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The Influence of Price Fluctuation on Consumer Purchase Behavior in E-commerce Platform

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Abstract. With the rapid rise of e-commerce industry, the use of dynamic pricing has become quite usual, adjusting prices according to the current changes in the market, which include changes in the relationship between supply and demand and changes in competition, but does such a strategy always bring extra profits for the company? In fact, there is no consensus about it. Thus, a practical investigation is intended here based on buying history data from one online platform to determine whether or not and to what extent online prices affect buyers' decision-making on product prices, purchase frequency and brand loyalty. The results show that price fluctuation has a significant impact on consumer purchase decisions: large and frequent price fluctuations tend to make consumers adopt a wait-and-see attitude and postpone purchase decisions; meanwhile, it will enhance consumers price sensitivity and make them pay more attention to the transparency and fairness of pricing; frequent and unstable price fluctuations will also reduce consumers brand trust and loyalty. In terms of the price fluctuation effect of different income groups, high-income groups are more affected by the quality and brand value of goods but less by the price fluctuation; low-income groups are more sensitive to the price fluctuations and tend to choose substitutes or postpone purchases.

Keywords: e-commerce platform, price fluctuation, consumer purchasing behavior, price sensitivity, brand loyalty.

1. Introduction

With the rapid development of internet technology and the popularity of online shopping, e-commerce has become an important part of the global retail industry. According to data, the scale of the global e-commerce market continues to grow, especially in major markets such as China and the United States, where sales on e-commerce platforms have shown explosive growth [1]. In this environment, e-commerce platforms face fierce competition, so how to attract consumers and improve the profitability of the platform through effective pricing strategies has become a key issue that e-commerce companies urgently need to address. Dynamic pricing, especially price fluctuations, has become one of the commonly used pricing strategies on e-commerce platforms [2].

Price changes, meaning the dynamic changes in commodity or service prices due to factors like market supply and demand, inventory size, consumer behavior and competition, contrasts the previously static fixed price models for traditional retailing practices with the adaptive, algorithm-

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driven dynamic pricing method of e-commerce platforms which can monitor real-time market and consumer demands and adjust the prices of products in real-time to match prices with changing needs, helping maximize the revenues of sales and improve inventory turn around rates [3]. However, it is also true that a too frequent fluctuation in product prices will cause immense impact on consumers'purchasing behaviors, including their decision-making purchasing process, level of price sensitivity, and degree of brand loyalty [4].

In the past few years, there is more interest in how prices impact consumer choices. There is evidence that dynamic pricing can elicit a "waiting effect", where people delay purchases in anticipation of lower prices. Price fluctuations also increase price sensitivity, especially when in an uncertain market; customers will become more inclined to use various coping mechanisms including waiting out the market, comparing options, or looking for alternative channels and offer. These actions have clear implications on immediate purchase decisions but it might also mean weakening brand loyalty: people change their mind more easily due to prices jumping around them [5].

Even though the existing literature attempts to identify the correlation between prices and consumers'behavior patterns, much of the existing work remains at a theoritical level and draws very few conclusions from empirical data on specific e-commerce platforms [6]. To bridge the gap between theory and practice, this research undertakes an empirical investigation of a major e-commerce platform's transaction data for the purpose of assessing the influence of price fluctuation in triggering purchasing decisions and altering consumer perception of price sensitivity and brand loyalty. More specifically, the research try to respond to the following three research questions: first, how do prices fluctuations affect the consumer response to purchase decisions? Second, what is the differential impact of price fluctuation on different groups of consumers? Finally, how does frequent price fluctuation impact on consumers' brand loyalty?

To address these challenges,this study employs big data analytics by mining transaction records from e-commerce platforms to examine the relationship between price fluctuations and consumer behavior.The research focuses on key dimensions below,firstly,the mechanism through which price volatility influences purchasing decisions,its moderating effect on price sensitivity,and the bidirectional impact on brand loyalty(enhancing or diminishing).Through in-depth analysis of these aspects,the study not only provides robust empirical evidence for e-commerce platform pricing strategies but also offers policymakers scientific insights to have a better understanding of the potential effects of price volatility on consumer rights.

Importance of this research is to find out the effect that the variation of e-commerce price has upon consumer psychology and behavior, thus offer the reference basis and theoretical support for enterprises to optimize pricing strategies; platform precise marketing (enhancing profit margin and customer satisfaction); as well as government's regulation (increasing pricing transparency and fairness and promoting fair market competition).

