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Review

Market-Oriented Perspectives on Dynamic Pricing Decisions under Limited Inventory Conditions

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Abstract: Dynamic pricing under limited inventory conditions has attracted substantial scholarly attention, particularly within the fields of revenue management and operations research. Existing studies predominantly emphasize algorithmic optimization and short-term revenue maximization, often abstracting from market-facing considerations. This review adopts a market-oriented perspective to re-examine dynamic pricing decisions in inventory-constrained environments. By integrating insights from consumer behavior, competitive strategy, and inventory management, the study highlights how limited inventory fundamentally reshapes market responses to dynamic pricing. The review demonstrates that inventory scarcity amplifies consumer price perceptions, fairness concerns, and strategic learning, while simultaneously intensifying competitive reactions and pricing interdependence among firms. Building on these insights, the paper develops an integrative framework that links inventory conditions, market dynamics, and firm-level strategic objectives, illustrating key trade-offs between short-term revenue optimization and long-term market sustainability. The review further identifies critical boundary conditions under which dynamic pricing may generate market resistance or instability. Finally, directions for future research are outlined, with particular attention to behavioral pricing models, fairness and regulation, human–algorithm interaction, and ethical considerations. Overall, this study contributes to the literature by reframing dynamic pricing under limited inventory as a market-embedded strategic decision rather than a purely analytical optimization problem.

Keywords: dynamic pricing; limited inventory; market orientation; consumer behavior; competitive dynamics

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1. Introduction

1.1. Background and Research Motivation

Dynamic pricing has become an increasingly prominent pricing strategy across a wide range of industries, including airlines, hospitality, e-commerce, ticketing services, and the sharing economy. Advances in data analytics, real-time demand Tracking, and algorithmic decision-making have enabled firms to continuously adjust prices in response to market conditions, consumer behavior, and competitive dynamics. In practice, dynamic pricing is no longer confined to traditional revenue management contexts such as airline seat allocation or hotel room pricing, but has expanded into digital platforms, ride-hailing services, online retailing, and event-based markets [1].

A defining feature of many of these applications is the presence of limited or perishable inventory. Airline seats, hotel rooms, concert tickets, and time-bound service capacity cannot be stored indefinitely, and unsold inventory often represents irreversible revenue loss. Under such conditions, pricing decisions are tightly coupled with inventory availability, remaining selling horizon, and demand uncertainty [2]. Inventory scarcity amplifies the strategic importance of pricing, as firms must balance the trade-off between

extracting short-term revenue and ensuring sufficient demand realization before inventory expires.

The academic literature on dynamic pricing under inventory constraints has grown rapidly over the past two decades [3]. Much of this work is rooted in operations research and revenue management, emphasizing optimal pricing policies derived from dynamic programming, stochastic control, or, more recently, reinforcement learning frameworks. These studies have generated important insights into how firms can maximize expected revenue under uncertainty by adjusting prices dynamically as inventory depletes.

However, this dominant analytical orientation has also led to a relative neglect of market-oriented considerations. In many real-world settings, pricing decisions are not evaluated solely on their revenue outcomes, but also on how they are perceived by consumers, how competitors respond, and how pricing practices affect brand reputation and long-term customer relationships [4]. As dynamic pricing becomes more visible and more pervasive, firms increasingly face resistance from consumers who perceive price changes as unfair, opportunistic, or manipulative—especially in situations where inventory scarcity is salient. These developments suggest that dynamic pricing under limited inventory conditions is not only an optimization problem, but also a fundamentally market-facing strategic decision.

1.2. Limitations of Existing Dynamic Pricing Reviews

Existing review studies on dynamic pricing largely reflect the analytical origins of the field [5]. Most surveys emphasize revenue management models, dynamic programming formulations, and algorithmic advancements, including approximate dynamic programming and reinforcement learning approaches. While these contributions have significantly advanced methodological sophistication, they often rely on strong assumptions that limit their relevance from a market perspective.

