

On the Illegality and Regulation of Algorithmic Price Discrimination in China's Digital Economy

Rongxin Zeng¹ & Xiaoshan Li²

¹ School of Law, Shanghai University of Political Science and Law, Shanghai, China

² Shanghai Institute of Justice, Shanghai University of Political Science and Law, Shanghai, China

Correspondence: Rongxin Zeng, School of Law, Shanghai University of Political Science and Law, Shanghai, China. E-mail: zrxshupl@163.com

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Abstract

The legal issue of algorithmic price discrimination sparked by the in-depth use of big data and algorithm techniques has emerged as a significant concern in the development of China's digital economy. Although Chinese law has implemented many regulations on the collection and protection of personal information, data security and governance, as well as on price discrimination, instances of algorithmic price discrimination have arisen in judicial practice. The legal issue surrounding algorithmic price discrimination has not yet been fully resolved. Legal studies in China on this issue mainly uses "big data killing" or "algorithmic price discrimination" to define it. Regarding the legal classification and regulation of algorithmic price discrimination: the Anti-Monopoly Law's regulatory measures are limited from a competition law standpoint. Instead, Anti-Unfair Competition Law provides a more appropriate framework. As for civil law, the question of whether the algorithmic price discrimination qualifies as a civil tort still requires discussion; nevertheless, it satisfies all the constitutive elements of fraud in Chinese civil law.

Keywords: algorithmic price discrimination; tort; fraud; anti-monopoly; anti-unfair competition

The extensive use of big data and algorithms techniques in the digital economy has facilitated the rapid development of the digital economy. Nevertheless, it has given rise to concerning issues such as the compromise of personal information and the prevalence of pricing (also known as "big data killing"). Defining and regulating algorithmic price discrimination in the digital economy is a relatively new legal issue that requires thorough discussion and consensus-building through academic and judicial practice.

1. The Concept Definition of Algorithmic Price Discrimination

1.1 Theoretical Debates on the Concept of Algorithmic Price Discrimination

Algorithmic price discrimination is not an officially recognized concept in legislation, but it is utilized in a scientific and legal practice. However, even technically speaking, scholars do not use the uniform term to describe this form of price discrimination.

Some scholars have explicitly used the term "algorithmic price discrimination", and define it as "a price discrimination act of business operator which depends on the results of big data analysis of user's willingness to pay and consumption acts prediction by applying the advantage of algorithm technique to the big data."¹ Ye Ming, Guo Jianglan, in the *Legal regulation of algorithmic price discrimination in the era of digital economy*, also explicitly adopts the concept of "algorithmic price discrimination", and defined it as "a discriminatory act to provide commodities or services on different prices to different internet users, which depends on the user's maximum willingness to pay and prediction of consumption acts according to the result of algorithmic analysis of the user's historical consumption data collected."²

¹ Xu. S. J., Gao. Q. (2022). Algorithmic price discrimination under the framework of Anti-monopoly law. *China Law Review*, No.3, 105-116.

² Ye, M., Guo J. L. (2020). Legal Regulation of Algorithmic Price Discrimination in the Era of Digital Economy. *Price Monthly*, No.3, 33-40. The term is also used by scholars such as Shan Maofeng and Fu Lixia. Referring also: Shan, M. F., Zheng X. (2020). Logic and Access of Algorithmic Price Discrimination Regulation, *Price Theory and Practice*, No.5, 27-31. Fu L. X. (2020). Research on the Illegality of Big Data Price Discrimination: Problems, Disputes and Countermeasures. *Journal of Huazhong University of Science and Technology*, No.1, 95-104.

Some scholars use the term "big data killing" to describe the act of tailored pricing executed by Internet platforms who take advantage of the algorithm technique to analyse the big data composed of users' browsing records, consumption preferences, price range, historical transaction information etc. In this scenario, these users are "acquaintances" of the platform.³ Under the mode of "big data killing", different consumers pay different prices for the same product or service on the platform, the algorithm technique and the big data have thus become powerful tools for the platform business to pursue super-normal profits. Because of its relative popularization and visualization, the term "big data killing" has gained a lot of traction and attracted the interest and use of numerous scholars.

