# An empirical legal investigation of online price discrimination

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# 6 Regulating online price discrimination: the role of markets, norms, technology, and law

## 6.1 Introduction

This chapter explores the regulatory avenues available to further shape the playing field that online price discrimination is situated in. As such, the guiding research question of this chapter is: 'What are (future) regulatory avenues for online price discrimination?' (RQ5). Preceding the assessment of available regulatory avenues for online price discrimination is establishing the need to regulate beyond the current level. Section 6.2 discusses what should be considered unfair about online price discrimination, deducting three problematic elements of online price discrimination (i.e., lack of transparency, lack of control and risk of unfair outcomes) that can endanger fair markets. Section 6.3 addresses the need for more fundamental regulation beyond legislation, building on the premise that the current level of protection in the legal framework is limited. Section 6.4 analyzes and discusses the regulatory avenues that could apply to online price discrimination. In doing so, I draw inspiration from Lessig's (2006) 'Code 2.0' regulatory model, exploring the way in which norms, technology, law and the market itself can form potential regulatory avenues. Section 6.5 concludes this chapter.

## 6.2 What is (un)fair in online price discrimination

Fairness considerations are increasingly becoming part of the larger debate on how to address asymmetries in the digital market. This can also be observed in recent EU legislative initiatives that explicitly declare to promote fairness in the digital economy.[1] When asked, consumers usually report strong unfairness perceptions regarding online price discrimination.[2] These unfairness perceptions could lead to a loss of trust in companies and the digital market, which could in turn lead to decreased participation in the digital market.[3] At the same time, online price discrimination can also present itself in a way that is beneficial to consumers and companies. The nature of online price discrimination is ambiguous and, in many cases, assessing its fairness will need to be done on a case-by-case basis. There are (at least) three problematic elements that form red lines as to the unfairness of the practice: lack of transparency, lack of control and unfair outcomes. Online price discrimination practices that contain (one of) these elements should be deemed problematic. This section discusses these three problematic elements respectively. But first let me explain why these three elements are problematic.

Fairness underpins the fields of law relevant to online price discrimination and plays a central role in the larger debate of how to address the asymmetry and vulnerability that are identified in the digital environment.[4] Online, consumers face a structural inability to understand and shape their economic interactions.[5] This can render consumers vulnerable

[1] Colangelo 2023.
[2] Turow, Feldman & Meltzer 2005; Poort & Zuiderveen Borgesius 2019.
[3] Zhang, Hassandoust & Williams 2020; Malgieri 2022.
[4] Colangelo 2023.
[5] Helberger et al. 2021; Helberger et al. 2022.

beyond vulnerability as a result of individual characteristics (e.g., socio-economic position, gender, age), constituting 'digital vulnerability'.[6] As such, the line between persuasion and deception becomes increasingly blurred, with developments in technology enhancing opportunities for – among others – consumer deception, exploitation, limiting freedom of choice and discrimination.[7] This goes hand in hand with an exacerbation of the power asymmetry between companies and consumers.

With price as a core contract term and a determining factor in the consumer's mind when making a transactional decision,[8] the potential harmful consequences for consumers economic interests are fundamental. In addition to potentially unfair applications of online price discrimination (e.g., not disclosing personalized pricing to the consumer, engaging in legally prohibited discrimination), consumer unfairness perceptions may erode trust and participation in the market.[9] What is (un)fair in online price discrimination can be found in both the procedural and distributive aspects of online price discrimination and at least concerns lack of transparency, lack of control or autonomy of consumers over the personalized price, and unfair outcomes. In this section, I will cover these three respective elements and explain why they pose problems for the digital market.

The first element is the *lack of transparency* with regard to both the existence of the practice and the underlying procedure. Information about the price is considered substantive information in consumer and contract law to enable the consumer to make a fully informed decision.[10] In data protection law, transparency is a key principle, both before and after consumer data is processed.[11] When there is an information deficiency or information is not communicated in a clear and intelligible manner, there is a high risk of consumers being misled, not being able to make informed transactional decisions (for example, whether they want to continue using a service) or exercise their data subject or consumer rights.[12] Transparency is of key relevance and a lack of transparency can be a vital clue in the finding of unfairness.[13] While only increasing transparency is not the silver bullet for making online price discrimination fairer altogether, it is a necessary first step towards bringing the practice to light and strengthening consumer empowerment.[14]

[6] Helberger et al. 2024.
[7] De Marcellis-Warin et al. 2022.
[8] See also ECJ 26 October 2016, C-611/14, ECLI:EU:C:2016:800 (*Canal Digital*), §55.
[9] See Chapter 4 and 5.
[10] See for example Article 7(4)(c) UCPD.
[11] See Article 5, 12, 13 and 15 GDPR; ECJ 1 October 2015, C-201/14, ECLI:EU:C:2015:638 (*Bara and Others*), §33.
[12] This was recently stressed by the EDPB in its binding decision regarding the lack of transparency in WhatsApp's data processing operations. See EDPB 5 December 2022, Binding Decision 5/2022 on the dispute submitted by the Irish SA regarding WhatsApp Ireland Limited (Art. 65 GDPR), edpb.europa.eu/system/files/2023-01/edpb_bindingdecision_202205_ie_sa_whatsapp_en.pdf
[13] See for example Article 7(4)(c) UCPD and Article 4(2) and 5 UCTD. See also Guidance UCTD, §3.1.
[14] Chapdelaine 2020, p. 35.

Due to the lack of company disclosures and the scarcity of evidence in quantitative research,[15] the current lack of transparency poses difficulties for monitoring the practice, let alone its underlying processes (e.g., the data used). It is reasonable to assume that most consumers expect uniform pricing or that price differences are at least not based on personal information, aside from 'known' segmentation grounds (e.g., purchase history or student status).[16] Given the consumer backlash that rare anecdotal instances of price discrimination evoked and the current dislike of the practice,[17] it could very well be the case that companies are exploring more covert tactics.[18] Even if companies would disclose that they have deployed a personalized pricing strategy, it is highly unlikely that consumers would be able to make a valid risk assessment.

It can be argued that the transparency requirement could be more of a warning system, as it can bring instances of online price discrimination to light or urge companies to think twice before they engage in online price discrimination.[19] Any non-compliance with the information requirement poses difficulties for the legislator and national enforcement authorities, as the current situation does not provide much starting points for monitoring the prevalence and underlying process of the practice. Hence, it is imperative to facilitate an information flow about both the existence as well as the workings of online price discrimination.

The second element is the *lack of control* that can be exerted by consumers over the personalized price. This ties in with the lack of transparency. Without knowledge of the existence of a personalized price and the procedure in which a price is set, it is rather difficult to think of the remedies or the controls available.[20] Even if consumers are informed about the way in which a price is set, it is conceivable that they are unable to exert effective control over the price that they are shown. This is due to the digital vulnerability that arises because of properties of digital architectures (e.g., confusing website layout),[21] consumers' inferior power positions compared to companies and the erosion of privacy.[22] Many consumers are battling against feelings of resignation, i.e., feelings that they cannot exert influence over certain practices, even if they wanted to.[23] The complexity and opacity of online price discrimination adds to this perceived lack of control. This feeling can lead to a

[15] For the latter see for example Vissers et al. 2014; EC 2018a; BMJV 2021.
[16] Compare Turow, Feldman & Meltzer 2005, who found that most American shoppers had very limited knowledge about price discrimination and its underlying mechanisms.
[17] See for example Rosencrance 2000a; Rosencrance 2000b; Baker, Marn & Zawada 2001.
[18] See also Heidary et al. 2022 and Chapter 3.
[19] Jabłonowska & Tagiuri 2023.
[20] A study by the EC revealed that consumers would be more positive regarding online personalization if they received more information about these practices and if they have more control over their online personal data. See EC 2018a, p. 266.
[21] De Marcellis-Warin et al. 2022, Leiser & Santos 2024.
[22] Helberger et al. 2024, p. 13.
[23] Turow 2017; Strycharz et al. 2019.

destabilizing effect, where (even non-cynical) consumers turn negative towards marketing efforts by companies.[24]

Control also encompasses access to and knowledge of possible (legal) remedies, such as the right to an explanation,[25] nullifying an agreement[26] or reporting a case to a national or international enforcement authority. It will likely not be clear for consumers which legal remedies are available to them. Even if consumers would have more knowledge about the remedies, there remains a hurdle in proving that there was legally prohibited discrimination underlying the presented price: partly due to the burden of proof in the current legal framework, but also because of the complexity of the practice itself. Consumers, who do not have the same tools and means as national enforcement authorities and researchers,[27] may experience even more difficulties in detecting that there is a price fluctuation, let alone discovering the cause of the difference in price. Authors have suggested that as personalized pricing develops and an adequate regulatory and policy response fails to constrain company practices, there will likely emerge a digital arms race where consumers will attempt to 'game' personalized pricing to their benefit but will likely have a losing hand.[28] Therefore, it is imperative to explore regulatory avenues to increase control over personalized pricing and the data used to these ends.

The third element is the *outcome of online price discrimination* and *the way in which this outcome is framed*. Even if all the requirements for procedural fairness are met, the results of personalized pricing processes could still very well result in outcomes that are considered unfair – think of discriminatory, exploitative and inaccurate outcomes. Targeting (and exploiting) vulnerabilities or vulnerable consumers is a concern that has already been raised in relation to other applications of personalized marketing communication, such as personalized advertising.[29] When this price is based on inaccurate data, it could also be considered unfair.[30] Exploitative, deceptive and misleading conduct impacts consumers' economic interests, as it might lead them to take transactional decisions they would otherwise have not taken. The economic consequences can manifest themselves in different ways, apart from ending up paying a higher or different price. It could also very well be that certain groups of consumers are denied or limited access to a product or service for reasons based on their personal data or consumers becoming entrapped in 'price bubbles', where it becomes increasingly difficult to form an estimation of a product's 'true' price and to compare prices.[31]

[24] Turow, Hennessy & Draper 2015.
[25] Edwards & Veale 2017.
[26] De Graaf 2019.
[27] Note that researchers have also had difficulty in uncovering instances of online price discrimination. See for example Mikians et al. 2012; Vissers et al. 2014; Hannak et al. 2014; EC 2018a.
[28] Grochowski et al. 2022.
[29] Strycharz & Duivenvoorde 2021.
[30] Häuselmann & Custers 2024, p. 10.
[31] Miller 2014; Ezrachi & Stucke 2016.

