



# AI-enabled price discrimination as an abuse of dominance: a law and economics analysis

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## Abstract

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. Since the protection of free competition and consumer welfare are objectives of competition law in China and the EU, competition law seems a proper instrument to step into digital markets to address these concerns. Indeed, the EU and China have established mixed regimes of competition law and other rules to tackle unfair and/or anti-competitive AI-enabled price discrimination. As such, AI-enabled price discrimination does not always require a competition law response and it requires competition authorities to make a trade-off between different considerations.

**Keywords** AI-enabled price discrimination · Abuse of dominance · Efficiency · Consumer welfare · Exclusionary and exploitative effects · Competition law intervention

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## 1 Introduction

In digital markets, amounts of Big Data<sup>1</sup> on consumers' profiles and their shopping experiences provide undertakings with a favorable information advantage over consumers. The adaptation of complex algorithms<sup>2</sup> in online markets and many other high-tech industries improve business decisions and automatise processes for competitive differentiation, in particular, for predictive analysis and optimisation of business processes.<sup>3</sup> As such, the rise of business models based on the collection and processing of consumer data<sup>4</sup> 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".<sup>5</sup> For consumers, it implies that, for example, 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.<sup>6</sup>

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. Not

<sup>1</sup> Big Data is commonly understood as the use of large scale computing power and technologically advanced software in order to collect, process and analyse 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).

<sup>2</sup> Algorithms are sequences of commands that generate an output from a given input. With the evolution of computer science, algorithms have been developed to automatically perform repetitive tasks involving complex calculations and data processing that could be costly to execute for human beings. Recent developments in artificial intelligence and machine learning have brought algorithms to a new level, allowing computers to solve complex problems, make predictions and take decisions more efficiently than humans, frequently achieving desirable policy goals for society. See OECD, Executive Summary of the Competition Committee Roundtable on Algorithms and Collusion (2017b, p. 2), see also OECD, Algorithms and Collusion: Competition Policy in the Digital Age (2017a, p. 9).

<sup>3</sup> See Stucke and Ezrachi, Virtual Competition (2016), see also OECD, Algorithms and Collusion: Competition Policy in the Digital Age (2017a, p. 9).

<sup>4</sup> Consumer data are data concerning individual consumers, where such data have been collected, traded or used as part of a commercial relationship. Furthermore, information Big Techs can collect and process might include, for example, the location of a consumer's mobile device, their home location, the type of computer they use, the types of the device they own or use, the search-terms they have used, their browsing history, the articles they read, their purchases, their virtual shopping basket, the content they stream or download, and their output on social media. See OECD (2020, p. 7).

<sup>5</sup> Price discrimination occurs when a trader applies different prices to different consumers or groups of consumers for the same goods or services. Price discrimination can take the form of personalised pricing based on online tracking and profiling the consumer's behaviour. AI-enabled price discrimination refers to price discrimination conducted by undertakings facilitated by Big Data and algorithms in digital markets. The concept Artificial Intelligence was coined by John McCarthy in 1956, who defined it as "the science and engineering of making intelligent machines". At the initial stages of AI, machines were programmed with extensive lists of detailed rules in order to attempt to replicate human thoughts. AI became a more effective tool after the development of algorithms that teach machines to learn, an idea that evolved from the study of pattern recognition and machine learning. (See OECD, Algorithms and Collusion: Competition Policy in the Digital Age (2017a, p. 9).) The application of self-learning algorithms to massive amounts of consumer data has enabled undertakings to price discriminate between different (types of) consumers.

Wei et al. (2019, p. 4).

<sup>6</sup> Example based on a case reported by CCTV.COM, available at <http://news.cctv.com/2018/03/24/VIDEXqPD3u257M8qTifKRWBx180324.shtml>.

surprisingly, AI-enabled price discrimination has been widely employed in both business-to-consumer and business-to-business relationships, where the former include marketplaces for airplane tickets, e-commerce, and travel services.<sup>7</sup> One may wonder whether AI-enabled price discrimination is desirable, in particular when it is applied by Tech Giants with (very) dominant market positions. The main research question of this paper is therefore whether AI-enabled price discrimination is always undesirable and would require a competition law response.

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 Sect. 2. Section 3 will present the competition concerns caused by AI-enabled price discrimination in digital markets. In Sect. 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.

## 2 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.<sup>8</sup> 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.<sup>9</sup> 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.<sup>10</sup>

Regardless of how to define price discrimination, this phenomenon is ubiquitous in online and offline markets. In order to examine the mechanism of AI-enabled price discrimination, the basic categories of price discrimination and the fundamental conditions for its occurrences will be presented in Sect. 2.1 from the perspective of law and economics. After that, Sect. 2.2 will examine the positive effects and negative effects of AI-enabled price discrimination under specific circumstances.

### 2.1 Basic mechanism of AI-enabled price discrimination

Traditional economics has distinguished three types of price discrimination: first, second and third-degree.<sup>11</sup> First-degree price discrimination, or perfect price discrimination as

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<sup>7</sup> Wei et al. (2019, p. 4).

<sup>8</sup> Carlton and Perloff (1999, p. 280).

<sup>9</sup> Lianos et al. (2019, p. 1144).

<sup>10</sup> OECD, Price Discrimination- Note by Dennis W. Carlton (2016d, p. 4).

<sup>11</sup> Pigou (1920, pp. 240–251).

it is known, involves an undertaking setting a price for each product that equals each consumer's willingness to pay for that product.<sup>12</sup> It enables the producer to set individualized prices for each buyer, relying on its knowledge of individual preferences.<sup>13</sup> Second-degree price discrimination involves an undertaking setting a menu of prices for different versions of the product, leaving to the consumers the decision of choosing a version according to their preferences.<sup>14</sup> Varying prices in relation to the amount or volume bought is also considered a type of second-degree price discrimination. Third-degree price discrimination involves an undertaking setting different prices for different groups of consumers with different observable (perhaps temporary) characteristics, such as location, age, gender or occupation.<sup>15</sup> This is a rather common type of discriminatory pricing strategy, and it can generally be justified by fairness considerations.<sup>16</sup>

Economic literature has recognized that an undertaking can implement an effective strategy of price discrimination when three cumulative conditions are fulfilled: (1) the undertaking has some degree of market power; (2) the undertaking can prevent arbitrage; and (3) the undertaking can estimate the consumer's valuation of a product and can thereby adjust the price accordingly.<sup>17</sup> The same applies in the case of AI-enabled price discrimination in digital markets. Since the rapid growth of Big Data analytics, algorithms can monitor prices more efficiently than human beings and can respond to market changes more quickly and accurately. They allow undertakings to set prices approaching their consumers' willingness to pay, and to predict the competitors' reactions in digital markets.<sup>18</sup> In this case, AI-enabled price discrimination is close to the hypothetical model of perfect competition.

