Dynamic Pricing on Two-Sided Platforms: Consequences on Customers’ Fairness Perceptions and Purchase Intentions

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Abstract

Technological advancements simplify the application of dynamic pricing, i.e., the flexible and rapid adjustment of prices to changes in demand. Consequently, companies increasingly use dynamic pricing in their business models, although research reports negative consequences on customer fairness perceptions. This holds not only for one-sided businesses, but also for popular two-sided platforms. However, these platforms differ from one-sided businesses in that the total prices paid by customers consist of product prices and platform fees – and both price components can be dynamically adjusted. In an online experiment, we examine customers' fairness perceptions and purchase intentions when product price and platform fee change dynamically. We find that dynamic price increases reduce fairness perceptions and purchase intentions, while the cause of the price increases is irrelevant to customers. These results indicate an imbalance in the risks and benefits of dynamic pricing between the pricing strategies of the platform and the provider.

Keywords: Dynamic Pricing, Platforms, Fairness, Purchase Intention

Introduction

Dynamic pricing is an extension of traditional price discrimination that has been enabled by recent developments in technology with the aim to better align offered prices with customers' willingness to pay and, thus, to ultimately increase profit (Elmaghraby and Keskinocak 2003; Jallat and Ancarani 2008; MacKay and Weinstein 2021). While price discrimination provides different prices for different customer groups, dynamic pricing implies price adjustments in real time that is based on, among other factors, demand, customer behavior, or customer characteristics (Jayaraman and Baker 2003; Reinartz 2002). With the advancement of modern technologies such as machine learning, artificial intelligence, or cookie tracking, and the increased ability to collect and process large amounts of customer data, the implementation of dynamic pricing features has increased dramatically (Aparicio and Misra 2023; Vijay and Bhaskar 2017).

Besides the benefits of using dynamic pricing to adapt to current demand flexibly and quickly (Wang et al. 2021), empirical evidence shows that dynamic pricing decreases customers' fairness perceptions (Choi and Mattila 2004; Garbarino and Lee 2003; Haws and Bearden 2006; Maxwell 2002), with potentially negative consequences for customers' goodwill and satisfaction (Choi and Mattila 2004; Kahneman et al. 1986; Kimes and Wirtz 2002). More specifically, studies find that negative fairness perception leads to more customer complaints, the spreading of negative word-of-mouth, and the risk of avoiding future transactions (Campbell 1999; Huppertz et al. 1978; Malc et al. 2016; Xia et al. 2004). Hence, negative effects of dynamic pricing on customers' fairness perceptions cannot only be expected to reduce immediate purchase intentions but pose the ultimate risk of harming the entire business model.

Even though dynamic pricing can be observed for one-sided markets (such as airlines) as well as for two-sided platforms (such as Airbnb or Booking.com), the consequences have only been investigated for one-sided markets so far. In this case, there is only one party (i.e., the provider) that causes a price change and to whom customers can directly attribute their displeasure. Two-sided platforms, on the other hand, involve two types of participants that can cause a price change: the provider, which provides a product or service, and the platform, which enables transactions between the provider and customers (cf., Parker et al. 2016). Typically, providers charge a price for their product or service and the platform charges a fee for the matchmaking service. Hence, from a customer's perspective, there are two potential prices that can be subject to dynamic pricing on two-sided platforms and customers can observe total price changes caused by the provider, the platform, or both.[1] In fact, some platforms, for example Booking.com, actually offer dynamic pricing services to providers for adjusting product prices based on customer characteristics (Booking.com 2023). At the same time, Airbnb, for example, already adjusts its platform fee based on a variety of factors such as purchase time, length of stay, or other transaction characteristics (Airbnb 2023). The latter has also been theoretically confirmed by Zimmermann et al. (2018) as they show that platforms should use dynamic pricing of their fees to maximize profits. Hence, given this finding from existing research and the recent technological advances, we expect that not only dynamic pricing of the product or service but also the dynamic adjustment of platform fees will substantially increase.

The triangle between customers, platform, and providers as well as the fact that dynamic pricing can occur for two price components (i.e., product price and platform fee) do, however, not allow to simply adapt the conclusions about dynamic pricing from one-sided markets to two-sided platforms: unlike one-sided markets, two-sided platforms are characterized by an interplay between the platform and the provider which can lead to different consequences and fairness perceptions. Individual price changes by either participant can affect the fairness perceptions of the entire transaction and cause shared consequences for both, the platform and the provider. For instance, if a transaction is rejected, both participants face a financial loss. Similarly, the effects of simultaneous price changes on customer fairness perceptions and their tendency to complete (or reject) a transaction are completely unexplored. Given the importance of two-sided platforms and the increased use of algorithms to dynamically adjust prices (Vijay and Bhaskar 2017), we aim to answer the following research question:

RQ: *How does dynamic pricing on two-sided platforms influence customers' fairness perceptions and purchase intentions?*

[1] In general, the platform can charge a fee from either the customer, the provider, or even both. In this paper, we focus on the case in which the customer has to pay a fee to the platform (as it is the case with Airbnb, for example). However, and especially considering recent trends in regulation towards more transparency in digital markets (see, e.g., European Commission 2021; European Commission 2022), it is reasonable to expect that platform fees – even if paid by the provider – will be disclosed to customers in the future. As a consequence, also in this case, customers will be able to distinguish between the price paid to the provider and the fee charged by the platform, and our theoretical considerations remain valid.

To answer this research question, we develop our hypotheses based on equity theory (Adams 1965) which represents one of the most prominent theories in the field of social psychology. To test the hypotheses, we conduct an online experiment with 537 participants using a 2x2 between-subjects full-factorial design. We thereby manipulate the platform fee (change vs. no change) and the product price (change vs. no change) to investigate the effects of dynamic pricing on customers' fairness perceptions and, consequently, on their purchase intentions.

Our results suggest a significant negative effect of dynamic pricing (in terms of increases in the product price and platform fee) on customers' fairness perceptions. Furthermore, we find no evidence that customers on two-sided platforms care about the cause of a total price increase. Both, fairness perceptions as well as purchase intentions, decrease at the same magnitude, independent of whether the total price increase originates from a higher product price or platform fee. We conclude that customers do not consider how much (in relative terms) the respective counterparts actually pocket in but perceive all price increases as equally unfair. This leads to an imbalance between financial risk and freedom to adjust prices of platforms and providers. We contribute to literature by extending previous work on dynamic pricing to two-sided platforms, taking a holistic view that considers all three participants involved. Our work further has practical implications, highlighting the importance of transparency and coordination between platforms and providers to mitigate the negative effects of dynamic pricing on customers' perceived fairness and their purchase intentions, which ultimately drives both parties' revenues.

Related Literature

There exists a considerable body of literature that examines the impact of dynamic pricing on fairness perceptions in one-sided markets. Previous studies provide empirical evidence that the use of dynamic pricing decreases fairness perceptions in various sectors. For example, Maxwell (2002) uses a laboratory experiment and shows that knowledge about the price setting process has a significant effect on fairness perceptions in the airline industry. Garbarino and Lee (2003) also leverage a laboratory experiment to show that dynamic pricing reduces trust levels as a consequence of reduced fairness perceptions in e-retailing. Similarly, Haws and Bearden (2006) show that the use of dynamic pricing has a detrimental effect on fairness perceptions employing three laboratory experiments using high school students. Similarly, Xia and Monroe (2010) use three laboratory experiments to show that transaction similarity is an important determinant in customers' fairness perceptions. Furthermore, they provide empirical evidence that a lower price is not necessarily perceived to be a fairer price. In a survey among travelers, Choi and Mattila (2004) document that variable hotel prices lower customers' fairness perceptions. Directly identifying fairness perceptions in archival data is impossible and requires the use of proxies. Therefore, Alderighi et al. (2022) use public data of 1,100 Italian hotels from booking.com and proxy fairness perceptions based on information in customer reviews. Their findings also suggest that dynamic pricing has a negative impact on customer fairness perceptions.

