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An Analysis Of The Abuse Of Dominance Using Artificial Intelligence (Ai) On Price Discrimination From A Legal Perspective

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ABSTRACT

With the rise of artificial intelligence in commercial markets, companies have increasingly adopted algorithm tools for price optimization, including personalized pricing. While such practices may yield efficiency gains and consumer benefits, they also raise significant concerns under competition law, especially in the context of abuse of dominance.

In digital markets, concentrated Big Data and analytical algorithms enable undertakings to predict each consumer's willingness to pay with increasing accuracy and offer consumers personalized recommendations and tailored prices accordingly. In this context, concerns have arisen about whether and when AI-enabled price discrimination amounts to an abuse of dominance under competition law and would require a legal response. To address these concerns, this paper will analyze AI-enabled price discrimination from a comparative law and economics perspective. In economics, price discrimination is not always undesirable as it can increase static efficiency, and, on some occasions, it can promote dynamic efficiency and boost consumer welfare. Nevertheless, it may also lead to exclusionary and exploitative effects, especially once Tech Giants abuse their dominant positions in relevant markets. The development of Artificial Intelligence and the growing use of algorithms to optimize prices have generated significant debate about their benefits and potential adverse effects on competition and consumers. Two key issues dominate this discussion: algorithmic price discrimination through personalized pricing and algorithmic tacit collusion. While the risks and opportunities of algorithmic tacit collusion have been extensively studied, the potential harm from algorithmic price discrimination remains underexplored. This article examines whether the current competition law framework is adequate to tackle algorithmic price discrimination that harms consumers.

KEYWORDS: *Artificial intelligence, Abuse of Dominance, Predatory Pricing, Price Discrimination, Analytical algorithms.*

INTRODUCTION

In digital markets, amounts of Big Data[1] on consumers' profiles and their shopping experiences provide undertakings with a favorable information advantage over consumers. The adaptation of complex algorithms in online markets and many other high-tech industries improve business decisions and automatize processes for competitive differentiation, in particular, for predictive analysis and optimisation of business processes.[2]

As such, the rise of business models based on the collection and processing of consumer data allows undertakings to charge consumers different prices for the same goods or services, offered at precisely the same time. This technique is called "AI-enabled price discrimination". For consumers, it implies that, for example,

[1] Big Data is commonly understood as the use of large scale computing power and technologically advanced software in order to collect, process and analyze data characterised by a large volume, velocity, variety and value. See OECD, Executive Summary of the Competition Committee Roundtable on Big Data (2016b, p. 2)
[2] See Stucke and Ezrachi, Virtual Competition (2016), see also OECD, Algorithms and Collusion: Competition Policy in the Digital Age (2017a, p. 9).

when ordering the same hotel room on the same website at precisely the same time, a loyal customer may be charged more than a new one. Concentrated Big Data and accurate algorithms as analytical tools enable undertakings to predict each consumer's willingness to pay with increasing accuracy and thereby offer consumers personalized recommendations and tailored prices.

In order to address the main research question, this paper will analyze AI-enabled price discrimination from a comparative law and economics perspective. After this introduction, the basic mechanism of AI-enabled price discrimination and its positive and negative effects will be discussed from an economic perspective in Section 2. Section 3 will present the competition concerns caused by AI-enabled price discrimination in digital markets. In Section 4, a comparative analysis of legal provisions under EU and Chinese competition regimes will be made to address this issue. Section 5 will then come to a conclusion.

In digital markets, the rise of business models based on the collection and processing of consumer data allows undertakings to charge business customers and final consumers different prices for the same goods or services, offered at precisely the same time. Concentrated big data and accurate algorithms as analytical tools enable undertakings to predict each consumer's willingness to pay with increasing accuracy and thereby offer consumers personalized recommendations and tailored prices. In this context, concerns have arisen about the possibility and consequence of AI-enabled price discrimination (AIPD) as an abuse of dominance employed by dominant Big Techs in digital markets. The central question of this chapter is therefore whether and when AIPD amounts to an abuse of dominance under competition law, and how Chinese competition authorities respond to this challenge in digital markets. From an economic perspective, AIPD is not always undesirable. In digital markets, AIPD makes economic sense as it can increase static efficiency, and under certain market conditions, it can promote dynamic efficiency as well as boost consumer welfare.[3]
The term "dominant position" is an integral concept of competition law, not just in India, but across the globe. It essentially denotes a situation where one company has enough power to act independently of any competitive forces present in the market. This independence allows them to establish terms and conditions that favor their interests without considering other companies, customers or suppliers; ultimately disregarding the consumer's needs.

