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Why online personalized pricing is unfair

Jeffrey Moriarty¹

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Abstract

Online retailers are using advances in data collection and computing technologies to “personalize” prices, i.e., offer goods for sale to shoppers at their reservation prices, or the highest price they are willing to pay. In this paper, I offer a criticism of this practice. I begin by putting online personalized pricing in context. It is not something entirely new, but rather a kind of price discrimination, a familiar pricing practice. I then offer a fairness-based argument against it. When an online retailer personalizes prices, it competes unfairly for the social surplus created by a transaction. I defend this argument against objections, and offer a simple remedy: online retailers should either disclose that they are personalizing prices, or stop doing so.

Keywords Competition · Dynamic pricing · Fairness · Personalized pricing · Price discrimination

New technology allows firms to estimate shoppers’ reservation prices, i.e., the highest price that they are willing to pay (Ezrachi & Stucke, 2016; Mohammed, 2017; Rest et al., 2020; Wallheimer, 2018). Increasingly, online retailers are using this technology to “personalize” prices, i.e., offer goods for sale to shoppers at their reservation prices (Hannak et al., 2014; Mikians et al., 2012; Seele et al., 2019; Valentino-Devries et al., 2012). In this paper, I offer a criticism of this practice.

I begin by putting online personalized pricing in context. It is not something entirely new, but rather a kind of price discrimination, a familiar pricing practice. Understanding this may blunt the strong negative reaction most consumers have to online price personalization (Priester et al., 2020; Seele et al., 2019; Turow et al., 2005). But it should not, I argue, lead us to think that there is nothing wrong with it. I next advance a fairness-based argument against online price personalization. When an online retailer personalizes prices, it competes unfairly for the social surplus created by a transaction. I defend this argument against objections, distinguish it from rival fairness-based arguments, and offer a simple remedy: online retailers should either disclose that they are personalizing prices, or stop doing so.

Understanding online personalized pricing

The concept of a reservation price is central to the analysis of personalized pricing. A reservation price is a limit. The buyer’s reservation price is the highest amount that he is willing to pay for a good. The seller’s reservation price is the lowest amount that he is willing to accept for the good. Suppose that I am selling a bike, and I won’t sell it for less than \$200. You want to buy my bike, and you won’t pay more than \$250. \$200 is my reservation price and \$250 is yours. The overlap between your reservation price and mine—in this case \$50—is the social surplus.

Personalized pricing can be understood as an attempt by the seller to capture the entire social surplus in a transaction. In the case at hand, I engage in personalized pricing when I attempt to discern your reservation price for the bike, and offer it for sale to you at that price. Your reservation price is \$250, so I offer you the bike for sale at \$250. If your reservation price were lower, say \$225, I would offer you the bike for sale at that price. Retailers who personalize prices may offer the same good for sale to different people at different prices at the same time. Suppose you and your friend are both shopping for a bike. Your reservation price is \$250 and your friend’s is \$225. I would be personalizing my prices if I offer the bike to you for \$250 and to your friend for \$225.

How do online retailers figure out shoppers’ reservation prices? Retailers are reluctant to divulge how they personalize prices, or even that they do. But based on what is known about this practice, it begins with tracking individuals on

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the internet (Mohammed, 2017; Wallheimer, 2018). Sellers collect information about shoppers' browsing history, the type of device they are using to access the website, their zip code, their social media activity, how often they have visited the site, where they hover their clicker on the page, how long their browsing window stays open, and more. They supplement the information they collect with information they purchase from data brokers (Hannak et al., 2014; Krishnamurthy et al., 2007; Steinberg, 2019). They feed this information into an algorithm that estimates how much shoppers are willing to pay for a good. Of course, the algorithm doesn't predict *exactly* how much shoppers are willing to pay. But it is able to predict who is willing to pay more and who is willing to pay less. The seller then displays a higher price to those who are willing to pay more and a lower price to those who are willing to pay less.¹

Online personalized pricing in context

Consumers tend to be outraged by online price personalization (Priester et al., 2020; Seele et al., 2019). When Amazon was found to have personalized the prices of DVDs in 2000, shoppers complained bitterly (Krugman, 2000; Turow et al., 2005). Amazon apologized and promised it wouldn't happen again. Ultimately, I will argue that online price personalization *is* objectionable. I want to begin, however, by taking some of the air out of this reaction. I do so by putting online personalized pricing in context, showing how it is a version of a common pricing practice. This will help us to see which arguments against it are likely to have the most traction.