Driven by economic incentives, companies may lean towards attracting 'high value' consumers and excluding 'low value' consumers. Long-term harms in terms of social sorting and injustice could then arise. If consumers suffer disadvantages because of 'who they are', which are often persistent qualities (i.e., characteristics difficult to change), this might lead to a market in which a part of the consumers receive constant rewards, and another part is systematically underserved and over-charged.[32] Under the classic economic understanding of price discrimination, some consumers might be able to purchase a product or service that they would not be able to buy under a regime of uniform pricing, but we do not have sufficient empirical evidence that the surplus that is extracted under a regime of online price discrimination is indeed used by companies to facilitate this theoretical assumption. Personalized pricing is a costly practice, so it is also conceivable that the extraction of consumer surplus will not go towards subsidizing 'poor' consumers.[33] A 'high value' consumer does not need to be a consumer with a high *ability* to pay but can also be a consumer that is in *need* of a product due to temporary or personal circumstances and vulnerabilities (See Textbox 7). This challenges the liberal idea of the market as a just mechanism for the free exchange and fair allocation of price advantages and disadvantages.

**Textbox 7: Uber**

In April 2023, Belgian newspaper Dernière Heure reported on evidence that Uber charged higher prices for devices with a low battery percentage.[34] Uber denied all allegations. Interestingly, in 2016, Uber itself shared the observation that consumers show a higher willingness to pay when their device is about to shut off due to low battery. The company also then firmly claimed not to act based on this observation.[35]

What is also problematic about online price discrimination and deserves extensive (regulatory) attention is the *framing* of the price. Online price discrimination can lead to higher or lower prices for consumers, with companies increasingly experimenting with personalized discounts rather than selective higher prices for some. Economically, personalized discounts have very similar economic effects as selectively charging people higher prices: companies could give higher discounts to consumers that they want to attract. Disadvantaging can still take place under the guise of discounts, but this will make it difficult for national enforcement authorities to detect and act. Given the positive connotation that discounts have for consumers, they may be less vigilant to compare discounts or to deem them unfair.[36] This

[32] Gandy 1993; Miller 2014.
[33] Chapdelaine 2020, p. 28.
[34] Natelhoff 2023.
[35] Vedantam & Penman 2016.
[36] See also Chapter 3, Section 3.5.4.

could also make them more vulnerable for deception through seemingly positively framed offers.

## 6.3 The need for further regulation

As online price discrimination moves towards more complex and opaque applications, the challenges that arise in terms of transparency, control and outcomes may require additional legal protection. It might be that on an individual level, the damage is small (e.g., small price differences) but on a societal level, the mechanisms underlying online price discrimination pose challenges to fairness principles agreed upon in the current EU legal framework.[37] The lack of transparency and fairness online has been identified as one of the most critical issues that can affect consumer trust and, consequently, consumer protection in the European (digital) market.[38]

The current legal framework provides little direct regulation of online price discrimination. As followed from Chapter 2, there are inconsistencies and uncertainties in the extent to which it applies to online price discrimination and the remedies available to consumers, which undermine the potential effectiveness of the legal regulatory framework as a constraint on unfair applications of online price discrimination.[39] The responsibility that is given to the consumer to remain vigilant and rationally assess risks of personalized prices, together with the seemingly *laissez-faire* approach to online price discrimination, is increasingly challenged as the practice evolves towards more complex applications. Among other factors, the lack of transparency on pricing policies and strong bargaining power of companies compared to that of consumers can undermine the level playing field for digital services.[40] A complete prohibition of the practice[41] or, alternatively, giving companies free reign,[42] would not do justice to the different interests involved in the playing field of online price discrimination. The truth lies somewhere in between these two extremes, striking a balance between these interests.

The information requirement in Article 6(1)(ea) Consumer Rights Directive (CRD) as a first initiative to address online price discrimination, is intended to aid consumers in assessing the risks of a transaction that involves a personalized price.[43] This is an example of an 'i-frame' intervention. This is a policy intervention that aims to 'fix' problems with individual behavior, rather than addressing the underlying system in which the individual

[37] Jabłonowska et al. 2018; Grochowski et al. 2022.
[38] EC 2016.
[39] See Chapter 2.
[40] EC 2015, p. 11-12.
[41] See also Edwards 2006, who argues that a strictly enforced equality rule would forbid potentially beneficial price discrimination practices.
[42] See for example Miller 2014, p. 93-95; Chapdelaine, p. 44-45 for telling illustrations of the consequences of maintaining the status quo of regulation regarding online price discrimination.
[43] See Recital 45 Omnibus Directive.

operates: the latter would constitute an 's-frame' intervention.[44] However, placing the responsibility on consumers and focusing solely on how to influence consumer behavior can deflect attention and support from more systemic policies.[45]

Given the ample criticism on the effectiveness of information requirements with regard to empowering consumers and informing consumer behavior in general,[46] it is imperative to assess whether there are ways to make the information requirement 'work', albeit in a different manner than the legislator might have had in mind when drafting the information requirement. As observed by Helberger et al. (2021), there are structural power imbalances in digital markets and personalization is affecting freedom of choice: not only because of the very large size of some companies or consumers' dependency on these companies, but also because of the structural inability of consumers to use their agency to shape the outcome of economic interactions.[47] These structural challenges that online price discrimination pose for the digital market call for a more fundamental redesign of the market interactions, one that cannot solely be reached through consumer-level interventions.[48] Section 6.4 will explore regulatory avenues that combine both consumer-level interventions and more system-level interventions.

## 6.4 Exploring regulatory avenues

In Section 6.2, I identified three elements of online price discrimination that should be deemed problematic: lack of transparency, lack of control and unfair outcomes. The current legal regulatory framework is limited in its protection, placing much of the responsibility on the consumer to assess the risks of personalized pricing in the transactional decision. Given the fundamental nature of the problems associated with online price discrimination and the far-reaching consequences that unfair applications and unfairness perceptions can have for the digital market, it is imperative to explore alternative regulatory avenues (i.e., norms, technology and markets[49]) that can potentially complement the legal framework in addressing these problematic elements. The three problematic elements and the four modes of regulation should be considered together, keeping in mind that legal reform is often needed to accomplish changes in the other modes.[50]

In this section, I draw inspiration from Lawrence Lessig's widely used regulatory model for technology regulation and assess what these four modes can mean for the three problems that have been identified. Section 6.4.1 explains Lessig's regulatory model and the four

[44] Chater & Loewenstein 2022. A telling example mentioned by the authors is that of privacy protection, where achieving digital privacy is still largely put in the hands of individuals, where system-level regulation is crucial. See also Section 1.5.2 of this thesis.
[45] Chater & Loewenstein 2022.
[46] Seizov, Wolf & Luzak 2019; Van Boom et al. 2020.
[47] Helberger et al. 2021.
[48] See also Helberger et al. 2024, p. 12.
[49] See Section 6.4.1. for more elaboration on the four modes of regulation.
[50] Lessig 2006, p. 124.

modes of regulation: markets, norms, technology and law. I have made minor changes to this model to better fit the nature of online price discrimination. I present the updated regulatory model in this section. Section 6.4.2 discusses the role of markets as a regulatory avenue to address the lack of transparency, lack of control and unfair outcomes. Section 6.4.3 covers the respective role of norms. Section 6.4.4 discusses the role of technology and Section 6.4.5 maps the role of law as a regulatory avenue.

### *6.4.1. Lessig's regulatory model: four modalities of regulation*

Regulatory intervention is one of the primary ways in which a government can achieve its aims, such as in this case securing a fair and well-functioning (e.g., innovative, productive and competitive) digital market. Legislation is one of the ways in which this can be achieved.[51] While the legal framework is necessary for mapping the boundaries of what constitutes unfair, unethical or illegal conduct by companies, there are alternative (or rather: complementary) avenues that could help address the problematic elements of online price discrimination from different angles.[52] Examples include self-regulation, co-regulation, incentive and market-based instruments and information approaches.[53] It may be difficult for the government to regulate consumer or company behavior directly, given the complex and ambiguous nature of online price discrimination and the interests involved. However, the *architecture* of the playing field that online price discrimination exists in can be subjected to regulatory intervention, to increase its 'regulability'.[54] Lessig (2006) poses that there are four ways to constrain (or enable) behavior: through laws, social norms, markets and technology architecture (the 'code' of the technology).[55] Figure 6.1. shows the four modes of regulation explored in this thesis, inspired by Lessig's 'Code 2.0' model.

[51] Kosti, Levi-Faur & Mor 2019.
[52] See also Cui & Choudhury 2003, p.18, who argue a similar point for marketing practices in general.
[53] Hepburn 2021; NAO 2021.
[54] See also Lessig 2006, p. 61-62.
[55] Lessig 2006, p. 122-123.

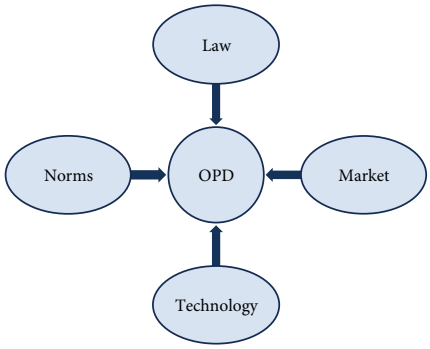


**Figure 6.1.** *Regulatory model of online price discrimination behavior*[56]

Regulation is the sum of these four constraints: the constraints are distinct, but also interdependent as they can support or undermine each other.[57] For a complete view, these four modes must be considered together.[58] Law regulates behavior through (mostly) *ex post* sanctioning of legal rights, by attaching certain consequences to situations where the law is defied. The extent to which the law is efficient or effective, is a different question.

