THE GEORGE WASHINGTON UNIVERSITY

WASHINGTON, DC

GW Competition & Innovation Lab Working Paper Series

No. 2025/8

Unlocking Manufacturer Utopia: AI's Role in Perfect Price Discrimination

Christian Bergqvist & Miroslava Marinova

The GW Competition & Innovation Lab
805 21th Street NW
Suite 621. 6th Floor
Washington, DC 20052
gwucil@gwu.edu

Unlocking Manufacturer Utopia: AI's Role in Perfect Price Discrimination

Christian Bergqvist[1] and Miroslava Marinova[2]

Abstract

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. Notably, no legal cases have yet addressed abusive algorithmic price discrimination. This article examines whether the current competition law framework is adequate to tackle algorithmic price discrimination that harms consumers. It argues for robust competition law enforcement under Article 102(a) TFEU to ensure that algorithmic pricing does not become a tool for exploitative abuse in the digital economy. However, it also outlines how case law is underdeveloped and, in some aspect, hostile to submitting personalized pricing under Article 102(a) TFEU.

[1] Dr. Christian Bergqvist is an Associate Professor at the University of Copenhagen and Senior Fellow at the GW Competition and Innovation Lab at the George Washington University, cbe@drbergqvist.dk. Christian Bergvist has no conflict of interest to disclose.

[2] Dr Miroslava (Mira) Marinova is a Senior Lecturer at the University of East London and Senior Fellow at the GW Competition and Innovation Lab at the George Washington University, M.Marinova@uel.ac.uk. Miroslava Marinova has no conflict of interest to disclose.

I. Introduction

Price discrimination means that sellers can charge different customers different prices for the same goods/services to maximize their overall profits by considering differences in price sensitivity or willingness to pay between different customers or customer groups.[3] Historically, companies have faced practical challenges in deploying price discrimination because it was impossible to identify customers with different preferences and, thus, predict their response to price adjustments. While price discrimination has long existed, such as student discounts or segmented pricing based on broad consumer groups, in recent years, digital technologies have allowed the collection of vast amounts of personalized information about consumer characteristics that allow for more precise targeting of consumers with specific preferences; the key difference today lies in the number of observable characteristics made available by digital technologies. This personalized information has also been used to adapt pricing strategies across industries such as airline ticketing, hotel bookings, and digital platforms transactions, allowing firms to price discriminate in a highly differentiated way that we call 'personalized pricing'.

These strategies use many more dimensions of customer characteristics and behaviours of customers on the internet to predict their preferences and, on that basis, personalize the price offer. Recent research indicates that companies are now using Artificial Intelligence (AI) driven algorithms that can process complex data and identify consumers by using information about customer behaviour, login history, purchase history, browser or OS type, track online activity on social media, payment cards, cookies, IP address, market trends, competitor actions, and external factors, with unparalleled speed and accuracy.[4] By using AI algorithms, companies can personalize and adapt pricing strategies for each consumer, depending to a far greater degree than was ever possible before. These strategies go beyond traditional third-degree price discrimination because the

[3] Willingness to pay can encompass several dimensions, including individual elasticity of demand, group-based elasticity (third-degree price discrimination), and personalized willingness to pay (first-degree price discrimination). These concepts form the foundation for different approaches to price discrimination, which are explored in detail later in this paper.

[4] See e.g. Ariel Ezrachi and Maurice E Stucke, Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy (Harvard University Press 2016); Inge Graef, 'Algorithms and Fairness: What Role for Competition Law in Targeting Price Discrimination Towards End Consumers?' (2017) 24 Colum J Eur L 541; Akiva Miller, 'What Do We Worry About When We Worry About Price Discrimination? The Law and Ethics of Using Personal Information for Pricing' (2014) 19 J Tech L & Pol'y 41; Christopher Townley, Eric Morrison and Karen Yeung, 'Big Data and Personalized Price Discrimination in EU Competition Law' (2017) 36 YB Eur L 683; Ramsi Woodcock, 'Personalized Pricing as Monopolization' (2019) 51 Connecticut Law Review 311.

algorithmic pricing is informed by detailed consumer behaviour patterns observed online.[5]

Economic research has generally considered price discrimination between different customers for essentially the same product as competitively neutral as it does not directly affect the average price. However, empirical evidence suggests that consumers may perceive price discrimination negatively so that they consider differentiated pricing unfair unless it seems to reflect tangible differences in the product, like differences in the costs of production.[6] The improved technological abilities to personalize pricing could, therefore, lead to a perception of unfair treatment on the side of consumers and could lower the overall consumer welfare, taking these 'behavioural' motivations into account.[7] Even where there is no consumer harm from traditional economic analysis of price discrimination, there may thus nevertheless be harm to consumer welfare from the perception of unjustified discrimination.[8]

The academic literature provides conflicting conclusions regarding the consumer welfare effect of algorithmic pricing with no clear conclusion about the appropriate legal qualifications.[9] Although some academic papers provide theoretical arguments that these practices might harm consumer welfare, others show no substantial evidence that firms implement personalized price discrimination.[10] Some scholars claim that consumers might benefit due to increased competition

---

[5] The classic work by Fudenberg and Tirole provides a foundational understanding of behavioural price discrimination, and its application has become more sophisticated with the advent of AI and big data see Drew Fudenberg and Jean Tirole, 'Customer Poaching and Brand Switching' (2000) 31(4) RAND Journal of Economics 634. They analyse duopoly poaching under various contract types and consumer preference scenarios, highlighting the inefficiencies in consumer switching behaviours. This framework was extended by Rosa-Branca Esteves and Carlo Reggiani, 'Elasticity of Demand and Behaviour-Based Price Discrimination' (2014) 32(1) International Journal of Industrial Organization 46, who examined the impact of demand elasticity on the profitability and welfare effects of behaviour-based price discrimination, demonstrating that increased demand elasticity mitigates the negative impact on profits. Both papers suggest potential consumer detriment associated with behaviour-based price discrimination, albeit in different ways and contexts.

[6] The empirical literature is discussed extensively in section three of this paper.

[7] Miller (n 4), p 90.

[8] See Frederik Zuiderveen Borgesius, 'Price Discrimination, Algorithmic Decision-Making, and European Non-Discrimination Law,' 31 EUR. BUS. L. REV. 401, 412 (2020).

[9] Pascale Chapdelaine, 'Algorithmic Personalized Pricing' 17 (2020) NYUJL & Bus.)1.

[10] OECD report Personalised Pricing in the Digital Era, 2 DAF/COMP/M(2018)2/ANN10/FINAL, 2018; Personalised Pricing and Disclosure BEIS Research Paper Number 2021/008 available at <https://assets.publishing.service.gov.uk/media/60f5ba4b8fa8f50c774582e7/Price_personalisation_and_disclosure_UEA_report.pdf > accessed 7 March 2024; See also Axel Gautier, Ashwin Ittoo, and Pieter Van Cleynenbreugel, 'AI algorithms, price discrimination and collusion: a technological, economic and legal perspective' 50(3) (2020) European Journal of Law and Economics), 405.

or by reducing search and transaction costs.[11] One reason for this is that consumer preferences concerning price discrimination would be expected to be self-correcting in a competitive market so that customers substitute for firms that they observe to be using discriminatory pricing practices, which they consider unfair. However, that would still mean that price discrimination could be seen as an abusive practice under competition law when used by a dominant company that does not face significant competition.

Some authors have gone further, suggesting that algorithmic personalizing pricing should be banned as a general form of unfair commercial practice independent of market structure because it should be found violating privacy/data protection norms.[12] While a pure behavioral interpretation of unfairness would only apply when consumers can detect different prices, the privacy argument would even apply if consumers are well informed and can monitor sellers' prices but in cases in which price discrimination practices are challenging to detect so that regulation might be warranted.[13] On the other hand, some scholars claim that the difficulty in defining unfairness is an argument against regulating markets on that basis.[14]

This article critically examines the contemporary legal, economic, and scientific academic literature and policy reports concerning algorithmic personalized pricing as a form of unfair pricing practice. It aims to summarise some principles that should shape the regulation of algorithmic personalized pricing, with a primary focus on competition law. Defining what constitutes unfair practices under competition law requires a deeper understanding of the concept of fairness. Algorithmic price discrimination further complicates matters by influencing consumers' perceptions of fairness. As pricing algorithms become increasingly sophisticated, companies can implement highly targeted and personalized pricing strategies. While these strategies may comply with legal standards, they can lead to perceptions of unfairness among consumers (particularly when

---

[11] Christopher Townley, Eric Morrison & Karen Yeung, 'Big Data and Personalized Price Discrimination in EU Competition Law' (2017) 36 Yearbook of European Law 683–711; Zeyu Zhao, 'Algorithmic Personalized Pricing with the Right to Explanation' (2023) 19(3) Journal of Competition Law & Economics 367, 396.

