Comparing Average Payments and Minimal Bounds for Lower and Higher Outcomes Among Customers in Participative Pricing Mechanisms: An Empirical Investigation of PWYW, NYOP, and PYP

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Abstract:

This research uses three online experiments (total n =501) to examine which participative pricing mechanism—Pay What You Want (PWYW), Name Your Own Price (NYOP), or Pick Your Price (PYP)—firms should use to optimize purchase intentions and expected payments. In doing so, we combine the PWYW and NYOP literatures and jointly test relevant mediators: perceived price fairness, price control, and effort. In addition to average total and indirect effects, a novel application of the Kolmogorov-Smirnov test provided lower bounds of consumers paying less or more under each pricing method. Our results show that PWYW leads to the highest purchase intention despite generating the lowest payments. PYP outperforms in terms of expected payments. Mediation analyses indicate that perceived control negatively affects purchase intention for PYP and NYOP. Under PYP and NYOP, at least 10% to 84% of consumers pay more, depending on the study, but very few (single digit percentages) pay less than under PWYW.

Keywords: Participative Pricing Mechanisms, Purchase Decisions, Kolmogorov-Smirnov

Track: Pricing & Promotions

1. Introduction

Price is the only part of the marketing mix that directly generates revenue. Under competitive pressure, firms look for ways to adapt their prices to diverse consumer preferences. One option is to employ Pay What You Want (PWYW) as a participative pricing mechanism that allows consumers to pay according to their preferences (Kim, Natter, and Spann, 2009; Kim, Kaufmann, and Stegemann, 2014; Krämer, Schmidt, Spann, and Stich, 2017).

While consumers obviously like having price control under PWYW and perceive it as fairer than a fixed price, managers fear that many consumers will choose to pay less, or even nothing at all. In response, new participative pricing mechanisms have been developed: Name Your Own Price (NYOP), where managers can set a hidden minimal price threshold, or Pick Your Price (PYP), where managers can pre-define available price options (e.g., pick one of three prices; Spann & Tellis, 2006; Hinz, Hann, and Spann, 2011; Wagner, Pacheco, Basso, Rech, and Pinto, 2022; Wang, Beck, and Yuan, 2021; Di Domenico, Premazzi, and Cugini, 2022; Rathore, Jakhar, Kumar, and Kumar, 2022.).

So far, all three methods have not been compared jointly, as extant studies compared only either NYOP or PYP against PWYW. Furthermore, price fairness has been established as a central mediating construct to explain PWYW effects, but none of the NYOP or PYP studies have studied it in addition to the traditional mediators price control and perceived effort.

Finally, managers not only want to know how average payments change under each mechanism, but also how many consumers pay less (or more), as average payments may be distorted by a few rare outlier consumers paying excessive prices.

The present research conducts a comprehensive comparison of all three participative pricing mechanisms (PPM). It tests them in three online experiments for their relative performance on relevant outcomes (purchase intention, expected payments), and compares all three central mediators (perceived price fairness, perceived price control, perceived effort).

Crucially, we add a novel test, based on the Kolmogorov-Smirnov Test that establishes minimal bounds for the share of consumers who would pay more and who would pay less (Fan & Park, 2010; Simonsohn, 2024). We discuss findings and point towards fruitful avenues for further research.

2. Theoretical Background

In participative pricing mechanisms, the buyer actively determines the product's final price (Chandran & Morwitz, 2005; Spann & Tellis, 2006; Koschate-Fischer & Wüllner, 2017). Buyers prefer having a say in the pricing process to accepting fixed prices, which also increases their perceptions of fairness, satisfaction, and purchase intention (Chandran & Morwitz, 2005; Haws & Bearden, 2006; Kim et al., 2009).

The best-known participative pricing mechanism is PWYW, where the buyer has complete control over the price and can set it at any level, including nothing, and sellers have to accept the price and thus bear substantial risk (Koschate-Fischer & Wüllner, 2017). PWYW only benefits a seller, if additional customer segments buy the product (Schmidt, Spann, and Zeithammer, 2015) or some customers pay excessive prices. For example, Kim et al. (2009) showed that PWYW in a restaurant reduced the average lunch buffet price by 19% but led to a 32% increase in sales due to increased customer traffic, and proved profitable overall. Furthermore, the company's image could be improved through positive word of mouth (Kim et al., 2014).

While behavioral findings assure sellers that many customers will not exploit PWYW due to social norms, fairness, reciprocity, altruism, or guilt (Jang & Chu, 2012; Koschate-Fischer & Wüllner, 2017; Spann et al., 2018), and pay prices higher than zero (Kim et al., 2014; Gneezy, Gneezy, Riener, Nelson, 2012), the average prices paid are often below the nominal retail price (Koschate-Fischer & Wüllner, 2017; Kim et al., 2014): in some extant examples, such as movie tickets and hot beverages, the increased sales did not offset the lower prices, and the pricing strategy resulted in a loss (Kim et al., 2009).