Under Section 4 of The Competition Act 2002 defines dominant position as "a powerful place held by an enterprise within a certain marketplace in India which empowers it with - (i) autonomy from all prevailing competitive powers; or (ii) capacity to influence its competitors or consumers within said relevant market for its own benefit" The power of firms to price above the competitive level and still attain profitability is what competition law calls 'market power'. This idea serves as the foundation for its definition.

Brief Overview of "Abuse of Dominant Position"
The notion of dominance is not inherently damaging to the principles of competition law; however, when a business abuses its power in this regard, it can cause significant detriment. The misuse of market influence by an enterprise with a dominant position is known as 'abuse' and involves exploitative or exclusionary conduct which harms competitors or consumers. To combat these actions, Section 4 of The Competition Act, 2002 explicitly prohibits them through the statement: "No enterprise or group shall abuse its dominant position." As well as this blanket prohibition on any such behaviour, there are several activities identified specifically that will be seen as an abuse if performed; for example charging unfair prices in buying/selling transactions , capping production levels and technical development opportunities , treating equivalent deals differently , using their clout from one sector to gain advantage in another . By setting out both general and specific boundaries on such practices, legal measures hope to protect fair competition across all markets. Investigating the concept of abuse of dominant

[3] Q Li , N Philipsen , and Cauff man , ' AI-enabled Price Discrimination as an Abuse of Dominance: A Law and Economics Analysis ' (2023) China-EU Law Journal , Vol. 9, p. 51–72. (published online 27 April 2023), https://doi.org/10.1007/s12689-023-00099 -z

position is highly necessary to ensure competition law and policy are functioning properly, promoting economic efficiency and protecting consumer welfare.
Moreover, with technology rapidly advancing and the digital economy gaining precedence in recent years, firms have been able to amass market power using network effects or data control - thus requiring new approaches for understanding as well as regulating this phenomenon. In India especially, where liberalization has just begun taking root, comprehending issues related to abuse of dominance is particularly crucial since it will help shape a better Competition Commission of India (CCI). With an ever-evolving market structure due to rapid technological developments and increasing digitization affecting every aspect of life within our country - including business strategies - Indian authorities must take appropriate steps towards developing effective regulation policies that keep up with these changes.

The benefits of first-degree price discrimination are contingent upon the selected welfare standard. Armstrong's findings suggest that the advantages associated with first-degree price discrimination are contingent upon the selected welfare standard, which may not necessarily lead to a corresponding gain in consumer welfare. Therefore, the application of first-degree price discrimination in digital marketplaces can yield favorable outcomes, specifically when it leads to an increase in output and when total welfare is considered as the criterion for evaluating welfare. Moreover, AI has revolutionized the way businesses operate, allowing them to set prices that align with consumer preferences and anticipate market fluctuations. However, the impact on consumer welfare remains uncertain, and further research is needed to fully understand the multifaceted economic impacts of AI-enabled price discrimination. Empirical economic literature suggests that traditional pricing discrimination can enhance societal welfare across various industries, particularly when it leads to an increase in output. However, there is a scarcity of empirical economic literature that examines the impacts of AI (Artificial Intelligence) enabled price discrimination within digital markets. According to economic theory, the use of some strategies can enhance static efficiency in markets, surpassing the effectiveness of conventional price discrimination. This has the potential to optimize the quantity of goods or services exchanged.