[12] Pascale Chapdelaine, 'Algorithmic Personalized Pricing' NYUJL & Bus. 17 (2020) 4. See also Peter ROTT, Joanna STRYCHARZ, Frank ALLEWELDT, Personalised Pricing, PE 734.008 - November 2022 and Zeyu Zhao, 'Algorithmic Personalized Pricing with the Right to Explanation' (2023) 19(3) Journal of Competition Law & Economics 367.

[13] Miller (n 4) 88.

[14] Miller (n 4) 88; See also Matthew A. Edwards, Price and Prejudice: 'The Case Against Consumer Equality in the Information Age' (2006) 10 Lewis & Clark Law Review 559, 583; William W. Fisher, 'When Should We Permit Differential Pricing of Information?' (2008) 55 UCLA Law Review 1, 20; Sarah Spiekermann, 'Individual Price Discrimination - An Impossibility?' (2006) MIMEo 2. 5.

prices vary significantly based on individual characteristics or behavior), even if they are technically legal.[15] Thus, bridging the gap between legal standards and consumer perceptions of fairness is essential for effectively addressing algorithmic price discrimination within the framework of competition law and the benchmark of consumer welfare.

This paper is formed by six sections including this introduction. The second section examines traditional economic theories of price discrimination and welfare effects to place algorithmic price discrimination into this context. Section three examines scientific experimental studies on the implementation of personalized price discrimination, with a particular focus on consumer perceptions and reactions. It explores how consumers respond when they become aware of price differentiation practices that they perceive as unfair or lacking transparency. By examining how consumers interpret and react to these practices, this section highlights a significant but often overlooked dimension of price discrimination: the harm arising from consumers' negative perceptions of fairness and how this dissatisfaction becomes a part of their preferences, reducing overall consumer welfare. The fourth section discusses the decisional practice of the European Commission and EU Courts related to price discrimination as a form of dominant position, aiming to assess the suitability of existing legal standards for addressing consumer harm facilitated by algorithmic pricing. The aim is to understand whether this legal standard is suitable for assessing algorithmic pricing discrimination. In the fifth section, attention is given to the challenges associated with identifying and assessing exploitative abuse of dominant position. The aim is to distinguish between instances where consumers perceive the discrimination as unfair, raising clear concerns of exploitative abuse, and those where consumer awareness is limited, potentially requiring regulatory intervention beyond competition law. Finally, the last section offers conclusions and policy recommendations.

II. Overview of Traditional Price Discrimination theories – economic perspective

2.1 Definitions of price discrimination

Price discrimination is a common and widespread practice in economic life, which is used to stimulate sales and increase

[15] See e.g. Christopher Townley, Eric Morrison, and Karen Yeung, 'Big Data and Personalised Price Discrimination in EU Competition Law' (2017) 36 Yearbook of European Law 683–748. The paper notes that algorithmic price discrimination may conflict with fairness even when it promotes efficiency, raising ethical and social concerns.

profits.[16] This applies across all sectors, but in particular, it is an important pricing policy for big companies with high fixed costs, which serves as a way to quickly recover those costs or to achieve economies of scale.[17] These pricing schemes are generally seen as pro-competitive by expanding sales via lowering prices when a company operates in a competitive market.[18] According to Levine, price discrimination very often occur in competitive markets as a way of recovering costs common to producing more than one unit of a good or service.[19] This suggests that price discrimination can be implemented by firms that do not possess market power. The same views were expressed by Bishop and Walker, who stated that '*...in reality, price discrimination is rife even in industries subject to effective competition, for example in the airline industry, other transport industries, the pricing of cinema tickets and so on*.'[20]

Tirole claims that a full and complete definition of price discrimination is difficult to be given and provides the next explanation: '*…the producer price discriminates when two units of the same physical good are sold at different prices, either to the same consumer or different consumer*s.'[21] However, this definition does not fully capture the essence of price discrimination, as differences in prices for what may appear to be the same product can often be justified by variations in underlying costs. In 1987, Stigler, as cited by Varian, gave an extended definition of price discrimination and added to Tirole's definition that these two or more similar goods '*are sold at prices that are in different ratios to marginal costs*.'[22] A similar

[16] See Simon Bishop 'Delivering Benefits to Consumers or Per Se Illegal? Assessing the Competitive Effects of Loyalty Rebates' in The Pros and Cons of Price Discrimination Swedish Competition Authority 2005, 65 See also OFT draft competition law guideline for consultation (414a) on Assessment of Conduct April 2004, [3.3] where it is states that price discrimination occurs frequently and in a wide range of industries, including industries where competition is effective.

[17] Economies of scale are an important factor in some industries when the cost of production decreases, over an appropriate range of output. When a firm wants to increase output to achieve lower costs, price discounts are a possible solution. See R Sherman, The economics of industry (Little, Brown 1973) 355.

[18] See 'Selective Price Cuts and Fidelity Rebates' (Economic Discussion Paper prepared by RBB Economics for the OFT, July 2005) 1.7; M Levine, 'Price Discrimination without Market Power' (2002) 19 Yale Journal of Regulation; Simon Bishop and Mike Walker, The economics of EC competition law (2th edn, Sweet & Maxwell 2010) 250.

[19] Levine (n 18) 5.

[20] Bishop and Walker (n 18) 250.

[21] Jean Tirole, Industrial organization (ch 3, MIT Press 1988);Dennis W Carlton and Jeffrey M Perloff, Modern Industrial Organization (4th edn, Addison-Wesley 2005)280, provided a similar definition.

[22] Hal Varian, 'Price discrimination' in Richard Schmalensee and Robert D Willig (eds), Handbook of industrial organization (vol 1, ch 10, Elsevier 1989) 598. A similar definition was given by Lars Stole, 'Price discrimination and competition' in Mark Armstrong and Robert Porter (eds), Handbook of industrial organization (vol 3, ch 34,

definition was set out by Bishop, who stated that '*price discrimination occurs when a product is sold to different consumers at different prices that do not reflect differences in the costs of supply*.'[23]

By charging higher prices to customers willing to pay more than customers who value the product less, a company could extract more profit than if it charged all customers with a uniform price. It can also lead to increased consumer surplus, where some consumers are able to access products or services at a lower price than under uniform pricing. In the latter case, price-sensitive customers (unwilling to pay the full price) will be deterred from purchasing, but through price differentiation, companies will maximize their profit while simultaneously catering to more customers. Thus, there is a transfer of surplus from consumers with a high willingness-to-pay, who are charged higher prices, to consumers with a low willingness-to-pay, who benefit from lower prices.[24] One of the key advantages of this form of price discrimination is that it allows firms to tailor prices to match consumers' willingness to pay while the latter, at the same time, get access to more products.

The majority of studies conducted by leading economists indicate that price discrimination is typically observed in markets where firms possess some degree of market power. [25] However, this market power should not be conflated with the concept of significant market power or dominance as defined under Article 102 TFEU. The theory suggests that while price discrimination occurs in markets with some level of market power, it is most prevalent in oligopolistic markets, where a few firms control a large portion of the market. [26] In contrast, economists argue that in perfectly competitive markets, where firms act as price takers, price discrimination cannot occur.[27] This is because under perfect competition equilibrium prices fall to marginal cost, so that there cannot be any price discrimination by definition. Thus, some market power, as it exists in any market under normal competitive conditions, is necessary for price discrimination to arise. Another area of consensus pertains to how discrimination can be segmented into three types of price discrimination, which will, be discussed in the next section.

Elsevier 2007) 2224 and Kathleen Carroll & Dennis Coates, Teaching Price Discrimination: Some Clarification, 66 S. ECON. J. 466, 468 (1999).

[23] Simon Bishop, 'Delivering benefits to consumers or per se illegal?: Assessing the competitive effects of loyalty rebates' in The pros and Cons of price discrimination, Swedish Competition Authority (2005) 65.

[24] OECD Report on Personalised pricing (n 10) 3.

[25] Tirole (n 21); Varian, 'Price discrimination' (n 22), Carlton and Perloff (n 21).

[26] Tirole (n 21) 152.

[27] Stole (n 22) 2224.