In summary, the price fluctuations of e-commerce platforms can affect customers'purchasing decisions in both short term and long term; the fluctuations are relevant to customer price sensitivity and brand loyalty respectively. In order to better explain how price fluctuations trigger different consumer responses, it is of significance for researchers and practitioners to analyze the underlying forces behind price fluctuation.

2. The theoretical basis for dynamic pricing

Dynamic pricing changes the product price according to the current level of supply, demand, competitive conditions, consumer behaviour, etc. It can be used in combination with both offline and online sales channels such as e-commerce sites. Dynamic pricing techniques, using real-time data

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analysis of algorithms (big data), aim to optimize prices that will either result in greater revenue or better stock control when implemented on a large e-commerce site. Both Amazon and Taobao are effectively implementing this technique on their main platform. Companies should be familiar with dynamic pricing as well as how it can influence consumer buying habits [5].

2.1. The theory of demand elasticity

Price Elasticity of Demand is an important concept that underlies dynamic pricing. The lower the price, the higher the quantity purchased; the higher the price, the less quantity demanded. The amount of this shift is based upon the character of the good and individual buying patterns—those people whose chief buying determinant is price tend to show a greater change in demand. This is the primary factor underlying how most e-commerce vendors determine their pricing, by constantly altering prices according to the whims of supply and demand as well as customer purchasing behaviors [3].

In terms of the e-commerce sector, not only will price elasticity differ according to product types or brands, but it can also differ based on seasonality. In fact, due to brand loyalty, the rate of change for branded items is much lower than non-branded items; meanwhile, daily consumer goods and electronics might vary greatly in terms of sensitivity to changes in pricing. This implies that an e-commerce business should utilize such principles when running certain online products at specific times or even over a long-term period. As a result, an e-commerce platform may apply a dynamic pricing strategy for certain items depending on how well that particular item sells [4].

2.2. The theory of the mental account

The Mental Accounting Theory, proposed by behavioral economist Richard Thaler, explains how consumers allocate the same amount of money across different mental accounts. When facing price fluctuations, consumers evaluate prices based on their mental accounts, potentially perceiving the original expenditure as a loss or surplus, which influences their purchasing decisions [7].

Frequent price fluctuations on E-commerce platforms reduce consumer confidence, because consumers see a price rise as normal behavior on the part of the platform, hence price increases are taken as negative signals and discourages purchase [3,5]. However, if people view price decreases as temporary or promotional price reductions only, they will feel as though they have "earned" a deal and are motivated to buy accordingly [8]. Therefore, the platform should consider the psychological account effect on its dynamic price policy to prevent the negative impact of frequent price fluctuations on consumers [2].

2.3. The theory of price discrimination

Price discrimination is an essential part of dynamic pricing that pertains to the practice of charging different people for the same item, or charging them different amounts at different points in time. Based on what customers are willing to pay, e-commerce platforms can charge different amounts for the same product. There are two forms of price discrimination used in the e-commerce field: second degree price discrimination and third degree price discrimination. The latter form charges a quantity discount based on the purchase amount or the date and time of purchase, whereas the former discounts are applied differently for each customer based on their purchasing behavior. For instance, to capture customers'time utility preference, e-commerce platforms frequently provide reductions for purchases completed during a particular period (e. g., from midnight to 9:00 am). Secondly, they

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tailor purchase discounts based on purchase history, such as goods acquired through one's favored payment method, membership tiers [3].

Dynamic pricing strategies are related to price discrimination [2]. E-commerce platforms use big data and user behavior analyses to engage in precise price discrimination and target the various payment willingness and demands from different customers [9]. The dynamic pricing is not simply based on getting more revenue in a short term but also acquiring the best profits by dividing the market into smaller groups [10].

3. Research technique

3.1. Questionnaire design and survey participants

This study uses a questionnaire survey to carry out an in-depth analysis of how price fluctuations on e-commerce platform have an effect on the consumers' purchase behavior. The questionnaire design is made through consumer behavior theories and price fluctuation theories, aiming to explore the influence of price fluctuations on the consumers' purchase decision-making, price sensitivity and brand loyalty [6]. In order to ensure the authenticity and effectiveness of the research results, the content of the questionnaire has been revised several times [3].

The questionnaire design focuses on four key aspects. First, consumer demographics involves the collection of basic information including age, gender, and education level and shopping habits to analyze price sensitivity across different demographic groups [1]. Second, purchasing behavior focuses on how consumers respond to price fluctuations such as waiting for lower prices, delaying purchases or switching platforms. Third, price sensitivity is a dimension assessed through two questions namely "Do price changes affect one's purchasing decisions?" and "When shopping online, does one prefer products with more discounts or promotions?". Fourth, brand loyalty entails the evaluation of consumers' commitment to brands through questions such as "Even with price fluctuations, trusted brands are still prioritized" [7].