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.<sup>19</sup> Apart from dynamic pricing, the OECD also presents several other forms of online personalization, for example, A/B testing,<sup>20</sup> targeted advertising,<sup>21</sup> and price steering.<sup>22</sup>

Finally, it must be noted that price discrimination is not always perceived as unfair.<sup>23</sup> Townley et al., for example, mention several types of socially acceptable

<sup>12</sup> Van Den Bergh (2017, p. 351).

<sup>13</sup> Lianos et al. (2019, p. 1231).

<sup>14</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 9).

<sup>15</sup> Van Den Bergh (2017, p. 352).

<sup>16</sup> Botta and Wiedemann (2020, p. 384).

<sup>17</sup> Botta and Wiedemann (2020, p. 386). *See also* Scherer and Ross (1990, p. 489).

<sup>18</sup> Graef (2018, p. 541).

<sup>19</sup> *See* OECD, Background Paper on Personalised Pricing in the Digital Era (2018, pp. 9–10).

<sup>20</sup> The practice of setting multiple prices for the same product to test how customers react to different price points.

<sup>21</sup> Marketing practice of tailoring personalized advertisements to consumers based on their preferences and behavior, in order to increase the probability of acquiring the consumer.

<sup>22</sup> Also known as personalized offers or search discrimination, manipulation of search results according to consumers' preferences and behavior, in order to display more expensive products to consumers with higher willingness to pay. *See also* OECD, Background Paper on Personalised Pricing in the Digital Era (2018, pp. 9–10).

<sup>23</sup> *See* Townley et al. (2019, pp. 18–19).

forms of price discrimination, such as status-based discounts,<sup>24</sup> volume-based or multi-buy discounts,<sup>25</sup> loyalty discounts,<sup>26</sup> new customer discounts,<sup>27</sup> peak pricing,<sup>28</sup> and timing-based discounts.<sup>29</sup> The perceived fair forms of price discrimination meet two criteria: (1) individuals can identify a substantive explanation for the price difference which they regard as legitimate, such as social conventions, reasons based on equity theory, and distributive justice theory; (2) the process by which prices are determined and offered to consumers is regarded as fair, which typically requires, at minimum, that the pricing policy is clear, transparent, and offered on a universal basis to all those who satisfy the stipulated requirements.<sup>30</sup>

## 2.2 Economic effects of AI-enabled price discrimination

From an economic perspective, price discrimination is not always undesirable. It makes economic sense as it can increase static efficiency, and on some occasions, it can promote dynamic efficiency and boost consumer welfare as well. As compared to more traditional forms of price discrimination, personalized pricing generally has more accentuated effects, having the potential to optimize static efficiency and incentives for innovation.<sup>31</sup> However, the effect on consumer welfare is ambiguous. The multi-dimensional economic effects of AI-enabled price discrimination require a more detailed assessment from a competition economics perspective.

### 2.2.1 Effects on static efficiency

In digital markets, based on the information about consumers' characteristics collected by different means and consumers' preferences observed from their shopping behaviour, undertakings can model and predict their consumers' willingness to pay

<sup>24</sup> The practice of offering price discounts to classes of persons who are not typically expected to draw a substantial income, such as students, children, the elderly, the unemployed, and other recipients of social welfare benefits, are generally considered fair. It relates to the concept of third-degree price discrimination as discussed earlier.

<sup>25</sup> Many sellers offer discounted prices to consumers who order larger quantities. It relates to the concept of second-degree price discrimination as discussed earlier.

<sup>26</sup> Customers who demonstrate loyalty to sellers through repeat purchases may be offered price discounts, often in the form of retailer loyalty programs. It is often regarded as a type of second-degree price discrimination.

<sup>27</sup> Retailers sometimes offer discounts to new consumers in order to encourage them to give their product a try. It is generally considered as second-degree price discrimination.

<sup>28</sup> Price discrimination based on whether the service is consumed during peak or off-peak periods is typically regarded as fair, at least in relation to the provision of 'club' goods—a species of quasi-public goods that are excludable but non-rivalrous (the cost of providing the good to an additional consumer is zero), at least until reaching a point where congestion occurs). It is often treated as second-degree price discrimination as well.

<sup>29</sup> For some services, particularly passenger transport services, the price offered varies depending upon the dynamic interplay between demand and supply, including proximity to the time at which the service will be provided). It is also usually regarded as a type of second-degree price discrimination.

<sup>30</sup> Townley et al. (2019, pp. 19–20).

<sup>31</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 7).

using sophisticated analytical tools.<sup>32</sup> In doing so, AI-enabled price discrimination is getting closer to first-degree price discrimination where a monopolist has perfect information about each consumer's willingness to pay for its products. It, therefore, makes sense to examine the effects of AI-enabled price discrimination with the example of first-degree price discrimination. In such a case, AI-enabled price discrimination can increase static (allocative) efficiency<sup>33</sup> by creating an incentive for undertakings to reduce prices for consumers with a low willingness to pay—who would otherwise be underserved—while preserving the profitability of consumers with a high willingness to pay.<sup>34</sup>

A necessary condition for traditional price discrimination to increase social welfare is that output must increase.<sup>35</sup> Armstrong concluded that the benefits of allowing first-degree price discrimination depend on the chosen welfare standard: with a total welfare standard such discrimination is beneficial, whereas with a consumer standard it is not.<sup>36</sup> In other words, the higher output will increase overall welfare but may not necessarily result in greater consumer welfare.<sup>37</sup> This seems to suggest that also in digital markets the impact of first-degree price discrimination can be positive, namely when it increases output and when one takes total welfare as the welfare standard.

Also from the *empirical* economic literature, traditional price discrimination normally increases the social welfare in different industries if it increases output. For example, Beckert et al. compared observed discriminatory prices with a simulated uniform price in the intermediary brick market in the UK, which fits the model of competition between similar products sold in different regions. Their simulation suggests that prohibiting brick sellers from price discrimination would increase average prices by nearly 12 percent (and reduce total welfare by nearly 24 percent).<sup>38</sup> In another case, Hastings found that in wholesale gasoline markets, the average price would rise by approximately 5 percent if undertakings could not price discriminate, while the quantity sold would decrease by 5 percent.<sup>39</sup> Furthermore, according to Cuddeford-Jones, a Hotel and Casino in Las Vegas used price discrimination to increase its average day rate price by 10 percent, while increasing the occupancy

<sup>32</sup> Graef (2018, p. 544).