All these studies, however, investigate customers' fairness perceptions in one-sided markets in which customers are typically facing price changes from only one party (i.e., provider). On two-sided platforms, however, two different types of parties, namely providers and platforms, can cause price changes. Because platforms, acting as the matchmaker between customers and providers, are typically profit-oriented, they charge participants for their service. Hence, the total price customers have to pay on two-sided platforms consists of two different price components (i.e., product/service price and fee) which can both be subject to dynamic pricing. In fact, Zimmermann et al. (2018) argue that the dynamic adjustment of fees is necessary to balance supply and demand.

Although research on two-sided platforms has experienced significant growth and evolution over the past two decades (Trabucchi and Buganza 2022) and IS research has investigated several aspects of two-sided platforms (see, e.g., Fu et al. 2018, for a literature review), the examination of fairness perceptions on two-sided platforms is largely unexplored. We are only aware of one study by Angerer et al. (2018). The authors investigate the effects of dynamic fee pricing on customers' fairness perceptions. However, they focus solely on the dynamic adjustment of the platform fee. In other words, the effect of price changes by the provider of a product or service and the platform on customers' fairness perceptions remains unexplored. In addition, there is – to the best of our knowledge – no study that compares the effects of total price changes caused by the platform with total price changes caused by the provider.

Given the characteristics of two-sided platforms (i.e., the triangle between customers, providers and a platform), understanding these effects is of high importance as decreases in fairness perceptions may jeopardy entire transactions hurting both, the platform as well as the provider. To address this research gap, we employ an online experiment that allows us to analyze the effects of product price changes and fee changes and their individual influence on customers' fairness perceptions and their tendencies to complete the transaction.

Theoretical Framework and Hypothesis Development

To develop our hypotheses, we draw on the equity theory of Adams (1965). According to equity theory, the assessment of fairness in a transaction is determined by evaluating the proportion of rewards in relation to the corresponding investment. Thereby, a transaction is perceived as fair, if the reward-to-investment ratios of all parties involved are perceived as equal. Any deviation from equality in these ratios decreases the fairness perceptions (Adams 1965).

The Effect of Dynamic Pricing on Fairness Perceptions

As outlined above, a transaction is considered to be fair if one's own reward-to-investment ratio is equal to the ratio of others. This reference ratio does not necessarily refer to a transaction of other customers, it can also refer to a previous transaction of the same customer. In our context, a customer may observe an initial total price which can be suddenly updated due to dynamic pricing. When customers observe such a total price change, they form two different ratios: the initial ratio before the total price change and the final ratio, which are then compared with each other. In more formal terms, according to equity theory, a situation with the ratios presented in equation (1) should be perceived as fair. Specifically, the ratio of the initial value (initial reward) to the initial total price (initial investment) should be equivalent to the ratio of the final value to the final total price.

$$\frac{Initial\ Value}{Initial\ Total\ Price} = \frac{Final\ Value}{Final\ Total\ Price} \tag{1}$$

On two-sided platforms, the value is contributed by two distinct parties and can be separated into the following two components: the product itself and the matchmaking service provided by the platform. Typically, the provider and the platform receive a compensation for their respective contributions. Assuming that the final value received does not change in the eyes of the customer (i.e., the customer is unaware of any quality changes to the product and the matchmaking service), equation (1) is satisfied if and only if the final total price is equal to the initial total price. Consequently, any change of the final total price leads to a deviation of equal ratios which, according to equity theory, has a detrimental effect on customers' fairness perceptions. On two-sided platforms the total price is affected by the pricing decisions of the platform and the provider. Hence, both parties can independently adjust either the platform fee or product price with consequences on customers' fairness perceptions, leading us to hypothesize:

H1A Total price changes caused by the fee decrease customers' fairness perceptions.

H1B Total price changes caused by the product price decrease customers' fairness perceptions.

As outlined above, any total price change has a negative effect on customers' fairness perceptions. Based on our application of equity theory so far, one might assume that an identical total price change would lead to the same negative effect on customers' fairness perceptions. On a two-sided platform however, it is important to note that a total price change not only affects the customer, but also how the total price change is distributed between the provider and the platform. Considering this distribution of the total price, equity theory suggests – from the customer's perspective – that the reward-to-investment ratios of the product provider and the platform should be equal as well. Put differently, for a situation to be perceived as fair, the ratio of the product price to the product value should be equal to the ratio of the platform fee to the value of the matchmaking service (cf. equation (2)).

$$\frac{ProductPrice}{ProductValue} = \frac{Fee}{MatchValue} \tag{2}$$

As a total price change can result from a change of the platform fee as well as the product price (i.e., $\Delta_{TotalPrice} = \Delta_{ProductPrice} + \Delta_{Fee}$), these changes are added to the product price and platform fee of the initially established ratios. This yields equation (3).

$$\frac{ProductPrice + \Delta_{ProductPrice}}{ProductValue} = \frac{Fee + \Delta_{Fee}}{Match\ Value}$$
$$\Leftrightarrow \frac{ProductPrice}{ProductValue} + \frac{\Delta_{ProductPrice}}{ProductValue} = \frac{Fee}{Match\ Value} + \frac{\Delta_{Fee}}{MatchValue} \quad (3)$$

When customers use the initial prices as a proxy for their value of the product and matchmaking service, equation (3) is satisfied if and only if the total price change is distributed between product provider and the platform in proportion to the value of their respective investment. In other words, the ratio of the product price change and platform fee change must be equal to the ratio of the product value to the value of the matchmaking service (cf. equation (4)), which in turn is equal to the ratio of the initial product price and fee (cf. equation (5)).

$$(3) \overset{(2)}{\Leftrightarrow} \frac{\Delta_{ProductPrice}}{\Delta_{Fee}} = \frac{ProductValue}{MatchValue} \quad (4)$$
$$\overset{(2)}{\Leftrightarrow} \frac{\Delta_{ProductPrice}}{\Delta_{Fee}} = \frac{ProductPrice}{Fee} \quad (5)$$

Consequently, following equity theory, a situation in which the product price and platform fee are proportionally adjusted (i.e., the total price change is allocated according to the respective investment), is perceived as fairer than unproportional changes. Hence, our next hypothesis is as follows:

H2 Total price changes caused by a proportional change of the product price and the platform fee are perceived to be fairer than unproportional changes.

From equation (4) we can further see that the difference in the ratios is more substantial if a fixed price change is credited to the participant contributing the lower value, i.e., having a smaller denominator in equation (3). Usually, the fee is smaller than the product price. Therefore, the matchmaking service is valued lower than the product, making the ratio of the platform more sensitive to changes. Consequently, a unilateral change of the platform fee leads to a more significant deviation from equal ratios and hence, lower fairness perceptions compared to a unilateral change of the product price. Therefore, we hypothesize:

H3 Total price changes caused by the platform fee have a more substantial negative effect on fairness perceptions than total price changes caused by the product price.