A kind of price discrimination

Online price personalization is in one sense a new phenomenon, made possible by the rise of internet shopping and

advances in data collection and computing technologies. But it is in another sense a familiar practice. It is a kind of price discrimination, a phenomenon with which all shoppers are familiar, and which is a standard part of a basic economics education.

A firm engages in price discrimination when it charges different prices to different people for goods, and the differences in price are not reflected in the goods' cost of production (Krugman & Wells, 2009; Lipsey & Chrystal, 2007). Firms discriminate on the basis of consumers' willingness to pay, charging more to those who can pay more, and less to those who can pay less.

According to a standard categorization, there are three types or degrees of price discrimination. One of these is personalized pricing, also known as first-degree or perfect price discrimination. This is discrimination at the individual level. The prices buyers are charged are based on their individual willingness to pay. Discrimination at the group level is third-degree price discrimination. This is when buyers are charged different prices based on their membership in a certain demographic group. Common examples are discounts for seniors and students. Second-degree price discrimination is an amorphous category that includes any instance of price discrimination that cannot be classified as first- or third-degree. Quantity discounts, rebates, and versioning are often cited as examples of second-degree price discrimination.²

Second- and third-degree price discrimination are more common than first-degree price discrimination. This is because first-degree price discrimination (i.e., personalized pricing) was, until recently, technically unfeasible on a large scale. Yet the prices of some goods are still personalized. The prices of cars, houses, jewelry, mortgages, mattresses, furniture, labor, and other goods are often negotiated by buyers and sellers. In fact, the prices of most goods were the subject of negotiation until recently. Uniform pricing—putting price tags on goods—was not common until about 150 years ago (Wallheimer, 2018). Negotiation always involves some amount of personalization. Sellers try to sell goods to buyers at high prices, and buyers try to bargain them down. When prices are negotiated, different buyers will pay different prices. Naturally, the prices people pay will be partly a function of their reservation prices. Skilled salespeople will get buyers who are willing to pay more to pay more, while those who are willing to pay less will pay less.

¹ Marcoux (2006) suggests that personalized pricing is ephemeral in competitive markets. If one firm F_1 tries to sell a good to a shopper at his reservation price, and this price is above the market clearing price, another firm F_2 will offer to sell the good to him at a slightly lower price. F_1 will then lower *its* price; F_2 will make a counteroffer; and so on until the market clearing price is reached. This is true in perfectly competitive markets, but markets in the real world are imperfect in ways that make personalized pricing possible. Most importantly, there are information asymmetries in real markets. In our example, for F_2 to offer the shopper a better price, F_2 needs to know what F_1 is charging. For F_1 to make a counteroffer, it needs to know what F_2 offered. But sellers will often be ignorant of what their competitors are charging. This is especially so online, where the prices being charged are known only to the sellers and buyers. In fact, we don't need to *infer* based on market imperfections that it will be possible for firms to engage in personalized pricing. We know that it is *possible* for firms to engage in price discrimination because firms *actually* do so (Hannak et al., 2014; Mikians et al., 2012).

² In versioning, sellers charge more for different versions of the same product, but the differences in prices do not fully reflect differences in the price of production. The price difference between hardback and paperback books is a standard example. Hardback versions of books, which are typically released prior to the paperback versions, have significantly higher prices than paperback versions, but do not cost significantly more to produce.

The moral status of price discrimination

What we should make, normatively, of price discrimination? We might begin by observing that price discrimination is not simply widely practiced, but widely accepted. It is hard to detect any public outcry over bulk discounts, versioning, student discounts, negotiations over car prices, and many other instances of price discrimination. Of course the fact that something is the case does not prove that it ought to be. But considerations in support of these practices are not hard to find, and can easily be extended to online personalized pricing. The first argument appeals to a general freedom in pricing. The second appeals to the effects of price discrimination on social welfare.