First, many models assume rational and price-taking demand, where consumers respond mechanically to price changes without considering fairness, trust, or strategic anticipation. Such assumptions overlook a growing body of behavioral research demonstrating that consumers form reference prices, evaluate price changes normatively, and may punish firms perceived as engaging in unfair pricing practices. These behavioral responses are particularly pronounced in inventory-constrained settings, where scarcity cues intensify emotional reactions and amplify perceptions of exploitation.

Second, existing reviews tend to treat competition in a stylized or simplified manner, frequently assuming monopolistic sellers or symmetric competitors with static response patterns [6]. In reality, firms operating under limited inventory conditions often face dynamic competitive interactions, where rivals adjust prices strategically in response to both observed prices and inferred inventory levels. Algorithmic pricing on digital platforms further complicates these interactions, potentially leading to price wars, tacit coordination, or unintended market instability.

Third, much of the literature focuses on short-term revenue optimization, paying limited attention to brand equity, customer loyalty, and long-term market positioning [7]. Dynamic pricing strategies that maximize immediate revenue may erode consumer trust, trigger negative word-of-mouth, or invite regulatory scrutiny, ultimately undermining firm performance over time. Existing reviews rarely integrate these longer-term consequences into their analytical narratives.

As a result, despite the richness of the technical literature, there remains a lack of comprehensive reviews that explicitly foreground market-oriented dimensions—namely consumer perceptions, competitive behavior, and strategic sustainability—in the context of dynamic pricing under limited inventory conditions.

1.3. Objectives and Contributions of This Review

The primary objective of this review is to address these gaps by offering a market-oriented perspective on dynamic pricing decisions under limited inventory conditions. Rather than focusing exclusively on pricing algorithms or optimal control solutions, this study emphasizes how pricing strategies interact with market actors and constraints in practice.

Specifically, this review makes three key contributions. First, it synthesizes literature on dynamic pricing by integrating insights from consumer behavior research, competitive strategy, and inventory management. This integrative approach highlights how inventory constraints shape not only pricing policies, but also consumer responses and competitive dynamics.

Second, the review reframes limited inventory as a market amplifier that intensifies consumer perceptions of fairness, accelerates strategic learning, and magnifies competitive reactions. By doing so, it demonstrates why pricing decisions that are optimal in a purely analytical sense may fail when evaluated through a market lens.

Third, this study proposes a comprehensive analytical framework that links inventory conditions, market responses, and firm-level strategic objectives. This framework provides a structured foundation for future empirical and theoretical research, and offers actionable insights for managers seeking to balance short-term revenue goals with long-term market sustainability.

By advancing a market-oriented understanding of dynamic pricing under limited inventory conditions, this review aims to bridge the gap between analytical optimization models and real-world pricing practice, and to encourage more interdisciplinary research in this increasingly important domain.

2. Conceptual Foundations: Dynamic Pricing, Limited Inventory, and Market Orientation

2.1. Dynamic Pricing under Limited Inventory

Dynamic pricing under limited inventory refers to pricing strategies in which firms adjust prices over time while facing explicit constraints on available supply. Unlike static pricing, where prices are fixed over a selling horizon, dynamic pricing allows firms to respond to evolving demand information, remaining selling time, and inventory availability [8]. The defining characteristic of this setting is that pricing decisions are intertemporally linked: prices set at one point in time influence not only immediate demand but also future sales opportunities through their impact on inventory depletion.

A critical distinction in this literature concerns the nature of inventory. Perishable inventory, such as airline seats, hotel rooms, and event tickets, has a fixed expiration date beyond which unsold units lose all economic value. Non-perishable inventory, including many durable or storable goods, does not expire in the same way but may still be subject to capacity constraints, holding costs, or seasonality. While both types impose limits on supply, perishability introduces a stronger temporal urgency, intensifying the trade-offs involved in pricing decisions [9].