<sup>33</sup> See Weishaar (2010, p. 18). According to Weishaar, allocative efficiency examines if those valuing a good most are able to attain it. It is defined as the condition in which all possible gains from exchange are realized and nobody can be made better off without making someone else worse off (Pareto efficiency). See also Cooter and Ulen (2010, p. 14), allocatively efficient means that it is impossible to change it so as to make at least one person better off (in his own estimation) without making another person worse off (again, in his own estimation).

<sup>34</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 9).

<sup>35</sup> See Schwartz (1990, pp. 1259–1262). See also Schmalensee (1981, pp. 242–247), Varian (1985, pp. 870–875).

<sup>36</sup> Armstrong, Price Discrimination (2006, p. 3). It is rather common that the impact of price discrimination on consumers is the opposite to its impact on overall welfare, although it may benefit consumers with low willingness to pay.

<sup>37</sup> Graef (2018, p. 545).

<sup>38</sup> Beckert et al. (2015, pp. 5–30).

<sup>39</sup> Hastings (2008, pp. 4–49).

rate by approximately 6 percent in competitive markets with a fixed capacity.<sup>40</sup> This strategy benefited consumers by increasing the number it served, but at the same time, it charged higher prices and extracted more consumer surplus from those that would have purchased in any case.<sup>41</sup>

Yet, it is rare to find empirical economic literature on the effects of AI-enabled price discrimination in digital markets. Economic theory suggests that it can improve static efficiency in such markets beyond the level of traditional price discrimination, potentially maximizing the output transacted.<sup>42</sup> The mechanism behind this conclusion is that as long as undertakings can tailor prices to consumers' valuations, and assuming that arbitrage is not possible, it is always optimal to serve each consumer whose willingness to pay exceeds the marginal cost of production, as that will not affect the profitability of other units sold.<sup>43</sup>

### 2.2.2 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.<sup>44</sup> 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.<sup>45</sup> The overall effect of AI-enabled price discrimination on consumer surplus is therefore ambiguous and the impact will likely vary from market to market.<sup>46</sup> 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.<sup>47</sup>

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.<sup>48</sup> 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

<sup>40</sup> Cuddeford-Jones (2013, pp. 9–12).

<sup>41</sup> Cuddeford-Jones (2013, pp. 9–12).

<sup>42</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 19).

<sup>43</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 19).

<sup>44</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 20).

<sup>45</sup> See O'donoghue and Padilla (2013, pp. 785–786).

<sup>46</sup> When algorithms set prices: winners and losers, Oxera Discussion Paper (2017, p. 26).

<sup>47</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 20).

<sup>48</sup> Botta and Wiedemann (2020, p. 386).

decrease in welfare.<sup>49</sup> 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.<sup>50</sup> 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.<sup>51</sup> In this scenario, consumer surplus is entirely captured and transferred to the monopolist.<sup>52</sup>

Nevertheless, AI-enabled price discrimination may benefit consumers in oligopolies through intensifying competition and thereby raising consumer surplus at the expense of industry profits.<sup>53</sup> For example, in order to poach consumers from rivals, each undertaking has an incentive to cut the price it offers to those consumers that it knows would otherwise not purchase the product.<sup>54</sup> In this case, it makes it possible for an undertaking to attack its rivals’ consumer bases, as well as new consumer segments, while maintaining higher margins on its own installed base.<sup>55</sup> However, since all the undertakings have similar strategic incentives to exploit price discrimination, the industry faces a prisoner’s dilemma situation, and competition is more intense than it would be with uniform prices.<sup>56</sup> In the scenario that the degree of personalization is small and prices are set at a level close to costs, almost all of the entire surplus would be captured by the consumers.<sup>57</sup> Academic literature further demonstrates that AI-enabled price discrimination may lead to more aggressive price competition even in duopoly markets under specific conditions.<sup>58</sup>

<sup>49</sup> Van Den Bergh (2017, p. 351).

<sup>50</sup> See Van Den Bergh (2017, p. 351), *see also* Botta and Wiedemann (2020, p. 386).

<sup>51</sup> See Carlton and Perloff (1999, p. 280).

<sup>52</sup> See Van Den Bergh (2017, p. 351).

<sup>53</sup> EAGCP (2005, p. 32).

<sup>54</sup> See Graef (2018, p. 545). *See also* Fudenberg (2000, pp. 634–657), Chen (1997, pp. 877–897).

<sup>55</sup> EAGCP (2005, p. 32).

<sup>56</sup> EAGCP (2005, p. 32).

<sup>57</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 20).

<sup>58</sup> Chen et al. (2018, pp. 1–30). This paper studies a duopoly model where each firm chooses personalized prices for its targeted consumers, who can be active or passive in identity management. Active consumers can bypass price discrimination and have access to the price offered to non-targeted consumers, which passive consumers cannot. When all consumers are passive, personalized pricing leads to intense competition and total industry profit lower than that under the Hotelling equilibrium. But market is always fully covered. Active consumers raise the firm’s cost of serving non-targeted consumers, which softens competition. When firms have sufficiently large and non-overlapping target segments, active consumers enable firms to extract full surplus from their targeted consumers through perfect price discrimination. With active consumers, firms also choose not to serve the entire market when the commonly non-targeted market segment is small. Thus active identity management can lead to lower consumer surplus and lower social welfare.



### 2.2.3 Effects on dynamic efficiency

AI-enabled price discrimination may also affect dynamic efficiency.<sup>59</sup> Dynamic efficiency is achieved through the invention, development, and diffusion of new products and production processes that better satisfy consumer preferences and increase social welfare.<sup>60</sup> Economists believe that dynamic efficiency plays an important role in the technical progress of industry since it is more efficient to develop new technologies that can save resources in producing known products, as well as to produce completely new products.<sup>61</sup>

The effects on dynamic efficiency created by AI-enabled price discrimination can be positive or negative. On the positive side, AI-enabled price discrimination can encourage undertakings to innovate and differentiate themselves by creating incentives to increase output without sacrificing sales.<sup>62</sup> As illustrated in an empirical study by Scherer and Ross: “what is needed for rapid technical progress is a subtle blend of competition and monopoly, with more emphasis in general on the former than the latter, and with the role of monopolistic elements diminishing when rich technological opportunities exist”.<sup>63</sup> On the negative side, such price discrimination may also promote rent-seeking activities that can reduce social welfare in other circumstances.<sup>64</sup> Therefore, the impact on dynamic efficiency caused by AI-enabled price discrimination is ambiguous and crucially depends on the market conditions.