In market economies, sellers of goods typically have considerable freedom when it comes to pricing. This freedom has two familiar moral foundations. The first is property rights. What it means to own something is to have a bundle of rights with respect to that thing. One of them is the right to transfer it to someone else, or not, if (e.g.) what the seller regards as sufficient payment is not received (Boatright, 2010). The second foundation is the value of the price system. As Hayek (1945) famously argued, prices serve a signaling function, telling us how much of a good is desired relative to supply. Producers respond accordingly, making more of what people want and less of what they don't, and in doing so, allocate resources to their most productive uses. But prices serve this function only if they are set through the voluntary choices of buyers and sellers. In sum, one argument for permitting price discrimination—and hence online personalized pricing—is that it is entailed by the general freedom that sellers have to price their goods as they wish.³

A second argument for permitting price discrimination sees it as a practice with a particular social value. According to a familiar result in economics, price discrimination increases social welfare, assuming that it enables sellers to increase output. There is a mathematical proof for this (Schmalensee, 1981; Varian, 1985), but it can be illustrated through a simple example. Consider pricing for medical drugs. Pharmaceutical companies sell drugs for lower prices in developing countries than in developed countries. If they were forced to sell drugs at a single price in all countries, then they would have to choose the higher price in order to cover their costs. They would stop selling drugs to people

³ According to the “just price” tradition, associated with Aquinas, sellers should offer their goods for sale at a single price, viz., the just price. On the standard interpretation of this idea, this is a function of how much the good costs to produce. But a more recent strain of scholarship argues that, for Aquinas, the just price mostly *is* the market price, as determined by the forces of supply and demand. In this case, there is no disagreement between the just price tradition and modern thinking about prices (see and cf. Koehn & Wilbratte, 2012).

at lower prices in developing countries, and these people would go without. The same goes for senior and student discounts on museums, movies, and public transportation. Price discrimination, including personalized pricing, helps to eliminate deadweight losses, or the welfare gains that are unrealized when possible transactions do not occur (Elegido, 2011). Indeed, it may increase the welfare of those for whom welfare increases matter most, viz., those who are worse-off (Parfit, 2002).⁴

My goal in this section is not to prove that online personalized pricing is permissible. While sellers in market economies have considerable freedom to price goods as they wish, most recognize limits on pricing, e.g., restrictions on price gouging (Snyder, 2009; cf. Zwolinski, 2008). And while many forms of price discrimination are accepted, some are not, e.g., price discrimination based on race or sex. Rather, my point is that online personalized pricing is not some nefarious scheme that is obviously wrong, but a version of a practice we are familiar with and accept, and for which good reasons can be given. If we are to believe online personalized pricing is wrong, an argument is needed.

Our contextualization of online personalized pricing also suggests, though does not prove, that the most promising arguments against this practice will have their source in the ways in which it differs from other forms of price discrimination. Most forms of price discrimination elicit a shrug; online personalized pricing elicits outrage. So if online price personalization is wrong, it will likely be wrong because of a feature that it has that other forms of price discrimination do not have.

Below I present an argument against online price personalization which appeals to fairness in competition. This argument does not assume that other forms of price discrimination are permissible. Indeed, it is compatible with the

⁴ It might be wondered whether price discrimination has another positive social effect, viz., reducing inequality. Due to the diminishing marginal utility of wealth, it might be said, the rich are willing to pay more for any given good than the poor. When the rich pay more than the poor, rich consumers' wealth is reduced by a larger amount than poor consumers' wealth. As a result, the wealth gap between rich and poor shrinks. This argument is questionable. First, while rich people may generally have higher reservation prices than poor people, this will not always be the case. In a notable case of price discrimination, Staples charged less for office supplies to richer consumers, because it faced stiffer competition in that area (Valentino-Devries et al., 2012). Second, in addition to considering the wealth gap *among* consumers, we also need to consider the wealth gap *between* consumers and producers. When a producer personalizes prices, he attempts to capture all of the social surplus generated in a transaction with a consumer. So price discrimination results in a transfer of wealth from consumers to producers. Assuming that producers are wealthier than consumers, this represents a transfer of wealth from the (relatively) poor to the (relatively) rich, exacerbating inequality. The lesson to be drawn here is that the distributional effects of price discrimination are difficult to discern and will vary from case to case (cf. Elegido, 2011).

claim that they are impermissible. But it identifies a *distinctive* wrong in online personalized pricing as it is currently practiced.⁵

A problem of exploitation?