Norms regulate through a similar mechanism, albeit that they mostly are unwritten and are rather a set of implicit understandings. As such, they 'constrain through the stigma that the community imposes'.[59] The consumer backlash that instances of online price discrimination evoke, suggest that there are implicit understandings of standard of (un) acceptable behavior: when these norms are not complied with, it elicits negative reactions from consumers.[60]

Regulation through technology architecture (or: 'code') provides (physical) constraints through the manner in which systems and the options available to users (e.g., user interfaces) are designed. Such technology architecture can, for example, limit the amount or type of personal data that can be collected.[61] An example includes the 'privacy by design' approach taken up in the EU, which seeks to proactively embed privacy safeguards into the design of – among others – technology.[62]

Markets mainly regulate by price: pricing models can prevent or discourage certain behavior. Increasing choice reduces constraint and low-performing companies or services are dropped due to a decrease in demand.[63] In the context of regulation, regulatory initiatives seem to focus more on regulating the market in a way that regulators deem desir-

[56] Based on Lessig 2006, p. 123.
[57] Lessig 2006, p. 124.
[58] Lessig 2006, p. 123.
[59] Lessig 2006, p. 124.
[60] See also Chapter 4 and 5, which report on the consequences of consumer unfairness perceptions.
[61] Haynes, Bawden & Robinson 2016, p. 875.
[62] See for example Rubinstein 2011.
[63] Lessig 2006, p. 124.

able, rather than the use of markets to regulate an industry.[64] As such, market regulation is sometimes wrongly conceptualized as the market being the object of regulation, rather than the method.[65] In Lessig's regulatory model, the role of self-regulation by the industry is underexposed,[66] even though it can be deemed an important element in regulating digital technologies moving forward.[67] Therefore, in this thesis, self-regulation will be considered together with markets as a regulatory avenue for online price discrimination.

In the next subsections (6.4.2-6.4.5), I will use these four modalities – markets (M), norms (N), technology (T), and law (L) – as an analytical framework to assess regulatory avenues for the three problematic elements identified in Section 6.2. For each regulatory mode, I will first discuss its potential role for addressing the lack of transparency, then for addressing the lack of control and lastly for addressing unfair outcomes. The three problematic elements and the four modes of regulation should be considered together, keeping in mind that legal reform may be needed to accomplish changes in the other modes.[68]

### *6.4.2. Markets*

In this subsection, I discuss the role of markets as a regulatory avenue for online price discrimination. I first explore its general role, after which I will explore its role for addressing the current lack of transparency, lack of control and unfair outcomes respectively.

Companies looking to engage in online price discrimination will be kept in line by market forces and consumers voting with their wallets if the price does not match their willingness to pay. As the conventional economic narrative goes, overall welfare could even benefit from price discrimination if the consumer surplus that is obtained by companies is used to increase overall output or supplier innovation.[69] This current *laissez-faire* method, placing emphasis on market forces and the responsibility of the consumer to stay vigilant, is increasingly challenged as online price discrimination develops. This is where markets and law are inextricably linked.

The classic view on regulation and (market) policy is that competition law addresses the supply side of the market and consumer policy approaches the market from the demand side.[70] Ultimately, both policies aim to enhance consumer well-being and ensure that markets function effectively, addressing and correcting market failures.[71] Legal enforcement

[64] Baldwin, Cave & Lodge 2011.
[65] Haynes, Bawden & Robinson 2016.
[66] See Lessig 2006, p. 97 for example. Lessig seems to qualify self-regulation as an extension of norm-based regulation and additionally does not explicitly distinguish self-regulation from law. This solidifies the view that all modes of regulation are inextricably linked.
[67] See Haynes, Bawden & Robinson 2016, p. 878.
[68] Lessig 2006, p. 124.
[69] Varian 1989.
[70] UNCTAD 2014; OECD 2008
[71] UNCTAD 2014.

is important to ensure that the market encourages fair and effective competition and consequently provides consumers with the greatest range of choice, at a low cost.[72]

Competition and consumer policy reinforce each other and there is a strong case to be made for the co-ordination of these two policy areas.[73] When consumers can exercise choice effectively, for example, because of diminished trust in a seller or discontent with a personalized pricing practice, this can act as a competitive discipline upon companies. Companies then, are urged to explore other routes to develop a sustainable relationship with consumers or to attract new customers.[74] As a large share of the mechanisms behind online price discrimination runs on personal data, a similar case can be made for the overlap with data protection enforcement: non-compliance with the GDPR may be a relevant consideration in establishing an abuse of a dominant position.[75]

### ***Transparency***

*M1 – Independent algorithm audits*

As for the lack of transparency, inspiration can be drawn from Article 15 DMA, which requires 'gatekeepers' to submit an audit to the European Commission with an overview of techniques used for consumer profiling; this audit needs to be updated at least annually. This provision shows similarities with Article 37 DSA, which subjects VLOPs and VLOSEs to independent audits to assess compliance with their obligations as set out in the DSA. These audits should be performed according to best industry practices and high professional ethics and objectivity, by auditors who have the necessary expertise in risk management and technical competence to audit algorithms.[76]

It can be argued that companies that engage in online price discrimination should be subject to similar independent audits to assess compliance with (self-regulatory) regulation. This could provide added transparency regarding the use of pricing algorithms, as well as to 'break open' clusters of informational power held by large online platforms.[77] To avoid companies grading their own homework, this audit should be done by a third-party auditor. Here, there is a role for the legislator to specify procedural rules on a certain audit, such as information to be reported by companies.[78] The audit could first be applied to gatekeep-

[72] UNCTAD 2016.
[73] OECD 2008.
[74] OECD 2008.
[75] See for example ECJ 4 July 2023, C-252/21, ECLI:EU:C:2023:537 (*Meta vs. Bundeskartellamt*), §47, where the Court ruled that '[…] compliance of conduct with the GDPR may be 'a vital clue among the relevant circumstances of the case' in order to establish whether that conduct meets the competition rules'.
[76] See Recital 92, 93 and 94 DSA for other requirements that the audit (and the following measures) should meet.
[77] See also Recital 72 DMA, which states that 'Transparency puts external pressure on gatekeepers not to make deep consumer profiling the industry standard, […]'.
[78] The European Commission has disseminated several templates to facilitate and streamline reporting by companies. For consumer profiling, see the Template relating to the audited description of consumer profiling techniques pursuant to article 15 of regulation (EU) 2022/1925 (Digital Markets Act). In this template, the European

ers, VLOPs and VLOSEs as they possess large informational power and reach in terms of economic transactions.[79] Legal regulation can also determine sanctions for non-compliance with the audit, such as fines or periodic penalty payments.[80]

In addition, a market-based initiative for an algorithm quality mark may be developed, where algorithms (e.g., the input, code and its conclusions) are examined for ethics by a third-party auditor.[81] This idea was also raised in the interview study, by one of the interview participants.[82] While the audit should be conducted by a third party, the elements for the audit can be formulated in close cooperation with companies. Here, much inspiration can be drawn from normative AI benchmarks, such as the seven key requirements (i.e., human autonomy and control; technical robustness and security; privacy and data governance; transparency; diversity, non-discrimination and justice; social well-being; accountability) for trustworthy AI as brought forward by the AI High-Level Expert Group of the EC.[83] The recently established European knowledge platform Algorithm Audit is an excellent example of such an initiative.[84]

***Control***

*M2 – Technological market initiatives*

The current lack of control over personalized pricing and, subsequently, companies' current freedom of pricing could also be regulated by the market. Technological initiatives can be undertaken by introducing and subsidizing bottom-up market solutions to help consumers regain control over their transactional decisions. Such technologies can help consumers with their information overload and to improve awareness of pre-contractual processes (e.g., automated analysis of policies[85] or smart disclosures[86]), help them compare prices (e.g., tools that show benchmark prices, updated price comparison tools[87]) and increase their knowledge and awareness of their consumer rights (e.g., tools that inform consumers of possible legal remedies).[88]

While such technologies can be tailored to respective target groups in terms of, for example, layout, the effectiveness of these initiatives largely depends on consumers' behavior,

Commission puts forward specific indicators for measuring the quantitative impact of the profiling technique, such as the number of end users exposed to each profiling technique per year. See under 2.1 (k) of the template.

[79] See Recital 72 DMA and Recital 75 and 76 DSA.

[80] See Recital 85, 86 and 87 DMA, as well as Article 30 and 31 DMA.

[81] See Chapter 3, under §3.5.5, where one of the interview participants also raised the idea of a quality mark of algorithms, where the input, code and the conclusions are examined.

[82] See Chapter 3, §3.5.5 and Heidary et al. 2022.

[83] AI HLEG 2019.

[84] See https://algorithmaudit.eu/algoprudence/how-we-work/

[85] See for example Harkous et al. 2018.

[86] Ducato & Strowel 2019.

[87] The Netherlands Competition Authority has found the quality of most price comparison sites for savings products and travel insurances substandard. See ACM 2012.

[88] Lippi et al. 2020.

personality traits and awareness about the existence of these technologies.[89] Furthermore, the use of AI in such technologies may very well carry similar risks of harm to consumer welfare as the mechanisms underlying online price discrimination, if they are used in ways without proper oversight or regulation.[90]

*M3 – (Personalized) market price caps*

Another approach that has been mentioned in the existing literature, is the introduction of personalized price caps. This is an intervention that puts a formal constraint on prices, which could take on the form of absolute (e.g. established upper and/or lower prices) or relative (e.g., limits on the difference between the prices offered to different consumers) price boundaries.[91] Standard, non-personalized price caps have been a common policy response to (avoid) excessive pricing.[92] Direct application of such price caps might not prove to be desirable in the context of price discrimination, as it is quite a blunt regulatory instrument and does not consider differences between consumers: it would result in 'rich' consumers paying the same capped price as a 'poor' consumer.[93] According to some scholars, personalized price caps might just be the solution, as it would protect consumers who would otherwise be harmed (i.e., exploited) because they overvalued the benefits of a product.