However, the use of AI in implementing price discrimination has the potential to provide advantages to consumers inside oligopolistic markets by increasing competition, resulting in an increase in consumer surplus while reducing business profits. In this scenario, businesses can strategically target their competitors' customer bases and new customer categories while preserving higher profit margins from their existing customer base. However, due to the similar strategic motivations to capitalize on price differentiation, the sector encounters a predicament close to the prisoner's dilemma, resulting in heightened rivalry compared to a scenario involving homogeneous prices. The implementation of AI-enabled price discrimination has the potential to impact dynamic efficiency, which is achieved through the creation, advancement, and dissemination of novel products and production methods. Dynamic efficiency is crucial for technical growth within industries, as it conserves resources in the production of established items and creates new ones. The impact of AI-enabled price discrimination on dynamic efficiency can be both positive and negative.

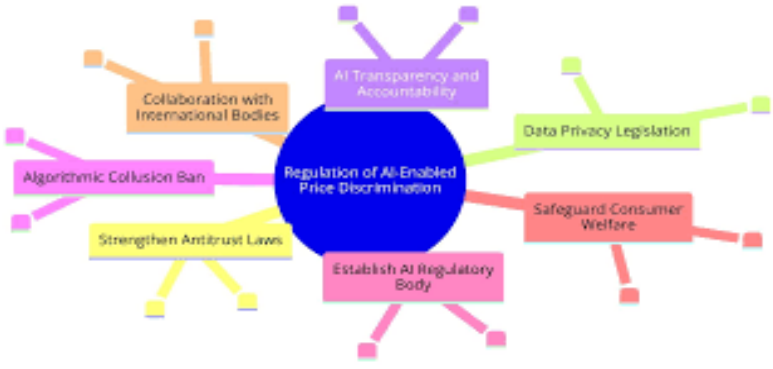

Fig.1 (Source: Pakistan Social Science review)

"Price discrimination"

Price Discrimination occurs when a seller charges different prices to different consumers for the same products, not justifies by cost differences. Price discrimination is a selling strategy that charges customers different prices for the same product or service. The seller charges each customer the maximum price they'll pay in pure price discrimination. For example, discounts for students or senior citizens are examples of price discrimination. Price discrimination is practiced based on the seller's belief that customers in certain groups can be asked to pay more or less based on certain demographics or on how they value the product or service in question. Price discrimination is most useful to sellers when the profit they earn as a result of separating the markets is greater than the profit that they would have earned had they kept the markets combined.
Whether price discrimination works and how long the various groups will be willing to pay different prices for the same product depends on the relative elasticities of demand in the sub-markets. Consumers in a relatively inelastic sub-market may pay a higher price. Those in a relatively elastic sub-market pay a lower price.[4]

AI FACILITATED ABUSE OF DOMINANCE

Artificial Intelligence (AI) aims to develop machines that possess human-like intelligence. While AI offers numerous benefits, it also presents complexities for traditional competition regulations and fair competition. This article delves into the legal ramifications arising from the impact of AI on competition. It also discusses the situation that presents challenges in regulating fair practices within this context. Dominance in a market, once obtained, was traditionally difficult to maintain without overt exclusionary tactics. However, with AI firms can entrench market power subtly and effectively.AI technology has the potential to drastically impact competition and raise new policy challenges. A few of the challenges that AI may create are:

1. Market Consolidation: The concentration of data and AI technologies among a few companies can lead to market consolidation.
2. Collusion and Price Fixing: Without any human intervention, algorithms can independently adjust prices in response to competitors' pricing actions, leading to tacit collusion. In such a situation it becomes difficult for the Authority to tackle anti-competitive behavior facilitated by AI.
3. Intellectual Property and Standardization: Issues related to patents and access to data can intersect with competition law. It may lead to hindering innovation and fair competition.
4. Algorithmic Exclusion: AI can be used to identify and target nascent competitors for undercutting, personalize offer to lock in customers and foreclose rivals, automate refusal to deal based on predicted threat level.