Before beginning, let me describe and put aside a different—but perhaps intuitively attractive—way of thinking about the issue. It might be claimed that personalized pricing is exploitative (Turow et al., 2005). In a typical transaction, a social surplus is created. When an online retailer personalizes prices, it tries to capture all of this surplus. It might be said that, in doing so, the retailer exploits the consumer.

While there are many accounts of exploitation, the standard gloss on the concept is that to exploit someone is to take unfair advantage of them (Zwolinski & Wertheimer, 2016). Consider a paradigm case. A and B are walking in the woods. B is bitten by a poisonous snake. The venom will kill B unless he takes an anti-venom quickly. As it happens, A is carrying several vials of anti-venom. While it retails for \$10, A offers to sell B a vial for \$1000. B does not have time to find another source of anti-venom before he succumbs. No one else is around and the nearest store is miles away. So B pays A \$1000. A is *advantaged* from his transaction with B because A benefits from it. This benefit is *unfair* because A gets much more than he should. Put another way, A benefits excessively from his transaction with B (Valdman, 2009). To say that A *takes* advantage of B implies a kind of extraction. It is not simply that A gets too much money from B. It is that B has little choice but to accede to A's demands. A's taking advantage is sometimes understood in terms of B's vulnerability. The fact that B is vulnerable—he was bitten by a snake and is about to die—is what allows A to benefit excessively.

Is online price personalization like this? The only plausible answer is 'no'. The reason is that consumers who are subject to price personalization online are typically not vulnerable in the way that B, the snakebite victim, is. Unlike B, they have decent alternative options. Evidence of personalized pricing has been found at retailers such as Staples, Amazon, Home Depot, Orbitz, and Expedia (Hannak et al., 2014; Valentino-Devries et al., 2012). There are robust markets in the goods sold by these retailers. If a person doesn't

get their office supplies from Staples, they can get them from Office Max or Target. If a person doesn't get their DVDs from Amazon, they can get them from Best Buy or Wal-Mart. And so on. Because ordinary consumers are not vulnerable to retailers, retailers are unable to extract excessive benefits from them.

We can understand the difference between exploitation and online price personalization in terms of a difference in relative reservation prices. In a case of exploitation, the victim has an extremely high reservation price, because of his vulnerability. But in a case of online personalized pricing, the consumer's reservation price isn't unusually high; it's just that the retailer tries to sell the good to him as close to that price as possible.

To be sure, there may be cases that involve both personalized pricing and exploitation. Imagine that you and I both want a certain drug. I want it because of its pleasing effects. You want it because without it, you will die. Your reservation price for the drug is much higher than mine. Beyond a certain price, I will simply turn to another drug with pleasing effects. Suppose there is only one supplier of this drug, and it costs the firm just \$10 per dose to produce. Because it wants to maximize profits, the firm charges you \$1000 while it charges me \$15. There is personalized pricing in this case, because the amounts we are charged depend on our reservation prices. There is exploitation too, but only in your case. The seller uses your vulnerability to extract a very high price for the drug from you. It follows from our discussion that online price personalization and exploitation are conceptually distinct. Moreover, most cases of the former are not cases of the latter. So if online price personalization is wrong, it is not because it is exploitative. I now explain what is wrong with it.

Fairness in competition

Imagine you are playing a game of tennis with your usual opponent, Pat. The game is not particularly high stakes, but you are both trying to win. You would be disappointed if you lost, and pleased if you won. You and Pat are normally evenly matched, but today Pat is beating you handily. She doesn't win all the points, but she is winning a lot more than normal. She seems to be able to predict exactly where you are going to hit the ball. She is almost always in the right spot, ready to deliver a powerful return. The reason Pat is able to do this, it turns out, is that she is wearing a special pair of glasses. The glasses contain a small computer with information about every point you have played in all of your recent matches against her. Pat has been wearing these glasses for the past several months to collect data about how you play, and in fact she has purchased information about your play from a few of your other regular opponents, who

⁵ Online price personalization may also raise concerns about privacy (Kokolakis, 2017; Krishnamurthy et al., 2007). I do not consider such concerns here, because it would take us too far afield. Moreover, the threats to privacy involved in online price personalization are similar to those involved in other familiar practices, such as online behavioral advertising. The objection I raise to online price personalization does not apply to online behavioral advertising—it is distinctive in this sense also.

have been wearing similar glasses. Pat has now flipped a switch to activate an algorithm in the glasses that predicts where you are going to hit the ball, taking into account factors such as where you are on the court, how fast the ball is coming toward you, how late in the game it is, how hot it is, and so on. The glasses are not perfect, and sometimes they give Pat incorrect information. But they tell her the correct information much of the time.