The Mediating Effect of Fairness Perceptions on Purchase Intentions

Research conducted in one-sided markets points out that customers' fairness perceptions are positively related to purchase intentions (Campbell 1999; Garbarino and Maxwell 2010; Xia and Monroe 2010), which are "a surrogate measure of actual purchase" (Lee et al. 2011, p. 544). Hence, we also expect a positive relation of the fairness perceptions and the purchase intentions on two-sided platforms. As we hypothesize that changes in the product price and platform fee reduce fairness perceptions (H1A and H1B) we expect a corresponding reduction in the purchase intentions. Consequently, we hypothesize:

H4 Total price changes influence customers' purchase intentions indirectly via customers' fairness perceptions.

To summarize our hypotheses, we expect dynamic pricing, represented by product price changes and platform fee changes, to decrease fairness perceptions (H1A and H1B) and consequently reducing customers' purchase intentions (H4). However, total price changes caused by the platform fee are perceived less fair than total price changes caused by the product price (H3). Finally, the negative effect on fairness perceptions can be mitigated by proportionally changing the product price and the platform fee (H2). Our research model is illustrated in Figure 1 and indicates the respective hypotheses developed above.

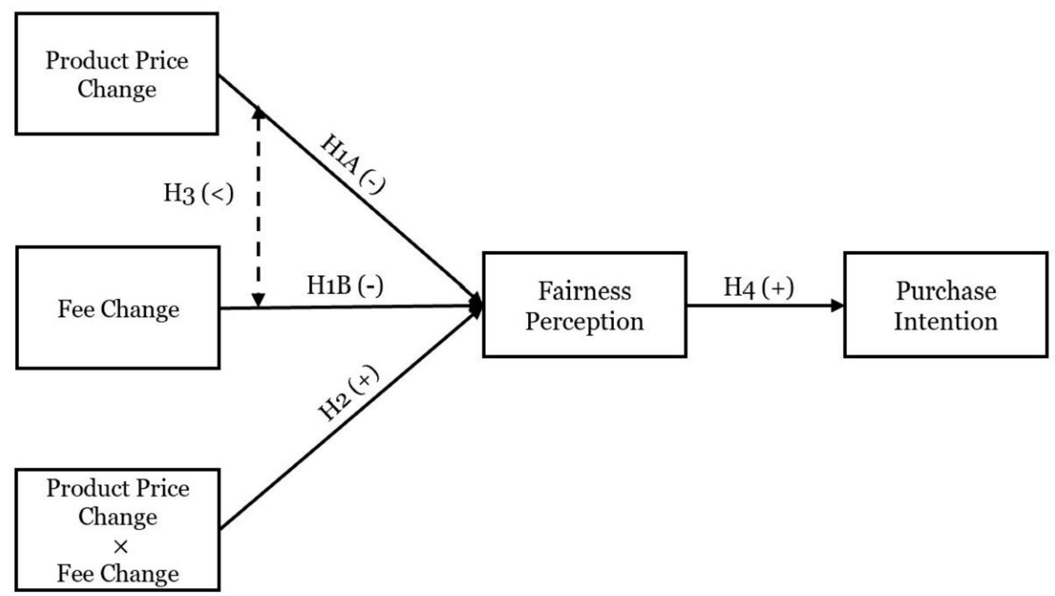

Figure 1. Research Model

Study Design

To test our hypotheses, we conduct an online experiment using a 2x2 between-subjects full-factorial design to isolate the individual effects of product price changes and platform fee changes on customers' fairness perceptions and purchase intentions.

Scenario Description

Throughout the experiment, we use a fictitious ridesharing scenario which is similar to Uber. We opt for ridesharing because it is very popular in the United States. In the scenario we divide the total price into the product price paid to the driver (i.e., trip fare) and the fee paid to the platform (i.e., booking fee). For the sake of readability, we refer to trip fare as fare and booking fee as fee for the remainder of the paper. In the fictitious scenario, participants are put in the situation where they look for a ride from John F. Kennedy Airport to Central Park and can use the ridesharing service named "SciCar". Participants automatically receive an initial offer from SciCar, which is suddenly updated with the information that their prices may have changed during the booking process. The scenario ends after participants either accept or refuse the offer by SciCar.

Treatment Variation

As outlined above, participants receive a notification that their prices may have changed during the booking process. Although participants observe real price changes during the experiment (except for the control group, see below for details), the final total price of the ride is the same for all participants. Following real-world prices, the final price for the ride that is shown to all participants is $80 and consists of the fee ($24) and the fare ($56). By keeping the final prices constant (rather than the initial prices before the price change), we ensure that participants in all groups are exposed to the same realistic prices for the ride, thus removing the effects of price-demand relationships. In other words, participants initially observe different prices but end up with the same final total price of $80. If we altered the final total price, participants presented with a price increase (decrease) would observe generally expensive (cheap) offers and potentially be biased in their fairness perceptions and purchase intentions.

The price change from the initial price to the final price represents our treatment variation which is caused by either (i) a change in the fare, (ii) a change in the fee, or (iii) changes in both, the fare and the fee.

Independent of the cause of the price change, we follow Blattberg et al. (1995) who proposed a total price change of ±20% to increase the ability to compare and generalize the effect of price changes across studies. In our scenario this corresponds to a total price change (Δ_{Total}) of ±$16. Depending on the treatment group, this price change is either fully attributed to the respective price component (i.e., fee or fare) or proportionally attributed to both price components.

In more detail, for participants who only encounter a unilateral change in the fee (treatment FeeChange), this means that the entire $16 change is due to the fee. Thus, these treatment groups start with an initial fee of $8 in the increase group and $40 in the decrease group respectively. Similarly, participants experiencing only a unilateral change in the fare (treatment FareChange), start with an initial fare of $40 ($72), such that the initial fare increases (decreases) by $16 compared to the fare in the final offer. When both, the fare and the fee, change (treatment PropChange), the price change is proportionally attributed to both price components. Since the ratio of fare to fee is 70:30 in the final total price, the total price change of $16 is distributed in the same ratio. Hence, an initial fare of $44.80 ($67.20), and an initial fee of $19.20 ($28.80) results in a proportionally allocated total price increase (decrease) of $16.

In the control group (treatment NoChange), none of the prices change during the experiment. Nevertheless, participants in the control group receive the same notification of potential price changes to eliminate the potential effects of the mere awareness of a dynamic pricing strategy. Table 1 summarizes the treatment variations.

		Fee Variation	
		No Change	Change
Fare Variation	No Change	**NoChange** $\Delta_{Fee}=\$0$ $\Delta_{Fare}=\$0$ $\Delta_{Total}=\$0$	**FeeChange** $\Delta_{Fee}=\pm\$16$ $\Delta_{Fare}=\$0$ $\Delta_{Total}=\pm\$16$
	Change	**FareChange** $\Delta_{Fee}=\$0$ $\Delta_{Fare}=\pm\$16$ $\Delta_{Total}=\pm\$16$	**PropChange** $\Delta_{Fee}=\pm\$11.80$ $\Delta_{Fare}=\pm\$4.20$ $\Delta_{Total}=\pm\$16$

Table 1. Treatment Variations

Notes: The table indicates changes of the initial price compared to the final price. The final price information is fixed for all participants (i.e., $24 fee, $56 fare, $80 total).

Main Variables

As suggested by Fink (2022), we leverage our online experiment to record behavior of our participants. As outlined in the scenario description, participants can either accept or refuse the offer Hence, instead of querying purchase intentions through our questionnaire, we directly measure purchase intentions through their decision to accept or refuse the offer. Therefore, *PurchaseIntention* is a binary variable being one if participants accept the final offer and zero if they refuse it.