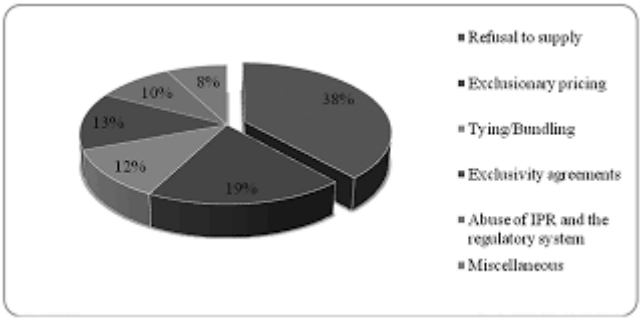

Fig: 2 (Sources: Clifford Chance)

Traditional competition law in India:

The Competition Act of 2002, which governs market competition in India, has certain aims to achieve by regulating the market. The Act prohibits anti-competitive activities, abuse of dominant market positions, and business-to-business agreements that restrict competition. In simpler terms, it aims to maintain an even playing field for all market participants. Currently, the Competition Act of 2002 in India does not explicitly address AI, which can lead to difficulties in interpreting and applying competition regulations to AI-related practices. This creates a potential challenge

[4] https://www.investopedia.com/terms/p/price_discrimination.asp#citation-1 visited on 15.05.2025

in resolving cases arising from AI-related competition issues. A recent example of unfair competition is the Google search bias case [Google LLC v Competition Commission of India, Competition Appeal (Appellate Tribunal)[5]
In a competition appeal filed by Google LLC and Google India Private Limited, the National Company Law Tribunal in New Delhi addressed the order passed by the Competition Commission of India (CCI). The CCI had found Google guilty of abusing its dominant position and imposed a penalty of INR 1337.76 crore (approximately $182 million) under the provisions of the Competition Act, 2002.

The division bench of "Justice Ashok Bhushan and Dr. Alok Srivastava" (technical member) upheld the fine imposed by the CCI but set aside certain key directions. Google had argued that the CCI's order suffered from confirmation bias and was based on a similar order by the European Commission in 2018. Google claimed that its agreements did not prevent equipment manufacturers from pre-installing competing apps and that dominance in the market did not necessarily imply abuse of dominance.
On the other hand, the CCI argued that Google abused its dominant position in a particular relevant market to enter into other relevant markets through obligations under the MADA and AFA/ACC. The CCI contended that Google, as a dominant entity in the market, had a special responsibility and that abuse of its dominant position constituted an offense under Section 4(1) of the Competition Act.

The CCI's directions to Google included: Original Equipment Manufacturers (OEMs) should not be forced to pre-install a bundle of applications, the licensing of Play Store should not be linked to pre-installing Google search services or other apps, Google must not deny access to Play Services APIs to disadvantage OEMs, app developers, and competitors, Google should not offer incentives to ensure exclusivity for its search services, and users should have the flexibility to easily set their default search engine. The Tribunal concluded that Google had abused its dominant position by imposing unfair conditions on OEMs and by leveraging its dominance in the online search market and the app store market for Android OS. It upheld the majority of the CCI's directions while setting aside a few. The Tribunal also affirmed the calculation of penalties based on Google India's revenue. Consequently, Google was directed to deposit the penalty amount (after adjusting the 10% amount of penalty as deposited under the order dated 04.01.2023) within 30 days.

Algorithmic pricing and abuse of dominance
Algorithmic pricing can not only be analyzed in the context of actual or potential collusive conduct, but also as unilateral conduct aimed at excluding competitors from the market by using pricing strategies, or exploiting customers by imposing unfair prices.
Algorithmic pricing may be qualified as an abuse of dominance under Article 102 TFEU if the algorithm is operated by a dominant entity. The dominant undertaking's intention is immaterial for the competitive analysis: the authority has to demonstrate only that the algorithmic pricing is capable of producing anticompetitive effects.[6]

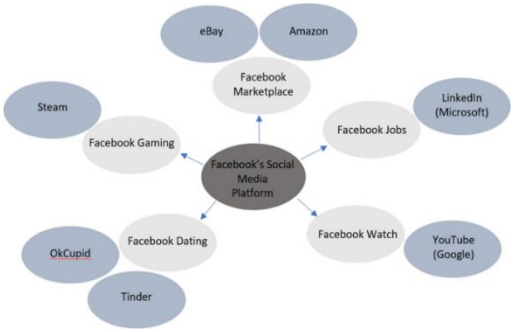

Fig: 3 (Sources: Amikus Qriae)

[5] No. 1 of 2023, decided on 29-03-2023].
[6] See, for example, Case C-377/20, *Servizio Elettrico Nationale and Others*, EU:C:2022:379.