You see that Pat is wearing glasses, but you don't know what they do. This technology is new, and only some people know about it. You assume that Pat's glasses are correcting her impaired vision, or protecting her eyes from errant shots.

What Pat is doing, I claim, is wrong. She is not playing fair. By wearing the glasses, she gains an advantage over you that you don't know about, and haven't consented to. You thought you were playing against Pat, but you are playing against Pat and her glasses, and they are winning.

My claim does not rely on the assumption that glasses technology is against the official rules of tennis. We can add to our example that this technology is sufficiently new that, not only is it unknown to many tennis players, the appropriateness of its use in competition has not been contemplated by the game's rule-making authorities. My claim relies on a moral intuition that what Pat does is unfair. It is a mistake to think, in any case, that the permissibility of moves in a competition is entirely dependent on what the rules say (D'Agostino, 1981; Simon, 2000). Rather, what moves are permitted by the rules should to some extent be responsive to intuitions about what moves are fair. Even if we thought Pat's use of the glasses were permitted by the competition's rules—perhaps because the rules did not explicitly forbid their use—her behavior would still be unfair.

It is worth observing that the problem with Pat's behavior is not simply that her glasses enable her to collect a lot of information about how you play tennis. The problem is what she does with this information, *viz.*, use it to increase her odds of winning the match.

It is important to my analysis that you don't know that Pat's glasses give her an advantage over you, and that your ignorance is reasonable. Assume that declining to play tennis with Pat would not be excessively costly for you. (You could play someone else, or not play at all.) Under these conditions, if you knew, or should have known, what Pat's glasses did for her, then your playing her could be understood to be an act of consent to her behavior. She would still have an advantage over you due to the glasses, but because you consented to her wearing them, it no longer seems wrong that she does. In the case at hand, however, the terms of your and Pat's engagement are not consented to. You think that you and Pat are playing by a certain set of rules, but Pat is playing by a different set of rules. Your rules countenance a certain set of known strategies for winning, but Pat's rules include a new strategy.

We can bring the sense of unfairness at issue into sharper focus by imagining that there is a different game—call it tennis*—which is exactly like tennis except that participants are allowed to wear glasses that predict where their opponents are going to hit the ball. Perhaps in this game people try to win simply by overpowering their opponents. You are playing according to the rules of tennis, but Pat is playing according to the rules of tennis*.

What we have concluded about Pat and her glasses applies to online retailers who personalize prices. Like Pat, these retailers make use of a new and largely unknown technology. In Pat's case, it is the glasses. In the case of online personalized pricing, it is a set of data-gathering and data-processing technologies. Pat uses her glasses to predict where you are going to hit the ball, so she can get ready to deliver a powerful return. Online retailers who personalize prices use their technology to predict your reservation price, so they can offer you their goods at that price. Pat's goal is to win the match, which results in her enjoying the sweet taste of victory. The retailer's goal is to capture more of the social surplus generated by transactions, which results in earning higher revenues.

In the case of online personalized pricing, as in the tennis case, it is important that you don't know that your opponent is helping herself to an advantageous technology, and that your ignorance is reasonable. You know that in some contexts retailers attempt to tailor prices to individual shoppers—e.g., when you are shopping in person for a car, or jewelry, or a mattress—but you reasonably believe you are not in such a context. If you know what the retailer is doing, and can avoid transacting with her at low cost, then your transacting with her can be understood as an act of consent to her behavior. But since you don't know, you don't consent. In this case also, you think that you and your opponent are playing by one set of rules, but your opponent is playing by a different set of rules.