After completing the scenario, participants are asked how they perceived the final total price. We adapted items from Xia and Monroe (2010) and Bolton et al. (2010) and asked participants whether they perceive the total price they have to pay as “fair”, “unfair”, “unreasonable”, “acceptable” and “just”. Answers are given on a seven-point Likert-scale measuring the level of agreement ranging from 1 = “Strongly Disagree” to 7 = “Strongly Agree”. We choose to use an agreement scale instead of a bipolar scale to avoid overly extreme responses (Moors et al. 2014). For our construct *Fairness*, we averaged the five items after checking Cronbach’s Alpha. The first row of Table 2 summarizes the items used.

Control Variables

At the end of the survey, participants answer general questions about their personal experience using ridesharing platforms (*Familiarity*) as experienced customers may use their knowledge of the product or platform to form their fairness perceptions (Sternthal and Craig 1982). Familiarity using ridesharing platforms is measured on a 5-point scale labeled: 1 (daily), 2 (weekly), 3 (monthly), 4 (rarely) to 5 (never).

We also measure participants' price sensitivity as it might affect their responses to price changes. Price sensitivity (*PriceSens*) is measured using a 7-point Likert scale measuring agreement adapting three items developed by Zeithaml et al. (1996) and Wakefield and Inman (2003). A high value indicates high levels of price sensitivity. As before, we average the respective items to the construct price sensitivity.

Similar to price sensitivity, participants may have different justice sensitivities, such that they react differently when confronted with unfair situations. Research indicates that justice sensitivity is linked to biases in information processing of unjust information (Baumert et al. 2011). Schmitt et al. (2005) conclude that observer and beneficiary sensitivity will lead to more concern for justice for others while victim-sensitive people have a lower threshold for perceiving themselves as being exploited (Schmitt et al. 2005; Schmitt et al. 2010). Hence, we include the ultra-short version of the justice sensitivity scales developed by Baumert et al. (2014), using six items. Items are averaged to form an overall measure of justice sensitivity (*JusticeSens*). Table 2 summarizes the constructs and their respective items.

Finally, we ask the participants about sociodemographic factors including *Age*, *Gender*, *Education*, and *Income*.

Construct	**Items**	**Alpha**	**Adapted from**
Fairness	The total price I have to pay is fair.	∝ = 0.96	Xia and Monroe (2010)
	The total price I have to pay is unfair. (-)		
	The total price I have to pay is unreasonable. (-)		
	The total price I have to pay is acceptable.		
	The total price I have to pay is just.		Bolton et al. (2010)
Familiarity	How often do you use ridesharing platforms?		–
Price sensitivity	I am willing to make an extra effort to find a low price.	∝ = 0.73	Wakefield and Inman (2003)
	I will change what I had planned to buy to take advantage of a lower price.		
	I will take some of my business to a competitor that offers better prices.		Zeithaml et al. (1996)
Justice sensitivity	It makes me angry when others are undeservingly better off than me.	∝ = 0.82	Schmitt et al. (2010)
	It worries me when I have to work hard for things that come easily to others.		
	I am upset when someone is undeservingly worse off than others.		
	It worries me when someone has to work hard for things that come easily to others.		
	I feel guilty when I am better off than others for no reason.		
	It bothers me when things come easily to me that others have to work hard for.		

Table 2. Item Scales and Measurement Properties

Attention and Manipulation Checks

To ensure that participants pay full attention to the experiment and the scenario description, we implement several attention checks. For this purpose, we use basic true/false questions about the scenario description (e.g., city, type of transportation). To further guarantee that participants correctly observe the price changes and the experimental manipulations, we also implement a set of manipulation checks. In more detail, participants are asked based on true/false answer options about the fare and/or fee changes in their respective groups. Importantly, these questions are asked after the fairness perceptions query to avoid bias. If participants fail to answer the attention or manipulation checks correctly, their questionnaire is considered invalid and they are excluded from the experiment.

Procedure

Participants were recruited using the Connect™ platform powered by CloudResearch® and randomly assigned to one of the groups outlined above. The survey was implemented using SoSci Survey, a professional tool for the development of online questionnaires.

On the welcome page, participants are provided with a short description of the scenario (i.e., they are on a trip to New York and want to book a car ride from John F. Kennedy Airport to Central Park), including the distance they must travel (19 miles) and information about the price structure used on the subsequent pages.

On the next page, participants receive initial information about the fee charged by the platform, the fare received by the driver, and the total price they have to pay to complete the transaction (see the left panel of Figure 2). As outlined above, these price components change depending on the group to which participants are randomly assigned. While participants can then either accept or refuse the initial offer, they do not receive a booking confirmation, but instead see a pop-up window. In the pop-up window, participants must complete a captcha before proceeding (see the middle panel of Figure 2). We deliberately use this pop-up window to implement the price change. After completing the captcha, participants receive the notification that prices may have changed including (potentially) new prices. Independent of their initial choice, participants again have to either accept or refuse this final offer (see the right panel of Figure 2).

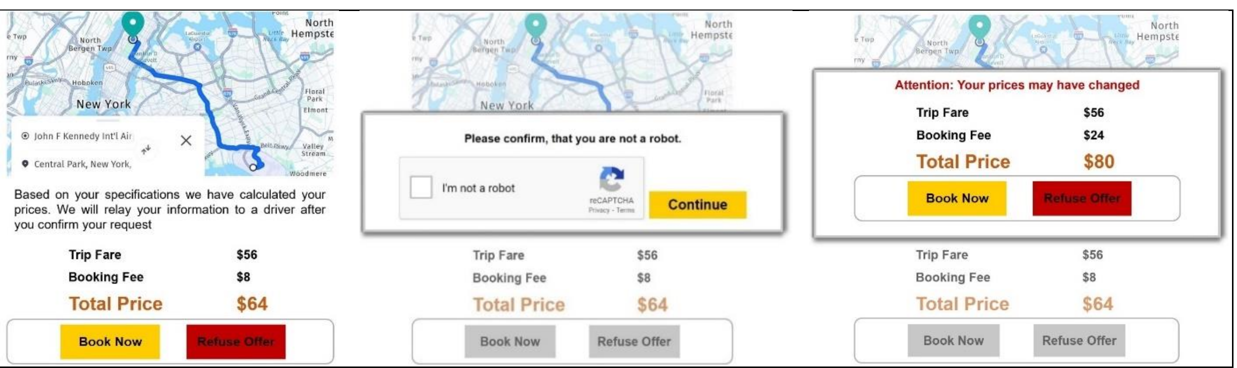

Figure 2. Price Information Before and After the Price Change[2]

After accepting or refusing the offer, participants are forwarded to several survey pages. First, they are asked about their fairness perceptions. Items are presented in random order to avoid a potential order bias. Second, participants must pass a set of manipulation checks outlined above. Third, participants are queried

[2] As outlined in the treatment variation, the final total price (right panel of Figure 2) is the same across all groups, but the initial price varies (left panel of Figure 2). Figure 2 exemplarily illustrates the FeeChange treatment, in which only the fee is changed and the fare remains equal in the initial and final offer.

about their familiarity with using ride-sharing platforms, their price sensitivity and justice sensitivity. Fourth and finally, participants are asked to provide sociodemographic information.