When undertakings employ AI-enabled price discrimination, it promotes their output and increases their profit, but it also creates mechanisms for them to engage in economic activities that can reinforce their current status and gain even more profit. Inspired by AI-enabled price discrimination, undertakings may compete to invest in innovation and reduce costs.<sup>65</sup> As a result, the dynamic efficiency will be improved from the industry perspective.<sup>66</sup> That can directly benefit consumers in digital markets, but it can also create positive externalities on a social scale if other undertakings adopt and promote these innovations as well.<sup>67</sup> Digital markets are characterized by dynamic competition and high innovation, so undertakings can enter the market and gain market power by means of innovation and differentiation. As such, AI-enabled price discrimination is more likely to improve dynamic efficiency, as it increases the reward from any future innovation, and dynamic efficiency

<sup>59</sup> See Viscusi et al. (2005, p. 79). According to Viscusi, Harrington & Vernon, the main distinction between static efficiency and dynamic efficiency (sometimes called as “technical progress”) is that in discussing technical progress the assumption is that technology is given, and in discussing dynamic efficiency the assumption is that resources are being allocated to developing new technologies.

<sup>60</sup> Van Den Bergh (2017, p. 92). Dynamic efficiency is a vague concept that loosely indicates the optimal rate of technological progress.

<sup>61</sup> Viscusi et al. (2005, p. 93).

<sup>62</sup> OECD, Background Paper on Price Discrimination (2016c, pp. 21–22).

<sup>63</sup> Scherer and Ross (1990, p. 660).

<sup>64</sup> Ezrachi and Stucke, The Rise of Behavioural Discrimination (2016a, pp. 485–492).

<sup>65</sup> OECD, Background Paper on Price Discrimination (2016c, pp. 11–12).

<sup>66</sup> OECD, Background Paper on Price Discrimination (2016c, pp. 11–12).

<sup>67</sup> OECD, Background Paper on Price Discrimination (2016c, pp. 11–12).

gains can then be passed on to consumers over time as long as market entry remains possible.<sup>68</sup> It also requires that market power is temporary and is not preserved through anti-competitive means.<sup>69</sup>

It is not always the case that the profits undertakings gain through AI-enabled price discrimination benefit consumers. On the contrary, it may lead to rent-seeking for anti-competitive protection from the government. That is, undertakings engage in lobbying activities and political action to convince governments to introduce regulations that protect them from competition, rather than invest in innovation.<sup>70</sup> This practice is particularly common in regulated industries such as utilities, communication, transport and retail.<sup>71</sup> As examined by the OECD, in highly regulated industries, the effect of AI-enabled price discrimination may depend on the degree of market power that undertakings hold.<sup>72</sup> Therefore, in highly monopolized markets, AI-enabled price discrimination can increase profits and enhance incentives for rent-seeking behaviour, whereas in more competitive markets it can foster competition and reduce rent-seeking.<sup>73</sup>

As such, AI-enabled price discrimination is not always undesirable in digital markets, as it can increase static efficiency, promote dynamic efficiency, and on some occasions, boost consumer welfare. Whether AI-enabled price discrimination amounts to an abuse of dominance in competition law requires competition authorities to make a trade-off between different considerations.

### 3 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.<sup>74</sup> 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 that AI-enabled price discrimination may impede competition and harm consumers by creating, *inter alia*, exclusionary effects and exploitative effects. In this case, it is likely to fall into the realm of competition law, as is the case in jurisdictions such as China and the EU.

<sup>68</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, pp. 21–22).

<sup>69</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, pp. 21–22).

<sup>70</sup> See OECD, Background Paper on Price Discrimination (2016c, p. 12). See also OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 22).

<sup>71</sup> See OECD, Background Paper on Price Discrimination (2016c, p. 12). See also OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 22).

<sup>72</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 22).

<sup>73</sup> OECD, Background Paper on Personalised Pricing in the Digital Era (2018, p. 22).

<sup>74</sup> Roller (2007, p. 4).

### 3.1 Competition concerns about exclusionary effects

Price discrimination is a common feature of many exclusionary strategies by undertakings seeking to build or protect market power by ‘foreclosing’ competitors.<sup>75</sup> It may be involved in, for example, predatory pricing, bundled discounts, as well as margin squeeze cases to exclude a rival.<sup>76</sup> Exclusionary price discrimination has the potential to hinder free competition and harm consumers’ interests and, therefore, draws the particular attention of competition authorities in different jurisdictions. At the same time, such cases require careful analysis to distinguish those in which the undertaking has an interest, and an ability to exclude rivals, from those in which the same form of conduct delivers efficiencies.<sup>77</sup> The analysis of the exclusionary effect caused by price discrimination with other types of conduct is thus examined below.

With regard to the involvement with predation, a *predatory pricing* strategy occurs in two stages: (1) the sacrifice phase, where an undertaking sets prices below the competitive equilibrium level to force a rival or new entrant out of the market; and (2) the recoupment phase, where once the rival undertaking has left the market, the incumbent undertaking can exploit its increased market power and raise its prices to recover the profits that it sacrificed during the first phase.<sup>78</sup> This scheme does not always involve price discrimination, but price discrimination can be used to reduce the profit that is sacrificed during the predatory stage.<sup>79</sup> For example, if the undertaking can identify the willingness to pay of consumers of its competitors, it can target them with customized prices and avoid losses on sales to its existing consumers.

Another typical instance of price discrimination is in the form of *rebates*, which are discounts paid by a seller to a purchaser in respect of purchases.<sup>80</sup> Second-degree price discrimination takes a typical form of fidelity rebates,<sup>81</sup> which offer a range of different prices depending on the quantity purchased or the proportion of purchases that the buyer makes from the seller.<sup>82</sup> Fidelity rebates are generally seen as a horizontal exclusionary device that is aimed at foreclosing competitors or impeding their expansion.<sup>83</sup> This can be observed in *Hoffmann-La Roche*, a case where the dominant undertaking had granted rebates to a number of purchasers, as

<sup>75</sup> See para.19 of the Guidance on enforcement priorities in applying Article 82 of the EC Treaty (2009/C 45/02), “The aim of the Commission’s enforcement activity in relation to exclusionary conduct is to ensure that dominant undertakings do not impair effective competition by foreclosing their competitors in an anti-competitive way, thus having an adverse impact on consumer welfare...”