2.2 Types of price discrimination

Economists traditionally categorize price discrimination into three types: first-degree, second-degree, and third-degree price discrimination.[28] While all three forms share the goal of profit maximization through differential pricing strategies, algorithmic price discrimination aligns most closely with first and third-degree price discrimination. Therefore, this discussion will focus on these types.[29]

First-degree price discrimination, or perfect price discrimination, when a seller charges each consumer the maximum price they are willing to pay for a product.[30] his approach allows the seller to capture all consumer surplus and maximize profits by extracting incremental value from every transaction.[31] However, three conditions must be met for this to succeed. Firstly, the seller must have some degree of market power, otherwise won't be possible any consumer to be charged more than the competitive price.[32] Secondly, the customer should be restricted in reselling the product at a higher price to a higher valuation customer.[33] For example, arbitrage can be restricted if a company offers products with warranties that are only valid for the initial buyer, which means that if the product is resold, the new buyer may incur additional costs.[34] Thirdly, the seller must have complete knowledge of its customer's willingness to pay in order to charge those who are willing to pay more with the highest price than those who value the good less.[35] These stringent requirements make first-degree price discrimination difficult to achieve in practice.[36] However, the advent of AI-supported pricing, has brought the possibility of achieving first-

---

[28] Arthur Pigou, The economics of welfare (Routledge, 2017). 240

[29] Second-degree price discrimination includes more complicated pricing schemes that maximize the seller's profits through charging prices depending on the quantity that is sold, which means that the price fluctuated nonlinearly. Real-life examples would be a student traveller card, telecom subscriptions, etc. Another form of second-degree price discrimination is the so-called "tie-in sales" which involves selling one product on the condition that the customer also purchases another. By bundling products, a monopolist can extract more consumer surplus, increasing overall profit. While this practice can be seen as price discrimination, it may also serve non-discriminatory purposes such as enhancing efficiency or ensuring product quality.

[30] Carlton and Perloff (n 21) 299.

[31] Carlton and Perloff (n 21) 299-300.

[32] Kathleen Carroll & Dennis Coates, Teaching Price Discrimination: Some Clarification, 66 S. ECON. J. 466, 470-71 (1999); Lars A. Stole, Price Discrimination and Competition, in 3 Handbook of Industrial Organization 2221, 2226 (R. Schmalensee & R.D. Willig ed., 1989) (2007). Some scholars consider that price discrimination is also possible in competitive markets, see e.g. Jonathan Bake, 'Competitive Price Discrimination: The Ex e Price Discrimination: The Exercise of Market Power Without Anticompetitive Effects (Comment on Klein and Wiley)' (2003).

[33] Stole (n 22) 2226; Varian, 'Price discrimination' (n 21) 599; Carlton and Perloff (n 21) 294.

[34] Carlton and Perloff (n 21) 295-96.

[35] Stole (n 22) 2226.

[36] Bishop and Walker (n 18) 251

degree price discrimination closer to reality. Algorithms can analyze vast amounts of data to predict individual willingness to pay with increasing accuracy. By leveraging this capability, firms can implement more refined and personalized pricing strategies, moving closer to the theoretical ideal of first-degree price discrimination.

Third-degree price discrimination involves segmenting consumers based on observable characteristics like age or location and charging different prices accordingly.[37] By adjusting prices to match each segment's demand elasticity, firms can optimize revenue while potentially offering lower prices to more price-sensitive consumers. For instance, students or senior citizens may benefit from discounts based on their presumed financial vulnerability. This form of price discrimination is widely employed because it is both practical and profitable, allowing firms to optimize revenue while potentially improving access to goods or services for certain segments.[38] Algorithmic price discrimination can be viewed as a more granular extension of third-degree price discrimination. By using algorithms to analyze detailed consumer data, firms can create segments based on behavioral and transactional patterns, offering personalized pricing to their customers based on individual preferences and purchasing power.

In general, companies use price discrimination to maximize profits. These pricing schemes are widely employed in competitive markets and those with firms holding market power.[39] However, the effects of price discrimination can vary. Under certain conditions, it may enhance welfare by improving efficiency and reducing prices for some consumers, while in others, it may have adverse effects by exacerbating inequalities or reducing access to essential goods or services, which the next section will explore.

2.3 Welfare effect of price discrimination

The welfare effects of price discrimination have been extensively studied in the economic literature.[40] First-degree price discrimination, where a firm charges each consumer the maximum they are willing to pay, is theoretically considered

---

[37] Ibid.

[38] Marco Botta and Klaus Wiedemann, 'To Discriminate or Not to Discriminate? Personalised Pricing in Online Markets as Exploitative Abuse of Dominance' (2020) 50 European Journal of Law and Economics 381, 384.

[39] Damien Geradin and Nicolas Petit, 'Price discrimination under EC competition law' in The pros and cons of price discrimination, Swedish Competition Authority (2005) 24.

[40] See Richard Schmalensee, 'Output and welfare implications of monopolistic third-degree price discrimination' (1981) 71 (1) The American Economic Review 242; Hal Varian, 'Price discrimination and social welfare' (1985) 75 (4) The American Economic Review 870.

socially optimal in the sense of total welfare (but not necessarily for consumer welfare).[41] Carlton and Perloff argue that perfect price discrimination is efficient because it aligns market output with what would occur under perfect competition, thereby maximizing total surplus.[42] Second and third-degree price discrimination, however, are more nuanced, as their impact depends largely on how they influence market output. Studies in the past two decades have shown that price discrimination can increase consumer welfare if it leads to an overall increase in total sales.[43]

Third-degree price discrimination, which segments consumers based on observable characteristics such as age or location, can be welfare-enhancing if total market output increases compared to non-discriminatory pricing. [44] However, if output decreases, it reduces both consumer surplus and firm profits. The literature emphasizes that in imperfectly competitive markets, the welfare effect of third-degree price discrimination is ambiguous, and it can reduce consumer surplus and profit if the total output is unchanged decreases.[45] Thus, each case must be evaluated individually to determine whether it enhances or reduces welfare, which is extremely difficult because of the difficulties of evaluating the properties of demand in any real-case scenario.[46]

Overall, the effects of different forms of price discrimination depend on the seller's ability to obtain and utilize information about the buyer. At the same time, the forms of price discrimination differ in terms of the type and depth of customer information required.[47] With the rise of digitalization, the boundaries between these forms of price discrimination are becoming increasingly blurred, making their welfare effects more complex.[48] This evolution will make it increasingly

---

[41] Mark Armstrong, 'Recent developments in the economics of price discrimination (2006) 97..

[42] Carlton and Perloff (n 21) 308.

[43] See Richard Schmalensee, 'Output and welfare implications of monopolistic third-degree price discrimination' (1981) 71 (1) The American Economic Review 242; Hal Varian, 'Price discrimination and social welfare' (1985) 75 (4) The American Economic Review 870. They established their result in the case of constant marginal costs.

[44] M. Motta, Competition Policy, Theory and Practice (Cambridge University Press 2004) 496.

[45] M Schwartz, 'Third-degree price discrimination and output: generalizing a welfare result' (1990) 80 (5) The American Economic Review 1259; Schmalensee (n 65) 242-47; Varian (n 65) 870-75; Tirole, Industrial organization (n 7) ch 3

[46] Carlton and Perloff (n 6) 307

[47] Akiva Miller, 'What do we worry about when we worry about price discrimination-the law and ethics of using personal information for pricing' 19 (2014) J. Tech. L. & Pol'y, 41.

[48] S. Merler, 'Big data and first-degree price discrimination', Bruegel blog, 20 February 2017, available at http://bruegel.org/2017/02/big-data-and-first degree-price-

important to understand how AI-driven pricing strategies influence market efficiency and consumer welfare. While these strategies can potentially improve market efficiency by optimizing pricing and expanding output, they raise significant concerns about fairness, transparency, and consumer harm. Despite their growing relevance, empirical studies on the effects of algorithmic price discrimination in digital markets remain limited.[49] To address these gaps, the next section examines how algorithmic pricing transforms the pricing landscape by enabling personalized price discrimination and considers how consumers perceive and react to these practices.

III. Algorithmic Pricing: A Paradigm Shift to personalized price discrimination

3.1 Achieving Personalised Price Discrimination

The overview of the economic theory of price discrimination in section two reveals that first-degree price discrimination or perfect price discrimination is impossible in practice as companies don't have enough information about each customer to differentiate the price.[50] However, over the past decade, the use of digital technologies and the utilization of big data have significantly changed traditional approaches to pricing.[51] Alongside conventional personal information like gender, age, and educational attainment, online platforms can now collect and analyze additional data that can be used to predict and even influence and modify consumer behavior and set up design personalized pricing according to a wide range of consumer characteristics.[52] This includes data on past online transactions,[53] geographic location,[54] browsing history,[55] all of which are

discrimination/ and M. Bourreau, A. De Streel and I. Graef, Big Data and Competition Policy: Market power, personalised pricing and advertising, CERRE Project Report, 16 February 2017, p. 41-45.

