Individual Price Discriminaton – An impossibility?

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As electronic channels to the customer (intelligent shelves, E-Commerce) are ideally suited to better comprehend customers' price sensitivity, communicate pricing policies and adjust prices regularly marketers are eager to charge people differently for the same product and according to their willingness to pay. This practice implies that not all customers are treated equally. Fairness concerns and privacy issues arise. In fact, when Amazon.com trialed this type of practice it encountered strong customer backlash. Despite this negative experience, this paper challenges the common notion that personalized prices are generally perceived as unfair and shows ways on how online channels may be used to raise fairness perceptions. An extensive overview of the pricing and fairness literature from economics is given. Furthermore, empirical results from an experiment with 160 subjects are presented.

1. Introduction

In September 2000 Amazon.com introduced a differential pricing structure that would use personal buyer profiles to charge individual customers different prices for the same DVD titles. Amazon’s customers met this practice with extreme displeasure over the site’s unfair treatment of its loyal customer base. In fact, backlash to this first attempt to use first-degree price discrimination in an E-Commerce site was so strong that Amazon had to stop its practice shortly afterwards. Since then, E-Commerce sites seem to have carefully abstained from charging people different prices for the same product. And if they do so, they usually employ pricing mechanisms such as auctions or reverse pricing that have proven acceptable in the offline world.

Yet, is individual price discrimination really an impossibility? After all, E-Commerce sites and other electronic sales channels (such as smart shelves or mobile offerings) entail the opportunity to change prices regularly and much more frequently than is the case in today’s regular sales channels. No extra cost is entailed due to cost intensive manual price labeling. And controlling the complexity of price changes can be handled by merchandise management systems. Moreover, E-Commerce sites constantly collect customer interest profiles and buying data that allow for understanding individual price sensitivity. Shall this head start in terms of customer access and knowledge be foregone for the pricing discipline due to fairness concerns? And how do customers really think about individually differentiated prices? Is it sensible to build algorithms for this purpose? And under what conditions may E-Commerce sites indeed win customer consent? These are questions frequently asked by E-Commerce players today.

The aim of this article is to address these questions by first giving an overview of findings from the marketing and economics literature on this subject and then present findings form a survey-based experiment conducted in this context among 160 students at Humboldt University Berlin, Germany. The focus of the experiment was to learn more about how negatively people really perceive individual price differentiation without self-selection and how they intend to react to it. Is this reaction a function of the absolute amount that one has to pay more or less for a product? Or is it a reaction due to a general underlying fairness perception as suggested by marketing literature? and how can fairness perception for price differences be raised in an E-Commerce channel?

The article starts out in section 2 with an overview of some major findings on individual price discrimination in the marketing and economics literature. Section 3 then presents the structure and methodology employed for our own survey carried out in summer 2004. Section 4 reports on the results obtained. Section 5 concludes and ends with some proposals for potential future research in this field.

2. Price Differentiation and Fairness in Economic Literature

Price differentiation of consumer goods and services is a subject investigated in marketing [1-4], economics [5, 6] and E-Commerce [7] for quite some time. Different types of price differentiation can be discerned according to whether buyers can actively influence price fixing. Influencing price fixing is referred to as price differentiation with *self-selection*. This stands in contrast to price differentiation without self-selection [7].

2.1. Fairness of price differentiation with self-selection

Buyers may have different price conditions for the same product due to varying times of order placement (e.g. late bookers in travel) or different levels of search cost incurred in different sales channels (e.g. special hotel rates for online bookers). However, as long as all customers have the same access to better prices and it is only the individually chosen purchase process by which conditions are determined, this type of price differentiation was shown to be perceived as fair by consumers. It meets peoples' perception of *procedural justice* [1, 6].

Buyers may also influence price levels by purchasing different volumes of the same good. As a result, one may pay more than another. This seems to be equally accepted due to the notion of *distributive justice* stating that „a man's rewards in exchange with others should be proportional to his investments" [8]. Allocation of rewards on the basis of individual contributions to an exchange relationship is therefore perceived as fair.