Some scholars distinguish the "algorithmic price discrimination" from the "big data killing", considering that the "big data killing" is one of the manifestations of the "algorithmic price discrimination" but not the only one form, and the two terms cannot be completely equated. For instance, Meng Qinguo highlights the distinction between the two, and considers that the "big data killing" is the most prevalent instance of infringement of algorithm discrimination to the rights and interests of consumers. "Big data killing" is defined as a situation in which an Internet platform or a business takes advantage of certain algorithm technique and models to analyse the consumption data of internet users (i.e. consumers) historically collected, and then automatically provide the commodities or services to various internet users at varying prices based on the automatic analysis results. All processes are automatically generated and output by algorithmic decision-making. This makes different consumers pay varying prices for the same good or service even all transactions incur at the same time.⁴

1.2 Core Elements and Concept of Algorithmic Price Discrimination

Although scholars use different terms to describe the issues of price discrimination in the digital economy, and there are ongoing debates about adopting a uniform term. Nevertheless, they have reached a basic consensus has been reached on the three core essentials elements of the phenomenon of the price discrimination – collecting the big data of users' consumption, algorithm analysis and offering commodities or services to different users at different prices (i.e. personal information collection, user profiling and differential pricing).

In addition to the above consensus, scholars have reached another consensus that the algorithmic price discrimination in law is a type of first-degree price discrimination in economics, but it is not appropriate to bracket together these concepts in different areas.⁵ Price discrimination in economics is a neutral description of the fact that market entities sell their commodities at different prices according to the market competition situation, without any value judgment of praise or criticism. According to the degree of discrimination, the British economist Pigou categorizes the price discrimination in economics into three levels: first-degree, second-degree, and third-degree price discrimination. First-degree price discrimination, also referred to as perfect price discrimination, is a pricing strategy where a market entity has precise knowledge of the demand elasticity and expected price of consumers, and then sets prices according to the expected maximum price of consumers. Prices are then set base on the expected maximum price of each individual consumer, resulting in a policy of "one person, one price". This strategy allows the market entity to extract the maximum possible price from each consumer. Secondary price discrimination can be summarized as "price by quantity" where a market entity sets different prices according to the different quantity of goods that a consumer purchases. This can be likened to the varying pricing policies seen between 'wholesale' and 'retail' prices. It is important to note that these prices should remain objective and not influenced by subjective evaluations. Clear, concise and necessary information should be conveyed in simple sentences with logical connections between statements. In order to avoid confusion, technical term abbreviations should be explained when they are first used. Consistent citation, common academic sections, and grammatical and spelling correctness should be maintained throughout. The language used should be formal, devoid of colloquial words, contractions or jargon, and value-neutral. Hedging should be used to indicate positions on subjects, and precise, subject-specific vocabulary employed to ensure clarity of meaning. Finally, balanced language should be employed so as to avoid any potential biases. Third-degree price discrimination, also known

³ Liao J. K. (2020). The Dilemma and Outlet of Big Data Killing – From Consumer Rights Protection to the Governance Of Business' Algorithmic Power. *Journal of Southwest University of Political Science and Law*, No.1, 70-82. Li F. X. (2020). Ethics, Governance and Enlightenment Behind Big Data Killing, *Journal of Northeastern University (Social Science Edition)*, No. 1, 9. Liu J. M. (2020). Legal Qualification and Regulation of Big Data Killing. *Journal of Hunan Agricultural University (Social Science Edition)*, No.1, 56-61. Wu. L. (2020). Legal Regulation of Big Data Killing in Platform Economy. *Shanghai Law Research*, No. 3, 44-55.

⁴ Meng Q. G. (2023). The Key Issues of Governance Algorithm Discrimination on Consumer Rights and Interests – From the Perspective of Big Data Killing. *Application of Law*, No. 3, 38.