Pre-Testing

Prior to conducting the experiment, we perform a pre-test using 200 participants to assess whether the instructions are clear and to eliminate potential ambiguities. Participants were recruited using Connect™ to form a comparable reference to the main experiment. After pre-testing we adjusted the scenario description to eliminate potential issues and ambiguities. Based on participants feedback, we adapted several aspects of the experiments for increased clarity, for example by increasing the font sizes and changing colors. Furthermore, we restructured the questionnaire by including manipulation checks after asking about their fairness perceptions to avoid potential priming effects.

Analysis and Results

Sample and Summary Statistics

A total of 700 participants completed our experiment without failing any attention and manipulation check questions. Prior to analysis, we removed participants with contradictory answers or with completion times that are too short to make an honest and reflective participation plausible. Such "speeders" are a common problem when collecting data through online surveys (Ford 2017). The final dataset consists of 537 participants.

To test if our experiment is well randomized, we use an ANOVA to compare control variables based on Likert-scales (*PriceSens, JusticeSens*) or continuous scales (*Age, Income*). Chi-Square tests are used to determine differences in answer frequencies in our categorical variables (*Gender, Income* and *Familiarity*). As we find no significant differences for any control variable, we can conclude that the randomization is appropriate.

The summary statistics of our main variables *Fairness* and *PurchaseIntention* are presented in Table 3. Columns represent the respective groups. The last column of Table 3 indicates whether the means are statistically significant from each other based on ANOVA (for *Fairness*) and a Chi-Square test (for *PurchaseIntention).* When pooling total price increases and total price decreases together as general total price changes (i.e., Panel A of Table 3), we observe no differences in means for *Fairness* ($F(1,535)=1.308$, $p>0.1$) and for *PurchaseIntention* ($\chi^2(3)=1.556$, $p>0.1$). Panel B and Panel C, however, separately summarize and test total price increases and decreases. For total price increases, we find a significant difference in means for *Fairness* ($F(1,340)=9.348$, $p=0.001$) and *PurchaseIntention* ($\chi^2(3)=24.980$, $p<0.001$). For total price decreases, on the other hand, we do not observe a significant difference in means for *Fairness* ($F(1,279)=0.134$, $p>0.1$) but for *PurchaseIntention* ($\chi^2(3)=8.190$, $p=0.042$).

When comparing the mean values across the groups, we observe that both, *Fairness* and *PurchaseIntention* decrease in case of a total price increase (Panel B). In contrast, they are inconclusive (*Fairness)* or increase (*PurchaseIntention)* in case of a total price decrease (Panel C). This finding is somewhat unexpected, as we hypothesize similar effects for both, total price increases and total price decreases. However, it can explain the absence of a general significant difference in *Fairness* and *PurchaseIntention* for the aggregated total price changes in Panel A. We can therefore conclude that it is not reasonable to combine total price increases and total price decreases as general total price changes, as effects tend to offset or weaken each other. Furthermore, as the ANOVA for total price decreases already indicates that participants' perceptions of *Fairness* is not significantly affected by the treatment variation, we cannot confirm our hypotheses H1-H3 for dynamic price decreases. This also implies that for these treatments, a mediation via *Fairness* to *PurchaseIntention* (H4) cannot exist. For the price increase treatments, ANOVA confirms that there is a significant influence on both, *Fairness* and *PurchaseIntentions*. Therefore, in the remainder of the paper, we continue with our detailed analysis and hypotheses testing for total price increases.

Panel A: Entire Sample	**NoChange n = 86**	**FeeChange n = 149**	**FareChange n = 148**	**PropChange n = 154**	**Difference in means**
Fairness	3.163 (1.600)	2.801 (1.442)	2.734 (1.373)	2.832 (1.432)	F = 1.308 p = 0.253
PurchaseIntention	32.6% (0.471)	27.5% (0.448)	25.0% (0.434)	27.9% (0.450)	χ^2 = 1.556 p = 0.669
Panel B: Increase Sample	**NoChange n = 86**	**FeeChange n = 83**	**FareChange n = 86**	**PropChange n = 86**	**Difference in means**
Fairness	3.163 (1.600)	2.595 (1.313)	2.588 (1.201)	2.455 (1.111)	F = 9.348 p = 0.002
PurchaseIntention	32.6% (0.471)	9.6% (0.297)	12.8% (0.336)	8.0% (0.274)	χ^2 = 24.980 p < 0.001
Panel C: Decrease Sample	**NoChange n = 86**	**FeeChange n = 66**	**FareChange n = 62**	**PropChange n = 67**	**Difference in means**
Fairness	3.163 (1.600)	3.061 (1.561)	2.935 (1.570)	3.322 (1.647)	F = 0.134 p = 0.715
PurchaseIntention	32.6% (0.471)	50.0% (0.504)	41.9% (0.497)	53.7% (0.502)	χ^2 = 8.190 p = 0.042

Table 3. Summary Statistics

Notes: Statistical significance for differences in means is based on ANOVA for *Fairness* and based on a Chi-square test for *PurchaseIntention*.

Hypotheses Testing

To test for effects on the customers' perceptions of *Fairness* (hypotheses H1A, H1B and H2), we perform multivariate regression analysis by estimating the ordinary least squares model

$$Fairness = \beta_0 + \beta_1 FeeChange + \beta_2 FareChange + \beta_3 FeeChange \times FareChange + \delta Controls + \varepsilon, \quad (6)$$

where *Fairness* is the dependent variable. Because all participants are confronted with the exact same absolute total price change, the independent variables *FeeChange* and *FareChange* capture the proportion of the total price change accounted for by the change in the fee (hypothesis H1A) or fare (hypothesis H1B) respectively. Thus, *FareChange* is one if the total price increase is exclusively caused by the fare. Analogously, *FeeChange* is one if the total price increase is exclusively caused by the fee. When total price changes are caused by the proportional change of the fare and the fee, *FareChange* is 0.7 and *FeeChange* is 0.3 because the total price increase is split proportionally in a 70:30 ratio. In all other cases, the value of *FareChange* and/or *FeeChange* is equal to zero.

We further include the interaction term *FeeChange* × *FareChange* which captures the additional effect of the proportional change of the fee and the fare, compared to the independent effects of unilateral changes captured in *FeeChange* and *FareChange* (hypothesis H2). Finally, *Controls* is a vector including all control variables outlined before. ε represents the remaining error term. Robust standard errors are used.

The regression results are presented in column (1) of Table 4. We find that both, *FeeChange* (β_1=-0.561, p=0.005) and *FareChange* (β_2=-0.533, p=0.007) significantly decrease *Fairness*. Hence, even though all participants have to pay the same final total price to complete the transaction, total price changes caused by the increase of the fee or the fare, significantly decrease the customers' fairness perceptions. Thus, we find partial (as it only holds for total price increases) support for hypotheses H1A and H1B.

To test hypothesis H2, the additional effect of the proportional change of the fee and the fare is relevant. However, we find no significant effect of the interaction *FeeChange* × *FareChange* (β_3=-0.332, p>0.1). This suggests that total price increases through a proportional adjustment of the fare and the fee are not perceived significantly fairer than total price increases caused by unilateral changes. Consequently, we find no support for hypothesis H2.

Dependent Variable	(1) *Fairness*	(2) *PurchaseIntention*	(3) *PurchaseIntention*
FeeChange	-0.561*** (0.200)	-0.237*** (0.053)	-0.168*** (0.048)
FareChange	-0.533*** (0.198)	-0.203*** (0.049)	-0.135*** (0.045)
FeeChange × *FareChange*	-0.332 (0.831)		
Fairness			0.121*** (0.013)
Observations	342	342	342
Adjusted R^2	0.089	0.108	0.285

Table 4. Regression Results

Notes: ***p < 0.01, **p < 0.05, * p < 0.1. Robust standard errors are used and shown in parentheses. All control variables are included.