The logic of dynamic pricing under inventory constraints is closely tied to the inventory depletion path. Early in the selling horizon, firms often face relatively high uncertainty about demand realization, which may encourage more exploratory or conservative pricing. As inventory is gradually consumed and the end of the selling period approaches, pricing decisions become increasingly sensitive to remaining capacity. When inventory levels are high relative to expected demand, price reductions may be used to stimulate sales and avoid leftover stock. Conversely, when inventory becomes scarce, firms may increase prices to ration demand and extract higher margins from remaining units.

Traditional analytical models conceptualize this process as a control problem in which prices are adjusted to optimize expected revenue over time. These models typically

assume that firms can continuously observe inventory levels and update prices accordingly. While this perspective provides a coherent theoretical foundation, it abstracts from how price changes are interpreted by market participants and how such interpretations feed back into future demand and competitive behavior.

2.2. Market-Oriented Perspective in Pricing Research

A market-oriented perspective in pricing research emphasizes that pricing decisions are embedded in a broader market context shaped by customers, competitors, and long-term strategic objectives. Rather than treating price as a purely instrumental variable for revenue maximization, this perspective views pricing as a strategic signal that influences perceptions, relationships, and market structure [10].

Customer orientation is a central component of market orientation. From this viewpoint, firms consider not only how consumers respond to price changes in terms of quantity demanded, but also how they perceive pricing practices in terms of fairness, transparency, and trustworthiness. Dynamic price adjustments, especially under visible inventory constraints, may alter consumers' reference prices and affect their willingness to engage with the firm in the future. A customer-oriented approach therefore recognizes that demand is shaped by cognitive and emotional processes, not solely by price elasticity.

Competitor orientation represents a second key dimension. Pricing decisions are rarely made in isolation, particularly in markets characterized by limited inventory and high demand volatility. Firms monitor competitors' prices, infer their inventory positions, and anticipate strategic responses. Dynamic pricing may trigger competitive reactions that alter market outcomes in ways not predicted by single-firm optimization models. A market-oriented perspective thus highlights the importance of strategic interdependence and adaptive behavior among competing firms.

The third dimension is long-term value orientation, which extends the focus beyond immediate revenue outcomes to include brand equity, customer lifetime value, and market reputation. Pricing strategies that aggressively exploit short-term scarcity may generate higher immediate returns but damage consumer trust or invite regulatory scrutiny. From a long-term perspective, sustainable pricing performance depends on maintaining credible and consistent pricing practices that align with the firm's broader strategic positioning.

Compared with pure revenue maximization models, a market-oriented approach relaxes assumptions about perfectly rational demand and frictionless markets. It acknowledges that pricing decisions have enduring effects that unfold over time and across market interactions [11].

2.3. Tension between Revenue Optimization and Market Responsiveness

The coexistence of revenue optimization objectives and market-oriented considerations creates an inherent tension in dynamic pricing under limited inventory conditions. On the one hand, firms are incentivized to adjust prices dynamically to capture willingness to pay and allocate scarce inventory efficiently. On the other hand, frequent or sharp price changes may undermine consumer trust and provoke negative market reactions [12].

This tension is particularly pronounced in inventory-constrained environments, where scarcity heightens consumer sensitivity to price movements. When inventory levels are visibly low, price increases may be interpreted as opportunistic, even if they are consistent with rational supply-demand adjustments. Conversely, rapid price decreases in response to weak demand may lead consumers to delay purchases strategically, anticipating further reductions.

The amplification of price sensitivity under inventory pressure also affects competitive dynamics. Firms may respond aggressively to rivals' price changes in an attempt to protect market share, potentially leading to price volatility or destructive

competition. In such settings, the pursuit of short-term revenue optimization may conflict with the need for market stability and long-term profitability.

These dynamics suggest the existence of market boundary conditions for dynamic pricing. Beyond certain thresholds of price variability, inventory scarcity, or market transparency, dynamic pricing strategies may cease to be effective or socially acceptable. Understanding these boundaries is essential for designing pricing policies that are not only analytically optimal but also market viable.