⁵ Meng Q. G. (note 4 above), 38. Yu L. (2020). Misinterpretation and Identification of the Nature in Anti-monopoly Law of Algorithmic Price Discrimination towards Consumers. *Law*, No.9, 84. Richard S. Online Price Discrimination and Personal Data: A General Data Protection Regulation Perspective. *Computer Law & Security Review*, 2017(6): 768-785.

as "pricing by classifications", refers to the practice where market entities categorize all consumers into different types and set differentiated prices based on the demand elasticity of each type. It is important to note that this form of price discrimination is based purely on objective characteristics and does not involve any subjective evaluations. All technical abbreviations will be explained upon first use. The text will adhere to conventional academic structure and clear, objective language will be used with no biased or emotional language. Finally, the text will be free of grammatical errors and follow all relevant style guides. For instance, certain groups such as the elderly and students may benefit from preferential pricing in certain areas. From an objective standpoint, it can be concluded that the algorithmic price discrimination falls under the category of first-degree price discrimination. This is due to the fact that in this scenario, a single market entity can acquire the entirety of producer surplus through the implementation of a "pricing by people" policy, thereby reducing the consumer surplus to zero.⁶ In digital economy, advancements in big data technique and algorithm computing power have facilitated the transition from second-degree or third-degree price discrimination to first-degree price discrimination.⁷ This evolution has become increasingly prevalent and effortless.

In the present research, the algorithmic price discrimination refers to an act of "pricing by people" policy, which is automatically output by computer information systems based on the application of algorithm technology, which will perform large-scale computation according to the predefined algorithm model on the big data of users' consumption acts, and which will lead to the accurate analysis and prediction of users' consumption acts. By its nature, it belongs to the first-degree price discrimination in economics. From the current practices in digital economy, the "big data killing" is the most common form but not the only form of algorithmic price discrimination.

Apart from "big data killing", the algorithmic price discrimination can also take other forms, such as algorithm against strangers, unjustified dynamic price discrimination, discriminatory distribution of coupons, accurate data-push of commodities or services at discriminatory price. Therefore, using the term "big data killing" to describe the issue of discriminatory prices in digital economy is suspected of being representative and overgeneralizing, while the "algorithmic price discrimination" is more appropriate to describe the essence of the phenomenon.

2. Illegality and Regulation of Algorithmic Price Discrimination under the Competition Law

2.1 Regulation of Algorithmic Price Discrimination in Anti-Monopoly Law and Its Deficiencies

Some scholars advocate that algorithmic price discrimination should be regulated from the perspective of anti-monopoly law and qualify the legal issue as a differential treatment at price in the sense of anti-monopoly law. In their view, the dominant market position held by a platform operator has is the precondition for qualifying its act of algorithmic price discrimination in anti-monopoly law, and in this case, the act of algorithmic price discrimination is an "abuse of dominant market position".⁸ According to them, there are three constitutive elements for qualifying the act of algorithmic price discrimination as illegal and thus regulated in anti-monopoly law: the dominant market position of the controller of algorithm, providing the commodities or services at different prices to different users (can also be known as "discriminatory pricing" or "discriminatory decision"), lack of reasonable grounds or justifiable reasons.⁹ According to article 3 of the Anti-monopoly Law of PRC, the application of the anti-monopoly law to regulate algorithmic price discrimination admittedly requires that the controller of the algorithm has a dominant market position. Article 17 of the Guidelines of Anti-Monopoly in the Domain of the Platform Economy, issued by Anti-monopoly Commission of the State Council, which enter into force on February 7, 2021, clearly indicates that a business in platform economy who excludes or restricts market competition by implementing differential treatments (such as discriminatory transaction prices or other discriminatory conditions) based on the big data and algorithmic analysis of users' different ability to pay, consumption preferences, usage habits and some other similar characteristics, only refers to the business in platform economy having dominant market position.

However, this requirement implies that the application of anti-monopoly law to regulate the algorithmic price discrimination is significantly insufficient. The reasons for this are as follows:

First, the subjects implementing algorithmic price discrimination are not limited to businesses in platform economy having dominant market position. Any e-commerce operator can easily implement algorithmic price

⁶ Ramsi A. Woodcock. Personalized Pricing As Monopolization. *51 Conn.L.Rev.*311 (2019).

⁷ See White House. The Economics of Big Data and Differential Pricing (2015), (April 15th, 2023) Retrieved from <https://obamawhitehouse.archives.gov/blog/2015/02/06/economics-big-data-and-differential-pricing>.

⁸ Xu. S. J., Gao Q. (note 1 above), 105. Shan. M. F., Zheng. X. (note 2 above), 29-30.