Implementing such a price-cap regime will require *a lot* of information to get it right and might seem like a very hypothetical regulatory option. While price caps could protect consumers for whom it is costly to switch (e.g., because of limited knowledge or other vulnerabilities), it may be challenging to develop yardsticks that can balance consumer protection against company interests.[94] Research would be needed to road test such a price-cap regime and assess which markets and situation might need such a regime. However, given the call for research on personalized disclosures and default rules,[95] it might contribute to the market shaping the boundaries within which online price discrimination should operate.

***Outcomes***

*M4 – Self-regulation*

Regulation through markets could also address potential unfair outcomes. Companies place great importance on the role of self-regulation.[96] After all, it would be in the interest of com-

[89] Park & Gretzel 2020; Zhao & Chen 2023.
[90] Paterson 2023.
[91] Schofield 2019.
[92] Bar-Gill 2015.
[93] Bar-Gill 2019.
[94] Houba, Motchenkova & Wang 2022.
[95] Sunstein 2011; Porat & Strahilevitz 2014.
[96] See Chapter 3, §3.5.5 and Heidary et al. 2022.

panies to create and adopt self-regulation to maintain consumer trust and avoid reputation damage: as such, ethical pricing would become part of CSR strategies.[97] Companies could put in place best practices and codes of conduct and foster the protection of normative principles, such as transparency, professional diligence, fairness and non-discrimination. One example can be found in the Dutch insurance sector, where insurance companies formulated a binding ethical framework for data-driven decision-making based on the seven key requirements for trustworthy AI as brought forward by the AI High-Level Expert Group of the European Commission.[98] In addition, companies could proactively identify and support potentially vulnerable groups, through educational support and service.[99]

In any case, under a regime of self-regulation, sellers 'steer' themselves into compliant behavior and the self-regulatory framework can serve as an enforcement tool. This is an attractive market-based solution, as it would foster collaboration between companies, and generally has low administrative costs.[100] Enforcement is crucial, as there is a risk of 'ethics washing'.[101] Through misleading marketing communication, companies can create the impression that they have put in place ethical AI, 'without the verifiable reality'.[102] In addition, this may hold off (stricter) formal legal regulation.[103]

It might be useful to establish a self-regulatory entity (SRE) or explore alternative additions to a system of co-regulation, working closely with national enforcement authorities.[104] The European Commission has underlined the role that principles-based self-regulatory/co-regulatory measures can play in creating a better, balanced regulatory framework.[105] The role of such a co-regulatory approach and the preliminary design of the self-regulatory ethical framework should be explored in academic research further, for example through focus groups, expert interviews, and the examination of existing ethical frameworks.[106]

*M5 – Incentivization beyond economic interests*

In a society characterized by biases and structural discrimination, market mechanisms are often going to reflect – and reinforce – such structures.[107] The same applies to companies' incentives to engage in price discrimination, which is usually profit maximization. While the incentive itself is difficult to change, regulation through market forces can help to balance

[97] Van der Rest et al. 2022.
[98] AI HLEG 2019.
[99] CDEI 2020; BEIS 2021, p. 17-18. However, there are also concerns in terms of privacy, the risk of false positives (and negatives) and other possible unintended consequences that should be considered.
[100] Weber 2014.
[101] Findlay & Seah 2020.
[102] Obradovich et al. 2019.
[103] Schultz, Conti & Seele 2024.
[104] Hepburn 2021.
[105] EC 2016, p. 5.
[106] Compare CDMSI 2021.
[107] See also OECD 2016, p. 3: 'If […] price discrimination is persistently harmful and unlikely to be resolved by the market then this might be a symptom of a malfunctioning market.'

such an incentive by introducing other parameters for companies to consider, balancing profit against fairness and consumer trust. In a sense, norms are at interplay with markets in the context of online discrimination. For example, if information would be disseminated that would trigger consumer backlash, it would facilitate underlying market forces that interfere with price discrimination.

The assumption that market forces as they stand now will keep online price discrimination behavior in line, deserves further nuance. There is reason to believe that leaving online price discrimination up to the market, could lead to a snowball effect in terms of larger information asymmetries, where companies because of their economic incentives increasingly obfuscate the playing field and make price comparison – and subsequently, the option to switch if not content with the price – more difficult and laborious.[108] Solely relying on market forces to correct such behavior, then, will not be enough. This regulatory avenue of shifting company incentives requires a long-term approach, as the current economic incentives for companies to potentially engage in exploitative applications of personalized practices are deeply rooted in the (European) market structure.[109]

In conclusion, markets can aid as a regulatory avenue to increase transparency, control over personalized prices and unfair outcomes. This could be done by introducing price caps for personalized pricing in (certain) markets, limiting the playing field within which companies can experiment with the practice.[110] Moreover, there is a large role for self-regulation by companies to foster the protection of normative considerations and compliance with the current legal framework. A shift in incentive (i.e., balancing economic interests against normative benchmarks of fairness and maintaining consumer trust) is needed, where companies put in place minimum standards of behavior for engaging in personalized pricing and provide insights in the state of the art through, for example, independent audits.

### *6.4.3. Norms*

In this section, I discuss the role of norms as a regulatory avenue for online price discrimination. I first explore its general role, after which I will explore its role for addressing the current lack of transparency, lack of control and unfair outcomes respectively.

In its purest form, consumer backlash – as a result of unfairness perceptions – could be one an important counterbalance against personalized pricing. Collectively, consumers are often in the best position to punish retailers who treat them unfairly. It explains why a company like Wish would rather stop personalizing prices altogether, than to disclose the fact that they do so, as currently required under the CRD.[111] As follows from the interview

[108] Ellison & Fisher Ellison 2009; Van Boom 2011.
[109] Zuboff 2018.
[110] These types of market interventions must be subject to roadtesting, to simulate and investigate the effects on, among others, competition and consumer welfare. See also Bar-Gill 2015.
[111] ACM 2022b.

study in Chapter 3, companies fear backlash, as it can damage their reputation, consumer relationships and market position.[112]

Assessing *what* the current norm is, is a difficult exercise. There is not yet a sufficiently entrenched norm against (or in favor of) discrimination based on willingness to pay.[113] However, past instances of online price discrimination that have come to light through media outlets, sparked strong negative reactions among consumers.[114] We should not underestimate the role that norms, and consumers enforcing these norms through negative perceptions, could play in regulating online price discrimination. It stands to reason that retailers would not be wise to disappoint their customers and will likely avoid practices that offer short-term gains but have a risk of hurting their businesses in the long term.

There are two main dynamics at play that might mitigate the strong moral dislike of personalized pricing and the extent to which norms can form an effective constraint. First is the current lack of transparency. Companies are increasingly aware of the current aversion against personalized pricing and might engage in more covert forms of price discrimination or invest in framing a personalized price in such a way that the benefits are more salient, for example, through presenting the offer as a discount.[115] This might lead to less instances of personalized pricing coming to light, or less support among consumers when national authorities decide to enforce personalized discounts.

Second, consumers are constantly battling against inconsistencies in their moral judgments and the overall risk of norm erosion. Consumers report concerns about their privacy, but simultaneously they blindly consent to privacy policies out of convenience, lack of understanding of the consequences or other incentives (e.g., price discounts or rewards).[116] Even if consumers *would* read the policies and understand them, the complexity of online price discrimination and the asymmetry in information and power distribution would still hinder consumers in making informed decisions.[117] In addition, as a result of self-serving bias, consumers might underestimate the risks that personalized pricing can pose for them.[118] As the first wave of unfairness perceptions settles, consumers might become used to a pricing practice or are less able to form a reference of what is personalized or not. This might also lead to weaker unfairness perceptions over time, or an overall feeling of

[112] Chapter 3 and Heidary et al. 2022. See also Odlyzko 2009, p. 47.
[113] Consumers generally find most forms of differentiating prices unfair, but not to the same extent. See Poort & Zuiderveen Borgesius 2019. In my survey research, I have attempted to nuance these unfairness perceptions: see Chapter 4 and 5.
[114] See for example Rosencrance 2000a; Rosencrance 2000b; Baker, Marn & Zawada 2001.
[115] See also Chapter 3, Section 3.5.4.
[116] Custers et al. 2018.
[117] Acquisti & Grossklags 2005.
[118] See also Van Boom et al. 2020, p. 346.

resignation.[119] Even if consumers find it unfair, they might feel like they have no control over personalized prices.[120]

***Transparency***

*N1 – Institutional norm-setting (transparency)*

Norm-setting can encourage transparency regarding online price discrimination applications by companies. Not only consumers can send out a signal about the acceptability of online price discrimination, but also institutions. Companies and government institutions are increasingly adopting codes of conduct and contract terms and sharing them with a broader audience.[121] This helps increase the transparency around algorithmic applications.

A telling example is the city of Amsterdam, The Netherlands, developing a set of contractual clauses for the procurement of ethical AI, to create a framework for the information that suppliers of these algorithms need to provide to ensure citizen trust, so that the city can provide transparent information on how AI is used.[122] In the contract terms, parties can make – among other matters – agreements on the technical and procedural transparency of the algorithm, as well as its explainability.[123] The municipality has made contractual clauses publicly available, so that other institutions can also use them: this encourages the use of AI while providing safeguards.

Algorithmic applications that are too difficult to explain afterwards, would not only fall short of the transparency requirements, but might also urge companies to rethink their conduct *ex ante*.[124] Amsterdam's good practices have inspired the European Commission to EU standard contractual clauses for the procurement of ethical AI, via a 'Community of Practice'.[125] This is an excellent example of the interplay between norms, market, law and technology.