<sup>76</sup> See OECD, Background Paper on Price Discrimination (2016c, p. 23). See also EAGCP (2005, p. 30).

<sup>77</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 4).

<sup>78</sup> OECD, Background Paper on Predatory Foreclosure (2004, pp. 111–113).

<sup>79</sup> OECD, Background Paper on Price Discrimination (2016c, p. 24).

<sup>80</sup> Ritter and Braun (2004, p. 465).

<sup>81</sup> See Geradin and Petit (2005, pp. 11–14). Sometimes different terminology is used, e.g. loyalty rebates. Apart from fidelity rebates, there are other kinds of rebates, *inter alia*, “quantity rebates”, i.e. discounts granted on the basis of the volume purchased, “target rebates”, i.e. those conditional on a company meeting a sales target that is higher than previous purchases.

<sup>82</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 5).

<sup>83</sup> Geradin and Petit (2005, p. 12).

a counterpart to their commitment to acquire all or most of their vitamins or certain vitamins from Hoffmann-La Roche.<sup>84</sup> As the Commission held, the contracts between Hoffmann-La Roche and its purchasers had a horizontal effect by distorting competition between vitamins producers and had a discriminatory effect in that they applied dissimilar conditions to equivalent transactions.<sup>85</sup> As such, the supplier's objective is to foreclose rivals in the market and thereby strengthen its own position in that market,<sup>86</sup> which may attract the attention of the competition authorities due to the exclusionary effect, particularly when the supplier has more information on the willingness to pay of purchasers in digital markets. However, very recently the approach of the CJEU towards fidelity rebates has become less critical, as a result of the recent judgement in *Intel*.<sup>87</sup> Following that judgement (much supported by economists), the Commission is obliged to take into account economic evidence brought in by a defendant to support the use of loyalty rebates. The huge fine originally imposed on Intel was quashed.

*Margin squeeze* occurs when a vertically integrated undertaking forecloses a rival by setting a narrow margin between the price it offers for an essential input (wholesale price), and its own downstream price (retail price).<sup>88</sup> The vertically integrated undertaking can choose whether and how to price discriminate. On the one hand, the undertaking may choose not to price discriminate in its wholesale price and instead to set high wholesale prices that squeeze the margins of both its downstream subsidiary and its downstream rivals, which resembles predatory pricing by the subsidiary and cover its loss with revenues earned in the upstream market; on the other hand, it is possible for the undertaking to price discriminate between its downstream subsidiary and its rivals in order to raise the rivals' costs.<sup>89</sup> As such, price discrimination can allow a vertically integrated undertaking to foreclose downstream rivals and hence protect its upstream market power, or to reduce competition in the downstream market.<sup>90</sup> In digital markets, there is a large possibility that the more information the vertically integrated undertaking has obtained, the more efficient it will be to engage in this kind of activity for more profits.

### 3.2 Competition concerns about exploitative effects

Price discrimination can be exploitive and hurt consumers if it is costly to impose, reduces consumer surplus in the short run and has no compensating effects. Such compensating effects might include expanding the market, intensifying competition, preventing commitment to maintaining high prices, or incentivizing innovation.<sup>91</sup>

<sup>84</sup> See ECJ, *Hoffmann-La Roche v. Commission*, ECLI:EU:C:1979:36, 13 February 1979.

<sup>85</sup> Geradin and Petit (2005, p. 12).

<sup>86</sup> Ibáñez Colomo (2014, p. 145).

<sup>87</sup> Case T-286/09 RENV, *Intel Corporation v Commission*, Judgment of the General Court, ECLI:EU:T:2022:19, 26 January 2022.

<sup>88</sup> OECD, Background Paper on Margin Squeeze (2009, p. 27).

<sup>89</sup> OECD, Background Paper on Price Discrimination (2016c, p. 28).

<sup>90</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 5).

<sup>91</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 3).

Despite the possibility of exploitative effects, competition authorities should first consider whether the market itself can solve the problem. According to Graef, by taking actions against *exclusionary* abuses to keep the market competitive, there is less room for a dominant undertaking to exploit consumers, since the market's self-correcting nature may mitigate the dominant undertaking's harmful effects of exploitative behavior.<sup>92</sup> In the words of Competition Commissioner Vestager, consumers can often be protected “just by stopping powerful companies from driving their rivals out of the market”.<sup>93</sup> That explains why some scholars hold that exploitative abuses are generally better tackled under unfair trading or consumer protection law.<sup>94</sup>

If the exploitative behavior is persistent and cannot be corrected by the market itself, however, then this might be a symptom of a malfunctioning market. That would then require a market study to provide a comprehensive and holistic examination of the market, so as to identify the reasons why the market is working ineffectively, and the relative magnitude of those different problems.<sup>95</sup> If a dominant undertaking is abusing its market power and that is the main reason for the exploitative effects,<sup>96</sup> it makes sense to take the intervention of competition authorities into account. For instance, Botta and Wiedemann present some advantages of competition law enforcement, particularly how it can offer behavioral remedies, such as transparency requirements and opt-out rights.<sup>97</sup> Moreover, it is possible to use economic analysis in competition law to evaluate the positive and negative effects on competition and consumers and to assess the effectiveness of competition remedies on a social scale. Particularly, in the era of machine learning and AI-assisted pricing, the risks of “digital” consumer manipulation may be admittedly increased on an industrial scale.<sup>98</sup> In that case, the competition authorities may cautiously respond to the concern of exploitative effects caused by AI-enabled price discrimination.

It is noteworthy that exploitative price discrimination may directly harm consumers in some cases. That means it contradicts some objectives of (competition) law as defined in many jurisdictions, such as, “consumer welfare”<sup>99</sup> or “safeguarding the interests of consumers”.<sup>100</sup> As discussed in Sect. 2.2, if dominant undertakings use

<sup>92</sup> Graef (2019, p. 464).

<sup>93</sup> VESTAGER, Margrethe, Protecting consumers from exploitation (Speech at the Chillin' Competition Conference Brussels, 21 November 2016).

<sup>94</sup> Graef (2019, p. 464).

<sup>95</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 3).

<sup>96</sup> For example, it may include problems of excessive concentration, tacit coordination, barriers to entry, behavioural biases on the demand side, and regulatory restrictions.

<sup>97</sup> Botta and Wiedemann (2020, pp. 395–399).

<sup>98</sup> Calo (2014, pp. 997–1003).