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ECONOMIC ANALYSIS OF AI-ENABLED PRICE DISCRIMINATION

In economics, price discrimination takes place when identical products are sold at different prices under identical cost conditions or when non-identical but similar goods are sold at prices which are in different ratios to their marginal cost.[7] For economists, a simple difference in the price of the same product to various consumers does not constitute price discrimination if the price difference reflects a difference in costs, such as different distribution costs. Economists tend to approve price discrimination in cases where the ratio of price to marginal cost differs, but (competition) laws sometimes forbid price discrimination irrespective of whether the ratio of price to marginal cost can be cost-justified. It is important to distinguish AI-enabled price discrimination from dynamic pricing, which involves adjusting prices to changes in demand and supply, often in real-time, not implying any kind of discrimination between consumers. Apart from dynamic pricing, the OECD also presents several other forms of online personalization, for example, A/B testing, targeted advertising, and price steering.

Effects on consumer welfare

Apart from the impact on static efficiency, AI-enabled price discrimination is also likely to affect the way social welfare is distributed among different interested parties, potentially leaving some individuals worse off.[8] For instance, it may affect the distribution of surplus between consumers and producers. By extracting each consumer's maximum willingness to pay, the producer may appropriate the consumers' surplus, leaving them worse off.[9] The overall effect of AI-enabled price discrimination on consumer surplus is therefore ambiguous and the impact will likely vary from market to market.[10] If AI-enabled price discrimination is implemented within a monopolistic market where there is little price competition, undertakings may be better able to use their knowledge about consumers' valuations to charge higher prices, whereas in more competitive markets, it may actually result in undertakings competing more aggressively for each individual customer, potentially increasing their incentive to reduce prices.

Under the monopoly scenario, AI-enabled price discrimination could increase product affordability for consumers who have lower incomes or reservation prices, and could promote the distribution with benefits to those consumers as well as monopolists. That is to say, based on collected and analyzed information on consumers' income and preferences, monopolists could draw profiles of consumers accordingly and charge lower prices to consumers with lower income or reservation prices. Under monopoly without price discrimination, some consumer surplus is transferred to the supplier and there is a deadweight loss which causes a true decrease in welfare.[11] In this case, AI-enabled price discrimination could eliminate the deadweight loss associated with a single-price monopoly, and favour welfare distribution among consumers and producers. However, since price discrimination aims to "capture as much consumer surplus as possible", monopolists likely estimate consumers' willingness to pay and charge exactly at their reservation prices. In this scenario, consumer surplus is entirely captured and transferred to the monopolist.

Nevertheless, AI-enabled price discrimination may benefit consumers in oligopolies through intensifying competition and thereby raising consumer surplus at the expense of industry profits.

Competition concerns caused by AI- enabled price discrimination

It makes sense for competition authorities to start from the default view that AI-enabled price discrimination is normally beneficial. However, if undertakings holding a dominant market position exercise AI-enabled price discrimination, this may create harmful effects. Competition economics typically distinguishes between exclusionary and exploitative effects in assessing the competitive effects of abuse, which respectively results in foreclosure of competitors and direct consumer harm. It concerns competition authorities since there are chances

[7] Lianos et al. (2019, p. 1144)
[8] OECD, Background Paper on Personalized Pricing in the Digital Era (2018, p. 20).
[9] *See* O'Donoghue and Padilla (2013, pp. 785–786).
[10] When algorithms set prices: winners and losers, Oxera Discussion Paper (2017, p. 26).
[11] Van Den Bergh (2017, p. 351).

that AI-enabled price discrimination may impede competition and harm consumers by creating, *inter alia*, exclusionary effects and exploitative effects.