[119] Feelings of resignation have already been observed with regard to other applications of personalized marketing communication, see Turow 2017; Strycharz et al. 2019.
[120] A similar phenomenon can be observed in privacy consent, where consumers seem to have become increasingly disengaged in the consent processes, weakening the intended moral effect of consumer agency and autonomy in (privacy) decision-making. See Custers et al. 2018; Hurd 1996.
[121] See for example EDAA 2011; ACM 2018; Verbond van Verzekeraars 2020.
[122] See Gemeente Amsterdam, 'Contractvoorwaarden voor algoritmen', amsterdam.nl/innovatie/digitalisering-technologie/algoritmen-ai/contractvoorwaarden-algoritmen/
[123] See Gemeente Amsterdam, 'Modelbepalingen voor gemeenten voor verantwoord gebruik van Algoritmische toepassingen', amsterdam.nl/innovatie/digitalisering-technologie/algoritmen-ai/contractvoorwaarden-algoritmen/
[124] Jabłonowska & Tagiuri 2023.
[125] EC 2023, 'EU model contractual AI clauses to pilot in procurements of AI', public-buyers-community.ec.europa.eu/communities/procurement-ai/resources/eu-model-contractual-ai-clauses-pilot-procurements-ai

***Control***

*N2 – Consumer empowerment and education*

Norms can also aid in increasing the perceived control over personalized prices. To keep consumer backlash from eroding as a potential constraint for companies and to empower consumers, consumers need to be duly informed about price discrimination practices that could be deemed undesirable or manipulative. Conversely, information about the benefits of online price discrimination should not be overlooked: consumers need to be aware that in some situations, a system of different prices will benefit society. Consumer knowledge about marketing practices *and* remedies available to them, must be fostered. As the ACM, the Dutch consumer law supervisory authority, has brought forward in the context of financial markets, problems that arise are often solved by consumer empowerment rather than imposing (product) regulation.[126]

Consumer empowerment could be effectuated through coaching consumers, for example, in the form of campaigns, in markets where switching has greater economic implications (or is more difficult due to lock-in effects or a *need* among consumers) and would enhance competition between companies, such as in the energy or financial market.[127]

***Outcomes***

*N3 – Naming and shaming*

Unfair outcomes of price personalization can also be constrained through norm-setting. Naming and shaming (or the threat thereof) by a national enforcement authority or private initiatives could prove to be effective to denounce unfair business practices: not only to strengthen norm-setting, but also as a warning to companies by means of a deterrence mechanism. Consumer unfairness perceptions can have far-reaching consequences, among which complaining publicly about a company.[128] Vocal consumer outrage can be a powerful deterrent against repeating similar practices. Caution is warranted: wrong accusations can have far-reaching consequences for companies.

Furthermore, as online price discrimination evolves, so will societal norms and what consumers deem acceptable. The research in this thesis on the current consumer perceptions shows that there are 'new' grounds that consumers deem unacceptable, that are not (yet) legally prohibited, which raises questions as to the extent in which law can (and should) keep up with normative developments.[129] Private initiatives or policies to publicly identify and announce companies that engage in unfair forms (e.g., opaque or discriminating) of

[126] OECD 2014.
[127] UNCTAD 2014, p. 16.
[128] See Chapter 4 for an overview of consequences of consumer unfairness perceptions.
[129] See Chapter 5.

personalized pricing, can be an effective avenue to raise consumer awareness (see also N2) and deter companies from violating the law.

Finding out the existence and root cause of the difference in treatment is a difficult undertaking, which brings us back to increasing transparency as a necessary first measure. Furthermore, there is a large role for technology architecture to facilitate the extent to which online price discrimination can be regulated. I will discuss this in Section 6.4.4.

*N4 – Institutional norm-setting (fair outcomes)*

Companies and government institutions can also engage in norm-setting regarding what are deemed fair applications and outcomes of online price discrimination. The examples mentioned under N1, e.g., codes of conduct and contract terms adopted by companies and government institutions, can also aid in guiding (other) companies as to how to prevent or combat unfair outcomes of online price discrimination. Furthermore, companies and governmental institutions can cooperate with third parties to (further) develop guidelines and checklists to address the harms that could flow from the use of (pricing) algorithms.[130] Using existing guidelines, such as the seven key requirements for trustworthy AI of the AI High-Level Expert Group of the European Commission,[131] companies and institutions could make publicly available how they give substance to these requirements.

However, in this regard it is thinkable that some elements of the underlying technology and logic are difficult to access (e.g., in the case of machine-learning), or that companies wish to protect some elements through trade secrets. Another route would be for third parties that conduct audits to assess the algorithms in place, to provide additional transparency by building a repository of 'success' cases, so that other companies can learn from this and tailor it to their business conduct. An example of this is the so-called 'Algoprudence' repository of knowledge platform and third-party auditor Algorithm Audit.[132]

In conclusion, norms can aid as a regulatory avenue through both the effects of individual perceptions and behavior (e.g., consumer complaints) and collective responses as a sum of negative individual perceptions (e.g., collective backlash). However, the complexity and lack of transparency of personalized pricing practices might mitigate the extent to which norms can form an effective constraint on personalized pricing. Companies and institutions can also send messages about what is deemed a fair application of technologies related to personalized pricing, such as of algorithmic decision-making.

[130] See for example the checklist drafted at the University of Groningen, in collaboration with DataFryslân and Statistics Netherlands (CBS), rug.nl/cf/onderzoek-gscf/research/research-centres/dataresearchcentre/pdfs/checklistsfairalgorithms.pdf

[131] AI HLEG 2019.

[132] See algorithmaudit.eu/algoprudence/

### *6.4.4. Technology*

In this section, I discuss the role of technology architecture as a regulatory avenue for online price discrimination. I first explore its general role, after which I explore its role for addressing the current lack of transparency, lack of control and unfair outcomes respectively.

It is worthwhile to explore avenues to address the current lack of transparency, control, and risk of 'unfair' outcomes through changes in technology architecture. Technology architecture, or 'code', provides boundaries for behavior, for example, through embedding the protection of fundamental rights (e.g., privacy, non-discrimination) in the architecture of the technology.[133] This also extends to technology-based software that, for example, blocks cookies so that consumers' online behavior is not actively tracked.[134]

***Transparency***

*T1 – Explainable AI (XAI)*

Regulation through technology architecture can help address the current lack of transparency. This point has also been made with regard to AI that qualifies as 'high-risk' under the AI Act, but due to its *black box* nature cannot meet transparency requirements.[135] Scholars have proposed developing *explainable* AI (XAI), where transparency about the technical workings and the process of the AI in question is embedded in the technology.[136] As such, XAI aims to make AI more transparent and interpretable to its users.[137] One of the technological modifications that could help increase the transparency of personalized pricing decisions by AI, would be a built-in logging and monitoring feature, that provides transparency about the inner workings of the pricing algorithm. This would also be of help for national enforcement authorities investigating the transparency and explainability of (pricing) algorithms.[138]

This raises the question of what transparency in the context of pricing algorithms means: is it disclosure of the source code, including the model, in- and outputs and training data? Some scholars suggest that transparency in source code might not be necessary (nor sufficient) for algorithmic accountability, and that it might even create harms that can subvert the algorithm's efficiency and fairness.[139] Instead, efforts to understand, audit and

[133] Think of automatic data encryption to protect unauthorized users from accessing personal data, for example.
[134] Haynes, Bawden & Robinson 2016, p. 875.
[135] De Graaf 2023; See Article 6 and Annex III AI Act.
[136] See for example Samek & Müller 2019.
[137] See also Chapter 3.
[138] For example, the Dutch ACM can launch investigations into the procedural transparency (the underlying goal and role of an algorithm), the technical transparency (how the algorithm works: code, parameters, etc.) and the explainability (the behavior of an algorithm, how outcomes can be explained) of an algorithm. See: ACM 2020.
[139] Edwards & Veale 2017, p. 43; Kroll et al. 2017, p. 654.

enforce algorithms can achieve accountability by looking at the external input and output of a decision process, rather than the inner workings.[140]

Similar to Article 39(2)(e) DSA, which requires companies to keep logs and repositories of the advertisements that they have ran with relevant information, companies could keep logs of the different prices, the product or service that the price was tied to and the grounds that were used to determine what groups did (not) get to see this price. This logging feature could be built into the technology or software used for personalized pricing. Here, there is also a role for legal regulation to, for example, require that algorithmic systems used in e-commerce are developed in such a way that they enable oversight and explainability.[141] This will of course prove to be more difficult in instances where prices fluctuate dynamically.

***Control***

*T2 – Built-in price caps*

Technology architecture can also aid in regulating the lack of control over personalized pricing. At least two avenues are conceivable: built-in price caps and built-in blocks of certain parameters. First, the technology architecture for personalized pricing could have built-in price caps, such that it would only allow experimentation with price differentiation within a certain pre-determined scope, such as a certain percentage above and below the 'non-personalized' price.[142] This regulatory route is similar to regulation through the market by imposing price caps for excessive prices in certain market and *ex post* sanctioning (M3), but provides an *ex ante* approach as it would not allow for experimentation with personalized pricing outside a certain pre-determined margin.

Similar to the concerns raised under M3, it may be challenging to determine the outer bounds that should be implemented into the technology architecture and the extent to which different markets or products would require different boundaries.[143] In the case that these outer bounds can be formulated, there is a potential role for legal or market regulation to require these bounds to be implemented in existing and future pricing algorithms.

*T3 – Built-in blocking of parameters*

Second, limits can be placed on the types of data that can be used in the pricing algorithm. A parallel can be drawn with the prohibition of the sensitive data (Article 9(1) GDPR) for

[140] Edwards & Veale 2017, p. 43.
[141] Zuiderveen Borgesius 2020. The author notes that a certain requirement for interpretability already exists for certain algorithmic trading systems used in investment firms, see Article 1 and 2 Commission Delegated Regulation (EU) 2017/589 of 19 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying the organisational requirements of investment firms engaged in algorithmic trading.
[142] Houba, Motchenkova & Wang 2022. Note that standard, non-personalized price caps have been a common market policy response to (avoid) excessive pricing. See Bar-Gill 2015.
[143] Houba, Motchenkova & Wang 2022.

targeted advertisements, that was introduced in the Article 26(3) DSA. In the context of online price discrimination, lawmakers could decide, for example, that data on emotional or mental states, political preferences or health data may not be part of the data used in the technology: this could be carried out by a built-in block on the use of these parameters.