To test hypothesis H3, which states that total price changes caused by the fee have a more substantial negative effect on fairness perceptions than total price changes caused by the product price, we need to compare the coefficients of *FareChange* and *FeeChange* on *Fairness*. At first glance, we can see in column (1) of Table 4 that effects are very similar (β_1=-0.561, p=0.005; β_2=-0.533, p=0.007). Using a linear combination test, we can furthermore conclude that there is no significant difference between the two coefficients (p>0.1). Hence, the negative effects of fare increases and fee increases on fairness perceptions do not significantly differ. Therefore, we find no support for hypothesis H3.

Next, we examine hypothesis H4 which states that total price changes influence purchase intentions indirectly via customers' fairness perceptions. More specifically, we separate the cause of the total price change into fare increase and fee increase and examine how these increases affect customers' purchase intentions. We first analyze the total effect by estimating the following logistic regression:

$$PurchaseIntention = \beta_0 + \beta_1 FeeChange + \beta_2 FareChange + \delta Controls + \varepsilon \quad (7)$$

We use logistic regression as our dependent variable *PurchaseIntention* is a binary variable being one if a participant accepted the updated offer from the platform and zero otherwise. We include our independent variables *FeeChange* and *FareChange*, together with our control variables (*Controls*) and use robust standard errors. As we did not observe any significant effect of the interaction term *FeeChange* × *FareChange* on *Fairness* in the analysis above, we do not include the interaction term in this equation.

The results, reported in column (2) of Table 4, indicate a significant total effect of *FeeChange* (β_1=-0.237, p<0.001) and *FareChange* (β_2=-0.203, p<0.001) on *PurchaseIntention*. Thus, the negative signs indicate that participants are less likely to accept the offer if either the fare or the fee increases.

To examine whether this significant total effect is mediated via *Fairness*, we extend logistic regression model outlined in equation (7) above with the mediating variable as follows:

$$PurchaseIntention = \beta_0 + \beta_1 FeeChange + \beta_2 FareChange + \gamma Fairness + \delta Controls + \varepsilon \quad (8)$$

Results are reported in column (3) of Table 4. We find a significant effect of *Fairness on PurchaseIntention* (γ=-0.121, p<0.001) indicating that the fairness perceptions are an important determinant for participants' purchase intentions. Furthermore, the coefficients of *FeeChange* (β_1=-0.168, p<0.001) and *FareChange*

(β_2=-0.135, p<0.001) are reduced but remain significant, indicating a partial mediation of the effect on *PurchaseIntention* via *Fairness*.

To statistically test and quantify the indirect effects of the total price changes caused by fare or fee increases via *Fairness*, we conduct a formal mediation analysis using the PROCESS macro (Model 4) for R (Hayes 2022). We assess the statistical significance via a bootstrapping procedure. According to Hayes (2022), the bootstrapping confidence interval tends to have higher power compared to traditional test by Sobel (1982). Therefore, we estimate the 95% confidence interval for the indirect effects using 5,000 bias-corrected bootstrapping samples. The results of the mediation analysis are summarized in Table 5.

	Effect	SE	LLCI	ULCI
FeeChange → PurchaseIntention	**-1.627**	0.537	-2.679	-0.575
FeeChange → Fairness → PurchaseIntention	**-0.537**	0.240	-1.088	-0.156
FareChange → PurchaseIntention	**-1.008**	0.450	-1.889	-0.126
FareChange → Fairness → PurchaseIntention	**-0.526**	0.224	-1.049	-0.167

Table 5. Mediation of Fare Increases and Fee Increases Through Fairness on Purchase Intentions

Notes: Results based on 5,000 bootstrapping samples. LLCI/ULCI = lower/upper limit of 95% confidence interval. All control variables are included. Effects in bold font indicate significance at the 5%-level.

We find significantly negative indirect effects of *FeeChange* (β_1=-0.537 p<0.05) and *FareChange* (β_2=-0.526, p<0.05) on *PurchaseIntention* through *Fairness*. This indicates that *Fairness* partially mediates the effect of total price changes on *PurchaseIntention,* lending partial (as it only holds for total price increases) support to our hypothesis H4. As we also observe statistically significant direct effects, we observe a partial mediation via fairness perceptions. In more detail, we observe that the indirect effect via *Fairness* accounts for approximately 25% (34%) of the total effect of fee (fare) increases on *PurchaseIntention*.

Conclusion and Discussion

Compared to one-sided markets, transactions on two-sided platforms involve more than two participants with a total price that compromises two components that can each be individually targeted by dynamic pricing strategies. Because findings from one-sided markets cannot be simply transferred to this more complex setting, this study adds to the understanding of the impact of dynamic pricing on customers' fairness perceptions on two-sided platforms.

The results of our study indicate that – contrary to our expectations from theory – only total price increases have a significant effect on customers' fairness perceptions but not decreases. Focusing on situations where dynamic pricing results in higher total prices, we find a significant negative effect of total price increases on fairness perceptions. More specifically, both increases in the fee and increases in the product price lead to a decrease in customers' fairness perceptions (hypotheses H1A & H1B). Contrary to our expectations, the proportional change of the product price and the fee does not mitigate the negative effect of total price increases on fairness perceptions (hypothesis H2). Moreover, when comparing the effect sizes, no significant difference is found between total price increases caused by the product price and total price increases caused by the fee (hypothesis H3). Thus, these results suggest that the cause of the total price increase does not significantly affect customers' fairness perceptions. As a consequence of dynamic pricing on customer behavior, we find that the observed decrease in fairness perceptions further leads to a decrease in customers' purchase intentions (hypothesis H4).

Theoretical Contributions

With this study, we contribute to the existing literature on the effects of dynamic pricing on customers' fairness perceptions which heavily focuses on one-sided markets. Drawing on the equity theory developed by Adams (1965), we extend the findings of previous studies to investigate how price changes due to dynamic pricing affect customers' fairness perceptions on two-sided platforms. As such, our study contributes to a better understanding of pricing decisions on two-sided platforms and emphasizes the importance of considering all parties involved in a transaction. In more detail, equity theory suggests that for a customer to perceive a transaction as fair, not only the relationship between the customer and two other participants, i.e., the provider and the platform, has to be equitable, but the relationship between these other two participants as well. On this basis, equity theory would suggest that if the total price is changed, the additional revenue should be shared between the provider and the platform according to the value they contribute. The transaction should be perceived as less fair the more the allocation of additional revenue deviates from this optimal allocation. However, contrary to theory, we find no evidence that the allocation of additional revenue between these two transaction partners does affect customers' fairness perceptions when total prices increase. This could be due to a lack of social norms (e.g., Maxwell and Garbarino 2010) for a "fair" allocation between the provider and the platform or, as Xia et al. (2004) point out, because fairness judgments are biased toward customers' self-interest. Customers on two-sided platforms might just not value the relationship between the provider and the platform high enough to significantly consider their interests in their fairness perceptions.