<sup>99</sup> See paras. 19 and 86 of the Guidance on enforcement priorities in applying Article 82 of the EC Treaty (2009/C 45/02).

<sup>100</sup> *Anti-Monopoly Law of the People's Republic of China* [中华人民共和国反垄断法] (Order No.68 of the President of the People's Republic of China, promulgated by the Standing Committee of the National People's Congress on 30 August 2007, entered into force on 1 August 2008, amended on 24 June 2022 and enacted on 1 August 2022, hereinafter referred to as “AML”). See Article 1 of the AML, “This Law is enacted for the purpose of preventing and restraining monopolistic conducts, protecting fair competi-

price discrimination, then this may capture significant consumer surplus and transfer it to the producers, which in turn has an adverse effect on consumers. In digital markets, consumers may be unaware that the price for a given product on their screen is different from the price for the same product that is displayed to another consumer.<sup>101</sup> That means they cannot choose from undertakings that set personalized prices and those that do not. As such, in the digital era, AI-enabled price discrimination will increase this exploitative effect if prices are excessive or conditions are unfair.

Similarly, as discussed in Sect. 2.3, despite the dynamic efficiencies that can be obtained, AI-enabled price discrimination can increase the profits of the dominant undertaking by innovation. However, the profits gained through price discrimination may not always be redistributed to consumers. For example, it may lead to rent-seeking by lobbying activities for anti-competitive protection by the government, which reduces social welfare. In the meantime, AI-enabled price discrimination is costly to carry out, since it requires data to be updated, algorithms to be improved, and analytics to be developed so that the accuracy of the estimates can be maintained.<sup>102</sup> Therefore, consumers are likely to be the last bearer for the costs of rent seeking and execution of price discrimination since it may be passed to consumers.

#### 4 Legal response from the perspective of competition law and policy

Since the protection of free competition and consumer welfare are objectives of competition law in China and the EU, it makes sense to consider competition law intervention. In the European Union, price discrimination is specifically mentioned as an abuse of dominance under Article 102(c) TFEU.<sup>103</sup> Laws outside of competition law such as the Platform to Business Regulation<sup>104</sup> and the Digital Markets Act<sup>105</sup> also impose obligations to undertakings to ensure contestable and fair markets in digital sectors. By contrast, in China, Article 22(1)(6) AML<sup>106</sup> challenges the discriminatory treatment of undertakings, while the Guidelines on the Platform

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Footnote 100 (continued)

tion in the market, enhancing economic efficiency, safeguarding the interests of consumers and social public interest, promoting the healthy development of the socialist market economy". The AML Amendment 2022 adds "encouraging innovation" as one objective.

<sup>101</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 5).

<sup>102</sup> OECD, Executive Summary of the Roundtable on Price Discrimination (2016a, p. 5).

<sup>103</sup> Treaty on the Functioning of the European Union (Consolidated version 2016) (*hereinafter referred to as "TFEU"*), OJ C 202, 7.6.2016.

<sup>104</sup> Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services (*hereinafter referred to as "P2B Regulation"*) (2019).

<sup>105</sup> Proposal for a Regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (*hereinafter referred to as "Digital Markets Act"*).

<sup>106</sup> Article 22(1)(6), AML.

Economy<sup>107</sup> specify its application in digital markets. The recently enacted Algorithm Recommendation Regulations<sup>108</sup> further prohibit undertakings from engaging in discriminatory practices via recommendation algorithms. Nevertheless, also other cases where price discrimination amounts to an abuse of dominance are prohibited.

#### 4.1 Assessment of AI-enabled price discrimination in the EU

In Europe, price discrimination is mentioned explicitly as an abuse of dominance where a seller applies “dissimilar conditions to equivalent transactions with other trading parties”. Therefore, it will fall into the scope of Article 102(c) TFEU if the abusive conduct places other trading parties at a competitive disadvantage and thereby creates negative effects in competition. However, when undertakings are equipped with amounts of Big Data and accurate algorithms in the digital market, it adds difficulties for competition authorities to qualify price discrimination by defining “dissimilar conditions” in “equivalent transactions” and identifying “trading parties” that are placed at “a competitive disadvantage”. In addition, it remains uncertain whether Article 102(c) TFEU applies to business-to-consumer relationships since it seems to make no sense to require that price discrimination places the discriminated consumers at “a comparative disadvantage” compared to other consumers.<sup>109</sup>

Nevertheless, Article 102(a) TFEU prohibits abusive conduct which directly or indirectly imposes unfair purchase or selling prices or other unfair trading conditions, without conditions of Article 102(c) TFEU being satisfied. The first sentence of Article 102 TFEU also provides the general prohibition of abusive conduct with anticompetitive effects. However, Article 102 TFEU always serves as a last resort to address competition concerns. The question arises whether Article 102 TFEU can effectively tackle the challenge caused by AI-enabled price discrimination.

An alternative option is to intervene in digital markets *ex ante*. Aiming to safeguard the innovation, growth, and competitiveness in digital markets, the Digital Markets Act (DMA) imposes obligations on gatekeepers,<sup>110</sup> which are without prejudice to the application of Article 102 TFEU.<sup>111</sup> In addition, the Platform to

<sup>107</sup> *Anti-monopoly Guidelines of the Anti-monopoly Committee of the State Council on Platform Economy* [国务院反垄断委员会关于平台经济领域的反垄断指南] (*hereinafter referred to as “Guidelines on the Platform Economy”*), entered into force on 7 February 2021 (The exposure draft was released by SMAR on 10 November 2020 to collect comments and suggestions from the public with a deadline on 30 November 2020), published on 7 February 2021 by the Anti-monopoly Committee of the State Council).

<sup>108</sup> *Internet Information Service Algorithm Recommendation Management Regulations* [互联网信息服务算法推荐管理规定] (*hereinafter referred to as “Algorithm Recommendation Management Regulations”*), published on 4 January 2022 and entered into force on 1 March 2022).

<sup>109</sup> Grafe (2021, p. 486).

<sup>110</sup> Pursuant to Article 2(1) and Article 3(1) of the Digital Markets Act, “Gatekeeper” means a provider of core platform services, which (a) has a significant impact on the internal market; (b) it operates a core platform service which serves as an important gateway for business users to reach end users; and (c) it enjoys an entrenched and durable position in its operations or it is foreseeable that it will enjoy such a position in the near future.

<sup>111</sup> Article 1 (5)-(6), Digital Markets Act.