Similar to what has been argued in T2, this built-in blocking of certain types of data would provide an *ex ante* approach as it would not allow for experimentation with certain data. This could be complementary to the approach of legally prohibiting the use of certain data, as leveraging the legal framework to safeguard against certain data being used is highly dependent on effective enforcement (see also L7). Given the complexity and opacity of online price discrimination and its underlying technologies, a built-in prohibition could prove to be an effective measure. It must be noted, however, that there still exists a risk of circumvention by, for example, using proxies to establish similar relations.[144]

***Outcomes***

*T4 – Fairness by design*

Regulation through technology architecture can help address the risk of unfair outcomes. For these undesirable or legally prohibited forms of price discrimination, one could consider designing price setting algorithms on the basis of legal and ethical design requirements that prevent or detect particular outcomes, such as (indirect) discrimination on the basis of protected characteristics.[145] Similar to 'privacy by design', scholars have posited the principle of 'fairness by design', which entails a policy shift towards taking into consideration an ethical dimension.[146] However, there are clear challenges associated with embedding fundamental rights into technology, such as demarcating the fundamental right in question and managerial' willingness (and ability) to embrace such technologies.[147]

To realize such discrimination-aware algorithms, sensitive data may need to be processed.[148] This requires an interplay between law and technology. While the GDPR does not allow for the processing of sensitive data under Article 9, the proposed AI Act includes a provision that would enable companies to use sensitive data to audit their AI systems. There are many reasons why companies and institutions would want to compile such statistics, such as to check whether an AI system accidentally (i.e., indirectly) discriminates, or that their internal company processes comply with anti-discrimination laws.[149] The UK has already adopted an exception to the ban on using sensitive data, for the exact purpose of

[144] Zuiderveen Borgesius 2018.
[145] Pedreschi, Ruggieri & Turini 2013; Weerts et al. 2024.
[146] BEUC 2023a. See also Recital 65 DMA, stating that 'gatekeepers should ensure the compliance with this Regulation by design. Therefore, the necessary measures should be integrated as much as possible into the technological design used by the gatekeepers.'
[147] Spiekermann 2012.
[148] Custers 2013; Zliobaite & Custers 2016.
[149] Van Bekkum & Zuiderveen Borgesius 2023.

fighting discrimination.[150] Merely allowing organizations to collect and process sensitive data does not guarantee that it will lead to effective debiasing of AI systems: it remains difficult to audit and debias AI systems.[151]

In conclusion, technology architecture can provide (physical) boundaries with regard to the playing field and outer bounds of the use of personalized price. This can be done through introducing built-in price caps, or caps as to the type of data that can be used. In addition to outer bounds, adding logging and monitoring features can mitigate the current lack of transparency. Lastly, the concept of embedding ethical dimensions into pricing algorithmic (e.g., detection of legally prohibited discrimination) is a worthwhile avenue.

### *6.4.5. Law*

In this section, I discuss the role of law as a regulatory avenue for online price discrimination. I first explore its general role, after which I explore its role for addressing the current lack of transparency, lack of control and unfair outcomes respectively.

As discussed in Chapter 2, there are four fields of law that are relevant for online price discrimination: consumer law, competition law, anti-discrimination law and data protection law. The current legal framework poses boundaries for online price discrimination but does not outright prohibit the practice nor has there been much guidance on the extent to which the existing rules apply. As such, it does not provide a clear norm for minimum standards of behavior.[152] Furthermore, there are hurdles that can be observed in the legal framework when it comes to the circumvention and lack of compliance with existing rules.[153] The European Commission has proposed several initiatives, such as the Digital Services Act, Digital Markets Act and AI Act to address new challenges online (see Section 2.7). Although personalized pricing is not mentioned in these acts, I believe there are lessons to be learned for the future regulation of the problematic elements of online price discrimination. In addition, legal regulation can help fortify the three other modes of regulation mentioned in this chapter.[154]

The updated information requirement in the Consumer Rights Directive (CRD) as amended by the Omnibus Directive is the most concrete starting point. In Section 2.3, I discussed that in its current form, the information requirement does not serve as a suitable or effective solution for increasing transparency, control over the personalized price, *nor* preventing unfair outcomes.[155] The current open frame of the disclosure duty leaves ample

[150] Article 8 (1)(b) UK Data Protection Act 2018.
[151] Van Bekkum & Zuiderveen Borgesius 2023
[152] Van der Rest & Heidary 2024.
[153] See also Heidary & Custers 2021 and Chapter 2.
[154] Lessig 2006, p. 126-130. I have included examples of the supporting role of legal regulation in the respective paragraphs.
[155] For example, the Dutch ACM can launch investigations into the procedural transparency (the underlying goal and role of an algorithm), the technical transparency (how the algorithm works: code, parameters, etc.) and the explainability (the behavior of an algorithm, how outcomes can be explained) of an algorithm. See ACM 2020.

room for business to use the frame in a way that is best aligned with their commercial interest.[156] As such, the current information requirement negatively impacts the intended effect of the regulatory intervention, which is to empower consumers in assessing the risks of a transaction with a personalized price and acting accordingly.[157] Given the ample criticism on the effectiveness of information requirements with regard to empowering consumers and informing consumer behavior in general,[158] it is imperative to assess whether there are ways to make the information requirement 'work' for the problematic elements of online price discrimination (lack of transparency, lack of control, and risk of unfair outcomes), albeit in a different manner than the legislator might have had in mind when drafting the information requirement. I discuss its role for each problematic element of online price discrimination in this subsection.

***Transparency***

*L1 – Updated CRD information requirement*

Regulation through law can address the lack of transparency in two ways that I will discuss here under L1 and L2. First, the updated information requirement in Article 6(1)(ea) Consumer Rights Directive (CRD). This information requirement can be explained to include the most important parameters that have gone into the personalized price, to increase transparency about the underlying process. This approach can also be observed in recent information requirements set in place for the ranking of offers (Article 7(4a) and Annex I under 11a UCPD and Article 6a CRD[159]), online advertisements (Article 26 DSA) and recommender systems (Article 27 DSA). Furthermore, Chapter 4 shows that consumers judge a price along *at least* the line of outcome (i.e., a price is personalized, a higher versus lower price) and process (i.e., the way in which a price is set).[160] This supports the point that the current information in the disclosure is not enough to allow consumers to make informed decisions. 'Main parameters' is an open description, so it remains to be seen how companies give substance to this requirement in relation to their personalized advertisements and recommender systems.

As the first national implementations of the DSA and the Omnibus Directive are rolling out, it is imperative for the legislator to monitor the developments and assess whether a similar advanced transparency approach should also apply to personalized prices. Further road-testing frames can help shed light on how mandated disclosures can be made more

[156] Van Boom et al. 2020, p. 333.
[157] See Recital 45 Omnibus Directive.
[158] See for example Seizov, Wolf & Luzak 2019 and OECD 2021.
[159] As amended by Article 3 and 4 of the Omnibus Directive.
[160] See Chapter 4.

effective in terms of transparency and increasing consumer control.[161] While even the updated transparency requirement might not result in more empowered or aware consumers, there is an important institutional role of the (updated) disclosure requirement. Requiring companies to disclose such information, even if it is tucked away in their terms and conditions or privacy policies or otherwise does not directly serve consumers, will aid national enforcement authorities in their detection and enforcement undertakings.

Transparency in this sense can serve as non-arbitrariness, playing a role beyond the information paradigm.[162] In this context, transparency is not merely about disclosing information, but rather contributes to an assessment of the *fairness* of the practice that requires transparency: if non-transparency holds up the existing power imbalance between companies and consumers, then it may be deemed unfair.[163] In this sense, the 'threat' of transparency could urge companies to rethink their conduct: if they cannot provide transparency about the parameters and technology used *ex post*, then this could disincentivize the use of such strategies *ex ante*.[164] Besides the role that transparency can play in influencing company conduct and aiding national enforcement authorities, it can also aid consumers in potential searches of remedies after their transactional decision, by providing them with more information on how the price came to be.

*L2 – Mandatory disclosure of benchmark prices*

Second, in addition to updating the information requirement of the CRD (L1), an advanced transparency approach could also be mandatory disclosure of a floor price or reference prices, such as prices paid by other consumers,[165] a 'non-personal' price, or an average price.[166] Requiring companies to communicate the prices offered to other consumers might prove to be an advanced level of transparency worth exploring. A similar initiative was undertaken with the updated Article 6a of the Price Indication Directive (PID) to include extra transparency requirements for price reductions.[167] Under this provision, companies are required to disclose the original price of a discounted product, which must be the lowest price charged by the seller in the past thirty days. This provision aims at preventing traders from artificially inflating the reference price and misleading consumers about the discount amount. This would allow consumers to compare prices and assess the risks of a

[161] Van Boom et al. 2020 have provided a strong start to this line of research in the context of personalized pricing. See also OECD 2018d.
[162] Jabłonowska & Tagiuri 2023, p. 381.
[163] Jabłonowska & Tagiuri 2023.
[164] Jabłonowska & Tagiuri 2023.
[165] BEIS 2021, p. 17; De Streel & Jacques 2019, p. 9.
[166] Esposito 2022b.
[167] Directive 98/6/EC of the European Parliament and of the Council of 16 February 1998 on consumer protection in the indication of the prices of products offered to consumers.

personalized pricing offer,[168] and allow enforcement authorities to control the fairness of a personalized price more easily.[169]

With regard to consumer decision-making, it remains to be seen what effect of the mandatory disclosure of benchmark prices would exert. This regulatory avenue would have to at least be complemented with consumer education, so that consumers can better understand the implications of the disclosure of the benchmark prices. Although the PID does currently not apply to personalized pricing,[170] it is worthwhile to explore whether companies should be required to disclose the 'prior' (read: 'original' or 'non-personalized') price or prices presented to other consumers whenever they present consumers with a personalized offer, particularly when this is framed as a discount.