When companies adopt an NYOP strategy, they set a minimum price, usually not communicated to buyers, and a transaction with the seller is only completed if the price offered exceeds this threshold (Spann & Tellis, 2006). Therefore, the companies can at least ensure that the costs associated with the offer are covered. NYOP can also be used for goods with high marginal costs. Krämer et al. (2017) revealed that NYOP vendors capture a larger market share and generate higher profits than traditional posted price providers, but also generates less additional sales. A well-known example of the use of this strategy was priceline.com. Here, flights and hotels could be booked using NYOP. Currently, eBays "Best Offer" feature uses this mechanism.

The latest participative pricing strategy is PYP. In PYP, buyers choose from a selection of prices set by the seller (Wang et al., 2021). Compared to PWYW and NYOP, buyers still have

the power to decide the price but no longer have complete control over it (Rathore et al., 2022). Compared to NYOP and PWYW, PYP is transparent and hence requires less cognitive effort from customers. Further, Wang et al. (2021) show that PYP generally outperformed PWYW (and fixed prices for purchase intention). Overall, the evidence is mixed when comparing PWYW, NYOP, PYP, and fixed price. Figure 1 below shows the most important research to date compares to our study.

Variables	**Pricing Mechanisms**				**Mediators**			**Outcomes**		**Tests**		
Publications	*PWYW*	*PYP*	*NYOP*	*Fixed price*	*Control*	*Effort*	*Fairness*	*Purchase intention*	*Expected navment*	*Mean*	*Share of respondents*	*Further moderator & mediator variables*
Spann/Tellis 2006			x									Bidding behavior
Kim et al. 2009	x			x			x		x	x		Altruism/ satisfaction/ loyalty
Hinz et al. 2011			x	x					x			Threshold price/ information on policy
Kim et al. 2014	x						x		x	x		Social distance/product value/external reference price
Krämer et al. 2017	x		x						x	x		Monopoly and competition treatments
Wang et al. 2021	x	x		x	x	x		x		x		Motivation to save time/money
Di Domenico et al. 2022		x						x		x		Selected price level/CSR/brand attitudes
Rathore et al. 2022	x	x		x		x		x		x		High or low need for cognition
Wagner et al. 2022	x		x	x	x							Satisfaction/ Pain of Payment
Our study	x	x	x	x	x	x	x	x	x	x	x	

Table 1: Research overview

3. Research Methodology

Table 2 below provides a methodological summary of the three studies reviewed. All participants received a randomly selected questionnaire with one pricing strategy and questions about two or three products/services. For the independent variables, for PWYW, any price could be entered (0 was also possible); for PYP, there were three options with predefined prices, one of which had to be selected, and for NYOP, any price was possible with the caveat that this price would be compared to a secret minimum price of the company and you would then receive feedback on whether your suggested price was accepted or not. In

the first study expected payment was furthermore calculated from the current or selected price and a percentage conversion of the purchase probability (1: 1%, 2: 5%, 3: 10%, 4: 25%, 5: 75%), the other studies used average payments.

Because the repeated measures examples in the first study varied widely in the price level, the repeated measures were z-standardized to ensure comparability. The price levels were very similar in Studies 2 and 3, so we compared them directly across repeated measures.

	Study 1	**Study 2**	**Study 3**
Type of Study	Online Experiment	Online Experiment	Online Experiment
Sample Size (n)	106 participants (university students) 318 Data points	194 participants (university students) 388 Data points	201 participants (university students) 384 Data points
Sample Demographics	Most of the participants between 21 and 25 years, 42% female	61.86% of the participants between 18 and 29 years, 47 % female	40,8 % of the participants between 26 and 30 years, 47 % female
Measures	*Dependent Variables (all 5 Point Likert scales)*		
	• Purchase Intention • Expected Payment (Z-standardized)	• Purchase Intention • Expected Payment • Satisfaction	• Purchase Intention • Expected Payment
	Mediators (all 5 Point Likert scales)		
	Control Effort Fairness	Control Effort Fairness	Control Effort Fairness
	Independent Variables		
	PWYW PYP Fixed Price	PWYW NYOP PYP	PWYW NYOP PYP
Study Design	Three versions of questionnaire (PWYW, PYP, Fixed Price) with low, mid and high-price	Three versions of questionnaire (PWYW, NYOP, PYP) with service and product	Three versions of questionnaire (PWYW, NYOP, PYP) with two different services
Randomization of Stimuli	Everyone received one of the three questionnaires Differ only in how price paid	Everyone received one of the three questionnaires Differ only in how price paid	Everyone received one of the three questionnaires Differ only in how price paid
Products/Service	• Adidas Deodorant • Samsung Galaxy 21 128 GB • Audi A4 30 TDI S tronic	• Day ticket gym • Drink bottle	• Football match ticket • Wellness day pass
Study Goal	Optimize Purchase Intention and Expected Payment through pricing mechanism	Optimize Purchase Intention, Expected Payment and Satisfaction through pricing mechanism	Optimize Purchase Intention and Expected Payment through pricing mechanism