2.2. Fairness of price differentiation without self-selection

Another type of price discrimination occurs when people can *not influence* price fixing through their actions. Instead, their belonging to a specific group of society, e.g. students or seniors, determines their access to specific price conditions. Again a perception of fairness has been proven among buyers, because the pricing procedure is determined by society norms and behaviors [1]. Even though one cannot change one's affiliation to a group, charging schemes of this type often adhere to grouping variables such as age or status that anyone has access to at some point during lifetime.

A more critical way of price differentiation is when people receive individual prices due to individual traits. The beautiful woman who gets access to an evening event for free while other woman or men have to pay is an example for this. Or, when a marketer has knowledge about customers' willingness to pay and uses it to charge them the maximum price he knows they will afford (so called first-degree price discrimination [9]).

2.2.1. Equity Theory

Some research exists on fairness perceptions of individual price discrimination without self-selection. Generally, the literature tends to argue that consumers perceive individual pricing as unfair. One main theory underpinning this argument is equity theory [1, 10, 11]. Equity theory posits that individuals who are similar to one another gauge fairness (or equity) of an exchange by comparing the ratios of their contributions to that of others in their peer or reference group. If the ratios are not equal they will quit buying at a company.

Leaving an exchange relationship is, however, *only one* strategy people were shown to pursue. Another one according to Martins [10] is to change one's reference or peer group. People want to reduce the "social tension" they perceive in unequal situations by moving relationships back towards an equitable position. One way to do so is to redefine one's reference group. Giving customers an explanation as to why they are charged differently than someone initially perceived as a peer may therefore support them in re-defining their peer group. For example, when a company charges a peer group of students different prices for the same product, students may initially perceive unfairness in the way they are treated. However, if the marketer shifts this initial perception by defining new reference groups for the apparently deceived he may actually be able to restore his image with the students. Examples for this type of new reference group building may be to distinguish loyal from unloyal customers, first-time buyers from later buyers, poor income people from higher income people, etc.. Electronic Commerce websites are ideally suited to carry this type of information about reference groups. We could therefore hypothesize that if EC websites were able to communicate reference groups from which a customer feels *different* they can improve fairness perceptions of individually differentiated prices. For example, a website could inform a customer A about the existence of a loyalty scheme. If customer A is not part of the loyalty scheme (feels different) and therefore has to pay more, he may in fact perceive the price as fair. Equally, it may be possible to tell a customer B that he is not receiving the same pricing scheme than customer C, because customer C is much more interested in the book than he is and therefore has to pay more (or has to pay less?).

No research is known to the author of this paper into this phenomenon of price fairness perception in relation to others. Nor is there any insight into the potential of EC channels to succesfully communicate this type of practice. In section 4.2. I will therefore present some first findings into what it means to differentiate prices without explanation and what effect reference group definition has on fairness perception. Moreover, I will comment on the level of detail EC websites should give their customers on how reference groups are formed.

2.2.2. Dual Entitlement

Another theory looking into the pricing perception among consumers is the theory of Dual Entitlement proposed by Kahneman et al. [5]. The principle of dual entitlement builds on equity theory and suggests that fairness perceptions depend on reference transactions. Buyers and sellers believe that they are entitled to a reference price and reference profit respectively. Specifically, dual entitlement suggests that perceived unfairness results when a reference price is increased such that a firm increases its profit, but an increased price is perceived as fair when it maintains the firm's existing level of profit. With this, the theory suggests that people reflect on marketer motives and marketer reputation when they judge on the fairness of pricing policies [2]. In section 4.2. of this article some results will be reported on the fairness judgment of different loyalty schemes leading do different profit levels for companies.

3. Method

A paper and pencil questionnaire was filled out by 160 undergraduate students for course credit at the Institute of Information Systems in summer 2004. 88 female and 72 male students were among the respondents. Average age in the sample was 24.