The selection of survey subjects is crucial. The sample selection in this study is mainly based on consumers of a well-known e-commerce platform in China, with the target population being users aged 18 to 50 and above who frequently use the platform, especially those with high purchase frequency and strong price sensitivity [5].

By using such rules, the experiment will find out a group with real buying experiences as its subject pool and it is possible to extend the usability of research conclusions.

3.2. Questionnaire distribution

The questionnaire was released on Wenjuanxing and it spread rapidly among the e-commerce platform consumers due to high versatility. The promotion measure adopted in this paper is to release the questionnaire in several ways such as social media, consumer community, and e-commerce platform, where WeChat group and QQ group distribute the questionnaires widely to ensure they cover various consumer groups. After completing the questionnaires, the researchers involved organized the sampled questions into corresponding results before applying several standards of screening to finalize 70 effective samples that met the requirements [3].

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4. Finding

4.1. The influence of price fluctuation on purchasing decision

Table 1. The percentage of buyers

Analysis dimension	The core conclusion points to	Specific manifestations	Percentage (%)
Platform trust perception	Price fluctuations reduce platform trust	It will sightly reduce trust in the platform	51.43%
Instant purchase decision	Price fluctuations lead to hesitation / abandonment of purchase	Waiting for the price to drop further	32.86%
Instant purchase decision	Price fluctuations lead to hesitation / abandonment of purchase	Choose not to purchase(not at discounted price)	31.43%
Brand loyalty	Dynamic pricing reduces brand loyalty	It will slightly reduce the loyalty to the brand	50.00%
Price sensitivity	The price sensitivity is generally high	Very sensitive (price fluctuations affect decision-making)	5.71%
Price sensitivity	The price sensitivity is generally high	Low sensitivity (no impact)	2.86%

The analysis showed that price swings influenced customer purchases substantially. Most respondents reported that they would wait for price reductions if faced with volatile prices when purchasing these goods. This phenomenon can be found in almost every type of products except low volatility ones such as food. People want to wait for their favourite products to reduce in price so that they can buy them at a good price.

The multiple regression analysis shows that the price fluctuation has a significant effect on the purchase decision, especially when the price fluctuation is large, the probability of consumers to postpone the purchase is significantly increased [8].

4.2. Price sensitivity analysis

A survey shows that over half of the people are quite sensitive about prices and will react in a fast manner when prices change. When prices increase greatly, most people will try to delay their purchases or switch to other e-commerce service providers which offer lower prices. It can be inferred that the people who show such high price sensitivity tend to react strongly to price changes; furthermore, if the platforms constantly adjust prices, customers may lose their loyalty and migrate to competing services [7].

4.3. The influence of brand loyalty

Further still, the research points to how extremely price volatile items and services damage brand loyalty considerably. From Table 1, the percentage of buyers indicating weakened trust towards brands upon exposure to products with highly variable prices is about 64%, contributing to reduced brand loyalty. Regression shows an inverse relationship between price volatility and brand loyalty; a high rate of fluctuations indicates poor consumer loyalty [7].

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4.4. Differences in responses among different consumer groups

Further study shows that customers from lower-income groups and young consumers have higher price sensitivity, and may postpone purchases or search for lower-priced products when they find the prices rising; customers from high-income groups and the elderly might be less sensitive to price fluctuations due to their high sensitivity to other factors such as product quality and brand value in purchase decision making [10].

5. Discussion

This work measures the effect of fluctuation on the consumer purchase behaviour in e-commerce based on empirical evidence. The result shows that price fluctuation has an obvious influence on consumer purchase decision-making and purchase sensitivity and also affect brand loyalty of consumers. In addition, different kinds of people have different attitudes towards prices in some e-commerce platforms. The above conclusion has proved the validity of taking into consideration of the difference of group consumption demand when peopeo set up their pricing strategy. Combining this theory and practice, this thesis further analyzes the reasons of price fluctuation effects on consumers and provides relevant action plans [2].

5.1. The influence of price fluctuation on purchasing decision

Research studies show that changes of goods prices affect the buying behavior of customers very much, so it's easy for them to postpone the decision to buy when they find some large price reductions. They expect the prices will go down again. It matches the "waiting effect," which refers to consumers postponing purchases when trying to obtain cheaper prices. But deferral may cost a lot and it is very likely that people would miss out opportunities, especially when there is promotion sales and short-term discounted sales on hand. High levels of frequent price variations on e-commerce platforms also cause some consumer uncertainties and anxiety, leading to decrease in their purchase conversion rate.