### ***Control***

*L3 – Right to a non-personalized price*

Regulation through law can address the lack of control through three interrelated avenues that I will discuss here under L3 through L5. First, legal regulation can require companies to provide information on how to modify or influence personalized prices. Inspiration can be drawn from the DSA in this regard. Under the DSA, very large online platforms are required to provide at least one option for their recommender systems and advertisements which is not based on profiling.[171] It has been argued that under the GDPR consumers already have a right to a non-personalized price.[172] Such a right contributes to the regulation of digital technologies and would increase consumer trust and empowerment.[173]

However, there is currently no concrete guidance on whether the existing legal framework allows for a right to a non-personalized price and how this would look in practice. Regarding the latter, there remain questions regarding the extent to which this non-personalized price would be a permanent option (e.g., presented next to the personalized price or the default option) and the level of responsibility placed on consumers to opt-in to (or opt-out of) a personalized price.

[168] Compare also Recital 45 Omnibus Directive.
[169] Esposito 2020.
[170] See Guidance PID §2.3, where it is stated that 'real' personalized pricing is a matter of the UCPD.
[171] Article 38 DSA. VLOPs are slowly emerging out with – rather creative – solutions. Meta introduced a subscription model, offering its EU users the choice to pay a monthly subscription to use Facebook and Instagram without advertisements. Users can also opt to continue services for free, but with personalized ads. Online platform TikTok recently issued a statement that they have stopped targeting minors with personalized advertisements and are working on providing their European community an option to turn off personalization: content on their 'For You' page will not be recommended to users based on their personal interests. Interestingly, TikTok has since deleted the press statement.
[172] Esposito 2022b.
[173] Esposito 2022b.

*L4 – Clarification of Article 22 GDPR*

Second, the current lack of guidance on the role of the existing legal framework against online price discrimination is partly due to the current confusion as to whether Article 22 GDPR applies to online price discrimination, which would require explicit consent from consumers and would provide a more robust protection against online price discrimination.[174] The multiple interpretations surrounding this provision flow from literature, but also from the interview study in Chapter 3.[175] Clarification on the intended scope of Article 22 GDPR would also shed light on the extent to which the data protection law framework provides for a right to a non-personalized price (see also L3). Right now, it is not yet clear whether in the context of online price discrimination, the practice is 'solely based on automated processing' and 'produces legal effects' or 'affects the data subject significantly'.[176]

In the case of Tinder, the Netherlands Authority for Consumers and Markets (ACM) stated that Tinder's practice of registering the extent to which consumers were (not) interested and offering them a discount accordingly, constituted an 'automated form of price personalization'.[177] While this provides some guidance on the (broad) scope of how to qualify personalized prices, more guidance is needed.

*L5 – Reversal (or: shift) of burden of proof*

Third, and closely related, is that legal regulation can provide clarity on what legal remedies are available to consumers looking to object to a personalized price. In all cases, a reversal (or rather: a shift) of the burden of proof from the consumer to the company is essential to address the lack of transparency that surrounds personalized pricing. Personalized pricing and the lack of communication regarding its use are not easily detectable. Where researchers and national enforcement authorities have more sophisticated tools to investigate suspicions of infringements, consumers are at a major disadvantage in terms of knowledge, tools and other resources needed to uncover personalized pricing – let alone to uncover the cause of a price difference that might constitute an unfair commercial practice.[178] The European Commission is aware of the obstacle that the current burden of proof can cause for facilitating digital fairness.[179]

[174] See Article 13.2 (f) GDPR, Article 14.2 (g) GDPR and Article 15.1 (h) GDPR. Wong 2020.
[175] See Zuiderveen Borgesius & Poort 2017; Wong 2020; Esposito 2022b and Chapter 3, §3.4.3.
[176] See the EDPB Guidelines on Automated individual decision-making and Profiling for the purposes of Regulation 2016/679. The recent Schufa case provides some hints on how to interpret the scope of 22 GDPR, as it was ruled that the (preparatory) calculation of a credit score should also be deemed an automated decision under 22 GDPR, see ECJ 7 December 2023, C-634/21, ECLI:EU:C:2023:957 (*Schufa),* §73. Whether 22 GDPR also applies to personalized pricing and other marketing decisions, is still unclear. See also Rott, Strycharz & Alleweldt 2022, p. 25-27.
[177] ACM 2024.
[178] Even for national enforcement authorities and researchers, it will likely prove to be difficult to explain the (potentially deceptive) mechanisms to initiative legal proceedings, especially in the case of 'black box' algorithms.
[179] In the light of its public consultation on digital fairness (Fitness Check on EU consumer law), the European Commission surveyed the perceptions regarding a shift of the burden of proof, ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13413-Digital-fairness-fitness-check-on-EU-consumer-law/public-consultation_en.

In consumer law, in particular the UCPD, the burden of proof is on the claimant to show that the company applies an unfair commercial practice. Here, there is a possibility to shift (or alleviate) the burden of proof, through the principle of effectiveness in Article 11(1) UCPD, requiring the claimant to provide merely an 'indication' of the potential presence of an infringement of the UCPD.[180] Similarly, in anti-discrimination law, there are already some acts that have enshrined a reversal of the burden of proof.[181] To 'establish facts from which it may be presumed that there has been direct or indirect discrimination', is still on the consumer. However, it is conceivable that simple evidence, such as two side-to-side screenshots with different prices, would confirm a presumption of discrimination or the presence of personalized pricing.[182] Increased transparency through Article 6(1)(ea) CRD, might aid in strengthening the consumers' evidentiary position.

This combination of shifting the burden of proof in anti-discrimination law and consumer law might prove to be a worthwhile avenue to bring more instances of price discrimination to light, as it would allow consumers and consumer organizations a more powerful position in relation to the company.[183] As bringing an alleged case of (nontransparent) online price discrimination would still mainly require consumers' initiative, procedural safeguards should be complemented with consumer empowerment and education on the legal remedies available to them. In the short term, it is perhaps more likely that consumer organisations compile complaints on behalf of consumers.

***Outcomes***

*L6 – Prohibition of personalized prices in certain markets*

Legal regulation can also address unfair outcomes of personalized pricing, through special prohibitions and strengthening *ex post* unfairness assessments and sanctions. A rigidly enforced principle of equal treatment, i.e., banning all instances of price discrimination, would also prohibit price discrimination practices potentially beneficial for consumers.[184]

Alternatively, special prohibitions of price discrimination could be considered. This could be a prohibition of online price discrimination in markets or for products where consumers find themselves in a state of (temporary) vulnerability, for example, because of a high need, low or limited involvement, or high transfer costs. Examples could be universal services (e.g., electricity, water, housing), situations in which involvement and central processing might be limited (e.g., emergency situations) or certain target groups that should

[180] Helberger et al. 2024, p. 249.
[181] Article 8(1) of Directive 2000/43/EC and Article 9(1) of Directive 2004/113/EC.
[182] Rott, Strycharz & Alleweldt 2022, p. 42.
[183] Heidary & Custers 2021, p. 2513.
[184] Edwards 2006.

not be subjected to personalized prices (e.g., children or elderly).[185] The DSA has introduced a similar prohibition for targeting based on sensitive data as classified in Article 9(1) GDPR, for the purposes of targeted advertisements.[186] Future prohibitions of online price discrimination in certain markets would require strong(er) enforcement in the form of, for example, sweep investigations, to ensure that the prohibitions are not circumvented.[187]

*L7 – Prohibition of the use of certain parameters*

Special prohibitions of price discrimination in the form of prohibiting the use of certain parameters could also be considered. Anti-discrimination law and data protection law already prohibit the use of certain grounds for differentiating prices. However, if a price is based on newly invented classes or grounds that are not legally prohibited, it could remain beyond the scope of non-discrimination law, or the sensitive grounds as stated in Article 9 GDPR.[188] If further analyses identify contexts in which differentiation based on certain grounds is unacceptable (e.g., the ground is arbitrary[189]) and identify a need to include new grounds, there is room to broaden the scope of law beyond formal legislation, such as international treaties, national constitutions, or equal treatment acts. Specific provisions can already be found in EU secondary anti-discrimination law, for example, in the Geo-blocking Regulation,[190] the Payments Accounts Directive[191] and the Services Directive.[192] Here, there is also the challenge of (often *ex post*) enforcement in cases where there is an alleged infringement of the use of prohibited grounds.[193]

Lessons can also be learned from the Consumer Credit Directive (CCD), which also introduced special rules for personalized pricing.[194] Creditors and credit intermediaries

[185] For the latter, inspiration can also be drawn from the DSA, which requires online platforms to put in in place appropriate and proportionate measures to ensure a high level of protection (privacy, safety and security) of minors: advertising targeted to minors, based on profiling as specified in Article 4 (4) GDPR, is prohibited if a company is aware with reasonably certainty that the consumer is a minor.
[186] Article 26(3) DSA.
[187] Article 29 CPC Regulation 2017/2394. For recent sweep investigations carried out by the EC and CPC authorities, see: commission.europa.eu/live-work-travel-eu/consumer-rights-and-complaints/enforcement-consumer-protection/sweeps_en. The ability to carry out investigations can also be found in competition law (Article 20 Regulation 1/2003; Article 6 ECN+ Directive) and data protection law (Article 58 GDPR).
[188] Wachter 2020; Wachter 2023.
[189] Chapdelaine 2020, p. 32.
[190] Regulation (EU) 2018/302 of the European Parliament and of the Council of 28 February 2018 on addressing unjustified geo-blocking and other forms of discrimination based on customers' nationality, place of residence, or place of establishment within the internal market and amending Regulations (EC) No 2006/2004 and (EU) 2017/2394 and Directive 2009/22/EC.
[191] Article 15 Directive 2014/92/EU of the European Parliament and of the Council of 23 July 2014 on the comparability of fees related to payment accounts, payment account switching and access to payment accounts with basic features.
[192] Article 20 Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market.
[193] See for example Flórez Rojas 2018.
[194] This Directive has a pre-contractual information requirement that is similar to that of Article 6(1)(ea)CRD: where applicable, an indication that the price was personalized on the basis of automated processing, including profiling and inferred data. See Recital 46, Article 10 (5)(m), 11 (4)(h) and 13 CCD. Furthermore, creditors and

should stick to assessing the creditworthiness of a consumer: in doing so, they cannot process special categories of data, such as the sensitive data referred to in Article 9 (1) GDPR, nor information obtained from social networks, since sensitive data cannot be used for the purpose of assessing consumer creditworthiness.[195] The assessment of creditworthiness should be based on information on the financial and economic situation of an individual. Such information should be necessary and proportionate to the nature, duration, value and risks of the credit for the consumer, in line with the data minimization principle as set out in the GDPR.[196] This information can include the income and expenses of the consumer, but should not include sensitive data as referred to in Article 9(1) GDPR.[197] Article 6 of the CCD ensures the right to non-discrimination: the conditions to be fulfilled for being granted a credit should not discriminate against consumers in the EU based on nationality or place of residence, or on any ground that flows from Article 21 CFEU, for any credit requests of conclusions within the Union.