In summary, the conceptual foundations of dynamic pricing under limited inventory extend beyond mathematical optimization to encompass market-oriented considerations. Recognizing the interplay between inventory constraints, consumer perceptions, and competitive behavior is crucial for developing a more comprehensive understanding of dynamic pricing in contemporary markets [13].

3. Consumer-Oriented Perspectives on Dynamic Pricing with Inventory Constraints

3.1. Consumer Price Perception and Fairness Concerns

Consumer responses to dynamic pricing are shaped not only by price levels but also by how price changes are perceived and evaluated. Reference price theory provides a foundational lens for understanding these perceptions [14]. Consumers form internal reference prices based on past experiences, observed prices, and contextual cues, and they assess current prices relative to these benchmarks. When prices fluctuate dynamically, especially within short time intervals, deviations from reference prices may trigger perceptions of abnormality or unfairness.

Perceived price unfairness has been identified as a critical factor influencing consumer attitudes and behavioral intentions. Research suggests that consumers are more likely to accept price increases when they are attributed to cost increases or external shocks, but they react negatively when price changes appear to be driven by opportunistic exploitation of demand. In dynamic pricing contexts, frequent adjustments can obscure the underlying rationale for price changes, making it difficult for consumers to assess whether prices are justified [15].

Inventory scarcity plays an important amplifying role in this process. When limited availability is salient, consumers are more attentive to price signals and more likely to interpret price increases as intentional attempts to extract surplus from scarcity. Scarcity cues, such as low-stock warnings or countdown timers, can intensify emotional reactions and heighten sensitivity to perceived unfairness [16]. As a result, dynamic pricing under inventory constraints may face stronger consumer resistance than similar pricing practices in unconstrained settings.

At the same time, scarcity can also legitimize certain price increases in the eyes of consumers, particularly when limited inventory is framed as a natural or unavoidable condition. The interaction between scarcity cues, framing strategies, and reference price formation thus plays a central role in shaping fairness perceptions in dynamic pricing environments.

3.2. Strategic Consumer Behavior under Limited Inventory

Beyond perceptual responses, consumers may behave strategically when they anticipate dynamic price adjustments. A central trade-off faced by consumers is whether to purchase immediately or wait for potential future price reductions. This waiting versus purchasing decision depends on expectations about price trajectories, perceived inventory risk, and individual tolerance for uncertainty.

Limited inventory introduces the risk of stockouts, which can significantly alter consumer behavior. When consumers perceive a high likelihood that products will sell out, they may accelerate purchases to secure availability, even at higher prices. This phenomenon, often described as stockout anxiety or panic buying, has been observed in both online and offline markets, particularly during periods of heightened demand or

supply disruptions. Dynamic pricing interacts with these behaviors by reinforcing urgency through rising prices or scarcity signals.

Repeated exposure to dynamic pricing allows consumers to learn and adapt over time. Through experience, consumers may infer pricing patterns, such as predictable price drops near the end of a selling period or systematic price increases as inventory declines. This learning process can lead to more sophisticated strategic behavior, including delayed purchases or repeated monitoring of prices. As consumers become more adept at anticipating pricing strategies, firms may find that initially profitable dynamic pricing policies become less effective.

Importantly, consumer learning does not occur in isolation. Information shared through online reviews, social media, and price comparison tools can accelerate collective learning and shape market-wide expectations. In inventory-constrained markets, such shared knowledge may amplify demand volatility and undermine the intended effects of dynamic pricing.

3.3. Heterogeneous Consumer Segments and Market Responses

Consumers differ substantially in their price sensitivity, inventory awareness, and tolerance for uncertainty. These differences give rise to heterogeneous market responses to dynamic pricing under inventory constraints. Some consumers are highly price-sensitive and willing to wait for lower prices, while others place greater value on certainty and availability and are willing to pay a premium to avoid the risk of stockouts.