The argument from fair competition identifies a distinctive wrong in online personalized pricing. That is, it identifies a wrong which is found in online personalized pricing but not in other forms of price discrimination, including in-person personalized pricing. Most forms of price discrimination are transparent. Discounts for seniors, students, and other groups are typically well-publicized. The norms regarding in-person personalized pricing are widely known. When you walk into a car dealership (or a jewelry store, a furniture store, etc.), everyone knows that the competition is "on." The salesperson will try to sell you the car for as much as you are willing to pay, and you will try to buy it for as little as the salesperson will sell it for. Knowing that this is what the salesperson is trying to do, you can take steps to protect yourself, in an effort to keep more of the social surplus for yourself. The salesperson can in turn try to take steps to protect himself from you. One of you may be a more

skilled negotiator, and may come out on top. But at least it will have been a fair fight, with no hidden advantages on either side.⁶

Does the analogy hold?

My argument against online personalized pricing is based on an analogy between a tennis match and a business transaction. The objections I consider challenge the aptness of this analogy. The first thing that might be said is that a business transaction is not like a game. So the conclusions we draw about Pat's behavior do not apply to the behavior of online retailers.

There is a lively literature about whether business can be understood as a game. Some believe this comparison is fitting (Ladd, 1970). They note that the morality of business is not like the morality of ordinary life, and must be assessed by different standards (Heath, 2014). Others resist it, arguing that business and games are crucially different. Unlike business, games have a definite beginning and end, a clear set of rules, and fairly small stakes (Koehn, 1997).

We need not enter into this debate. While my argument relies on an analogy between a tennis match and a business transaction, it does *not* rely on the claim that business in general should be understood as a game, or that commercial transactions specifically should be understood as games. What is essential to my analysis is the idea of *competition*. Competition occurs not only in games, but in other contexts too, such as when applicants compete for jobs or when children compete for parents' attention. Both a tennis match and a negotiation over a social surplus are competitions. In both cases individuals are pitted against each other—tennis players for points, and buyers and sellers for the social surplus. Also in both cases, the competition is zero sum: the more one person gets, the less the other gets. So in this sense, the analogy between tennis matches and business transactions holds.

This objection might be pressed a different way. It might be claimed that the resemblance among competitions is

weaker than the resemblance among games. We might be able to say that what is true of a certain game G1 must be true of another game G2, since both are games. But we cannot say that what is true of a certain competition C1 must be true of another competition C2. Competitions are too diverse a set of activities, according to this objection.

In response, I agree that competitions come in many forms. Tennis competitions are different from competitions over social surpluses. These competitions, in turn, are different than competitions for jobs, spots at selective universities, parents' attention, lovers' affection, and so on. But games are similarly diverse. Tennis, football, golf, shuffleboard, monopoly, and poker are all games, but have vastly different sets of rules. More importantly, I do not rest my argument on the mere fact that tennis matches and business transactions are both competitive activities. I have dug into their details to show that they are alike in the key respects. It is on this basis that I claim that online personalized pricing is similar to, and just as wrongful as, Pat's behavior in the tennis match.

There is a final way of questioning the aptness of this analogy. It might be claimed that, not only are business transactions not games, they are not even competitions. In a business transaction, the seller offers a good for sale at a certain price, and the shopper pays that price, or not, as she chooses. When the transaction is concluded, it may turn out that the seller has captured most of the social surplus, or that the buyer has captured most of it. But at no point, according to this objection, do the seller and buyer *compete* for the social surplus. If they do not compete for it, the objection goes on, then they aren't bound to compete *fairly* for it. In support of this objection, it might be observed that, while competition is a standard and indeed desirable feature of business, this is competition *among sellers*, to transact with buyers. It is not competition between sellers and buyers.

This version of the objection also fails. It is true that there is competition among retailers to sell goods to consumers. But there is also competition between buyers and sellers. I offer as evidence for this the phenomenology of bargaining. Reflect on the experience of buying a car—or a house, a mattress, a furniture set, or a trinket in a flea market. The seller is trying to get you to pay more, so that she can capture most of the social surplus. You, the buyer, are trying to get the salesperson to sell it for less, so that you can capture most of the social surplus. You cannot both capture most of it. The salesperson gets more when you get less, and vice-versa. You are both aware of these facts. Assuming a reasonable degree of self-interest, you will compete.