Table 2: Methodological summary of the Studies 1, 2 and 3

4. Results

We ran linear regressions to determine the effect of NYOP, PYP, and fixed price against PWYW (as base category common to all studies) on the purchase intention and expected payments. These results and those of the new Kolmogorov-Smirnov test are presented in Table 3 below.

	Study 1		**Study 2**			**Study 3**	
DV	Purchase Intention	Expected Payment	Purchase Intention	Expected Payment	Satisfaction	Purchase Intention	Expected Payment
	Group mean difference: estimate (SE)	*Group mean difference: estimate (SE)*	*Group mean difference: estimate (SE)*	*Group mean difference: estimate (SE)*	*Group mean difference: estimate (SE)*	*Group mean difference: estimate (SE)*	*Group mean difference: estimate (SE)*
PYP	-0.440 (.235)	0.319*** (.071)	-0.464* (.203)	1.727 (.898)	-0.296 (.176)	-0.212 (.232)	-0.906 (6.450)
NYOP			-1.802*** (.203)	0.135 (.898)	-2.934*** (.176)	-0.566* (.230)	-4.085 (6.399)
Fixed Price	-0.552* (.237)	0.308*** (.072)					
Intercept	2.642*** (.099)	-0.053 (.033)	4.389*** (.091)	10.858*** (.367)	4.644*** (.098)	4.880*** (.095)	38.026*** (2.621)
				Min. respondents with effect: D+ / D-			
PYP	0.000 / 0.225	0.838*** / 0.000	0.000 / 0.214**	0.469*** /0.047	0.024 / 0.192**	0.067 / 0.165*	0.094 / 0.041
NYOP			0.000 / 0.401***	0.352*** / 0.078	0.000 / 0.676***	0.031 / 0.225 **	0.054 / 0.062
Fixed Price	0.027 / 0.319***	0.892*** / 0.000					
Sample Size	318	318	388	388	388	384	384

*Note. *p < .05, ** p <.01, *** p < .001.*

Table 3: Regression Results compared to PWYW and new Kolmogorov-Smirnov test

It is noticeable that PWYW has the highest purchase intention in all three studies. NYOP reduces purchase intention more strongly compared to PWYW than PYP compared to PWYW. Correspondingly, PYP shows a higher purchase intention than NYOP/fixed price. Only the differences in the first study are significant for standardized expected payments. Here, PYP has the highest value, 0.319, close to fixed price, at 0.308. The same direction (but no significance due to wide variation in payments) is found in Study 2. In Study 3, the results between expected payments under PYP and NYOP are similar, but PWYW shows highest payments overall (but no significance due to wide variation in payments). The new test for

lowest or highest bounds explains this finding: an equal number of consumers pay more or less, indicating that a few very high outlier payments affect the average for PWYW.

We used the D values from the Kolmogorov-Smirnov test as a means of estimating the largest positive and negative differences (D+ and D-) between cumulative empirical distributions in the different conditions. This gave us the minimum percentages of participants who paid at least more (D+) and at least less (D-) for the tested pricing strategy compared to PWYW.

The first study shows that at least 31.9% of participants have a significantly lower purchase intention with fixed prices than PWYW. The second and third studies show that at least 21.4% and 16.5% of participants have a significantly lower purchase intention with PYP, and at least 40.1% and 22.5% of participants have a significantly lower purchase intention with NYOP than PWYW. The results are different when it comes to expected payments. In the first study, at least 83.8% of participants in PYP and at least 89.2% in fixed price had significantly higher expected payments compared to PWYW. The same trend and smaller but significant values can be seen in Study 2, with at least 46.9% of participants showing a higher expected payment in PYP and at least 35.2% in NYOP. The analyzed satisfaction of the participants in Study 2 shows that at least 19.2% are significantly less satisfied with PYP and at least 67.6% with NYOP compared to PWYW.

Indirect effects through the three mediators were tested with mediation analyses. Figure 4 below shows the results of the mediation analysis. When testing all three mediators jointly, we find that perceived effort no longer explains economic outcomes (purchase intention or expected payments), but only satisfaction, in study 2. Both perceived price control and price fairness explain purchase intentions, as well as satisfaction. Corresponding with the earlier results, few significant indirect effects on payments could be found.