Variation in inventory perception further contributes to heterogeneity. Consumers with better information or greater experience in a particular market may more accurately assess inventory conditions and adjust their behavior accordingly. In contrast, less informed consumers may rely more heavily on observable cues, such as scarcity messages or price trends, which can make them more susceptible to emotional responses.

Information transparency plays a critical role in shaping these heterogeneous responses. Greater transparency regarding inventory levels and pricing rules can reduce uncertainty and mitigate perceptions of unfairness, but it may also facilitate strategic waiting behavior. Conversely, opaque pricing practices may preserve pricing power in the short term while increasing the risk of consumer dissatisfaction and distrust.

Personalized pricing represents an extension of dynamic pricing that leverages consumer heterogeneity, but it also introduces ethical and regulatory concerns. When personalized prices are combined with inventory constraints, consumers may perceive differential treatment as discriminatory or manipulative, particularly if price differences cannot be easily justified. Such perceptions can trigger backlash and erode trust, offsetting potential revenue gains.

Taken together, a consumer-oriented perspective highlights that dynamic pricing under limited inventory conditions operates within a complex behavioral environment. Consumer perceptions, strategic behavior, and heterogeneity interact with inventory constraints in ways that can either reinforce or undermine pricing effectiveness. Understanding these interactions is essential for designing dynamic pricing strategies that are not only economically efficient but also acceptable and sustainable in the marketplace.

4. Competition-Oriented Perspectives: Dynamic Pricing in Inventory-Constrained Markets

4.1. Competitive Interactions under Limited Inventory

Competition plays a central role in shaping dynamic pricing outcomes, particularly in markets where inventory is limited and demand is volatile. Traditional pricing theory often relies on Bertrand competition, in which firms compete by setting prices simultaneously for homogeneous products. However, in inventory-constrained markets, competition is inherently dynamic. Firms adjust prices sequentially over time while observing rivals' pricing behavior and inferring their inventory positions.

Inventory asymmetry between competitors further complicates these interactions. Firms with larger inventories may pursue aggressive pricing strategies to expand market share, while inventory-constrained rivals may adopt higher prices to ration demand. Such asymmetries can lead to shifting competitive advantages over the selling horizon, as firms' relative inventory positions evolve. Dynamic pricing thus becomes a strategic tool not only for revenue optimization but also for managing competitive positioning.

Price matching policies and reactive pricing amplify competitive pressures in inventory-limited settings. When firms commit to matching competitors' prices, dynamic adjustments by one seller can rapidly propagate through the market. In the presence of limited inventory, such reactions may accelerate inventory depletion and increase price volatility, raising the risk of price wars that erode profitability for all participants.

4.2. Strategic Pricing Responses and Market Equilibria

Firms facing inventory constraints may adopt either defensive or aggressive pricing strategies depending on their strategic objectives and market conditions. Defensive pricing seeks to stabilize demand and preserve margins, often by avoiding sharp price cuts that could trigger competitive retaliation. Aggressive pricing, in contrast, aims to preempt rivals by rapidly adjusting prices to capture demand or signal strength.

Price changes can also serve as signals of inventory conditions. In markets with limited transparency, competitors may infer a firm's remaining inventory from its pricing behavior. For example, rising prices may signal scarcity, while persistent discounts may indicate excess inventory. These signals influence rivals' expectations and strategic responses, shaping market outcomes over time.

The interaction of signaling and strategic response can give rise to complex market equilibria. In some cases, firms may converge toward stable pricing patterns that balance demand and inventory across competitors. In other cases, dynamic pricing interactions may lead to cyclical or unstable outcomes, characterized by repeated price adjustments and shifting market shares.

These dynamics also raise concerns about tacit coordination and collusion. Algorithmic pricing systems that respond to competitors' prices in real time may unintentionally facilitate coordinated behavior, particularly in markets with limited inventory and high transparency. While explicit collusion is illegal in many jurisdictions, the boundary between competitive adaptation and tacit coordination becomes increasingly blurred in algorithm-driven pricing environments.