[49] Qian Li and Niels Philipsen, 'Assessment of AI-enabled Price Discrimination under Competition Law in China' in Digital Platforms Competition Law and Regulation: Comparative Perspective (Hart Publishing, 2024) 203-220.

[50] Geradin and Petit (n 39).

[51] According to OECD, Executive Summary of the Competition Committee Roundtable on Big Data (2016b, p2) '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.'

[52] Pascale Chapdelaine, 'Algorithmic Personalized Pricing' NYUJL & Bus. 17 (2020), p 10.

[53] Stephanie Clifford, Shopper Alert: Price May Drop for You Alone, N.Y. TIMES (Aug. 10, 2012).

[54] Valentino-Devries, Jennifer, Jeremy Singer-Vine, and Ashkan Soltani. 'Websites vary prices, deals based on users' information' Wall Street Journal 10 (2012): 60-68 who claim that identifying the location of online shoppers, stores can offer higher prices to customers who live far from their competitors' stores.

[55] Dana Mattioli, 'On Orbitz, Mac users steered to pricier hotels' Wall Street Journal 23 (2012): 2012. Contrast with Jakub Mikians et al., Detecting Price and Search

routinely gathered from users directly, through cookies, or acquired from third-party data vendors. Modern algorithms have the capacity to analyse vast volumes of data, constructing detailed profiles of individual consumers.[56] Through techniques like data mining, online platforms can analyse pieces of information to develop comprehensive consumer profiles, enabling them to predict and influence consumer behaviour and reactions to changes in price or special deals online.[57] Using this information, platforms can tailor advertisements to specific consumers known as targeted advertising. They also can adjust prices in response to real-time demand fluctuations, known as dynamic pricing, or incentivize purchases through personalized discounts or special offers not available to other customers.[58]

These practices, allowing sellers to adjust prices has emerged as a natural consequence of the extensive personal data collected by online retailers and the capabilities afforded by algorithms and data mining techniques. It has been several years since the literature started to recognise how price discrimination on online platforms is possible.[59] However, the extent to which personalized pricing is used in real markets remains unknown.[60]

Discrimination on the Internet, (2012) Proceedings of the 11th ACM Workshop on Hot Topics in Networks 79, who disputes the occurrence of browser-based price discrimination and only finds limited evidence of search discrimination.

[56] Viktor Mayer-Schonberger and Kenneth Cukier, Big Data: A Revolution That Will Transform How We Live, Work, and Think (Houghton Mifflin Harcourt 2013) 123; Gregory E Smith and Michael S Rimler, 'Will You Be Mined? Ethical Considerations of Opt-In Loyalty Programs and Price Discrimination' (2009) 10 Issues in Information Systems 204, 208.

[57] Alexander Furnas, 'Everything you wanted to know about data mining but were afraid to ask'(2012)The Atlantic 13.

[58] It is essential to differentiate AI-enabled price discrimination from dynamic pricing, as the latter (which is outside the scope of this paper) adjusts prices based on real-time fluctuations in demand and supply without targeting specific consumer groups or engaging in discriminatory practices. An example could be Uber charging different prices depending on the demand in a particular geographic area or the recent investigation by the CMA regarding online ticket sales, https://www.gov.uk/cma-cases/ticketmaster-consumer-protection-case). In that regards see e.g. OECD, 'Personalised Pricing in the Digital Era: Background Note by the Secretariat', DAF/COMP (2018) p 9 and Inge Graef, 'Consumer Sovereignty and Competition Law: From Personalization to Diversity', 58 (2021) COMMON MARKET L. REV. 471.

[59] See for example, Consumer Experience in the Retail Renaissance: How Leading Brands Build a Bedrock with Data, (2018) Deloitte Digital and European Commission, Consumer Market Study on Online Market Segmentation through Personalized Pricing/Offers in the European Union: Request for Specific Services 2016 85 02 for the Implementation of Framework Contract, EAHC/2013/CP/04 Final Report, (2018) <https://commission.europa.eu/publications/consumer-market-study-online-market-segmentation-through-personalised-pricingoffers-european-union_en > accessed 27 January 2025.

[60] See e.g. Axel Gautier, Ashwin Ittoo, and Pieter Van Cleynenbreugel, 'AI algorithms, price discrimination and collusion: a technological, economic and legal perspective' European Journal of Law and Economics 50, no. 3 (2020): 405-435. Their study analysed experimental assessment of price discrimination and identified a gap between the theory (models proposed in research) and real-life practice of algorithmic pricing. See also OECD 2018, p 5.

Although a series of scientific papers have shown that personalized pricing can lead to significant profit increases, these experimental studies showed no strong evidence that firms actually implement personalized price discrimination in practice.[61] Moreover, these studies highlight that while algorithms enable online platforms to combine various forms of personalization and segment consumers based on observable characteristics or usage patterns, they remain unable to accurately determine individual willingness to pay.[62]

As a result, algorithmic pricing predominantly operates within the framework of third-degree price discrimination. First-degree price discrimination, though often referenced as an idealized concept, remains unattainable in practice due to the inherent limitations of data collection and analysis. Some studies even suggests that '*the extent to which personalised pricing is generally happening in real markets still remains largely unknown*.'[63] The lack of conclusive evidence about the existence of personalised price discrimination is not surprising. Detecting algorithmic personalized pricing poses significant challenges and more importantly, as explored in the section discussing the traditional economic theory of price discrimination above, there are three conditions for personalized pricing to exist. However, the advancement of AI algorithms requires a re-evaluation of traditional economic frameworks surrounding price discrimination. As outlined in section two, personalized price discrimination becomes possible when three conditions are met: Firstly, the seller must have some degree of market power, otherwise it won't be possible any consumer to be charged more than the competitive price.[64] Secondly, the customer should be restricted in reselling the product at a higher price to a higher

---

[61] European Commission, 'Consumer Market Study on Online Market Segmentation Through Personalised Pricing/Offers in the European Union' (2016); Frederik Zuiderveen Borgesius & Joost Poort, Online Price Discrimination and EU Data Privacy Law, 40 J. CONSUMER POL'Y 347 (2017). OECD Report 2018 (n. 10), p 14-16; Gerhard Wagner & Horst Eidenmuller, 'Down by Algorithms? Siphoning Rents, Exploiting Biases, and Shaping Preferences: Regulating the Dark Side of Personalized Transactions, 86 U. CHI. L. REV. 581 (2019); Axel Gautier, Ashwin Ittoo, and Pieter Van Cleynenbreugel, 'AI algorithms, price discrimination and collusion: a technological, economic and legal perspective' European Journal of Law and Economics 50, no. 3 (2020): 405-435.

[62] Ezrachi and Stucke 2016 (n 4).

[63] OECD Report 2018, (n 10) page 5; A summary of the empirical evidence regarding the existence of first-degree personalised pricing is in online markets can be found at the study 'Personalised Pricing' requested by the IMCCO Committee and conducted by Peter ROTT, Joanna STRYCHARZ, Frank ALLEWELDT PE 734.008 - November 2022, available at https://www.europarl.europa.eu/RegData/etudes/STUD/2022/734008/IPOL_STU(2022)734008_EN.pdf> accessed 7 March 2024.

[64] Kathleen Carroll & Dennis Coates, 'Teaching Price Discrimination: Some Clarification,' 66 S. ECON. J. 466, 470-71 (1999); Lars A. Stole, Price Discrimination and Competition, in 3 Handbook of Industrial Organization 2221, 2226 (R. Schmalensee & R.D. Willig ed., 1989).

valuation customer.[65] Thirdly, the seller must have complete knowledge of its customers willingness to pay in order to charge those that are willing to pay more with the highest price than those who value the good less. A recent study[66] re-evaluated these conditions in light of the current development of digital markets, collection of personal data, and algorithms and concluded that: (1) large platforms expanding their marker power due to economies of scale, network effects and tipping (the first condition fulfilled);[67] (2) As prices become more complex, it's harder for buyers to find competitive alternatives, which might reduce arbitrage opportunities (second condition fulfilled); and (3) the quality of analytics that can predict consumers behaviour is improving, which means that sellers have more accurate information about their customers and can adjust the price of the product accordingly (the third condition fulfilled).

While these developments lay the technical groundwork for personalized price discrimination, they overlook a critical and often underexplored factor: consumers' perceptions of fairness. This dimension is essential because personalized pricing strategies rely not only on technical feasibility but also on consumer acceptance. If consumers perceive such practices as unfair, they may resist or even penalize companies, undermining the effectiveness of these strategies. Let's now focus on how consumers' views of fairness impact the implementation of personalized pricing strategies.