The main part of the questionnaire dealt with a scenario depicted to the subjects as follows: "Imagine you are buying a book (e.g. Harry Potter) at a big well-known book store in your town. The book costs you € 24. Soon afterwards you learn that a friend of yours (also a student) has bought the same book, from the very same book store around the same time. However, he has only paid € 22,80. Other people confirm that they also observed that the book store charges different prices for the same books."

Following this scenario description the respondents had to answer five questions on their acceptance of this price differentiation. Acceptance was measured in terms of spontaneous anger about the price difference, willingness to continue buying at the store and trust in the store (Table 1). Furthermore, subjects were told that the store would maintain a website with an explanation for the price difference. The explanations rated by the students as to their fairness included: giving discounts to poor income buyers, giving discounts to first-time buyers, charging people their maximum willingness to pay, charging people 5% less than their maximum willingness to pay or offering loyal customers a discount. The alternative to giving these explanations was to give no explanation about the pricing mechanism at all (Table 2).

Table 1. Median (Me) and Average (μ) acceptance of price discrimination

Me μ	G1/ +5%	G2/ -5%	G3/ +3%	G4/ -10%	G5/ +10%	All
N	39	17	36	36	32	160
Q1: "I am annoyed (angry) about the price difference!"	4.00 3.62	1.00 1.76	3.00 2.97	1.00 1.39	4.00 3.81	3.00 2.81
(1=no, 2=little, 3=middle, 4=rather, 5=very)						
Q2: „ I will continue buying in the store!"	3.00 2.87	3.00 3.41	3.00 2.92	3.00 3.14	3.00 2.91	3.00 3.01
Q3: „My trust in the shop is considerabl lower."	2.00 2.59	2.00 2.71	3.00 2.75	2.00 2.39	2.00 2.56	2.00 2.59
Q4: „ I will critically question the pricing policies of this shop in the future!"	4.00 3.51	4.00 3.41	4.00 3.61	4.00 3.69	4.00 4.00	4.00 3.66
(1=not at all, 2=probably not, 3=perhaps, 4=probably, 5=for sure)						

Most importantly, the questionnaire was distributed in five different versions varying in one respect: the discount experienced by a student in the purchase scenario. 3 groups (treatments) of students (G1, G3, G4) were told that they should image to have paid 3%, 5% or 10% more for a Harry Potter book than a peer. And 2 groups (G2, G5) were told that they should image to have paid 5% or 10% less than a peer. The price differences were described in absolute terms.

Table 2: Median (Me) and Average (μ) price policy fairness perception

Me μ	G1/ +5%	G2/ -5%	G3/ +3%	G4/ +10%	G5/ -10%	All
N	39	17	36	36	32	160
Q5: No explanation	3.00	3.00	3.00	4.00	3.00	3.00
	2.95	2.71	3.06	3.39	3.22	3.10
Q6: Reduction to poor income consumers	5.00	4.00	5.00	5.00	4.00	5.00
	4.82	4.41	4.53	4.58	4.41	4.58
Q7: Reductions to first-time buyers	5.00	5.00	5.00	5.00	5.00	5.00
	4.74	4.76	4.47	4.67	5.03	4.73
Q8: Maximum price a consumer is willing to pay	3.00	3.00	3.00	2.00	3.00	3.00
	2.66	2.53	3.00	2.86	2.72	2.78
Q9: 5% less than the maximum price a consumer is willing to pay	3.00	3.00	4.00	4.00	4.00	4.00
	3.18	3.12	3.75	3.53	3.66	3.48
Q10: Loyal customers discount	5.00	5.00	5.00	6.00	6.00	6.00
	5.39	5.12	5.44	4.47	5.59	5.43
Q11: 5% discount to those who bought more than 10 times	5.00	5.00	5.00	5.00	5.00	5.00
	5.13	5.06	5.28	5.14	5.19	5.17
Q12: 5% discount for loyal customers store 3% more profi	5.00	5.00	5.00	5.00	5.00	5.00
	5.00	4.76	5.17	4.69	4.97	4.94
Q13: 5% discount for loyal customers store 7% more profi	5.00	5.00	5.00	5.00	5.00	5.00
	4.95	4.81	4.89	4.50	4.97	4.82

