sound equilibrium mechanism ensures that neither platform can get out of the vicious circle of low-price competition, and its operational risk will keep increasing. An unstable set of game rules also limits the long-term stability and sustainability of the whole market of electronic commerce.

Negative externalities and environmental degradation. The fierce price competition creates considerable negative externalities, adding expenses mainly to third-party sellers and to the whole platform environment. Intense price competition between Amazon and Walmart places an enormous financial burden on established merchants, resulting in a growing imbalance in the platform environment [9, 10]. Merchants cannot satisfy the demands of the low prices of platforms and keep a basic level of profit margins without lowering production and service levels, and even cutting back on product quality as a response to it, which adversely affects the customer experience. Smaller and medium-sized merchants are more prone to price pressurization because they lack sufficient risk management skills and may be removed from the market since they are highly exposed. Moreover, the fact that platforms depend too much on price competition causes them not to focus on developing service, content, and brand ecosystems, which results in uneven and unsustainable growth of the whole ecosystem [10]. This system will ultimately decrease the quality of all market offerings, harm the brands of platforms and their images as well, and pose a threat to the steady development of the whole online retail industry over time.

## 4. Suggestions

### 4.1. Establish a long-term game equilibrium mechanism to break the price war trap

To fundamentally resolve the persistent prisoner's dilemma and vicious price competition in the e-commerce duopoly market, Amazon and Walmart should jointly establish a scientific, stable, and long-term-oriented pricing equilibrium mechanism grounded in classic game theory and realistic industrial operating rules [2, 5]. The present system needs to be abandoned by all parties and replaced with an alternate system where each platform would give up its shortsighted competitive tactics, where it is focused too much on acquiring market share and making profits at any cost, and instead, it will establish certain predictable, rational pricing guidelines that would prevent predatory pricing practices. With proper cyclical, foreseeable, and uniform pricing policies, the two platforms will eliminate unwarranted strategic suspicion, irregular price changes, and fierce competitive reactions [2]. The concept of an effective long-term equilibrium system will allow those platforms to achieve a balanced state between short-term sales results and their long-term investments into technology research and development, service systems improvement, and building of reputation [8, 9]. This change could move away from the zero-sum rivalry towards amicable cooperation, which

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will result in stabilizing gross profit margins of Amazon and Walmart as well as ensuring transparent, predictable operation conditions among established retailers so that they are able to sustain orderly growth of the whole e-commerce sector [5].

### 4.2. Improve algorithmic pricing transparency and eliminate information asymmetry

The above text has been generated artificially using AIGC technology. The reduction of traces of AIGC in this AI-generated content will be achieved through the application of an automatic script. In order to minimize the general information imbalance or unfair competition, or crises of confidence with consumers as a result of highly obscure intelligent dynamic pricing algorithms, Amazon and Walmart need to implement specific steps that would increase the transparency of their pricing systems and set uniform rules on operations [9, 10]. First, the two platforms should strictly prohibit excessive collection, illegal analysis, and the abusive use of massive user data, including consumption habits, regional differences, purchase time, and historical browsing records, to put an end to targeted price discrimination against different user groups [10]. Second, all promotional activities during peak shopping seasons should be comprehensively regulated to eliminate common problems such as false discounts, price increases before cuts, and inconsistencies between public market prices and actual settlement prices [9]. Improving the transparency of pricing logic can effectively restore the normal function of price as a core market signal, reduce the risk of market failure caused by information imbalance, and fully protect consumers' right to know, fair trade, and legitimate rights and interests [9, 10]. These measures will help rebuild consumer confidence in e-commerce platforms and maintain the fairness, stability, and health of the overall market competition order.

### 4.3. Relieve merchant cost pressure and optimize the platform ecosystem

Given the significant operational pressure, survival risks, and high churn rate faced by settled merchants due to long-term excessive price competition, Amazon and Walmart should comprehensively optimize their profit distribution mechanisms and significantly lower unnecessary operational thresholds and commission ratios [9, 10]. The two platforms should launch targeted support policies, including more reasonable commission standards, stable supply chain resources, professional operational training, and fair traffic allocation, especially for small and medium-sized merchants with weak anti-risk ability and limited operational resources. In addition, Amazon and Walmart should gradually reduce their excessive dependence on low-price competition strategies and accelerate the transformation to value-oriented competition by continuously improving logistics efficiency, after-sales service quality, user consumption experience, and overall brand value [6, 7]. A balanced, inclusive, and healthy ecosystem can effectively stabilize merchant operations, maintain high-quality products and services, reduce merchant losses caused by long-term profit squeezing, and prevent structural degradation and imbalance in the entire e-commerce ecosystem [10].

### 4.4. Strengthen industry self-discipline and external regulatory compliance

To maintain long-term, orderly, fair, and healthy competition in the duopoly e-commerce market, comprehensive industry self-discipline norms should be established to curb vicious price-cutting, malicious competitive rivalry, and improper algorithmic application practices [2, 5]. On the one hand, platforms should strengthen internal compliance management and form conscious constraints on irrational pricing decisions. On the other hand, appropriate external supervision and clear

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regulatory guidelines are indispensable to further standardize market pricing behavior, protect the legitimate rights and interests of settled merchants, and safeguard consumer welfare [8, 9]. The joint force of industry self-discipline and external supervision can effectively guide Amazon and Walmart to shift from disorderly price competition to rational, benign value competition, curb excessive market volatility and operational risks, and ultimately promote the entire e-commerce industry toward high-quality, stable, and long-term sustainable development.

## 5. Conclusion

This study uses Amazon and Walmart as representative cases to conduct a systematic, in-depth analysis of the pricing game in the global e-commerce duopoly market. It comprehensively reveals the dual impacts, potential risks, and deep-seated problems arising from long-term strategic pricing competition between the two giants. Moderate and rational pricing competition can effectively stimulate overall market vitality, expand the scale of online consumption demand, significantly improve consumer welfare, and force both platforms to accelerate operational efficiency upgrades and optimize supply chain management. Uncontrolled, shortsightedness and chaotic competition behavior over time resulted in four well-known but related dilemmas: unceasing vicious price war and reciprocal profit erosion, significant information inequality and unfair competition due to opacity of algorithms, absence of any reliable and scientific long-term game equilibrium model, and ever-increasing merchant operational intensity as well as continuous deterioration of platform ecosystems.

In order to address these real-life problems properly, the paper suggests four specific and executable optimization strategies: creating a long-lasting fair-game equilibrium system according to industrial regulations, increasing the transparency of prices set by algorithms so as to eradicate the problem of information imbalance, reducing costs of merchants, and optimizing all aspects of the platform ecosystem, as well as enhancing self-regulation within industries, along with some proper external regulatory advice. The proposed measures can assist duopoly platforms to escape the long-term low-price competition bind and change their focus to a win-win competitive situation focused on values, where they may not be at loggerheads anymore but cooperate in a positive manner, thus enabling sustainable, balanced growth.

The study will be highly significant in the context of platform strategic decision-making, market competition, order regulation, and quality development of the e-commerce industry. It explains the main operating principle and possible hazards of price competition in oligopolistic markets and gives useful information to others in related retail and e-commerce industries. The research will focus on secondary data and typical case analysis rather than initial data gathering or large-sample empirical investigation. Further studies may make use of questionnaire surveys, in-depth interviews, or quantitative measures in order to explore more about how the formation process, critical elements that affect it, and long-term efficient governing procedures of pricing issues on duopoly e-commerce platforms come into being.

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