In addition, our findings raise doubts with respect to the applicability of equity theory to the case where prices are dynamically decreased on two-sided platforms as we do not find the expected differences in participants' fairness perceptions. Although some previous findings from one-sided businesses are aligned with equity theory (e.g., Xia and Monroe 2010), these studies have commonly examined special cases where customers experienced a price decrease in comparison to a friend or peer and not the more general case of a quick change compared to the own reference price. Hence, it is likely that fairness perceptions for one-sided business might also be unaffected by dynamic price decreases in the absence of a comparison to an emotionally connected person. In this case, customers might not scrutinize causes of price reductions and simply be guided by their self-interest (Xia et al. 2004).

Practical Implications

Besides the theoretical contribution of the paper, our study also provides important managerial implications. Our findings suggest that customers on two-sided platforms do not care about the cause of a total price increase: the decrease in fairness perceptions as well as purchase intentions is not significantly different whether the total price increase originates from a higher fare or fee. While the total price change is of same amount in absolute (US-Dollar) terms, the fee increase is substantially higher in relative terms (+200%) compared to the fare increase (+40%). Hence, customers do not consider how much (in relative terms) the respective counterparts actually pocket in but only consider the overall change of the total price to form their fairness perceptions.

As a consequence, there is an imbalance between risk and freedom of dynamic pricing on two-sided platforms. Providers (usually adding more value to an individual transaction) have a disproportionately small amount of freedom to adjust their prices in relative terms. In contrast, platforms (typically adding less value to an individual transaction) can adjust their fees disproportionately strong in relative terms. However, in the event of an adverse customer reaction to any price change, i.e., rejecting of an offer, providers bear substantially more risk than platforms. They have more to lose as they miss out on more revenue compared to the matchmaking platform. Regulators should take these imbalances into account and, for example, ensure greater transparency regarding demanded fees. Although the Digital Markets Act (European Commission 2022) and pricing regulations of the European Union (see, e.g., European Commission 2021) already force platforms to disclose more relevant information on prices and fees, this transparency is only required for occurred, past transactions. It does, however, not refer to transactions that have been rejected by customers. As our findings suggest that fee increases have the same negative consequences on whether a transaction takes place or not as product price increases, platforms should be required to constantly disclose the demanded fees. This could be implemented by, e.g., adding a timeline to the providers profile that shows the fees demanded by the platform over time. With this increase of transparency, platforms may be less likely to exorbitantly change fees over time and providers may be able to include fee information in their own pricing strategy.

However, regardless of future requirements for increased transparency, we advise platforms and provider to coordinate their dynamic pricing strategy because of the high interdependence of both parties' decisions and the financial consequences for both of them in case a customer rejects an offer. Such a coordination is very crucial as we do not find a compensating positive effect of price reductions on customers' fairness perceptions. In other words, there is no possibility that both parties can increase customers' fairness perceptions again with decreasing prices. Hence, an uncoordinated and excessive use of dynamic pricing may harm the joint business model in the long run for both, the platform and the providers.

Limitations and Future Research

Our study is not without limitations which, however, can serve as a starting point for future research. First, we use a between-subjects full-factorial design to determine the fairness perceptions based on a single transaction after a single adjustment of the product price and/or platform fee. In reality, customers of (ridesharing) platforms may interact with the platform repeatedly, providing better reference points for determining fair product prices and platform fees. Thus, repeated interactions over multiple periods may allow participants to form more robust fairness perceptions. Furthermore, there may be aggregate effects of multiple observed price changes that influence customers fairness perception. Future research could hence investigate scenarios in which customers interact with the platform for longer periods of time and experience more price changes. In this way, one would not only examine the short-term consequences of decreased fairness perception due to dynamic pricing but also the long-term consequences, including further customer behavior such as spreading of negative word-of-mouth. This is a worthwhile direction for future research as it is yet unknown whether negative effects of price changes aggregate over time or not.

Second, we test our hypotheses in the context of a fictitious ride-sharing platform because ride-sharing platforms have become very popular and heavily used in the United States. Therefore, we expect that study participants are familiar with this service and have a good intuition about reasonable prices. However, on ride-sharing platforms, some customers may confuse drivers with employees of the platform rather than independent workers offering their service through the platform. If the distinction between the platform and the provider is unclear, it may hinder participants' understanding of the source of a product price change or platform fee change, respectively. In a similar vein, some platforms do not charge the platform fees from the customer but from the service provider only. Although our theoretical considerations are a valid foundation in this case as well, this needs further experimental investigation. Hence, future research should investigate the consequences of dynamic pricing on other types of platforms to examine platforms that charge a fee from the provider which is, however, observable by the customer.

Third, our study focusses on the situation where customers observe a change of their own price. However, as investigated by studies in one-sided markets, dynamic pricing on two-sided markets can lead to different product prices and platform fees across individuals or customer groups. Future research could investigate the effect of dynamic pricing on fairness perceptions when customers can compare product prices and platform fees with those paid by other customers instead of their own prices over time.

Furthermore, our results suggest that fairness perceptions only partially mediate the effect of dynamic price changes on purchase intentions, as we find an indirect effect via fairness perceptions that accounts for approximately 25%-34% of the total effect. As we eliminated price sensitivity as a potential influencing factor by our study design, this gives reason to suspect that there may be additional mediators. Future research could examine additional mediators such as other emotional reactions to provide a more complete understanding of the effects of dynamic pricing on purchase intentions.

Finally, the interdependence of platform and provider on customers' fairness perceptions and resulting purchase intentions as well as the aforementioned imbalance between freedom and risk in dynamic pricing on two-sided platforms raise an interesting game theoretical problem. Because platforms and providers share the same margin for price adjustments, but platforms bear a substantially lower risk, they can react slower to price adjustments by the provider than the other way round (i.e., providers need to react quicker to price adjustments by the platform). In the extreme case, platforms could potentially adjust their fees freely to maximize profits, while the provider would have to react by adjusting its offered product price to avoid losing the transaction. Future research could explore this issue in a game-theoretical model to investigate the relationship between the dynamic pricing of platforms and providers and to examine their dominant strategies.

References

Adams, J. S. 1965. "Inequity in social exchange," *Advances in Experimental Social Psychology* (2), pp. 267-299.

Airbnb 2023. *Airbnb service fees - Airbnb Help Center*. https://www.airbnb.com/help/article/1857. Accessed May 4, 2023.

Alderighi, M., Nava, C. R., Calabrese, M., Christille, J.-M., and Salvemini, C. B. 2022. "Consumer perception of price fairness and dynamic pricing: Evidence from Booking.com," *Journal of Business Research* (145), pp. 769-783.

Angerer, P., Zimmermann, S., Pale, G., Salomon, G., Provin, D., Kathan, W., and Matzler, K. 2018. "The Impact of Dynamic Two-Sided Platform Pricing on Fairness Perception in the Sharing Economy," in *Proceedings of the 51st Hawaii International Conference on System Sciences*, T. Bui (ed.), Hawaii International Conference on System Sciences, pp. 675-684.

Aparicio, D., and Misra, K. 2023. "Artificial Intelligence and Pricing," in *Artificial Intelligence in Marketing*, K. Sudhir and O. Toubia (eds.), Bingley: Emerald Publishing Limited, pp. 103-124.

Baumert, A., Beierlein, C., Schmitt, M., Kemper, C. J., Kovaleva, A., Liebig, S., and Rammstedt, B. 2014. "Measuring four perspectives of justice sensitivity with two items each," *Journal of personality assessment* (96:3), pp. 380-390.

Baumert, A., Gollwitzer, M., Staubach, M., and Schmitt, M. 2011. "Justice Sensitivity and the Processing of Justice–Related Information," *European Journal of Personality* (25:5), pp. 386-397.