3.2 Algorithmic price discrimination and consumers' perception of fairness

Consumers' views of fairness introduce a novel and crucial perspective into discussing personalized pricing. While fairness has traditionally been rejected by economists as a concept due to its subjective nature and lack of a general definition, evidence suggests that fairness considerations significantly influence consumer preferences and decision-making.[68] This challenges

[65] Stole (n 21) 2226; Varian, 'Price discrimination' (n 22) 599; Carlton and Perloff (n 21) 294.

[66] Pascale Chapdelaine, 'Algorithmic Personalized Pricing' NYUJL & Bus. 17 (2020), pp 12-18.

[67] For evaluation of dominance in digital markets see W Sauter, 'A duty of care to prevent online exploitation of consumers? Digital dominance and special responsibility in EU competition law' [2020] 8(2) Journal of Antitrust Enforcement 406-427 and J Crémer and others, 'Competition Policy for Digital Era' [2019] Brussels: European Commission <https://op.europa.eu/en/publication-detail/-/publication/21dc175c-7b76-11e9-9f05-01aa75ed71a1/language-en > accessed 29 March 2024.

[68] Daniel Kahneman, Jack L Knetsch and Richard H Thaler, 'Fairness and the Assumptions of Economics' (1986) Journal of Business S285-S300. More recent study explores the understanding of fairness, see S Frerichs 'The origins of fairness in economic experiments: how evolutionary behavioural economics makes a case for doux commerce' 29(4) (2023). New Political Economy, 495.

the normative view that fairness has no place in economic analysis. In reality, fairness concerns are part of consumers' preferences and must, therefore, be included in the assessment of consumer welfare.

Price discrimination based on specific consumer characteristics is generally considered fair when the parameters used to set different prices are transparent and easily understood.[69] However, algorithms in the digital markets can process complex data patterns to set up different prices for different categories of consumers based on their personal characteristics and willingness to pay, as outlined above. Because consumers are not aware of the parameters taken into consideration when setting up the prices, they might consider these prices unfair even if the charged price might maximise the consumer's welfare.[70] If consumers consider a price unfair, this directly impacts consumer choices.

From this perspective price discrimination may raise concerns about fairness, because it leads to differential treatment that cannot be objectively justified from the customer's perspective. This perception of unfairness is critical because it directly affects consumer welfare by influencing consumer choices, reducing trust in the market, and creating psychological discomfort that diminishes the overall value of transactions. For example, consumers tend to react negatively to pricing practices that lack an understandable or objective justification. This aligns with evidence from behavioural economics and cognitive science, which shows that consumers have overwhelmingly negative attitudes toward price discrimination when they perceive it as unfair. The Amazon case illustrates this well: in 2000, Amazon experimented with price discrimination by charging different prices for the same DVDs based on customers' purchasing behaviour. When consumers discovered that the company was using data from their purchasing behaviour to charge different prices for online DVD sales, it led to the public's negative reaction [71] This negative reaction highlighted strong consumer resistance to opaque personalized pricing strategies.

Behavioural economists and cognitive scientists have studied consumers perceptions of fairness and concluded that in general,

---

[69] See e.g. Christopher Townley, Eric Morrison, and Karen Yeung, 'Big Data and Personalized Price Discrimination in EU Competition Law' (2017) 36 Yearbook of European Law 683.

[70] MarcoBotta and Klaus Wiedemann,. 'To discriminate or not to discriminate? Personalised pricing in online markets as exploitative abuse of dominance' 50 (2020) European Journal of Law and Economics 381.

[71] David Streitfeld, 'On the Web, Price Tags Blur', WASH. POST, Sept. 27, 2000, at A01; BBC News, 2000

consumers have very negative attitude towards different forms of price discrimination because they perceive them as unfair.[72]

For example, if consumers find out that they paid more than others, they will not buy again from the same supplier.[73] Some empirical studies report that consumers exhibit a greater acceptance of price discrimination if more transparency is associated with personalized pricing.[74] Another empirical study analysing consumers' response towards personalised pricing strategies in online marketing revealed that consumers are concerned about sharing their data with the sellers.[75] Recent studies, show that algorithmic pricing creates feelings of betrayal, reduces perceived fairness, and damages consumer trust.[76] These findings are consistent across studies, which show that consumers not only dislike personalized pricing but also fear sharing personal data with sellers, given the potential for misuse. The empirical evidence shows that consumers perceive certain pricing practices as unfair, and this perception impacts their welfare. Based on this evidence, some authors have suggested that in digital markets, many firms will refrain from employing personalized pricing even where it is technically possible because they are concerned about potential damage to their brand reputation and loss of consumer trust.[77] However, as outlined above, this mechanism fails when a dominant firm engages in algorithmic price discrimination. Under such conditions, consumers lack meaningful alternatives. This is where algorithmic price discrimination transitions from a competitive strategy to a practice that impacts consumer welfare.

---

[72] Lan Xia et al., 'The Price is Unfair! A Conceptual Framework of Price Fairness Perceptions', 68 J. MKTG. 1, 1 (2004); Daniel Kahneman et al., 'Fairness as a Constraint on Profit Seeking: Entitlements in the Market', 76 AM. ECON. REv. 728, 729-30 (1986); Kelly L. Haws & William 0. Bearden, Dynamic Pricing and Consumer Fairness Perceptions, 33 J. CONSUMER RES. 304, 307-09 (2006); Poort, Joost, and Frederik J. Zuiderveen Borgesius, 'Does everyone have a price? Understanding people's attitude towards online and offline price discrimination' (2019) 8(1) Internet Policy Review.

[73] Malc, D., Mumel, D., & Pisnik, A. 'Exploring price fairness perceptions and their infuence on consumer behavior' (2016) 69(9) Journal of Business Research, 3693–3697; M Maggiolino, 'Personalized prices in European competition law' (2017) Bocconi Legal Studies Research Paper No. 2984840, p. 12.

[74] Richards, T. J., Liaukonyte, J., & N Streletskaya, 'Personalized pricing and price fairness, (2016) 44 International Journal of Industrial Organization 138.

[75] Victor, V., Nathan, R.J. and M Fekete-Farkas, 'Consumer response towards personalised pricing strategies in online marketing' (2021) 15(2/3) Int. J. Technology Marketing, 223.

[76] See, Zhiyan Wu , Yuan Yang, Jiahui Zhao, and Youqing Wu. 'The impact of algorithmic price discrimination on consumers' perceived betrayal.' 13 (2022): Frontiers in Psychology 825.

[77] A Leibbrandt, 'Behavioral Constraints on Pricing: Experimental Evidence on Price Discrimination and Customer Antagonism' (2016) CESifo Working Paper No. 6214; Jakub Mikians et al., 'Detecting Price and Search Discrimination on the Internet' (2012) Proceedings of the 11th ACM Workshop on Hot Topics in Networks 79.

IV. Price Discrimination under Article 102 TFEU

Article 102 TFEU addresses abusive actions, and this section will explore its availability against (abusive) price discrimination and if we can creditably rely on this to police against (unfair) algorithmic (personal) pricing. While Article 102(c) TFEU specifically refers to discrimination as potentially abusive, case law has never been particularly clear in setting up principles for submitting actions under Article 102(c) TFEU. Most cases involving discrimination, including classics such as *Hoffmann-La Roche,*[78] *Michelin I,*[79] and *Post Danmark I,*[80] appears more exclusionary than discriminatory and more akin to an Article 102 (b) TFEU infringement than Article 102(c) TFEU. Section IV will be devoted to clearing key concepts and closing some ambiguities, while Section V will contemplate the availability of Article 102 TFEU against perfect price discrimination in more detail.

4.1 Lack of consistency between economic and legal theory

As outlined earlier, economic theory refers to first-, second-, and third-degree price discriminations, but neither case law nor the antitrust literature have relied upon these. Academic literature has instead presented two other concepts that are easier to apply to Article 102,[81] relying on the effect and segmenting between:

a) *Primary-line price discrimination,* directed at excluding competitors, e.g., by offering discounts to customers who commit to buying exclusively from the dominant undertaking, and in this, discriminating between loyal and non-loyal buyers, similar to the mechanism used in fidelity rebates. In this way, price discrimination not only distorts competition among downstream customers (who do not compete directly with the dominant firm) but may also lead to the foreclosure of its direct rivals if the discriminatory practices induce artificial loyalty. *Primary-line price discrimination* may, therefore, be viewed as exclusionary abuse, as it facilitates market foreclosure in the dominated market.

b) *Secondary-line price discrimination,* focusing on the harm caused in the downstream market. If the customers are final consumers, the harm can involve exploitation of these by extracting more or all of the consumer surplus. If the

[78] Case C-85/76 -Hoffmann-La Roche, ECLI:EU:C:1979:36, paras 80 and 90.
[79] Case C-322/81 – Michelin I, ECLI:EU:C:1983:313, paras 71-74.
[80] Case C-209/10 Post Danmark v. Konkurrencerådet, ECLI:EU:C:2012:172, para 30.
[81] This does not make them universally accepted in Competition Law. The Court of Justice, does, e.g., in Case C-209/10 Post Danmark v. Konkurrencerådet, ECLI:EU:C:2012:172, para 8 appears uneasy about the two concepts. The same reservations are expressed in CW/01122/01/14 Discriminatory pricing in relation to the supply of bulk mail delivery services in the UK, Ofcom 14 August 2018, p. 129.

customers are intermediaries, including downstream competitors, price discrimination could place them at a competitive disadvantage vis-vis the dominant undertakings' downstream activities or other customers not subject to the discrimination. Depending on the effect, *secondary-line price discrimination* may be viewed as exclusionary or exploitive abuse in the non-dominated market.

