

Classic Case Study of Price Discrimination in the Age of Big Data

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Abstract. The popularization and development of big data in the age of the Internet have enabled merchants to implement price discrimination through personalized pricing strategies based on consumers' personal information and behavioral data. This paper presents a classic case study of price discrimination in the era of big data, focusing on examples from the travel industry, internet shopping, and e-commerce platforms. The case study highlights the social unfairness caused by price discrimination, as it leads to different prices for the same goods among different groups of consumers, violating the principle of fair trade. It also points out the information asymmetry between consumers and merchants, where consumers may find it difficult to determine if they are being discriminated against in pricing. Additionally, the study examines the implications of price discrimination on consumer rights and interests, emphasizing the need for fair and reasonable prices for consumers. The legal and ethical issues surrounding the use of personal information in price discrimination are also addressed. The paper suggests that government regulation, especially through antitrust laws, plays a crucial role in addressing price discrimination. It emphasizes the importance of strengthening regulatory review, increasing penalties, and focusing on a level playing field to promote fair competition and protect consumer rights. In conclusion, the study sheds light on the complexity and significance of price discrimination in the age of big data. It underscores the responsibility of governments and regulators in safeguarding consumer rights, maintaining fair competition, and formulating effective regulations to address price discrimination issues.

Keywords: Price discrimination, Government, Consumer, Rights, Big Data.

1. Introduction

Today, the popularization and development of the Internet has led to the increasingly widespread application of big data, which also brings more opportunities and means for merchants to implement price discrimination. The Big Data Discriminatory Pricing (BDDP) refers to the merchants through the analysis and mining of consumers' personal information, purchase records, browsing habits, etc., to classify different consumers into different groups, and customized pricing strategy [1]. This pricing strategy often leads to different selling prices for the same goods in different groups. BDDP has attracted a lot of attention and discussion at present, and the following are the main reasons:

(1) Unfairness: BDDP is essentially a kind of price discrimination behavior, which sells the same goods to different consumers at different prices, and this difference is unfair to consumers. Consumers often choose and compare goods on equal terms when they buy them, but BDDP destroys this equality [1].

(2) Information asymmetry: by using big data to analyze consumers' personal information and behavioral data, merchants can more accurately understand consumers' needs and purchasing ability. Consumers, on the other hand, have a limited understanding of the information held by merchants and often find it difficult to determine whether they are being discriminated against in pricing. This information asymmetry exacerbates the imbalance between consumers and merchants [2].

(3) Consumer rights and interests' protection: the emergence of BDDP poses a new challenge to consumer rights and interests. Consumers should enjoy fair and reasonable prices, but BDDP uses individual information to divide the market and set prices, and it is difficult for consumers to notice this unfair pricing strategy [3].

(4) Legal and ethical issues: BDDP involves the use and abuse of personal information, which involves legal and ethical considerations such as privacy protection and data security. When using

big data, merchants must comply with relevant laws and regulations to protect consumers' privacy and personal information security [4].

This paper will systematically analyze several typical examples of price discrimination in the era of big data and illustrate its implications for today's society from different perspectives. Specifically, the research will focus on the following aspects:

Reveal the problem of social unfairness: By analyzing the examples of price discrimination, the impact of price discrimination on social fairness can be revealed. Price discrimination leads to differential pricing of the same goods or services among different groups of consumers, which violates the principle of fair trade. An in-depth analysis of these examples can arouse social concern and promote public awareness and discussion of the issue of price discrimination, which in turn promotes the pursuit of fair competition in society.

Explore the problem of damaged consumer rights and interests: price discrimination poses a threat to consumer rights and interests. When merchants set prices based on personal data and behavior, consumers may not be able to obtain fair and reasonable prices. By analyzing examples of price discrimination, we can gain a deeper understanding of the unfair treatment consumers suffer when facing price discrimination and promote social concern for consumer rights protection and the improvement of relevant laws and policies.

Provide policy reference basis: Studying typical examples of price discrimination helps government officials better understand the actual impact and potential risks of the problem. By analyzing the phenomenon of price discrimination in depth, it can provide reference bases for relevant government departments to help them formulate more reasonable and effective laws, policies, and regulatory measures to maintain market order, protect consumers' rights and interests and promote fair competition.