It might be replied that, while some retailers negotiate prices, most retailers—including online retailers who personalize prices—do not. In most contexts, there is no back-and-forth. There is simply the offering of a good at a certain price by the seller, and the acceptance of that price, or not,

⁶ It might be thought that the problem with online personalized pricing is that the fight is not fair. The algorithm used to determine shoppers' reservation prices in online personalized pricing, it might be said, is a lot more accurate than the "algorithm" used to determine their reservation prices in in-person personalized pricing. In online personalized pricing, there is a sophisticated mathematical formula that takes into account many variables. In in-person personalized pricing, it is the salesperson's intuition, based on a few observable characteristics. In response, this oversells the technology used in online personalized pricing. It cannot read people's minds; it is not *that* accurate. Indeed, an experienced salesperson may be able discern facts about shoppers that a computer cannot. The problem, I have argued, is that the salesperson has an unknown advantage.

by the buyer. So it might be claimed that while some retailers and shoppers compete over the social surplus, retailers and shoppers in online contexts do not.

This claim should be resisted. When sellers personalize prices, they are *clearly* trying to maximize their share of the social surplus. That is the whole point of attempting to discern shoppers' reservation prices, viz., to sell them goods at or at least near those prices. In doing so, retailers reveal themselves to be in competition with shoppers. It is true that there is no back-and-forth, but most shoppers do not know that they are competing with retailers, and none have an opportunity to make a counter-offer. More importantly, competition does not require negotiation. People compete all the time for goods—jobs, parents' attention, romantic partners, and more—without negotiating the terms of exchange. In fact, I suggest, all sellers—even those who do not personalize prices—can be understood as trying to maximize their share of the social surplus in transactions. In the usual case, they fix prices with the goal of maximizing their share of the social surplus across all transactions considered as a set, on the understanding that different shoppers have different reservation prices. Given advances in technology, online sellers can now tailor their prices to individual shoppers, trying to maximize their share of the social surplus in each individual transaction.

Other fairness-based arguments

I have argued that online price personalization involves a kind of unfairness, viz., unfairness in competition. In this section I examine two other fairness-based arguments against online personalized pricing, and explain why they fall short.

In an early discussion, Marcoux (2006) considers and rejects a fairness-based argument against online personalized pricing. According to this argument, online personalized pricing is unfair because it violates an equal treatment norm, a norm which is claimed to require that sellers treat buyers equally by charging them all the same price.

In reply, Marcoux points out that different people have different reservation prices for goods. This means that they derive different amounts of welfare, understood in terms of consumer surplus, from purchasing goods, assuming they are sold at a single price. If my reservation price for a stapler is \$5 and yours is \$10, and the stapler is sold to both of us for \$4, then my consumer surplus is \$1 while yours is \$6. I gain less from the transaction than you do. If equal treatment is understood in terms of equal production of welfare, it would be better if we were charged prices that reflect the differences in our reservation prices, e.g., if I were charged \$4 and you were charged \$9. For then we would both gain the same consumer surplus of \$1. Instead of supporting unitary

pricing, then, an equal treatment norm in fact supports price discrimination.

Marcoux is correct that this argument doesn't work against online personalizing pricing. It is notable, however, that he does not identify anyone who endorses it. He identifies people—e.g., Krugman (2000)—who claim that online personalized pricing is unfair, and he identifies a norm—a version of the equal treatment norm—that someone might try to use to justify this claim. But he does not identify anyone who actually endorses this version of the norm, or who uses it to draw this conclusion. This is unsurprising. The norm is implausible, and would condemn all forms of price discrimination, not just online personalized pricing. Indeed, this norm would condemn almost all forms of unitary pricing, except in the unusual case where consumers have identical reservation prices.

The argument given in this paper offers a way to justify the claim that online personalized pricing is unfair without appeal to an implausible norm. The crucial issue, I have argued, is not whether consumers are equally benefitted by their transactions with a retailer, but whether consumers are on “equal footing” with retailers in the competition for the surplus created by their transactions. What matters is not the result—i.e., how much surplus each party ends up with—but the competition itself—whether consumers and retailers compete on fair terms.

In a more recent discussion, Steinberg (2019) endorses a different fairness-based argument against online personalized pricing. He says that the problem with this practice is that it prevents consumers from “profit[ing]” or “substantially benefit[ing]” from market exchanges, by which he means capturing any of the social surplus generated by them (2019, p. 113). One of the benefits of having a market, Steinberg says, is that it “provides individuals with the possibility of improving rather than merely maintaining their welfare” (2019, p. 112). When retailers capture all of the surplus created by a transaction, he continues, this doesn't happen.