Blattberg, R. C., Briesch, R., and Fox, E. J. 1995. "How Promotions Work," *Marketing Science* (14:3), pp. 122-132.

Bolton, L. E., Keh, H. T., and Alba, J. W. 2010. "How Do Price Fairness Perceptions Differ across Culture?" *Journal of Marketing Research* (47:3), pp. 564-576.

Booking.com. 2023. *Pricing Toolkit | Booking.com for Partners*. https://partner.booking.com/en-us/solutions/advice/pricing-toolkit. Accessed May 2, 2023.

Campbell, M. C. 1999. "Perceptions of Price Unfairness: Antecedents and Consequences," *Journal of Marketing Research* (36:2), pp. 187-199.

Choi, S., and Mattila, A. S. 2004. "Hotel revenue management and its impact on customers' perceptions of fairness," *Journal of Revenue and Pricing Management* (2), pp. 303-314.

Elmaghraby, W., and Keskinocak, P. 2003. "Dynamic Pricing in the Presence of Inventory Considerations: Research Overview, Current Practices, and Future Directions," *Management Science* (49:10), pp. 1287-1309.

European Commission. 2021. *Commission Notice - Guidance on the interpretation and application of Directive 2005/29/EC of the European Parliament and of the Council concerning unfair business-to-consumer commercial practices in the internal market*.https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC1229(05). Accessed May 3, 2023.

European Commission. 2022. *Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828*: *Digital Markets Act*. http://data.europa.eu/eli/reg/2022/1925/oj. Accessed May 3, 2023.

Fink, L. 2022. "Why and How Online Experiments Can Benefit Information Systems Research," *Journal of the Association for Information Systems* (23:6), pp. 1333-1346.

Ford, J. B. 2017. "Amazon's Mechanical Turk: A Comment," *Journal of Advertising* (46:1), pp. 156-158.

Fu, W., Wang, Q., and Zhao, X. 2018. "Platform-based service innovation and system design: a literature review," *Industrial Management & Data Systems* (118:5), pp. 946-974.

Garbarino, E., and Lee, O. F. 2003. "Dynamic pricing in internet retail: Effects on consumer trust," *Psychology and Marketing* (20:6), pp. 495-513.

Garbarino, E., and Maxwell, S. 2010. "Consumer response to norm-breaking pricing events in e-commerce," *Journal of Business Research* (63:9-10), pp. 1066-1072.

Haws, K. L., and Bearden, W. O. 2006. "Dynamic Pricing and Consumer Fairness Perceptions," *Journal of Consumer Research* (33:3), pp. 304-311.

Hayes, A. F. 2022. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, New York, NY: The Guilford Press.

Huppertz, J. W., Arenson, S. J., and Evans, R. H. 1978. "An Application of Equity Theory to Buyer-Seller Exchange Situations," *Journal of Marketing Research* (15:2), pp. 250-260.

Jallat, F., and Ancarani, F. 2008. "Yield management, dynamic pricing and CRM in telecommunications," *Journal of Services Marketing* (22:6), pp. 465-478.
Jayaraman, V., and Baker, T. 2003. "The Internet as an enabler for dynamic pricing of goods," *IEEE Transactions on Engineering Management* (50:4), pp. 470-477.
Kahneman, D., Knetsch, J. L., and Thaler, R. H. 1986. "Fairness and the Assumptions of Economics," *The Journal of Business* (59:4), pp. 285-300.
Kimes, S. E., and Wirtz, J. 2002. "Perceived fairness of demand-based pricing for Restaurants," *Cornell Hotel and Restaurant Administration Quarterly* (43:1), pp. 31-37.
Lee, S., Illia, A. and Lawson-Body, A. 2011. "Perceived price fairness of dynamic pricing." *Industrial Management & Data Systems* (111:4), pp. 531–550.
MacKay, A., and Weinstein, S. 2021. "Dynamic Pricing Algorithms, Consumer Harm, and Regulatory Response," *Washington University Law Review* (100:111), pp. 111-174.
Malc, D., Mumel, D., and Pisnik, A. 2016. "Exploring price fairness perceptions and their influence on consumer behavior," *Journal of Business Research* (69:9), pp. 3693-3697.
Maxwell, S. 2002. "Rule-based price fairness and its effect on willingness to purchase," *Journal of Economic Psychology* (23:2), pp. 191-212.
Maxwell, S., and Garbarino, E. 2010. "The identification of social norms of price discrimination on the internet," *Journal of Product & Brand Management* (19:3), pp. 218-224.
Moors, G., Kieruj, N. D., and Vermunt, J. K. 2014. "The Effect of Labeling and Numbering of Response Scales on the Likelihood of Response Bias," *Sociological Methodology* (44:1), pp. 369-399.
Parker, G., van Alstyne, M., and Choudary, S. P. 2016. *Platform revolution: How networked markets are transforming the economy - and how to make them work for you*, New York, NY: W.W. Norton & Company.
Reinartz, W. 2002. "Customizing Prices in Online Markets," *Symphonya. Emerging Issues in Management* (1), pp. 55-65.
Schmitt, M., Baumert, A., Gollwitzer, M., and Maes, J. 2010. "The Justice Sensitivity Inventory: Factorial Validity, Location in the Personality Facet Space, Demographic Pattern, and Normative Data," *Social Justice Research* (23), pp. 211-238.
Schmitt, M., Gollwitzer, M., Maes, J., and Arbach, D. 2005. "Justice Sensitivity: Assessment and Location in the Personality Space," *European Journal of Psychological Assessment* (21:3), pp. 202-211.
Sobel, M. E. 1982. "Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models," *Sociological Methodology* (13), pp. 290-312.
Sternthal, B., and Craig, C. S. 1982. *Consumer behavior*: *An information processing perspective*, Englewood Cliffs, NJ: Prentice-Hall.
Trabucchi, D., and Buganza, T. 2022. "Landlords with no lands: a systematic literature review on hybrid multi-sided platforms and platform thinking," *European Journal of Innovation Management* (25:6), pp. 64-96.
Vijay, V., and Bhaskar, M. 2017. "Dynamic Pricing and the Economic Paradigm Shift–A Study Based on Consumer Behaviour in the E-commerce Sector," *International Journal of Scientific and Research Publications* (7:6), pp. 242-247.
Wakefield, K. L., and Inman, J. 2003. "Situational price sensitivity: the role of consumption occasion, social context and income," *Journal of Retailing* (79:4), pp. 199-212.
Wang, Y., Tang, T., Zhang, W., Sun, Z., and Xiong, Q. 2021. "The Achilles tendon of dynamic pricing—the effect of consumers' fairness preferences on platform's dynamic pricing strategies," *Journal of Internet and Digital Economics* (1:1), pp. 15-35.
Xia, L., and Monroe, K. B. 2010. "Is a good deal always fair? Examining the concepts of transaction value and price fairness," *Journal of Economic Psychology* (31:6), pp. 884-894.
Xia, L., Monroe, K. B., and Cox, J. L. 2004. "The Price is Unfair! A Conceptual Framework of Price Fairness Perceptions," *Journal of Marketing* (68:4), pp. 1-15.
Zeithaml, V. A., Berry, L. L., and Parasuraman, A. 1996. "The Behavioral Consequences of Service Quality," *Journal of Marketing* (60:2), pp. 31-46.
Zimmermann, S., Angerer, P., Provin, D., and Nault, B. R. 2018. "Pricing in C2C Sharing Platforms," *Journal of the Association for Information Systems* (19), pp. 672-688.