Trigger social concern and change: By studying the examples of price discrimination and publicizing the problem, it triggers widespread social concern and discussion about unfair phenomena such as price discrimination. This social concern can promote the formation of social opinion, push enterprises to pay more attention to consumer rights and social justice, and prompt businesses to change unfair pricing behaviors, thus promoting the development of society in the direction of greater fairness and equality.

2. Classic Case

2.1. Ctrip

On March 10, 2019, Ctrip user Chen Liren indicated that he purchased a HNA ticket on the Ctrip App at 10:47 that day for a total price of 17,548 RMB. It then indicated that he forgot to select the option of reimbursement voucher. After exiting to fix it, he was told there were no more tickets. Mr. Chen's ticket price after re-searching rose to 18,987 RMB, 1,500 RMB more expensive than before, and after performing a repeat logout login and uninstalling the app to reinstall it, the price remained the same. At 12:24 p.m. that day, Chen Liren purchased a ticket under the official HNA app and found that the same ticket was much cheaper than before, at 16,890 yuan. Subsequently, although Ctrip explained that it was a system failure, but netizens seem to be difficult to be convinced [5].

The above case implies that Ctrip may have adopted a dynamic pricing strategy or personalized pricing strategy, which may be based on personal information, such as historical purchase records, browsing habits, etc., to give different prices to different users or user behaviors. This is a typical second-degree price discrimination behavior and is not easy to regulate. Such personalized pricing may result in consumers facing unfair price differences for the same product, leading to the phenomenon of price discrimination and consumer concerns about it. If a platform implements different pricing strategies for different users or user behaviors, it may be perceived as discriminatory pricing against certain users, violating the principles of fair competition and consumer protection.

This case provides an observation from the perspective of price discrimination, which involves pricing differences across channels, pricing differences based on personal information, transparency,

and fair competition, and has attracted much attention and discussion among netizens. This shows consumers' sensitivity to the issue of price discrimination and their pursuit of fair competition. This concern and controversy have helped drive relevant platforms and organizations to review and improve their pricing strategies. It is crucial for platforms to maintain price transparency and fair competition to maintain user trust and consumer rights.

2.2. Travel APPs

In the "2020 Research Report on the Status of Taxi Software Travel", Prof. Sun Jinyun's team has taken 836 taxi rides across seven taxi platforms, answering the questions people have about online taxi in the era of big data from various aspects. In the fourth section of the article, the team shows us in detail the "Apple tax" that exists in the taxi platform. The analysis points out that Apple users are more likely to be picked up by drivers of high-end vehicles (private cars, premiums, etc.) than non-Apple users, and the ratio is three times higher than that of non-Apple users. In addition, if a passenger is using a non-Apple phone, then the platform will also select the class of vehicle based on the price of the passenger's phone. The higher the price of the phone, the more likely it is to be picked up by a higher-end vehicle. In addition to this, the data points out that Apple phone passengers only get 2.07 RMB off on average, while non-Apple phone passengers get 4.12 RMB off on average [6].

In this report, we can see that taxi platforms adopt different pricing and discount strategies for Apple phone users and non-Apple phone users, reflecting the possibility of price discrimination. Since more high-end vehicles are picked up using Apple phones, this implies that taxi platforms may choose the vehicles to be dispatched based on the user's cell phone type, thus implementing price discrimination, and making Apple phone users more likely to enjoy high-end vehicle services. In addition, as Apple phone passengers on average enjoy much lower discounts than non-Apple phones, this shows that the taxi platforms are treating different phone users differently in terms of their discount strategies, i.e., price discrimination. Although in the case, the taxi platform did not explicitly adopt different pricing for users, it achieved a second-degree price discrimination by choosing the delivery vehicles and preferential strategies to differentiate between different types of cell phone users.

2.3. Internet Shopping

Ms. Wang, a citizen of Shenzhen, purchased goods online at Sam's Club because of different delivery addresses and encountered a "rob rich" situation, with significant differences in the price of goods. Ms. Wang placed orders with different addresses around March 25th. She purchased the exact same 650 grams of Member's Mark Australian imported grain-fed eye meat. However, when the order was delivered to an old mansion in the CBD section of Futian, the price of the goods was 166.4 RMB; while when it was delivered to an industrial building address in Luohu District, the price of the goods was 128.7 RMB, a difference of nearly 30%. Ms. Wang to Sam consulting, Sam's customer service did not answer the question of why there is such a big price difference, but simply said that different warehouses out of the warehouse will have a price difference. Subsequently, the reporter conducted a practical test, confirmed the price difference of the same goods at different addresses. Sam's customer service staff initially explained that the price difference between different warehouses, but then Sam's side corrected the price deviation caused by the App system problems. They apologized and said that the issue has been addressed and the prices of the same item in the same city have been standardized [7].