Steinberg's claim that, when retailers personalize prices—and in doing so, capture all of the social surplus—consumers merely “maintain” their welfare seems false. Unless he is forced to transact, if a consumer engages in a transaction, then presumably he does so because he believes it makes him better off, i.e., increases his welfare. This suggests that consumers who are targets of online price personalization still benefit from their transactions.

The deeper issue is that, intuitively, there is nothing unfair per se with the retailer's capturing all of the social surplus from a transaction. Suppose that a retailer who does not personalize prices has a reservation price for a stapler of \$3. It lists it for sale at \$4. As it happens, \$4 is my reservation price for the stapler. When I purchase the stapler for \$4, the retailer captures all of the social surplus. But it doesn't seem that there is anything wrong with this. It just so happens

that I purchase an item for as much as I'm willing to pay for it. Occurrences like these are common. The same goes if the consumer, and not the retailer, captures all of the social surplus. A retailer might place the stapler on sale for \$3 in order to clear space on its shelves. When I pay \$4, I capture all of the surplus—\$1—in the transaction. It is hard to see anything wrong with this result.

It might be claimed that the problem is that, in the case of online price personalization, the retailer is *trying* to capture all of the surplus. The retailer is greedy, gobbling up all of the surplus, and intentionally leaving nothing for the consumer. But there does not seem to be anything wrong with this either. In an in-person negotiation of the price of a car or mattress, retailers and shoppers may each try to capture all of the social surplus from the transaction. The shopper will try to purchase the (e.g.) car for as close to his reservation price as possible, while the salesperson will try to sell it to him for as close to her reservation price as possible. This is common and unremarkable.

Like Marcoux, Steinberg understands the unfairness of online personalized pricing in terms of a result. The retailer captures, or seeks to capture, all of the surplus generated by a transaction, leaving none for the consumer. I have suggested that it is not wrong for the retailer (or the consumer) to try to capture all of the surplus. What matters is not the result but the process. In the competition for the surplus generated by a transaction, retailers and consumers must be on equal footing. But they are not. In online personalized pricing, retailers are playing by one set of rules and shoppers are playing by another. I have offered an intuitive way to account for the unfairness of this practice that appeals not to the results it generates, but to the process that leads to those results.

A solution

This paper offered a criticism of online personalized pricing. When online retailers personalize prices, they compete unfairly for the social surplus created by transactions. They target shoppers in a way that shoppers do not expect, and do not prepare for. I identified a distinctive wrong in online personalized pricing—a wrong found in this practice but not in other forms of price discrimination. I do not assume that other forms of price discrimination are permissible. But it is an advantage of my argument that it does not tell against them, since they attract little critical attention.

Where do we go from here? An argument that a practice is unfair is not yet an argument that it should be prohibited. Above we noted that sellers in market economies enjoy a robust freedom to price their goods as they wish, and that price discrimination can be socially beneficial, provided that it enables sellers to increase output. This increase in output

may benefit those for whom benefits matter most, assuming that it results in sales of goods to people who couldn't otherwise afford them. Could these considerations give us reason to think that online personalized pricing should in the end be permitted, in the hidden way that it is currently practiced?

Space considerations prevent a detailed exploration of this issue, but I suggest the answer is 'no'. The solution to the problem of online personalized pricing is to make it more like other forms of price discrimination. The problem with online personalized pricing is that it occurs without shoppers' knowledge or consent. By contrast, other forms of price discrimination, including second- and third-degree price discrimination, and in-person personalized pricing, occur in the open. It is plain for all to see that (e.g.) seniors pay less than non-senior adults for many things and that buying in bulk enables shoppers to get discounts on a per-item basis. Everyone knows that the prices displayed at car dealerships (etc.), are negotiable, and the final price will be in part a function of how much each party is willing to pay. This suggests that online personalized pricing would not be problematic if retailers disclosed that they were using it—or alternatively, once this practice becomes common knowledge. Then shoppers would enter online retailers' websites, as they now do car dealerships, knowing what is at stake. If online retailers are unwilling to disclose that they are personalizing prices, then the only way for them to steer clear of moral wrongdoing is to stop doing so.

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