⁹ Xu. S. J., Gao. Q. (note 1 above), 107. Zhou. W. (2021). Anti-monopoly Law Regulation of Personalized Pricing Algorithms in the Era of Artificial Intelligence. *Journal of Wuhan University (Philosophy and Social Sciences Edition)*, No.1, 109. Yu. L. (note 5 above), 95.

discrimination by directly purchasing big data and algorithm technique.¹⁰ In practice, many business implementing algorithmic price discrimination are far away from having dominant market position in terms of sizes. Furthermore, it is difficult for both users or law enforcement to gather sufficient evidences of dominant market position, not to mention the high economic costs and time involved. Therefore, the regulatory system constructed on this basis cannot create a timely and effective deterrent to acts of algorithmic price discrimination, and cannot provide timely and reliable protection to the consumers' rights and interest.

Second, even if the subject implementing algorithmic price discrimination does not have a dominant market position, it may also have the ability to create a situation of "locking" the users to a large extent, by means of its algorithmic technical advantage and the big data formed by the frequent and long-term use of loyal users. The reasons are as follows: first, when a business owning algorithm has a strong users base, such as a large number of users, strong user stickiness and high user activity, users have formed path dependence based on long-term and massive use. The path dependence to the platform or APP has been formed when a user has frequently used a platform or App in the long-term; second, there are usually different operation interfaces and operation methods between different platforms or Apps, users who want to switch platform or App need to pay a lot of time and energy to adapt to the new platform or App; third, it is common that the data of some platforms and Apps cannot be exported, or the format of the data is not compatible with other platforms and Apps, even if it can be exported. In this case, a user of one platform or App cannot, or at least cannot easily, switch to another platform or App by taking the original data of the old platform or App he abandoned. As a consequence, there is a high switching threshold that makes it difficult for users to abandon the present platform or App they are currently using and switch to another platform or App operated by others. Therefore, it is obviously insufficient to regulate the algorithmic price discrimination from the perspective of anti-monopoly law.

2.2 Legitimacy of Regulating Algorithmic Price Discrimination under Anti-Unfair Competition Law

As defined in Article 2 of the Anti-Unfair Competition Law of the People's Republic of China, an "act of unfair competition" means an act of a market entity engaged in the production, distribution of commodities or provision of services that, in the course of its production or distribution activities, "illegally disrupts the order of market competition and causes damages to the lawful rights and interests of other business or consumers".

The acts of unfair competition listed in articles 6 to 12 of the Law do not explicitly include algorithmic price discrimination. Therefore, it is doubtful whether algorithmic price discrimination constitutes an act of unfair competition. Article 8 (1) of the Law stipulates that a business shall not conduct any false or misleading commercial advertising regarding the performance, functions, quality, sales status, user comments, awards and the like of its commodities in order to defraud or mislead consumers. From the point of view of the theory of legal interpretation, on the one hand, the expression "and the like" indicates that it is an open-ended enumeration, and other than the items explicitly listed in the article, there are other false or misleading commercial advertising that defraud or mislead consumers; on the other hand, since the business does not express the discriminatory pricing to the consumers when implementing the act of algorithmic price discrimination, and consumers usually make transactional decisions with the thought of being treated equally with other consumers at the time of the transaction, therefore, the act of algorithmic price discrimination should be of the same and similar nature to defraud or mislead consumers as the "false or misleading commercial advertising about the performance, functions, quality, sales status, user reviews, and awards of its commodities", and therefore is a type of false or misleading commercial advertising that defraud or mislead consumers.

On August 17, 2021, Article 21 of the "Regulations on Prohibiting Unfair Competition on the Internet (Draft for Public Comments)" issued by the State Administration for Market Regulation of China stipulates that "A business shall not use data, algorithms and other technical means to collect and analyze the transaction information, the content and times of browsing, the brand and value of the terminal equipment used during the transaction of its counterparties, unreasonably provide different trading information to counterparties under the same conditions, in order to infringe the counterparties' right to know, right of options, right to fair trade, etc., and to disrupt the market order of fair trading. The aforementioned transaction information includes transaction history, willingness to pay, consumption habits, individual preferences, ability to pay, degree of dependency, credit status, etc."