*L8 – Leveraging open-ended unfairness assessments*

The current open-endedness of the legal framework can still be leveraged to create avenues to strengthen *ex post* unfairness assessments and accompanying sanctions. For example, the open-endedness of the listings of discrimination grounds (i.e., non-exhaustive listings that use phrases like 'or other characteristics') in many legal instruments allows judges and courts to qualify new grounds as illegal in particular contexts. Further research would be needed to inform the legislator for which markets and products such (temporary) vulnerability might occur and should trump companies' freedom of entrepreneurship. This also requires a rethinking of consumer vulnerability to encompass the notion that online, all consumers could be rendered vulnerable, as has been increasingly raised by scholars.[198] In competition law, the benchmark for abuse could be extended to consider such harms.[199]

Furthermore, there is also a role for the UCPD to address applications of online price discrimination that fall outside the scope of Article 6(1)(ea) CRD and Article 7(5) UCPD, through the broad unfairness test of Article 5 UCPD. However, this likely requires a rethinking of the UCPD, with regard to reviewing important concepts in the UCPD (e.g., 'average consumer'[200]) and reviewing the UCPD's general clauses to better fit the harms that

credit intermediaries are required to inform consumers about the *sources* of data used for the personalization of the offer, pursuant to Article 14(2)(f) GDPR (Recital 46 CCD)

[195] Recital 55 and 57 CCD.

[196] Recital 55 CCD.

[197] Recital 55 CCD.

[198] Better known as 'digital vulnerability' See for example Helberger et al. 2022; OECD 2023; Helberger et al. 2024.

[199] Graef 2021.

[200] See AG Emiliou's opinion in Case C-646/22 (*Compass Banca SpA)*, stating that the 'average consumer' benchmark is flexible enough for the consumer to be perceived as an individual with 'bounded rationality'. While it remains to be seen whether and to what extent the Court will follow the AG's opinion, such an interpretation would allow for a more flexible, case-by-case approach of the 'average consumer'.

can result from personalized pricing.[201] *Ex post* sanctions can include prohibitions to put a rapid end to personalized pricing and fines as a deterrent and preventive avenue. The OECD suggests that fines could be increased in cases where personalized pricing is combined with other unfair commercial practices, such as blacklisted commercial practices.[202]

**Table 6.1.** *Regulatory avenues for online price discrimination*

| | Market (M) | Norms (N) | Technology (T) | Law (L) |
|---|---|---|---|---|
| Transparency | M1 – Independent algorithm audits | N1 – Institutional norm-setting (transparency) | T1 – Explainable AI (XAI) | L1 – Updated CRD information requirement<br>L2 – Mandatory disclosure of benchmark prices |
| Control | M2 – Technological market initiatives<br>M3 – (Personalized) market price caps | N2 – Consumer empowerment and education | T2 – Built-in price caps<br>T3 – Built-in blocking of parameters | L3 – Right to a non-personalized price<br>L4 – Clarification of Article 22 GDPR<br>L5 - Reversal (or: shift) of burden of proof |
| Outcomes | M4 – Self-regulation<br>M5 – Incentivization beyond economic interests | N3 – Naming and shaming<br>N4 – Institutional norm-setting (fair outcomes) | T4 – Fairness by design | L6 – Prohibition of personalized prices in certain markets<br>L7 – Prohibition of the use of certain parameters<br>L8 – Leveraging open-ended unfairness assessments |

In conclusion, although the current level of protection of the EU legal framework is limited,[203] there are add-ons and interpretations thinkable that would extend the framework's ability to address the problematic elements of online price discrimination. Ranging from relatively simple add-ons (e.g., updating the information requirement in Article 6(1)(ea) CRD to include parameters) to more fundamental reform (e.g., shifting the burden of proof, reviewing the UCPD's general clauses), there are several avenues for legal regulation to be explored. However, it is important to keep in mind that the complexity of the practice leaves room for companies to deploy proxies to circumvent prohibited grounds or otherwise obfuscate transparency or control over the practice. Given that pricing algorithms are often *black boxes*, this raises the question whether companies themselves are always able to explain the reasoning behind certain output.[204] It is imperative to monitor and further evaluate

[201] See Galli 2021; Duivenvoorde 2023 and Helberger et al. 2024, Chapter VI.
[202] OECD 2018a, p. 38. See Annex I UCPD for an overview of blacklisted practices.
[203] For a more comprehensive discussion of the limitations of the EU legal framework, see Chapter 2.
[204] Ebers 2020.

to what extent the current legal framework is fit to address the challenges associated with online price discrimination.

## 6.5 Conclusion

This chapter discussed the (future) regulatory avenues that are available for online price discrimination (RQ5: What are (future) regulatory avenues for online price discrimination?). A total of 21 regulatory avenues were identified and qualified (i.e., M1, M2, M3 […] L6, L7, L8). These regulatory avenues were identified by examining the four modalities of Lawrence Lessig's Code 2.0 model for technology regulation (law, technology, markets and norms) for the three major problematic elements of online price discrimination (lack of transparency, lack of control, and unfair outcomes). Table 6.1 provides an overview of the regulatory avenues and examples.

First, markets can impose self-regulation, fostering the protection of normative benchmarks and compliance with the current legal framework. Independent algorithm audits (M1) would provide more transparency regarding the current state of the art and the risks involved, and would form an external constraint on companies' abilities to engage in potentially problematic forms of online price discrimination. In addition to placing the responsibility on companies and the auditor, technological market initiatives to empower consumers are also an avenue worth exploring further (M2). Market price caps could also pose boundaries on the extent to which companies can experiment with personalized pricing (M3). As the industry is well-informed about what is (not) currently possible in the realm of pricing, involving the market in setting minimum norms of behavior is a worthwhile regulatory avenue to explore (M4). A challenge here would be to incentivize companies to balance their economic interests – and consequently, the drive to engage in covert forms of price personalization – against normative benchmarks of fairness and consumer trust (M5).

Second, norms play an important role in constraining unfair applications of online price discrimination. Norms can take on the form of individual and collective responses, with the latter being a sum of negative individual perceptions. Institutions can send important messages about what is deemed a fair application of technologies related to personalized pricing, such as of algorithmic decision-making (N1 and N4). In addition to top-down norm-setting, consumers must be duly informed about the ambiguity of online price discrimination and remedies available to them (N2). Naming and shaming initiatives can serve as a strong deterrent for unfair applications of online price discrimination (N3). However, the complexity and intransparency of personalized pricing practices might mitigate the extent to which norms can form an effective constraint on the practice.

Third, technology architecture can provide (physical) boundaries with regard to the playing field and outer bounds of the use of personalized price. This can be done through embedding features into the technology to bring to attention ethical dimensions such as transparency, e.g., through logging and monitoring, (T1) and fair outcomes, e.g., through

discrimination-aware algorithms, (T4). Additionally, more specific boundaries can be built into the technology architecture with regard to the outer bounds within which companies can experiment with personalizing prices (T2) and the type of data that can be used (T3).

Fourth, there is some room for the legal framework to address the problematic elements of online price discrimination more effectively. Some add-ons and changes might be more easily executable, e.g., including parameters in Article 6(1)(ea) CRD (L1), while other might require more legal scholarship before they can be embedded, e.g., rethinking the UCPD's general clauses and mandatory disclosure of non-personalized price (L2 and L8). More guidance is needed on the extent to which the legal framework prescribes a right to a non-personalized price (L3). A first step for this would be to clarify the scope of Article 22 GDPR and its applicability to online price discrimination (L4). Furthermore, procedural guidance on the burden of proof and what would constitute a complete claim of online price discrimination is needed (L5). A prohibition of the use of personalized prices in certain markets (L6) or certain data (L7) could also be considered. The legal framework can also reinforce the other three modes of regulation, for example, through providing procedural and material legal reinforcement for an independent market-based audit of pricing algorithms (M1).

The three problematic elements and the four modes of regulation should be considered together, keeping in mind that legal reform is often needed to accomplish changes in the other modes.[205] Ultimately, exploring regulatory avenues for online price discrimination is a matter of exploring all four modes simultaneously. To illustrate this: if we were to only explore market-based technological bottom-up solutions, such as developing consumer tools to provide consumers with more control over the personalized price (M2), we would put the main responsibility on the consumers to use these tools, with the added risk of a *digital arms race*, where the consumer is likely to be on the losing end.[206] Upgrading the information requirement to include mandatory disclosure of the parameters of a personalized price (L1), would likely not result in companies coming out with the information on their own, similar to what we have seen with the level of compliance with the current information requirement.

Here, simultaneous regulation through, for example, technology (e.g., audits) would be needed to urge companies to provide transparency. Although increased transparency (and consequently, hopefully higher societal awareness) does not equal fairness, it is a prerequisite for measures to increase control and consumer resilience or prevent undesirable outcomes.[207]

[205] Lessig 2006, p. 124.
[206] Grochowski et al. 2022.
[207] Chapdelaine 2020.