(1=not at all fair, 2=unfair, 3=rather unfair, 4=middle rate, 5=pretty fair, 6=fair, 7=very fair)

4. Results

4.1. Acceptance of Price Differentiation

Challenging the view of some of the literature discussed above, subjects do not state that price differentiation will probably or for sure lead lead them away from the store. Instead, they view continuation of business on a middle ground (Me = 3.0). The median of Me = 3.0 of Q2 (perhaps continue to buy) and perfect normal distribution of responses to this question suggest that stores do not have to be outright afraid of immediate customer loss due to individual price differentiation (Figure 1). This result is reinforced when comparing the distributions of continue-to-buy intentions for two extreme treatments paying either 10% more (Me = 3.0) or 10% less (Me = 3.0) for the same book. No statistically significant difference can be observed ($\chi^2 = 0.177$, $p > 0.5$) between these two extreme groups even though one would have expected according to equity theory that those who pay 10% more than their peers are less willing to continue buying.

The findings are further supported by subjects' rating of subsequent trust in the shop. On average, respondents state that their trust is probably not considerably lower (Me = 2.0). And again answer distribution for those who paid more and those who paid less are not significantly different ($\chi^2 = 0.160$, $p > 0.5$).

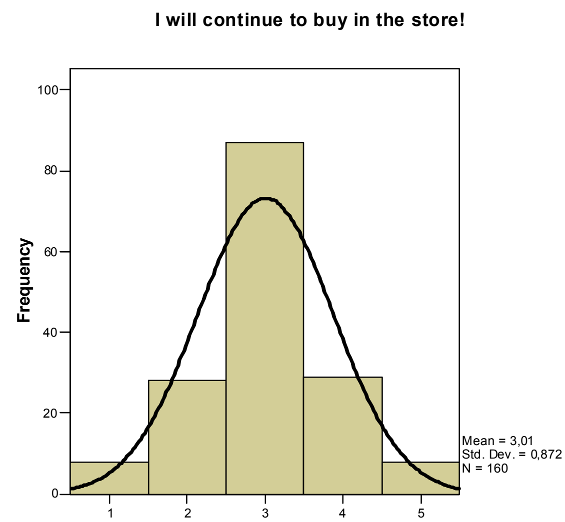

Figure 1

Finally, a question asked neutrally at the very beginning of the questionnaire before describing any scenario was: "To what extend do you agree with the following statement? : In my opinion, every seller can ask for the product price that a customer is willing to pay, even if this leads one customer to pay more than another customer." Figure 2 visualizes the answering pattern enforcing the notion that price differentiation is not viewed as negative as we have always believed (1=do not at all agree, 7=do totally agree). 47% of respondets agree with such a pricing practice, 14% are undecided and only 39% dismiss it for sure.

Do these findings challenge the literature? And do they imply that marketers can go for individual price discrimination more than they thought they could? The data suggests that regardless of privilege or discrimination all subjects state that they will probably critically watch the pricing policies of the shop in the future (Me = 4.0). Furthermore, those who paid more are significantly more annoyed about the price difference than those who paid less ($\chi^2 = 0.000$, $p > 0.5$). This anger shows a middle correlation with trust (r = .29), critical questioning (r = .34) or buying continuation (r = .36). It should therefore be considered by marketers. Yet, on the overall, the results indicate that there may be more room for individual price discrimination than theory suggests. Consequently, more research is required to understand why there is so much acceptance of price differentiation regardless of the condition in which one finds him or herself.