In this case, there were significant price differences for the same item positioned at different delivery addresses, 166.4 RMB for a mansion and 128.7 RMB for an industrial building address. This pricing difference reflects the platform's different pricing strategy for users with different addresses, which is not based on reasonable factors such as actual operating costs or product quality, but rather arises from the positioning of the delivery address. This implies that the platform may have analyzed information such as users' addresses and spending power through big data in order to implement price discrimination against different users. The platform's initial explanation for the price difference was due to different warehouses going out of stock, which was later corrected to be an App system issue.

Whether it's a warehouse issue or an app system issue, this pricing discrepancy raises questions about the platform's pricing strategy and users' concerns about whether there are other potential price discrimination factors in the system.

2.4. Summary

After analyzing the above three cases, it can be concluded that in the era of big data, due to the wide application of data and enhanced analytical capabilities, platforms have more information about their users, including data on personal characteristics such as consumption habits, geographic location, and purchase history. Although big data provides enterprises with better business opportunities and personalized services, it also brings the risk of price discrimination. In order to safeguard users' rights and fair competition, platforms and government regulators need to take measures so as to protect users' rights and interests as well as maintain their trust in the platforms.

As a consumer, it is recommended to adopt the following ways to screen for price discrimination:

(1) Compare prices in different channels: When purchasing goods or services, consumers can compare prices in different sales channels, especially between different platforms or different merchants. If the same goods are found to have significantly different prices in different channels, there may be a case of price discrimination.

(2) Increase awareness of the leaking of personal information: Consumers should pay attention to the protection of personal information and avoid providing too much personal sensitive data to merchants or platforms. If merchants ask for too much personal information and price accordingly, they may be engaging in personalized pricing or price discrimination.

(3) Use different accounts or devices: Some platforms may base their pricing on the type of user account or device, so consumers may try to access the platform using different accounts or devices to observe if there is a price difference.

(4) Monitor price fluctuations: Watch for fluctuations in the price of goods or services, especially if there are large fluctuations within a short period of time, which may be due to price discrimination or personalized pricing.

3. Government Regulation of Price Discrimination

In dealing with price discrimination, the government plays a key regulatory role to ensure fair competition in the market and the protection of consumer rights. The regulatory function of the government is particularly important in this topic that has aroused widespread concern. It is indispensable for the government to protect consumers from price discrimination and to maintain a fair and transparent market [8]. This chapter will focus on the government's role in the regulation of price discrimination, using the antitrust law as an entry point to explore how the government responds to price discrimination. In addition, the chapter will explore the roles and responsibilities of regulators in monitoring price discrimination, as well as the government's responsibility to safeguard market fairness and consumer rights.

The Apple e-book antitrust case is a classic example of the relationship between antitrust law and price discrimination. It arose out of Apple's "agency model" in launching its iBooks service, whereby publishers gave Apple pricing power and Apple would ensure that they received the same or lower prices as competitors under the Most Favored Nation (MFN) clause. This model allows Apple to control the pricing of e-books and attempts to limit the price advantage of other competitors, such as Amazon's Kindle, etc. In April 2012, the U.S. Department of Justice and 31 state antitrust agencies filed a lawsuit against Apple alleging that it had conspired with five major publishers to discriminate in pricing and restrict competition. The charges were based on U.S. antitrust laws that are designed to maintain fair competition in the marketplace and prevent monopolistic behavior from adversely affecting consumers and the marketplace. In 2013, a federal judge ruled that Apple did indeed collude with publishers to commit price discrimination and antitrust violations. The judge found Apple guilty of antitrust offenses and required Apple to pay \$45 million in damages [9].