4.3. Platform-Based and Multi-Seller Environments

The rise of digital platforms has transformed competitive dynamics in inventory-constrained markets. E-commerce platforms, ticketing systems, and online marketplaces host multiple sellers offering similar products while competing for limited demand. Platform rules, such as price ranking algorithms or commission structures, influence how dynamic pricing strategies are deployed and how competition unfolds.

In these environments, algorithmic pricing systems interact not only with consumer demand but also with other algorithms. The resulting feedback loops can amplify price fluctuations and intensify competition, particularly when inventory levels are low. Small pricing adjustments by one seller may trigger automated responses from others, leading to rapid and sometimes unintended market-wide effects.

Market transparency on platforms further shapes competitive intensity. High transparency allows sellers to observe competitors' prices and adjust accordingly, increasing the speed of competitive reactions. While such transparency can enhance market efficiency, it may also increase price volatility and reduce differentiation opportunities. Under inventory constraints, these effects are magnified, as sellers race to balance price competitiveness with inventory preservation.

Overall, a competition-oriented perspective highlights that dynamic pricing under limited inventory conditions is deeply embedded in strategic interactions among firms. Understanding these interactions is essential for assessing the viability and sustainability of dynamic pricing strategies in competitive markets.

5. Integrative Framework: Market-Oriented Dynamic Pricing under Limited Inventory

The framework is designed to capture the complex interactions among inventory constraints, market responses, and firm-level strategic objectives. By moving beyond isolated analytical models, it provides a holistic view of dynamic pricing as a market-facing decision embedded in both behavioral and competitive environments.

5.1. A Three-Dimensional Framework

The proposed framework is structured around three interrelated dimensions: inventory conditions, market responses, and firm strategy. Together, these dimensions define the context in which dynamic pricing decisions are formulated and evaluated.

The inventory dimension reflects the physical and temporal constraints faced by firms. Key elements include the absolute level of remaining inventory, the speed at which inventory is depleted over time, and the degree of demand uncertainty. High inventory levels combined with slow depletion may justify price reductions to stimulate demand, whereas rapid depletion or high uncertainty increases the strategic value of price increases as a rationing mechanism. Importantly, inventory conditions evolve dynamically, altering the relevance of pricing objectives throughout the selling horizon.

The market dimension captures how consumers and competitors respond to pricing decisions under inventory constraints. On the demand side, consumer behavior is shaped by price perceptions, fairness evaluations, strategic learning, and heterogeneity in preferences and risk tolerance. On the supply side, competitors observe prices, infer inventory positions, and adjust their own strategies accordingly. These market responses feed back into demand realization and competitive intensity, influencing subsequent pricing decisions.

The firm strategy dimension reflects the trade-off between short-term revenue optimization and long-term value creation. Firms differ in their tolerance for demand volatility, their reliance on repeat customers, and their sensitivity to reputational risk. A strategy focused narrowly on short-term revenue may prioritize aggressive price adjustments as inventory tightens, while a long-term orientation may favor more stable pricing paths that preserve consumer trust and brand equity.

5.2. Key Mechanisms and Trade-Offs

Within this three-dimensional framework, several key mechanisms drive the outcomes of dynamic pricing under limited inventory. One central mechanism is the interaction between scarcity and price adjustment. Inventory scarcity increases the marginal impact of price changes on both revenue and consumer perception. While higher prices can effectively ration demand and extract surplus, they may also trigger perceptions of unfairness and intensify scrutiny of pricing practices.

A second mechanism arises from the interaction between consumer learning and competitive imitation. As consumers gain experience with dynamic pricing, they adapt their purchasing behavior, often anticipating future price movements. At the same time, competitors may imitate observed pricing strategies, particularly in transparent markets. These parallel learning processes can erode the effectiveness of initially optimal pricing policies and increase price volatility.