Business Regulation (P2B Regulation) aims at protecting businesses against unfair commercial practices by platforms. The Regulation distinguishes between business users of online intermediation services and corporate website users using online search engines. It mainly imposes transparency obligations on online intermediary service providers and search engines as well as redress possibilities in case these obligations are not complied with.<sup>112</sup>

In relation to B2C relationships, the so-called Omnibus Regulation<sup>113</sup> introduced a specific rule on price discrimination in the Consumer Rights Directive (CRD).<sup>114</sup> According to the new Article 6(1)(ea) CRD, traders must inform consumers in case the price was personalised on the basis of automated decision-making. In its 2021 Guidance on the interpretation and application of the Unfair Commercial Practices Directive,<sup>115</sup> the Commission states that the UCPD<sup>116</sup> “does not, as such, prohibit traders from price discrimination as long as they adequately inform the consumer about the total price or how it is calculated”. However, it is added that price discrimination may be prohibited by other rules of EU origin. The Commission refers for example to Article 20 Services Directive<sup>117</sup> which prohibits price discrimination based on nationality and place of residence in all cases of services (including retail sales of goods) to the public at large, except when the differentiation is directly justified by objective criteria. With regard to personalized pricing as a specific type of price discrimination based on online tracking and profiling the consumer’s behaviour, the Commission draws attention to the need for traders to respect the

<sup>112</sup> Article 1, the EU Platform to Business Regulation.

<sup>113</sup> Directive (EU) 2019/2161 of the European Parliament and of the Council of 27 November 2019 amending Council Directive 93/13/EEC and Directives 98/6/EC, 2005/29/EC and 2011/83/EU of the European Parliament and of the Council as regards the better enforcement and modernisation of Union consumer protection rules, OJ L 328, pp. 7–28 (18.12.2019).

<sup>114</sup> Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council Text with EEA relevance, OJ L 304, pp. 64–88 (22.11.2011).

<sup>115</sup> Commission Notice – Guidance on the interpretation and application of Directive 2005/29/EC of the European Parliament and of the Council concerning unfair business-to-consumer commercial practices in the internal market, C/2021/9320, OJ C 526, pp. 1–129 (29.12.2021).

<sup>116</sup> Directive 2005/29/EC of The European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council (hereinafter referred to as “UCPD”).

<sup>117</sup> Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market, OJ L 376, pp. 36–68 (27.12.2006).



personal data protection rules contained in the GDPR<sup>118</sup> and the e-Privacy Directive.<sup>119</sup> Finally, the Commission points out that personalised pricing “may be combined with different unfair commercial practices, for example if in the context of the data-driven personalisation traders take advantage of ‘undue influence’ over the consumer under Articles 8 and 9 UCPD”. Articles 8 and 9 define the concept of aggressive commercial practices,<sup>120</sup> a type of prohibited unfair commercial practices and provide a list of elements that can be taken into account when determining whether a practice qualifies as aggressive. Although it is not mentioned explicitly by the Commission, we believe that personalized pricing or any type of discriminatory pricing may also qualify as a misleading practice in case the consumer did not receive adequate information about its use.<sup>121</sup> Indeed, pursuant to Article 6(1) UCPD, “A commercial practice shall be regarded as misleading if it contains false information and is therefore untruthful or in any way, including overall presentation, deceives or is likely to deceive the average consumer, even if the information is factually correct, in relation to [the price or the manner in which the price is calculated, or the existence of a specific price advantage], and in either case causes or is likely to cause him to take a transactional decision that he would not have taken otherwise”.<sup>122</sup>

As such, EU law has established a mixed regime of competition law and other rules to tackle unfair and/or anti-competitive AI-enabled price discrimination in digital markets. Nevertheless, whether the current rules are enforced in an optimal way from the perspective of economics or whether they lead to over-enforcement (false positives) or under-enforcement (false negatives) requires further assessment.

## 4.2 Assessment of AI-enabled price discrimination in China

In China, price discrimination falls into the scope of Chinese competition law and would be considered a possible abuse of dominance in Article 22(1)(6) of the AML. Article 22(1)(6) AML challenges the discriminatory treatment engaged by a

<sup>118</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 119, pp. 1–88 (4.5.2016). See in particular Art. 21 Concerning the individual’s right to object to the use of its personal data for direct marketing, Arts. 12–14 containing information obligations and Art. 22 granting the individual the right not to be subject to a decision which produces legal effects concerning them or significantly affects them and which is based solely on automated processing of data, including profiling.

<sup>119</sup> Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications), OJ L 201, pp. 37–47 (31.7.2002). See in particular Art. 13 requiring the prior consent of subscribers or users for the use of automatic calling machines, faxes, or email for direct marketing.

<sup>120</sup> Pursuant to Art. 8 UCPD: “A commercial practice shall be regarded as aggressive if, in its factual context, taking account of all its features and circumstances, by harassment, coercion, including the use of physical force, or undue influence, it significantly impairs or is likely to significantly impair the average consumer’s freedom of choice or conduct with regard to the product and thereby causes him or is likely to cause him to take a transactional decision that he would not have taken otherwise”.

<sup>121</sup> Art. 6(1) UCPD.

<sup>122</sup> Art. 5(1) and (2) UCPD.

dominant undertaking in a manner of applying discriminatory treatments on trading prices or other trading conditions to their trading parties with equal standing without any justifiable reasons. In the meantime, Article 22(1)(1) AML prohibits abusive conduct which imposes unfairly high or low prices, without the conditions of Article 22(1)(6) AML being satisfied.<sup>123</sup> In addition, the AML Amendment 2022 also prohibits undertakings from engaging in abusive practices by use of data, algorithms, techniques, platform rules, etc.<sup>124</sup>

To facilitate enforcement of the AML and allow it to function predictably, the *Interim Provisions on Prohibiting Abuse of Dominant Market Positions*<sup>125</sup> were developed to prevent and curb abuse of dominant market positions based on the enforcement experience and market reality. Article 19 further specifies the prohibition of discriminatory treatment in the form of (1) implementing different transaction prices, volumes, varieties and quality grades; (2) implementing different volume-based discounts and other preferential conditions; (3) implementing different terms of payment and modes of delivery; (4) implementing different contents and terms of warranty, contents and terms of maintenance, supply of spare parts, technical guidance, and other after-sales service conditions.<sup>126</sup> This provision further clarifies that “equivalent conditions” means “trading parties have no differences that substantively affect transactions between the trading parties in terms of transaction security, transaction cost, scale and capability, credit status, transaction process, duration of a transaction, and other respects.”<sup>127</sup>

Considering the necessity to tackle issues that arise in the prosperously developed platform economy, the SAMR<sup>128</sup> has published the *Guidelines on the Platform Economy* to regulate monopolistic behavior in platform markets, promoting the development of the market economy as well as safeguarding the interests of the customer and the public. Article 17 articulates the factors to be considered when analyzing whether differentiated treatment is constituted, including but not limited to “(1) applying discriminatory transaction prices or other transaction conditions based on big data and algorithms and in accordance with the payment capacity, consumption preference and usage habits of the counterpart parties; (2) applying discriminatory standards, rules and algorithms; (3) applying discriminatory payment terms and transaction methods.”<sup>129</sup> The explanation to “equivalent conditions” provided by the Guidelines is similar to the one in the *Interim Provisions*, which says “no differences between trading parties that substantively affect trading in trading security, trading

<sup>123</sup> Article 22(1)(7) AML also provides the general prohibition of abusive conduct as determined by the Anti-monopoly Law Enforcement Agency under the State Council.