The antitrust law plays a crucial role in this case. It provides the government with a powerful tool to regulate market behavior and ensure that firms do not abuse their market position, restrict competition, or harm consumers by colluding to raise prices, for example. Enforcement of the antitrust law has resulted in Apple and its partner publishers being scrutinized and sanctioned, thus safeguarding fair competition in the market and the rights and interests of consumers. China's relevant authorities can draw on and learn from the experience of using the antitrust law in the Apple e-book antitrust case in order to strengthen the regulation of market competition and the protection of consumer rights and interests in the field of digital economy. The following are some of the things that can be borrowed and learned from this case:

(1) Increase regulatory review: In the Apple case, the U.S. federal government and state antitrust agencies worked together to investigate and regulate the case, thus stopping Apple's attempt to monopolize the market. In China, although the State Administration for Market Supervision and Administration plays the role of a regulatory agency, the main challenge China facing is not the lack of a regulatory agency or the imperfection of regulatory laws, but rather the insufficiency of regulatory review. Although China has established relevant regulatory bodies and legal frameworks to deal with price discrimination, in the actual implementation process, the regulatory authorities may find it difficult to comprehensively and thoroughly review all corporate behaviors suspected of price discrimination due to limited resources, technical difficulties, or insufficient sanctions [10]. Therefore, the human and financial resources of the regulator should be increased to ensure that it can adequately cover the scope of regulation and conduct in-depth investigation and examination of pricing behaviors of enterprises. In addition, special reporting and monitoring channels can be set up to encourage the public to participate in monitoring and report price discrimination in a timely manner, so as to increase the channels through which regulators can obtain information.

(2) Increase penalties: In the Apple case, Apple was found guilty of antitrust law offenses and paid \$45 million in damages. Policy designers should consider increasing the penalties for companies that violate the antitrust law, making non-compliance more costly in order to have a better deterrent effect.

(3) Focus on a level playing field: When formulating antitrust regulations, policy designers should focus on creating a fair and competitive market environment, encouraging enterprises to participate in market competition, and avoiding policies that discriminate against or favor specific enterprises. The government should ensure that all types of enterprises in the market have access to development opportunities in a level playing field.

(4) Strengthen international cooperation: Competition and antitrust issues in the digital economy are global in nature, and policy designers should strengthen international cooperation, exchange information, and cooperate with regulatory agencies in other countries to jointly address antitrust challenges in a globalized economy.

(5) Strengthening regulators and technology application: Strengthen the technological and data capabilities of regulators and enhance their understanding and application of big data analysis and personalized pricing strategies. Increase the human and financial resources invested by regulators to ensure that they can adequately cover the regulatory scope and conduct in-depth investigations and reviews of companies' pricing behavior.

Overall, Apple's e-book antitrust case provides valuable lessons for China's authorities. The government should formulate clear antitrust regulations and strengthen supervision in the digital economy to promote fair competition and protect consumer rights.

4. Conclusion

BBDP is a form of price discrimination, in which customized pricing strategies are implemented through the analysis of consumers' personal information and behavioral data, resulting in different selling prices for the same goods among different groups of people. This raises issues of unfairness, information asymmetry, consumer protection and legal ethics. This paper analyzes typical examples of price discrimination and its impact on society in the era of big data from different perspectives,

including revealing the issue of social fairness, exploring the issue of damaged consumer rights and interests, providing a reference basis for policy, and triggering social concern and change.

After analyzing the above cases, the typical examples of price discrimination in the era of big data involve the issues of pricing differences in different channels, pricing differences based on personal information, transparency, and fair competition. These cases have triggered widespread concern and discussion and show the sensitivity of consumers to the issue of price discrimination and the pursuit of fair competition.

Government should play a key role in the regulation of price discrimination and ensure fair competition in the market and the protection of consumers' rights and interests through regulations such as the antitrust law. The government should establish effective regulatory agencies, increase penalties, and enhance international cooperation to address antitrust challenges in the digital economy.

Regulators should continuously monitor and investigate market behavior, enforce antitrust laws, fine, and penalize companies suspected of price discrimination, and promote information disclosure in the context of price discrimination in order to protect consumer rights and maintain fair competition in the market.

Consumers should compare prices across different channels, pay attention to personal information protection, try to use different accounts or devices, monitor price fluctuations, pay attention to platform transparency, and file complaints and feedback to help safeguard our rights and promote more effective regulation.

These findings or insights reveal the complexity and importance of price discrimination in the era of big data and emphasize the important responsibility of governments and regulators in protecting consumer rights and interests and maintaining fair competition in the market. Governments and regulators need to pay close attention to the issue of price discrimination and strengthen the construction of regulations and systems and enforcement efforts to ensure fair competition in the market and the protection of consumer rights and interests.

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