A third mechanism involves the relationship between inventory depletion and market backlash. As inventory approaches exhaustion, aggressive pricing strategies may maximize short-term returns but increase the risk of negative consumer reactions or

regulatory attention. Market backlash, once triggered, can have lasting effects that extend beyond the current selling period, undermining future pricing flexibility.

These mechanisms highlight fundamental trade-offs that firms must manage when implementing dynamic pricing under inventory constraints. Decisions that improve performance along one dimension may impose costs along another, underscoring the need for a balanced, market-oriented approach.

5.3. Managerial Implications

The integrative framework offers several implications for managerial practice. Aggressive pricing strategies are more likely to be appropriate when inventory is highly perishable, demand uncertainty is substantial, and consumer relationships are transactional rather than relational. In such contexts, the cost of unsold inventory may outweigh concerns about long-term perceptions.

In contrast, when markets are characterized by high transparency, repeated interactions, or strong brand dependence, firms may benefit from prioritizing market trust over short-term revenue gains. Gradual price adjustments and clear communication of pricing rationale can mitigate negative consumer responses and stabilize demand.

Industry context further moderates these trade-offs. In airline and hospitality markets, where perishability is extreme and dynamic pricing is widely accepted, consumers may be more tolerant of price fluctuations. In e-commerce and service industries with ongoing customer relationships, however, aggressive dynamic pricing under inventory constraints may generate stronger resistance. Recognizing these differences is essential for aligning dynamic pricing strategies with both inventory realities and market expectations.

6. Conclusions and Future Research Directions

6.1. Summary of Key Insights

This review has examined dynamic pricing under limited inventory conditions from a market-oriented perspective. By synthesizing insights from consumer behavior, competitive strategy, and inventory management, it complements the dominant analytical and algorithmic approaches in the existing literature. Rather than treating pricing decisions as isolated optimization problems, this review emphasizes their embeddedness in market interactions and strategic contexts.

A central insight emerging from this review is that limited inventory functions as an amplifier of market responses. Inventory scarcity heightens consumer sensitivity to price changes, intensifies fairness evaluations, and accelerates strategic learning. At the same time, it sharpens competitive reactions, as firms infer rivals' inventory positions from pricing behavior and respond accordingly. These amplified responses help explain why pricing policies that are optimal in theoretical models may encounter resistance or instability in real markets.

Another key insight is the inherent trade-off between short-term revenue optimization and long-term market sustainability. Dynamic pricing strategies designed solely to maximize immediate returns may undermine trust, damage brand equity, or provoke regulatory scrutiny, particularly when inventory constraints are salient and pricing practices are highly visible. A market-oriented perspective highlights the importance of balancing revenue goals with considerations of consumer relationships and competitive stability.

6.2. Directions for Future Research

Several promising directions for future research emerge from this review. First, there is a need for behavioral pricing models that explicitly incorporate inventory awareness. Integrating psychological factors such as fairness perceptions, reference price formation,

and stockout anxiety into dynamic pricing models would improve their descriptive realism and managerial relevance.

Second, future studies should further explore issues of pricing fairness and regulation in inventory-constrained markets. As dynamic pricing becomes more widespread, questions regarding acceptable price variability, transparency, and consumer protection are likely to gain prominence. Comparative studies across institutional and regulatory contexts would be particularly valuable.

Third, the interaction between human decision-makers and algorithmic pricing systems represents an important area for further investigation. Understanding how managers design, monitor, and intervene in algorithm-driven pricing under inventory constraints can shed light on the limits of automation and the role of human judgment.

Finally, sustainability and ethical considerations warrant greater attention. Dynamic pricing practices may influence consumption patterns, resource allocation, and social welfare, especially in markets for essential or time-sensitive goods. Research that examines these broader implications can help align pricing strategies with societal expectations.

6.3. Final Remarks

Overall, this review argues for a shift in focus from identifying optimal prices to developing market-sustainable pricing strategies. By framing dynamic pricing under limited inventory as a market-oriented and socially embedded practice, it encourages closer integration between analytical modeling and market research. In doing so, it aims to provide a conceptual bridge for interdisciplinary research and to support the development of dynamic pricing approaches that are both economically effective and market viable.