<sup>124</sup> Article 22(2) AML.

<sup>125</sup> *Interim Provisions on Prohibiting Abuse of Dominant Market Positions* [禁止滥用市场支配地位行为暂行规定] (Issued by Order No. 11 of the State Administration for Market Regulation on 26 June 2019, entered into force on 1 September 2019, hereinafter referred to as “Interim Provisions”), replaced the *Provisions for the Industry and Commerce Administrations on the Prohibition of Abuse of Dominant Market Position* [禁止滥用市场支配地位行为暂行规定] (effective from 1 February 2011 to 1 September 2019).

<sup>126</sup> Article 19 Interim Provisions.

<sup>127</sup> Article 19 Interim Provisions.

<sup>128</sup> The State Administration for Market Regulation was established on 21 March 2018.

<sup>129</sup> Article 7 Guidelines on the Platform Economy.

cost, credit status, trading link, trading duration, and other respects”.<sup>130</sup> In digital markets, it is noteworthy that “the differences in privacy information, transaction history, individual preferences and consumption habits of the transaction counterparts obtained by the platform during the transaction do not affect the determination of the equivalent conditions of transaction counterparts”.<sup>131</sup>

With a particular focus on the algorithm recommendation phenomenon, the recently enacted *Algorithm Recommendation Regulations* prohibit undertakings engaging in discriminatory practices via recommendation algorithms. Article 21 explicitly sets out an obligation, which requires undertakings not to impose differential treatment on consumers for the sale of products and services, such as engaging in price discrimination based on consumers’ preferences and transaction habits and other illegal behavior.<sup>132</sup>

In addition to competition law, there are other regulations that provide the possibility to tackle AI-enabled price discrimination in China. In business-to-business relationships, the Price Law prohibits undertakings from imposing price discrimination in equivalent transactions of equivalent products or services.<sup>133</sup> In business-to-consumer relationships, the Consumer Protection Law stipulates the right to be informed and the right of fair trading to protect consumers’ interests.<sup>134</sup> Moreover, the Cyber Security Law deals with the manner to collect and use consumer data<sup>135</sup> while the E-Commerce Law prohibits e-commerce undertakings from displaying search results of products or services to consumers according to their personal characteristics such as interests, preferences and consumption habits.<sup>136</sup> In addition, the Personal Information Protection Law also prohibits undertakings to engage in unreasonable differential treatment towards individuals in trading conditions such as trade price when they use personal information to conduct automated decision-making.<sup>137</sup>

As such, similar to EU law, Chinese law has established a mixed regime of competition law and other rules to tackle unfair and/or anti-competitive AI-enabled price discrimination in digital markets. Despite recent cases in digital markets not having

<sup>130</sup> Article 7 Guidelines on the Platform Economy.

<sup>131</sup> Article 7 Guidelines on the Platform Economy.

<sup>132</sup> Article 21 Algorithm Recommendation Management Regulations.

<sup>133</sup> *Price Law of the People’s Republic of China*[中华人民共和国价格法]( Issued by Order No. 11 of the President on 29 December 1997, entered into force on 1 May 1998, hereinafter referred to as “Price Law”), Article 14(5) Price Law.

<sup>134</sup> *Consumer Protection Law of the People’s Republic of China*[中华人民共和国消费者权益保护法]( Issued by Order No. 92 of the President on 31 October 1993, entered into force on 1 January 1994, hereinafter referred to as “Consumer Protection Law”), Article 8 and 10 Consumer Protection Law.

<sup>135</sup> *Cyber Security Law of the People’s Republic of China*[中华人民共和国网络安全法](Issued by Order No. 53 of the President on 11 July 2016, entered into force on 6 January 2017, hereinafter referred to as “Cyber Security Law”), Article 41 Cyber Security Law.

<sup>136</sup> *E-Commerce Law of the People’s Republic of China*[中华人民共和国电子商务法]( Issued by Order No. 7 of the President on 31 August 2018, entered into force on 1 January 2019, hereinafter referred to as “E-Commerce Law”), Article 17 E-Commerce Law.

<sup>137</sup> *Personal Information Protection Law of the People’s Republic of China*[中华人民共和国个人信息保护法] ( Passed at the 30th meeting of the Standing Committee of the 13th National People’s Congress on 20 August 2022, entered into force on 1 December 2021, hereinafter referred to as “Personal Information Protection Law”), Article 24 Personal Information Protection Law.

been established under discriminatory treatment provisions, China has stepped forward in the legislative process to address the competition concerns caused by AI-enabled price discrimination. Likewise, whether the objectives of those competition relating legal instruments, among others, protection of free competition and consumer welfare, have been achieved when tackling AI-enabled price discrimination through the current regime remains to be evaluated in legal enforcement and requires further discussion.

## 5 Conclusion

To answer the main research question defined in the Introduction, AI-enabled price discrimination is not always undesirable in digital markets and hence does not always require a competition law response. In general, it is good for the economy, as it can increase static efficiency, and, on some occasions, it can promote dynamic efficiency and boost consumer welfare as well. Nevertheless, it may also lead to exclusionary and exploitative effects, especially once Big Tech Giants abuse their (very) dominant positions in relevant markets. Since the protection of free competition and consumer welfare are objectives of competition law in China and the EU, competition law seems a proper instrument to step into digital markets to address these concerns. It is yet another question, however, to what extent the application of competition law to AI-enabled price discrimination in the EU and China is in line with economic theory. The answer to that question, and more particularly whether there is under-enforcement (false negatives) or over-enforcement (false positives), is beyond the scope of this paper.

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