The distinction between primary and secondary-line price discrimination provides a helpful framework for understanding the confusion case law when it comes to Article 102(c) TFEU. Theoretically, primary-line price discrimination aligns with exclusionary abuses under Article 102(b) TFEU. In contrast, secondary-line price discrimination falls more squarely under Article 102(c) TFEU as it focuses on the competitive disadvantage inflicted upon trading partners in the downstream market. Interestingly, both take issues with the exclusionary effects of the abusive actions and only to a more limited extent with any exploitive element, perhaps accounting for why case law tends to center on the former.

4.2 Providing content to the notion of discrimination under Article 102

While case law is rich in examples of discriminatory practice infringing Article 102 TFEU, this mostly pertains to examples of exclusion.[82] Usually, direct competitors (primary-line price discrimination), but occasionally, some competing downstream vis-vis the dominant undertakings subsidiary of the internal division (secondary-line price discrimination).[83] In contrast, case law offers almost no examples where the victim is a downstream customer not engaged in activities competing with the dominant undertaking. A rare exception to this can be found in *MEO*[84] (2018), where the Court of Justice was consulted on a national case where a Portuguese TV provider felt victimized by the national copyright collecting society when this had offered a competitor a more favorable tariff. Unfortunately, rather than clearing up the ambiguities, the Court confined itself to two observations.

First, that the non-vertically integrated company usually lacked interest in thwarting competition downstream (or upstream), and second, that differential treatment would only be abusive if able to distort competition considering all the relevant circumstances. While the first provided an account for the limited case law, the

[82] For further see, e.g. Geradin and Petit (n 39).
[83] See, e.g., Case T-229/94 - Deutsche Bahn AG, ECLI:EU:T:1997:155, para 93 for a case where the discrimination had been directed at foreclosing the downstream market.
[84] Case C-525/16 - Meo, ECLI:EU:C:2018:270, paras 30-37.

latter confirmed the availability of Article 102 TFEU in the unlikely event this should be relevant. Moreover, only discriminatory actions that, considering all relevant circumstances, have anti-competitive effects qualify as abusive, making it insufficient that different terms are offered.

4.2.1. The Whistl Decision – Adding more confusion

An attempt to apply *MEO* and Article 102 to discriminatory abuses was made by the UK telecommunications regulator, Ofcom, in *Whistl/Royal Mail*[85] (2018). Under UK law, third parties, like Whistl, were granted access to Royal Mail's network, allowing them to rely on this for distribution in areas not covered by their own network. In an attempt to hamper Whistl's ability to compete in the market for mail distribution, Royal Mail adjusted the access prices in a manner beneficial to its own distribution activities. Relying on *MEO*, Ofcom concluded that Royal Mail's price discrimination was abusive, infringing Article 102, as it disadvantaged Whistl vis-vis Royal Mail. However, Ofcom appears to have conflated the primary-line and secondary-line discrimination concepts when relying on *MEO* to condemn what must be understood as discrimination directed at foreclosing a competitor.[86] While correctly identifying the action as distortive discrimination, *MEO* pertained to abusive action deployed by the non-vertically integrated operator, making it "incorrect" to rely on the specific case.

4.2.2. BdKEP/Deutsche Post AG – Defines the content of Article 102(c) TFEU

Regardless of case law, being rich in examples of discriminatory abuses, the most recent attempt (*MEO*) to apply Article 102 to the practices of a non-vertically integrated operator did not provide much clarity.[87] Neither has attempts at translating it to discriminatory abuses (*Whistl/Royal Mail)* been successful, as Ofcom appears to have conflated the concepts. Revisiting EU case law, the European Commission has on one occasion

[85] CW/01122/01/14 Discriminatory pricing in relation to the supply of bulk mail delivery services in the UK, Ofcom 14 August 2018. Confirmed on appeals as Royal Mail Group Ltd v Office of Communications [2019] CAT 27 and Royal Mail Group Ltd v Office of Communications [2021] EWCA Civ 117.

[86] Perhaps explaining why the case has been referred to as a "hybrid". See, e.g., Sam MacMahon Baldwin 'A primary & secondary line 'hybrid'? Royal Mail case reopens legal framework for abusive price discrimination' Kluwer Competition Law Blog, November 2018.

[87] Another missed opportunity to clear up the ambiguities is Commission Decisions AT.40462 - Amazon Marketplace, and AT.40703 – Amazon Buy Box, where the European Commission opted for an early commitment solution. For an outline of the case, see Christian Bergqvist 'Amazon Buy Box – Another Secret Jewel on Discrimination' Kluwer Competition Law Blog, March 2023.

provided content to Article 102(c) TFEU when in *BdKEP/Deutsche Post AG,*[88] (2004), explaining how:

> " *The wording* [of Article 102 TFEU] *covers three types of discrimination, the first two of them exclusionary and the last one exploitative: (i) the customer of the dominant firm is placed at a competitive disadvantage vis-à-vis the dominant firm itself; (ii) about other customers of the dominant firm; or (iii) the customer suffers commercially in such a way that its ability to compete in whatever market is impaired. It is obvious that types (i) and (iii) do not require a competitive relationship between the two comparator groups."*

Combined with other cases, in particular, *MEO,*[89] it becomes apparent that Article 102(c) TFEU covers not only three forms of abuse, of which two are exclusionary and one exploitive but also how these can be described more precisely as:[90]

a) *Horizontal (exclusionary) discrimination* initiated to foreclose competitors by targeting actual or potential customers with selective price reductions or other favors. Moreover, this includes foreclosure of upstream and downstream markets by preferential treatment of subsidiaries and internal departments of the vertically integrated company. The foreclosure might be vertical, but because the victim is a direct competitor (upstream or downstream), the foreclosure remains horizontal. This covers both primary- and secondary-line discrimination, and in terms of operative tests, it falls under classic foreclosure cases such as *Hoffmann-La Roche,*[91] *Michelin I,*[92] and *Post Danmark I.*[93]

b) *Vertical (exclusionary) discrimination* initiated to twist competition in other markets, e.g., for the benefit of a preferred trading partner (but not a subsidiary or internal department). While also directed upstream or downstream, the potential abuser has no direct interest in the foreclosure as it remains inactive in any affected market, making the foreclosure (truly) vertical. This covers secondary-line discrimination if initiated by a non-vertically integrated operator, and in terms of the operative test, it falls under *MEO*.

---

[88] Commission Decision COMP/38.745 - BdKEP/Deutsche Post AG, recital 93.

[89] Case C-525/16 – MEO, ECLI:EU:C:2018:270. See, also AG Wahl Opinion in Case C-525/16 - Meo, ECLI:EU:C:2017:1020, para 109.

[90] For further on discrimination under Article 102 TFEU, see Christian Bergqvist 'Discriminatory Abuse – The Missing Link in the More Effect Based Approach' 40 (3) (2019) ECLR No .

[91] Case C-85/76 Hoffmann-La Roche, ECLI:EU:C:1979:36, paras 80 and 90.

[92] Case C-322/81 Michelin I, ECLI:EU:C:1983:313, paras 71-74.

[93] Case C-209/10 Post Danmark v. Konkurrencerådet, ECLI:EU:C:2012:172, para 30.

c) *Exploitative discrimination* that, in practice,[94] has involved national-based discrimination, but it could also be applied against perfect (individualized) pricing as that minimizes consumer welfare and thus is exploitative. This also means that it fits poorly under the notion of discrimination in Article 102(c) TEFEU, making it more akin to exploitation under Article 102(a) TFEU and the operative test for identifying this.

Accepting horizontal and vertical discrimination as different forms of exclusionary abuse and how the economic concepts of secondary-line discrimination can fall under both, more clarity emerges. It also daunts how the matter of AI-promoted (perfect) price discrimination should be evaluated under exploitative discrimination, or just exploitative abuse, and legally have little to do with discrimination.