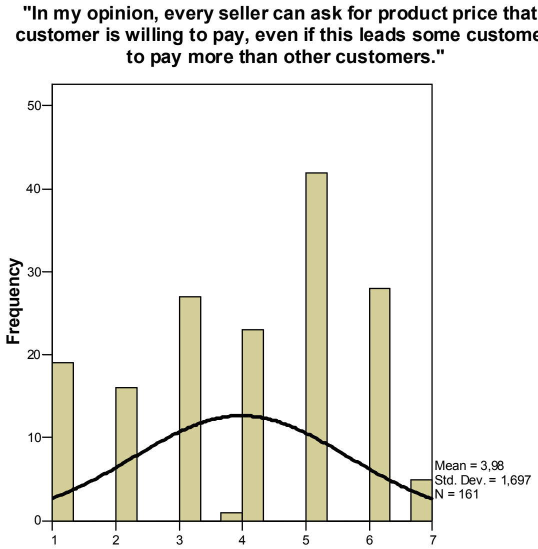

Figure 2

4.2. Influencing Fairness Perceptions

As noted above, Electronic Commerce websites have the unique capability to provide customers with extensive information on pricing policies and how customers are served. In the Amazon case there was no information available to customers on how and why prices were different. For the purpose of the current study, subjects received the following information: "Because you are curious to learn why you paid more (less) than your friend, you look for an explanation on the public website of the bookstore. You find the following text: In order to determine our product prices we employ an automatic pricing system that aims at always calculating the best price for you. This implies that sometimes prices are different for different people." On the background of this website text, which basically gives no explanation on how the pricing system really works, subjects were asked to rate the fairness of the company's pricing policy. For subsequent questions, the website text was then enriched by additional information on how the pricing system actually works. Here, different reference groups were introduced as explanatory for the price difference and different levels of detail were distinguished. Tabe 2 gives an overview of the median perceptions of fairness.

Regardless of the condition in which subjects were in, perception of fairness was mostly identical. This is in line with the fairness literature that identifies underlying constructs such as distributive or procedural justice for causing homogenous judgements beyond specific conditions [8]. The most prevalent finding is that giving no concrete explanation for price differences (Q5) is perceived as a rather unfair marketer practice (Me = 3.0). In terms of unfairness it is only topped by the blunt explanation that people are charged according to their maximum willingness to pay (Q 8). The average fairness perception for giving no explanation is $\mu = 3.1$ (rather unfair) while the average fairnss perception of charging customers a maximum is $\mu = 2.78$. This difference is statistically significant (Wilcoxon $z = 2.69$, $p = 0.007$) suggesting that being frank about maximum charging is even worse than leaving customers in the dark.

A considerable increase in fairness perception can be achieved by changing peoples' reference group focus. Thus, even though all participating student subjects were asked to think about other students (their peer group) when receiving better (or worse) conditions, the re-definition of peers with the help of website explanations raised fairness perceptions to a level that price differentiation was then seen as (pretty) fair (Me = 5.00 for Q6/more or less loyal customers, Q7/first- or later time buyers, Q8/poor or more rich students). Thus, helping people to understand why they are different from others and then charge them accordingly seems to be accepted; accepted independently of whether someone is in the situation to pay more or less (see Table 2). Obviously, it is arguable though whether procedural justice could not be more at work here than reference group definition. Potentially, the two theories are intertwined with each other in the sense that reference group definition must be done according to the social or behavioural norms underlying procedural justice.

Another interesting finding is the comparison between fairness perceptions when different levels of detail are provided. In Q10 subjects were generally informed that customer loyalty was recognized in the pricing procedure. On average subjects perceived loyalty scheme charging as pretty fair ($\mu = 5.43$). In Q11 subjects were informed that people having bought 10 times in the store would receive a 5% discount on subsequent purchases. Here, the average $\mu = 5.17$. Surprisingly, the latter and more precise explanation of the pricing scheme let to a significantly lower fairness perception (Wilcoxon $z = 4.16$, $p = 0.000$). This is true regardless of whether someone paid more or less.