Key Competition Concern from AI-Enabled Price Discrimination:
1. Exploitation of Market dominance: Firms with substantial market power can use AIPD to extract maximum consumer surplus, potentially leading to exploitative pricing practices. This is particularly concerning when dominant players leverage AI to set prices that closely match each consumer's maximum willingness to pay, thereby reducing consumer welfare
2. Exclusionary Effects and Market Foreclosure: AIPD can create barriers for new entrants by enabling dominant firms to undercut competitors selectively. By offering lower prices to price-sensitive consumers while maintaining higher prices for others, incumbents can deter competition and entrench their market position.
3. Facilitation of tactic Collusion: AI algorithms can inadvertently lead to tacit collusion, where competing firms' pricing algorithms align without explicit agreements, maintaining higher prices across the market. This undermines competitive pricing and can harm consumers.
4. Transparency and Fairness Issues: The opaque nature of AI-driven pricing makes it difficult for consumers to understand or challenge price differences. This lack of transparency can erode trust and raise concerns about fairness, especially when similar consumers receive different prices without clear justification.
5. Regulatory Challenges: Traditional competition laws may not adequately address the nuances of AIPD. For instance, existing frameworks like Article 102(a) TFEU in the EU are underdeveloped in handling personalized pricing abuses, making enforcement against exploitative AIPD practices challenging.

CONCLUSION

In conclusion, the integration of Artificial Intelligence (AI) into pricing strategies has revolutionized market dynamics, offering both opportunities and challenges from a legal standpoint. While AI-enabled price discrimination can lead to efficiencies and personalized consumer experiences, it also raises significant concerns regarding the abuse of dominance, particularly when leveraged by firms with substantial market power.
One of the primary legal concerns is the potential for AI to facilitate exclusionary practices. Dominant firms can use AI-driven pricing algorithms to engage in predatory pricing, fidelity rebates, or margin squeezes, effectively foreclosing competitors and entrenching their market position. For instance, by analyzing vast datasets, a dominant firm can identify competitors' customer bases and offer them targeted discounts, undermining rivals' market share without incurring significant losses. Such practices not only distort competition but also challenge the traditional legal frameworks designed to address anti-competitive behaviors.
Moreover, AI-enabled price discrimination can lead to exploitative outcomes. By personalizing prices based on individual consumers' willingness to pay, firms can extract maximum surplus, potentially leading to unfair pricing practices. This is particularly concerning in digital markets where consumers may be unaware of the price variations they face compared to others. Such opacity undermines consumer trust and raises questions about fairness and transparency, core principles upheld by competition laws in various jurisdictions.
The legal frameworks in regions like the European Union and China have begun to address these challenges. The EU's Article 102(c) TFEU prohibits applying dissimilar conditions to equivalent transactions, directly targeting discriminatory pricing practices. Similarly, China's Anti-Monopoly Law and its Guidelines on the Platform Economy emphasize the need to prevent discriminatory treatment facilitated by algorithms[12]. These legal instruments aim to ensure that AI's deployment in pricing strategies does not compromise market fairness or consumer welfare.[13]
However, the rapid evolution of AI technologies necessitates a more proactive and adaptive legal approach. Traditional antitrust tools may fall short in detecting and addressing algorithmic collusion, where AI systems independently learn to align prices without explicit agreements between firms. This form of tacit collusion challenges the very foundations of competition law, which historically relies on evidence of explicit coordination.

[12] Qian Li & Niels Philipsen for the IGIR and METRO Faculty of Law Maastricht
[13] Li, Q., Philipsen, N. & Cauffman, C. AI-enabled price discrimination as an abuse of dominance: a law and economics analysis. *China-EU Law J* **9**, 51–72 (2023). https://doi.org/10.1007/s12689-023-00099-z

Furthermore, the global nature of digital markets means that unilateral legal actions may be insufficient. International cooperation and harmonization of legal standards are crucial to effectively regulate AI-driven price discrimination and prevent regulatory arbitrage. Regulators must also invest in technical expertise to understand and monitor complex AI systems, ensuring that enforcement actions are both timely and effective.

In essence, while AI offers transformative potential for pricing strategies, it also poses significant legal challenges concerning the abuse of dominance. To safeguard competitive markets and protect consumers, legal frameworks must evolve, embracing technological advancements and fostering international collaboration. Only through such comprehensive and forward-looking approaches can the benefits of AI be harnessed without compromising the principles of fair competition.

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11. Lianos et al. (2019, p. 1144)