References

1. X. Li and Z. Zheng, "Dynamic pricing with external information and inventory constraint," Management Science, vol. 70, no. 9, pp. 5985–6001, 2024.
2. B. Chen, D. Simchi-Levi, Y. Wang, and Y. Zhou, "Dynamic pricing and inventory control with fixed ordering cost and incomplete demand information," Management Science, vol. 68, no. 8, pp. 5684–5703, 2022.
3. S. Yuan, "Data Flow Mechanisms and Model Applications in Intelligent Business Operation Platforms", Financial Economics Insights, vol. 2, no. 1, pp. 144–151, 2025, doi: 10.70088/m66tbm53.
4. G. Wang, "Performance evaluation and optimization of photovoltaic systems in urban environments," Int. J. New Dev. Eng. Soc., vol. 9, pp. 42–49, 2025, doi: 10.25236/IJNDES.2025.090106.
5. N. B. Keskin, Y. Li, and J. S. Song, "Data-driven dynamic pricing and ordering with perishable inventory in a changing environment," Management Science, vol. 68, no. 3, pp. 1938–1958, 2022.
6. W. Ma, D. Simchi-Levi, and J. Zhao, "Dynamic pricing (and assortment) under a static calendar," Management Science, vol. 67, no. 4, pp. 2292–2313, 2021.
7. J. Zhao, "'To IPO or Not to IPO' - Recent 2025 IPOs and AI Valuation Framework", Financial Economics Insights, vol. 2, no. 1, pp. 131–143, Dec. 2025, doi: 10.70088/hhczb769.
8. H. Matsumoto, T. Gu, S. Yo, M. Sasahira, S. Monden, T. Ninomiya, M. Osawa, O. Handa, E. Umegaki, and A. Shiotani, "Fecal microbiota transplantation using donor stool obtained from exercised mice suppresses colonic tumor development induced by azoxymethane in high-fat diet-induced obese mice," Microorganisms, vol. 13, no. 5, p. 1009, 2025.
9. X. Zhang, "The Enabling Path of Private Equity Funds in the Growth Process of Emerging Market Enterprises", Econ. Manag. Innov., vol. 2, no. 5, pp. 94–102, Oct. 2025, doi: 10.71222/511cxp26.
10. P. K. Kopalle, K. Pauwels, L. Y. Akella, and M. Gangwar, "Dynamic pricing: Definition, implications for managers, and future research directions," Journal of Retailing, vol. 99, no. 4, pp. 580–593, 2023.
11. A. V. den Boer and N. B. Keskin, "Dynamic pricing with demand learning and reference effects," Management Science, vol. 68, no. 10, pp. 7112–7130, 2022.
12. C. Yang, Y. Feng, and A. Whinston, "Dynamic pricing and information disclosure for fresh produce: An artificial intelligence approach," Production and Operations Management, vol. 31, no. 1, pp. 155–171, 2022.
13. X. Hu, Z. Wan, and N. N. Murthy, "Dynamic pricing of limited inventories with product returns," Manufacturing & Service Operations Management, vol. 21, no. 3, pp. 501–518, 2019, doi: 10.1287/msom.2017.0702

14. W. Sun, “Integration of Market-Oriented Development Models and Marketing Strategies in Real Estate,” European Journal of Business, Economics & Management, vol. 1, no. 3, pp. 45–52, 2025
15. C. Wu, W. Bi, and H. Liu, "Proximal policy optimization algorithm for dynamic pricing with online reviews," Expert Systems with Applications, vol. 213, p. 119191, 2023.
16. B. Wu, “Market research and product planning in e-commerce projects: A systematic analysis of strategies and methods,” Academic Journal of Business & Management, vol. 7, no. 3, pp. 45–53, 2025, doi: 10.25236/AJBM.2025.070307.