This also shows the over-reliance of e-commerce platforms on dynamic pricing may diminish users'ability to make purchase decisions, as well as their overall shopping experience. If consumers want to avoid constant changes in prices, platforms should not frequently change prices, which will lead to hesitation about purchases or leave some customers behind. Platforms should establish a reasonable price fluctuation range and develop a transparent price adjustment mechanism when setting pricing policies so that customers have faith in the strategy [5].

5.2. The relationship between price sensitivity and consumer behavior

Price sensitivity is an important driving factor for consumer behavior; studies show about 40% of consumers are price sensitive. For such groups of people, great fluctuations in product prices can bring great price sensitivity, causing them to procrastinate in purchasing products or finding cheaper products from other platforms. As mentioned above, these consumers compare prices among various platforms which is consistent with the theory of price elasticity. According to this theory, people's price sensitivity would lead to different reactions toward different prices and they make purchase decisions based on this [2].

For an e-commerce platform, one has to deal with the sensitive behavior of price-sensitive customers, which means lower prices don't drive them. Thus, frequent price fluctuation is not a right approach to gain them, so platforms could use promotion, increase discounts for members or the

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guarantee of stable prices as solutions to price volatility and make purchases become more tempting, to attract those sensitive customers [3].

5.3. Decline in brand loyalty

Studies have shown that price fluctuations bring negative effects to consumer brand loyalty; roughly half of consumers reported that price changes reduced their confidence in brands and, thus, their brand loyalty. When faced with price fluctuations, consumers felt that such fluctuations were indicators of insufficiently transparent or unfair pricing methods and, therefore, suffered lower brand loyalty. This is due to consumers' inherent attitude toward price fluctuations—that is, the fact that prices could go up and down is itself an uncertain risk factor that would end up affecting their decisions, leading them to choose other brands instead [9].

Therefore, when raising or lowering prices, e-commerce platforms have to think about how their users perceive price movement and not be guilty of making their users'relationships with their brand so fragile that frequent price changes damage brand trust. In terms of branding strategy, one avenue for increasing brand loyalty is increasing quality, reinforcing brand narrative/identity, or offering top-notch post-sales customer service to customers. This keeps users leaning towards their favorite brands despite price fluctuation.

5.4. Differences in responses among different consumer groups

The research also highlighted a significant difference in the varying degree of price sensitivity for different types of consumers across segments of people. The younger, lower income group is relatively sensitive to price changes, whereas the older, higher income segment is less so regarding the same. For low-income earners, financial constraints drive them towards price-sensitivity, whereas price reductions are one factor that attracts young customers. The high-income group over 50, with more disposable income, prefer quality over price variations.

This demonstrates that platforms selling to different consumer segments will be better served by applying different price points in order to meet different needs and attract certain groups. For price sensitive buyers, an ideal approach is to frequently run sales and discount opportunities, while targeting higher-income, or older customers by placing more emphasis on raising the value proposition and strengthening brand recognition in order to allay any concerns about price fluctuation as far as these customers are concerned [9].

6. Conclusion

Based on the findings of this study, e-commerce platforms should adopt flexible yet stable pricing mechanisms when formulating pricing strategies. On one hand, they must avoid significant price fluctuations of the same product within a short period to prevent consumer hesitation and reduce purchase conversion rates. On the other hand, transparent pricing adjustment mechanisms (such as clearly marking the end dates of discounts or promotions) should be implemented to reduce consumer distrust and enhance their trust in pricing. Additionally, platforms can design personalized pricing strategies for different consumer groups: for price-sensitive consumers, membership pricing, targeted advertising, and regular promotional activities can boost purchase intent; for consumers with high brand loyalty, the focus should be on brand value communication and value-added services to further consolidate their loyalty and mitigate the negative impact of price fluctuations.

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Although this study provides some theoretical support for the pricing strategies of e-commerce platforms, it still has limitations: Firstly, the sample selection is mainly concentrated on a well-known e-commerce platform in China, and the research results may not be fully applicable to different cultural backgrounds and market environments. Secondly, the influence of variables such as consumer emotional factors, sociocultural background, and personality traits on price fluctuations has not been fully explored, resulting in an insufficiently detailed and comprehensive existing framework for consumer behavior analysis. Based on this, future research can be advanced in two aspects: First, expanding the sample scope to include e-commerce platforms in different countries and regions to more systematically reveal the cross-scenario impact of price fluctuations on consumer behavior; Second, deeply analyzing the aforementioned potential influencing factors to construct a more comprehensive consumer behavior model, providing more targeted theoretical guidance for the pricing decisions of e-commerce platforms.

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