Finally, we investigated fairness perception with a view on dual entitlement theory. We gave subjects the following information: "Consider the book store is actually following the policy where people who have bought more than 10 times in the store receive a 5% discount on all future sales. From a very reliable source, you learn that the scheme is actually very profitable for the book store: customers become so loyal that store profits are actually increased by 3% during the last month. How would you now rate the fairness of the pricing policy?" Contrasting with this 3% reference profit the following question varied the scenario by informing people that, in fact, it was not 3%, but 7%. At the same time, reference price (5% discount) was kept stable.

The results obtained are in line with the dual entitlement theory. In fact, subjects rated the situation in which company profit rose beyond their own benefit as slightly less fair.

5. Conclusion and research outlook

Individual price discrimination is a strongly debated issue. Marketer's would like to profit from enhanced profits through better price fixing. Customers have been observed to react negatively. And still, price differentiation has become every-day practice, especially through the Internet. The electronic sales channel to the customer with its unique capability to collect customer information, communicate policies and adjust prices in a flexible way has brought individual price discrimination without self-selection on the top of EC portal managers' agenda. Little is known though about peoples' real perceptions of price fairness and expectations on price setting rules. This article has attempted to bring together some of the main concepts elaborated so far in marketing and economics. The way price differentiation practices are structured, the theories of justice, equity theory and the dual entitlement concept are summarized and discussed as to their relevance for marketers with online channels. In the empirical study we show that the degree of annoyance with price differences varies between those who pay more and those who pay less. Those who pay more are significantly more annoyed. Still, even though those who paid less are less annoyed, they are still stating to critically watch the store's pricing policy in the future,- to the same degree as those who paid more. This does not mean that trust in the store is strongly impacted. Both parties will continue to trust in the store in an equal manner. However, there is a slight, non significant tendency of those who paid more, to trust less. Tu sum it up: Shops that charge different consumers with different prices might not see any sanctions in their customers' behavior in the beginning, but consumers are alerted and will watch the shop's pricing policies more carefully. Giving customers general information about how and why there are price differences is a way to raise fairness perception while leaving them in the dark is dangerous. A potentially important and little researched lever for fairness perception could be reference group signaling. Giving customers an idea of why they are different and are therefore charged differnetly. The question is, however, what variables are socially acceptable to be used for price distinction?

6. References

[1] J. Cox, "Can differential prices be fair?," *The Journal of Product and Brand Management*, vol. 10, pp. 264-276, 2001.

[2] M. Campbell, "Perceptions of Price Unfairness: Antecedents and Consequences," *Journal of Marketing Research*, vol. 36, 1999.

[3] L. Bolton, L. Warlop, and J. Alba, "Consumer Perceptions of Price (Un)Fairness," *Journal of Consumer Research*, vol. 29, pp. 474-491, 2003.

[4] E. Garbarino and O. Lee, "Dynamic Pricing in Internet Retail: Effects on Consumer Trust," *Psychhology & Marketing*, vol. 20, pp. 495-513, 2003.

[5] D. Kahneman, J. Knetsch, and R. Thaler, "Fairness as a Constraint on Profit Seeking: Entitlements in the Market," *The American Economic Review*, vol. 76, pp. 728-741, 1986.

[6] P. Dickson and R. Kalapurakal, "The use and perceived fairness of price-setting rules in the bulk electricity market," *Journal of Economic Psychology*, vol. 15, pp. 427-448, 1994.

[7] B. Skiera and M. Spann, "Preisdifferenz im Internet," in *Roadm@p to E-Business*, M. Schlögel, T. Tomczak, and C. Belz, Eds. St.Gallen: Thexis, 2002, pp. 270-284.

[8] C. Homans, *Social Behavior: Its Elementary Forms*. Ney York: Brace & World, 1961.

[9] A. Pigou, *The Economics of Welfare*, first edition ed. London: Macmillan and Co., 1920.

[10] M. Martins and K. Monroe, *Perceived price fairness: a new look at an old construct*, vol. 21: Association of Consumer Research, 1994.

[11] J. Adams, "Toward an understanding of inequity," *Journal of Abnormal Psychology*, vol. 67, pp. 422-436, 1963.