All tested PPM show at least one significant direct effect on the tested outcomes. This indicates that despite combining relevant mediators from PWYW and NYOP literature, further mechanisms might play a role in explaining PPM effects.

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Effects				**Study 1**		**Study 2**			**Study 3**	
DV				Purchase Intention	Expected Payment	Purchase Intention	Expected Payment	Satisfaction	Purchase Intention	Expected Payment
Indirect Effects				*Estimate (SE)*	*Estimate (SE)*	*Estimate (SE)*	*Estimate (SE)*	*Estimate (SE)*	*Estimate (SE)*	*Estimate (SE)*
PYP	→	Control	→ DV	-0.220* (.098)	0.066* (.029)	-0.186* (.090)	-0.029 (.102)	-0.144* (.070)	-0.211** (.072)	0.096 (1.697)
NYOP	→	Control	→ DV			-0.965*** (.133)	-0.149 (.552)	-0.745*** (.114)	-0.210** (.071)	0.095 (1.687)
Fixed P.	→	Control	→ DV	-0.404** (.133)	0.121** (.039)					
PYP	→	Effort	→ DV	0.073 (.057)	-0.030 (.022)	0.052 (.059)	-0.448 (.313)	0.129* (.058)	-0.005 (.016)	0.009 (.109)
NYOP	→	Effort	→ DV			-0.059 (.066)	0.503 (.349)	-0.145* (.064)	0.025 (.023)	-0.044 (.545)
Fixed P.	→	Effort	→ DV	0.113 (.069)	-0.047 (.024)					
PYP	→	Fairness	→ DV	-0.041 (.047)	-0.022 (.024)	-0.272*** (.072)	-0.040 (.286)	-0.111* (.054)	-0.237** (.084)	-0.145 (1.201)
NYOP	→	Fairness	→ DV			-0.016 (.046)	-0.002 (.018)	-0.006 (.019)	-0.400*** (.098)	-0.244 (2.022)
Fixed P.	→	Fairness	→ DV	-0.091 (.062)	-0.050 (.027)					
Direct Effects										
PYP	→		→ DV	-0.253 (.216)	0.306*** (.062)	-0.058 (.184)	2.244* (.961)	-2.038*** (.186)	0.227 (.207)	-0.752 (6.589)
NYOP	→		→ DV			-0.763*** (.202)	-0.218 (1.054)	-0.171 (.170)	0.005 (.211)	-3.780 (6.728)
Fixed P.	→		→ DV	-0.171 (.237)	0.284*** (.068)					
Total Effects										
PYP	→		→ DV	-0.440 (.232)	0.319*** (.070)	-0.464* (.202)	1.727 (.894)	-0.296 (.176)	-0.226 (.231)	-0.793 (6.405)
NYOP	→		→ DV			-1.802*** (.202)	0.135 (.894)	-2.934*** (.176)	-0.580* (.229)	-3.972 (6.354)
Fixed P.	→		→ DV	-0.552* (.233)	0.308*** (.071)					
Sample Size				318	318	388	388	388	384	384

Note. *p < .05, ** p <.01, *** p < .001.

Table 4: Mediation Model Results

5. Discussion

Across three studies, PWYW's purchase intention was the highest. This result contradicts Wang et al. (2021), who found that the purchase intention of PYP was higher than PWYW and the fixed price. Interestingly, the expected payment is significantly higher for PYP in study 1 and lower for PWYW. Since any price can be mentioned for PWYW, it is understandable that the value is the lowest. In study 2, the values are the same but not significant. Our new Kolmogorov-Smirnov test mostly confirms these average directions by

indication that higher shares of consumers report smaller (larger) outcomes when average values decrease (increase). The exception is study 3, where the high payments under PWYW are likely the result of a few consumers with very high payments.

Summarizing, these results imply that PYP performs best in expected payments, followed by fixed price and NYOP, while PWYW performs worst, consistent with the regression results. Consequently, managers intend on offering PPM options to differentiate prices among customers should fare well and not risk too much under a PYP mechanism.

Our results partly contradict current research findings: in contrast to Wang et al. 2021, PYP does not show the highest purchase intention in our study; in contrast to Rathore et al. 2022, we do not find a significant difference in cognitive effort across the PPM. These findings indicate a need for further studies to allow empirical generalizations and uncover potential context effects that change the relative efficacy of PPM in different settings. Moreover, the present work also has limitations. Most prominently, none of our studies required actual payment. This limits generalizability to actual economic or incentive aligned settings, and may in part explain our high variability in expected payment variables.

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