V. Exploitive Pricing under Article 102 TFEU

From Section IV, it emerges that the ability to submit perfect price discrimination under Article 102 TFEU hinges on the scope and reach of the notion of exploitative price discrimination or just exploitative abuse. Moreover, Article 102(a) TFEU would probably be a better fit than Article 102(c) TFEU, but case law has always been relaxed regarding the exact submission, making this immaterial. Before contemplating the ability to submit perfect price discrimination under Article 102 TFEU, the matter of exploitative abuse under Article 102(a) TFEU needs to be developed.

5.1. Assessing Exploitative Practices under Article 102 TFEU[95]

Article 102(a) TFEU prohibits dominant firms from "*directly or indirectly imposing unfair purchase or selling prices….,*' which is usually understood as prices that significantly exceed what would prevail under competitive conditions. In contrast to exclusionary abuse, the consumer endures a direct loss when compelled to pay a premium for goods or services or only can secure these under unfavorable terms. However, drawing a clear line between acceptable conduct and exploitative abuse can be challenging, as dominant firms are generally entitled to exploit

[94] The cases referred to in Commission Decision COMP/38.745 - BdKEP/Deutsche Post AG, recital 95 all involve national-based discrimination, indicating this as the European Commission's most eminent concern.

[95] Some parts of this section are based on one of the author's previously published research; see, in general, M. Marinova 'Unmasking Excessive Pricing: Evolution of EU Law on Excessive Pricing from United Brands to Aspen' 20 (2) (2024) European Competition Journal, 315.

their market position to some degree.[96] The key is whether the conduct goes beyond normal competition and causes significant harm to customers.

5.1.1 Case law has given rise to a two-pronged test

In practice, the enforcement of excessive pricing cases has been (very) limited,[97] probably due to the high burden of proof and the risk of discouraging investment and innovation (known as "type I errors"). According to *United Brand,*[98] a price is considered excessive if (i) the difference between the cost incurred and the price charged for a product or service is found to be excessive, and (ii) the price is unfair in itself or when compared with competing products. From this emerges a two-pronged test, where the first limp involves assessing if the price is *excessive* and the second limp if the price is *unfair*, but applying this is difficult in practice, and the case law shows a great deal of inconsistency.

In *Port of Helsingborg,*[99] the European Commission only relied on a price-cost analysis ((United Brand, 1st limb)) to rebut the prices for port services as excessive. It even recognized the difficulties in establishing the precise level of the costs, profits, and equity attributable to the ferry operations. In *Deutsche Post*,[100] the European Commission decided that the price-cost test was not applicable due to the lack of reliable data. Instead, it compared Deutsche Post's prices for a cross-border tariff with its domestic tariffs (United Brand, 2nd limb) and, against this, identified an abuse. In *SACEM,*[101] the Court of Justice rebutted a price-cost test and compared prices across countries (United Brand, 2nd limb). Lately, in *Aspen*,[102] the European Commission deployed a hybrid, evaluated Aspen's profitability before and after the price increase, and then compared Aspen's profitability with a sample of other undertakings selling similar products and with a similar business profile. As evident from these cases, benchmarks can be used as part of the test or an alternative test if price-cost tests are unfeasible or inconclusive.

---

[96] Deborah Healey, 'Abuse of dominance' Global Dictionary of Competition Law, Concurrences, Art. N° 20101, Abuse of dominant position.

[97] See, e.g. Case 26/75 General Motors v Commission ECLI:EU:C:1975:15; Case C-27/76 United Brands v Commission ECLI:EU:C:1978:22; Case C-30/87 Corinne Bodson v Pompes Funebres ECLI:EU:C:1988:225; Case C-110/88 Lucazeau v SACEM ECLI:EU:C:1989:326. See also Commission Decisions COMP/C-1/36.915 British Post office v Deutche Post AG, OJ 2001 L331/40 and COMP/A 36.568/D3 Scandlines Sverige AB v. Port of Helsingborg.

[98] Case 27/76 United Brands v Commission ECLI:EU:C:1978:22, paras 250-252.

[99] Commission Decision COMP/A 36.568/D3 Scandlines Sverige AB v. Port of Helsingborg, recital 139 and 156.

[100] Commission Decision COMP/C-1/36.915 British Post office v Deutche Post AG [2001] OJ L331/40, recital 159-167.

[101] Case C-110/88 Lucazeau v SACEM, ECLI:EU:C:1989:326, paras 22-30.

[102] Commission Decision Case AT.40.394 – Aspen, recitals 104 and 140.

5.1.2 Implementing United Brand has proven challenging

Regardless of providing content to Article 102(a) TFEU, applying *United Brand*, in practice, has not been without challenges. Further to suggesting[103] the prices as unfair in itself or when compared with competing products, the Court also referred to the availability of other methods and considerations on the notion of unfairness, if relevant. The former has given ground for a broad spectrum of benchmarks,[104] as already suggested, and the latter for contemplating, among other things, if non-cost-based considerations can be included. In *Port of Helsingborg*[105] the European Commission pondered what to include in "the economic value" of the rendered services (port access) by stating that:

> "*the economic value of the product/service cannot simply be determined by adding to the costs incurred in the provision of this product/service a profit margin which would be a pre-determined percentage of the production costs..*'

This is significant and of direct relevance for the matter of personal pricing, by accepting that the economic value of the product/services is more than the production costs plus a profit margin. Non-cost-related factors such as consumer preferences could and should be included. In this specific case, how the port was located close to the rail- and road networks and where the sailing distance between Denmark and Sweden was the shortest. Factors held in premium by users and presumably influencing their willingness to pay.[106] Revisiting *United Brand,*[107] the same consideration can be seen as the Court of Justice accepted differences in levied prices due to cost differences and "… *the density of competition…".* This suggests that it is insufficient that customers are treated differently, aka discriminated, and that non-cost related factors can be considered when considering the value of a product or service.

5.2. Case law allows for the inclusion of non-economic consideration

Against the abovementioned cases, it must be concluded that while various tests may be used to evaluate allegedly unfair and exploitive prices under Article 102 TFEU, relying on the cost-plus test alone is insufficient. Other tests and benchmarks may include comparisons with prices charged in other markets by the

[103] Case 27/76 United Brands v Commission ECLI:EU:C:1978:22, paras 250-253.
[104] Richard Whish & David Bailey, Competition Law (Oxford, 11 edition, 2024) 815.
[105] Commission Decision COMP/A 36.568/D3 Scandlines Sverige AB v. Port of Helsingborg, recitals 221-232.
[106] Commission Decision COMP/A 36.568/D3 Scandlines Sverige AB v. Port of Helsingborg, recitals 234-235.
[107] Case 27/76 United Brands v Commission ECLI:EU:C:1978:22, para 228.

dominant undertakings,[108] or by competitors,[109] and enforcers must be assumed to be afforded a broad margin, provided the results appear robust.[110] Additionally, the "*in itself*" test and the "*competing products*" test are not cumulative conditions but rather separate measures of unfairness as they actually address the same question, namely whether the price is excessive in relation to the economic value of the product/service.[111]

In evaluating if a price is excessive and unfair under Article 102 TFEU, prominence must be given to its relationship with the economic value. In the latter, non-cost-related factors, such as consumer preferences and willingness to pay a premium, must be included. This has relevance for personalized price discrimination, where the price differentiation is unrelated to material improvements of the products or other cost-related justifications. Instead, it mostly reflects consumer preferences and subjective perceptions, making them willing to pay a premium. A most pivotal observation, as it refutes, prices that are capitalizing on (some) customers' ability to pay a premium as abusive per se.

The inclusion of non-economic considerations was more clearly embraced by the General Court in *Deutsche Bahn*,[112] considering, but ultimately rebutting, that the observed differences in terms and prices could be attributed to the downstream competition density. The same conclusion emerges from *Scandlines Sverige AB v Port of Helsingborg*[113] accepting that demand-related conditions could explain (and justify) price differences. Granted, none of these cases dealt directly with exploitive or perfect price discrimination, and the European Commission has[114] reserved the right to intervene against discrimination directed at customers' willingness to pay.

5.4. European Commission positions comport badly with case law, or does it?

---

[108] Case 27/76 United Brands v Commission ECLI:EU:C:1978:22, paras 260-264. See also Case C-395/87 – Tournier, para 38.
[109] Case 27/76 United Brands v Commission ECLI:EU:C:1978:22, para 266. See also Case C-24/97 – Parke David, ECLI:EU:C:1998:184, and Case C-53/87 – Renault, ECLI:EU:C:1988:472, paras 16-17.
[110] Case C-177/16 – Akka/LAA vs Konkurences padome, ECLI:EU:C:2017:689, para 49.
[111] M Lamalle, L Lindström-Rossi and A Teixeira 'Two important rejection decisions on excessive pricing in the port sector' (2004) (3) Competition policy newsletter 40.
[112] Case T-229/94 - Deutsche Bahn AG, ECLI:EU:T:1997:155, para 91.
[113] Commission Decision COMP/A.36.568/D3 - Scandlines Sverige AB vs. Port of Helsingborg, recital 241.
[114] DG Competition discussion paper on the application of Article 82 of the Treaty to exclusionary abuse, recital 141.