On November 22, 2022, Article 4 of the Regulations on Prohibiting Unfair Competition on the Internet (Draft for Public Comments) issued by the State Administration for Market Regulation of China states that "The State shall improve the rules of fair competition in the digital economy. A business shall not use data, algorithms, technology, capital advantages and platform rules to engage in unfair competition." Article 19 clearly states that "A business

¹⁰ Liu, J. M. (note 3 above), 57.

shall not use algorithms to analyze users' preferences, trading habits and other characteristics in order to impose unreasonable differential treatment or unreasonable restrictions on transaction counterparties in terms of transaction conditions, thereby harming the lawful rights and interests of consumers, other businesses and the public interests of society, disrupt the order of fair competition in the market." In addition, articles 15, 16 and 21 of this draft regulation also set out a number of more specific rules for a business to use data, algorithms, technologies and platform rules to influence users' choices or other means to disrupt the order of fair competition in the market. Although these two draft regulations have not yet entered into effect, they are sufficient to demonstrate the legitimacy of regulating the act of algorithmic price discrimination from the perspective of anti-unfair competition law.

3. Illegality and Regulation of Algorithmic Price Discrimination in Civil Law

3.1 *Questionable Classification of Algorithmic Price Discrimination as a Civil Tort*

The theoretical perspective of tort advocates that the act of algorithmic price discrimination constitutes a consequential tort that infringes the lawful rights and interests of consumers, which should be deemed as a general tort in civil law.¹¹ The constitutive requirements of general torts in civil law comprise of tortious act, damage consequences, subjective fault, and the causal relationship between the tortious act and damage consequences. Some scholars contend that among the above constitutive requirements, the causal relationship between the infringing act of algorithmic discrimination and damage to consumer rights is "self-evident". The qualification of the act of algorithmic discrimination as infringing act presuppose the distinction of explicit and implicit algorithmic discrimination: the explicit algorithmic discrimination involves the violation of specific legal obligations, such as violating the rules of clearly marking prices, inducing users to indulge or over-consume, etc., can directly be qualified as tortious act according to the specific statutory duties violated; regarding the implicit algorithmic discrimination that actually results in the use of algorithms harming consumers' lawful rights and interests, the determination should not and does not need to consider whether the algorithm itself has discriminatory technical elements. Instead, the criterion and basis for judgment should solely be based on whether the algorithm harms consumers' lawful rights and interests. The evaluation of harm to the lawful rights and interests of consumer should be based on "the illegality of the act that result in differential treatment". In case of explicit illegal acts, the violation of legal obligations can be used as a factual judgment standard to directly determine the harm caused. However, in case of implicit illegal act, it is challenging for legislation to address, one by one, the compliance of various commodity or service price adjustments with the rules for clear pricing. Instead, the consensus and rules concerning the reasonability of adjusting time, method, and extent of price could be promoted by judicial interpretations and guiding cases released by the Supreme People's Court. Regarding the issue of subjective fault on the part of a business engaging in the algorithmic discrimination, it is stated that "the general principle of fault liability does not apply to the tort of algorithmic discrimination". This is due to the fact that "the technical nature of algorithmic discrimination makes it nearly impossible for consumers to prove that the business had the intention or gross negligence to harm their lawful rights and interests". Furthermore, it is often difficult to provide evidence of general negligence. Therefore, it is more reasonable to adopt the principle of presumption of fault, which aligns with the legislative purpose and value orientation of the Consumer Rights Protection Law.¹²

However, some scholars argue that technical obstacles, such as proprietary algorithms and a lack of transparent data processes, make it challenging to effectively provide relief for victims of algorithmic discrimination through general tort liability, which depends on the fault of the infringer.¹³

In addition, in identifying the illegality of algorithmic price discrimination that constitutes implicit illegal act, the theoretical perspectives of tort advocates adopting an objective stance. They suggest that the judgment criterion should be whether the algorithm harms consumers' lawful rights and interests. Additionally, they advocates that the determination of damage results should be based on "the illegality of the act to determine the harm of differential treatment." It appears to be a circular reasoning where the cause is being treated as the result and vice versa. Consequently, it remains uncertain whether the act of algorithmic price discrimination can be classified as a tort under Chinese civil law.

¹¹ Tang, L. Y. (2020). Regulation of Algorithm in the Era of Artificial Intelligence: Hierarchy of Responsibility and Obligation of Compliance. *Modern Law*, No.1, 194-209, Zhang, L. H. (2018). Research on Interpretation Right of Algorithm in Commercial Automation Decision-making. *Legal Science*, No. 3, 51-60.