The European Commission has, on several occasions, taken the position that Article 102 TFEU covers perfect and personal price discrimination. Most recently, in 2018, when submitting a note to the OECD on Personalised Pricing in the Digital Era,[115] suggesting that Article 102 TFEU could be used to address algorithmic price discrimination as either discriminatory or exploitative abuse. However, this comports badly with case law as it must be assumed that *United Brand*,[116] *Deutsche Bahn,*[117] and *Scandlines Sverige AB v Port of Helsingborg*[118] offers sympathy for capitalizing on (some) customers' ability to pay a premium.

It remains unknown how much these cases can be stressed. *United Brand* (1978) predates the proliferation of the internet, and *Deutsche Bahn* (1997) and *Scandlines Sverige AB v Port of Helsingborg* (2004), the deployment of advanced AI pricing algorithms. It's thus apparent that the Courts did not consider what would come. At that time of their deliverance, perfect price discrimination was considered unattainable,[119] as it would require an unrealistically high level of knowledge about each consumer, as Section II outlines. However, as developed in Section III, the emergence of internet-based platforms and the concept of big data have changed realities, giving ground to much more individualized pricing.[120]

5.6. Are We Ready for Personal Pricing?

It remains unknown how advanced AI has become and if it allows for personal pricing and algorithmic price discrimination. Still, the European Commission appears mindful of the risk and willing to take proactive enforcement steps.[121] While Article 102 TFEU should be available,[122] and the European Commission has referred to end-user discrimination as a particularly heinous form of infringement of Article 102 TFEU, issues remain.[123] These will briefly be discussed before concluding in Section V.

---

115 Personalised Pricing in the Digital Era – Note by the European Union, 28 November 2018.

116 Case C-27/76 - United Brands Company, ECLI:EU:C:1978:22, para 228.

117 Case T-229/94 - Deutsche Bahn AG, ECLI:EU:T:1997:155, para 91.

118 Commission Decision COMP/A.36.568/D3 - Scandlines Sverige AB v Port of Helsingborg, recital 241.

119 Simon Bishop & Mike Walker 'The Economics of EC Competition Law: Concept, Application and Measurement' Sweet & Maxwell, third edition, 2010, p. 251.

120 For further see Personalised Pricing in the Digital Era Background Note by the Secretariat, OECD November 2018.

121 See, e.g., Commission Decision AT.40462 - Amazon Marketplace, and AT.40703 – Amazon Buy Box, where the European Commission opted for an early commitment solution. For an outline of the case, see Christian Bergqvist 'Amazon Buy Box – Another Secret Jewel on Discrimination' Kluwer Competition Law Blog, March 2023.

122 For a clear policy statement on this, see, e.g., DG Competition discussion paper on the application of Article 82 of the Treaty to exclusionary abuse, recital 141.

123 Commission Decision IV/36.888 - PO/World Cup 1998, recital 102.

Firstly, as personal pricing does not result in any welfare loss, only a shift between producer and consumer welfare, most economists (and many lawyers) hesitate to submit it under Article 102 TFEU. Moreover, Article 102 TFEU is confined to dominant undertakings, but algorithmic and personal pricing does not necessitate seller dominance. This implies that competition law's efficacy is constrained, as it may only apply when a dominant entity enforces exploitative personalized price discrimination. Nonetheless, the potential for sellers lacking market power to engage in customized price discrimination suggests that consumers could still face overcharging even in competitive markets.[124] It even begs whether Article 102 TFEU should be brought to bear against something universally deployed and unrelated to being in a dominant position.

Secondly, personalized price discrimination fits poorly with our understanding of Article 102 (a) as requiring manifestly (inflated) prices. While personal pricing and perfect-price discriminations are prone to yield considerable benefits on the producer side, they only have minuscule and marginal effects on the individual consumer. The overall profit might be (significantly) higher, but the prices levied upon each customer are not manifestly unfair, making it challenging to condemn them. This also means that other instruments and policies might be more adequate, including data protection, consumer protection, or general anti-discrimination laws.[125]

Thirdly, and perhaps more troublesome, is how case law might be hostile to accommodating personal pricing under Article 102 TFEU. Across cases, the Courts have been rather adamant in accepting the inclusion of non-economic factors on the buyer's side. Potentially, this could include personal pricing. Granted, the cases predate the proliferation of AI and the digital economy and revisited the cases, different readings would emerge, including that only a narrow window is available for more personal pricing. Implementing advanced AI pricing and algorithmic price discrimination would probably fall short of this.

This also means that consumer pushbacks probably would be more of a deterrent than Article 102 TFEU in the short run. In the longer run, Article 102 TFEU should be available, but this would require that the European Commission either advance cases or clarify its position in more detail. Interestingly, in 2005,

---

[124] Akiva Miller, 'What Do We Worry About When We Worry About Price Discrimination? The Law and Ethics of Using Personal Information for Pricing' (2014) 19 J Tech L & Pol'y 41, p 74.

[125] Inge Graef, 'Algorithms and fairness: what role for competition law in targeting price discrimination towards end consumer?' [2018] 24(3) Columbia Journal of European law 541.

the European Commission indicated the availability of Article 102 TFEU against perfect price discrimination and how this would be clarified in a separate paper.[126] It's most regrettable that the European Commission never delivered on this.

VI. Conclusion

This paper examined the implications of algorithmic price discrimination and its potential to constitute exploitative abuse under Article 102(a) TFEU. Algorithmic price discrimination, enabled by the growing use of AI and big data allow companies to personalize prices for individual consumer based on detailed behavioural data. This practice results in greater price differentiation, especially when consumers revisit websites multiple times. While such practices aim to maximize profits, they often lead to perceptions of unfairness among consumers, which is a crucial factor in determining their competitive and legal implications.

Consumers' perceptions of fairness are central to this analysis. If algorithmic price discrimination is perceived as unfair, it becomes part of consumers' preferences, influencing their purchasing decisions, potentially making them turn to platforms guaranteeing uniform pricing. This dynamic shows the self-regulating nature of competition in competitive markets, where consumers can switch to alternative suppliers. However, this self-correcting mechanism fails in markets dominated by firms with significant market power. In such cases, algorithmic price discrimination is not constrained by competitive forces and instead serves as a tool for dominant firms to extract additional profits by reducing consumer surplus.

This dynamic underscores that algorithmic price discrimination is controlled by competition and becomes a competition law issue only when there is market power. The underlying principle is that pricing practices deemed fair are those that could arise under normal competitive conditions. When price discrimination occurs solely due to the existence of market power, it departs from what would be considered fair in a competitive environment. The potential impact of this algorithmic pricing is that it can lead to unfair treatment of consumers. It can also lower consumer welfare as it represents an extreme shift in welfare from consumers to producers. Even when algorithmic pricing does not necessarily reduce overall welfare, it raises significant concerns about fairness and potential consumer harm. While the academic literature provides mixed conclusions, there are valid

[126] See MEMO/05/486 – Commission discussion paper on abuse of dominance - frequently asked questions.

concerns that these practices could lead to unfair treatment of consumers and lower consumer welfare.

While algorithmic price discrimination presents unique challenges for competition law, its impact largely depends on the market structure. In competitive markets, consumers can mitigate harm by switching suppliers, though concerns about fairness and data privacy persist. However, in markets where a dominant firm controls pricing, algorithmic price discrimination becomes far more problematic, as consumers have no alternatives, leading to a reduction in consumer welfare and potential exploitative abuse under Article 102 TFEU. Unlike excessive pricing, which may occasionally occur in competitive conditions, algorithmic price discrimination often reflects the exercise of market power, amplifying concerns about fairness and consumer harm.

The impact of algorithmic price discrimination is, therefore, highly dependent on market structure. In markets dominated by a single or few firms, consumers lack viable alternatives. In such cases, algorithmic price discrimination might represent a clear instance of exploitative abuse under Article 102(a) TFEU, but case law does not offer full support for this. Across cases, the Courts have been rather adamant in accepting the inclusion of non-economic factors on the buyer's side, which might include the more subjective evaluation of a product and service. The European Commission is very confident in its ability to deploy Article 102 against personal discriminatory pricing, and there is much in support of this. However, until actual cases are advanced, uncertainty remains.