¹² Meng, Q. G. (note 4 above), 43.

¹³ Tang, L.Y. (note 11 above), 194-209. Zhang L. H. (note 11 above), 51-52.

3.2 Qualification of the Act of Algorithmic Price Discrimination as Civil Fraud

Some scholars contend that "big data killing" is an act of price fraud implemented by a business based on subjective intention and abuse of information advantages, which leads to defects in consumers' expressions of intention. The transaction made by consumers without realizing the reality of being differently treated goes against their true will, such act should be qualified as "fraud" in civil law.¹⁴ Conversely, others argue that the price discrimination has its own economic rationality. Unified pricing is economically inefficient and hinders the maximization of economic and social welfare. As a result, not all acts of algorithmic price discrimination (including big data killing) are illegal, they should not be subject to strict regulation under the current legal system without differentiation.¹⁵ Moreover, there are two additional drawbacks to categorize the act of algorithmic price discrimination as fraud in civil law: firstly, there was no detailed demonstration that the "act of algorithmic price discrimination" meets all the constitutive requirements of fraud in civil law; secondly, only a small number of current academic studies in China specifically label big data as price fraud.¹⁶

The general theory of civil law considers that the constitutive requirements of fraud include the subjective intention of the defrauding party, the act of fraud committed through fabricating facts or concealing facts, the misunderstanding of the defrauded party, and the manifestation of intention made by the defrauded party because of the misunderstanding.

According to article 3 of the Rules on Prohibiting the Act of Price Fraud issued by the National Development and Reform Commission's, the act of price fraud refers to the act of a business defrauding or misleading consumers or other businesses to conclude transactions with it by using false or misleading pricing forms or pricing methods. The definition of the act of price fraud is reiterated in Paragraph 3 of Article 2 of the Provisions on Marking the Price clearly and Prohibition on Price Frauds issued by the State Administration for Market Regulation.

In the case of algorithmic price discrimination, the business fails to clearly inform users that its commodities or services are implementing differential pricing for the purpose of maximizing profits, which constitutes an act of price fraud defrauding or misleading consumers to conclude transactions with it; as a result of the above-mentioned fraud, consumers fall into misunderstandings, believing that they are treated "equally" with other consumers during transactions; and the defrauded consumers make the manifestation of intention and the transaction decisions based on that misunderstanding. As a result, the act of algorithmic price discrimination satisfies to all constitutive elements of fraud in Chinese civil law and hence shall be qualified as one type of fraud in Chinese civil law.

4. Conclusion

The regulation of algorithmic price discrimination is a hot topic in the era of digital economy, as well as in current legal research. Although Chinese scholars have mostly reached an agreement on its necessity of legal regulation, there are still significant disagreements over the definition of illegality and the appropriate regulatory approaches. So far, in the context of competition law, the regulation imposed by the Anti-Unfair Competition Law is more appropriate than the regulation imposed by anti-monopoly law; in the perspective of civil law, it meets all constitutive elements of fraud in Chinese civil law. Furthermore, current researches on algorithmic price discrimination is far from ideal, and it is still critical for academic and practical circles to conduct in-depth researches from the perspectives of consumer rights protection law, science and technology ethics, and industry self-discipline, in order to further promote the science and technology for Social Good, and the rapid and healthy development of digital economy.

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¹⁴ Liu. J. M. (note 3 above), 58. Deng. Z. C. (2018). The Legal Boundary of Big Data Killing. *Journal of Huaihua University*, No.8,94. Liu. P. F., Qu. X. C. (2018). Big Data Killing: The Strange Smile of High Technology". *China Press*, No.4, 58.

¹⁵ Gao. F. P., Wang. Y. (2018). Why does big data "kill ripe"? Legal Thoughts on Differentiated Pricing. *Shanghai Rule of Law News*, May 16, B06 edition. Yu. L. (note 5 above), 99.

¹⁶ Zheng. Z. H, Xu. Z. X. (2019). Legal Regulation and Judicial Review of Algorithmic Discrimination in the Era of Big Data--Taking U.S. Legal Practice as an Example. *Comparative Law Research*, No. 4, 111-122.

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