A REVIEW OF THE EMPIRICAL EVIDENCE ON PWYW PRICING

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ABSTRACT: *The purpose of the paper is to review recent studies on Pay-What-You-Want (PWYW) pricing and to identify research gaps in the recently mushrooming literature on the topic. We examine a total of 53 empirical studies published between 2009 and 2016. In contrast to previous reviews we classify the research according to the type of study, i.e., the applied research methodology. That is why we discuss separately laboratory experiments, field experiments, survey experiments and case studies. Based on this descriptive review we identify the following two gaps in the study on PWYW pricing: (1) studies on PWYW pricing for high cost goods, and (2) studies on the long-term effects of PWYW pricing.*

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1. INTRODUCTION

Pay-What-You-Want (PWYW) is a participative pricing mechanism (Chandran and Morwitz 2005, Natter and Kaufmann 2015), which leaves the pricing decision with the buyer. In contrast to other participative pricing mechanisms, like name-your-own-price (NYOP, see Spann, Skiera and Schäfers 2004, Spann and Tellis 2006), a buyer can choose any price (including zero) and the seller has to accept this price.

PWYW can be considered as a special form of voluntary market payments, which have been discussed before (e.g., the literature on tipping, Azar 2004, 2007). What distinguishes PWYW from other forms of voluntary market payments is that PWYW is used for goods and services, which are usually sold employing fixed or posted prices (e.g., music, restaurant meals, drinks, entertainment activities), and that the sellers who use PWYW compete with sellers who use fixed pricing (Chao, Fernandez and Nahata 2015; Gerpott and Schneider 2016).

PWYW pricing has recently received considerable attention in the management, business, and economics literature. There have been a sizeable number of empirical studies on

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PWYW pricing, and in this paper, we present a review of empirical studies on PWYW pricing published between 2009 and October 2016. In particular, we review empirical studies on PWYW pricing which report data generated in laboratory experiments, field experiments, survey experiments and case studies (see additionally Krzyżanowska and Tkaczyk 2016). In contrast to other recent reviews (Gerpott 2017), we include also studies that report findings from experimental settings.

The primary purpose of the paper is to structure recent research with respect to the different types of studies conducted. We thus distinguish between four methodological approaches: laboratory experiments, field experiments, survey experiments, and case studies. We differentiate between these four types of studies because results of PWYW mechanisms depend on the applied methodology, hence also the subjects on which data has been gathered. The result from our systematic comparison of 53 studies allows us to learn which effects are robust. Furthermore, certain authors report on different types of studies and apply different methodologies in one paper. So the descriptive review helps to disentangle these peculiarities. The second aim of the paper is to identify gaps in recent studies on PWYW pricing that are independent from the type of methodology, i.e. to identify topics that require additional research in order to obtain a more comprehensive answer to the question when PWYW is a suitable pricing mechanism and when it is not.

We find that (1) PWYW is used almost exclusively for low-cost goods, experience goods, and for bundles of goods and services, and that (2) almost all empirical studies focus on relatively short time periods. Based on our review, we identify some unanswered questions and suggest directions for further research.

This paper is structured as follows. In section 2, we review the empirical literature on PWYW pricing and summarize our findings in four tables. In section 3 we address topics which have not been dealt with in detail but which are relevant for sellers if PWYW is put into practice. In section 4, we conclude.

2. THE EMPIRICAL LITERATURE ON PWYW PRICING

2.1 Categorization of Empirical Studies

The first paper that explicitly addresses PWYW pricing, to our knowledge, is Kim, Natter and Spann (2009). Since this publication, the literature on PWYW has received considerable attention. In Tables 1 to 4 we summarize the results of the empirical studies on PWYW pricing published in the English language in journals in Economics and Business Administration between 2009 and October 2016. These studies have been collected from various scientific databases, such as JSTOR, EconLit, EBSCO, Scopus, Science Direct, ResearchGate and Google Scholar. We selected papers that included the keywords or acronyms such as Pay-What-You-Want, PWYW, Pay Your Own Price, voluntary pricing and that were empirical in nature. We excluded the related but distinguished topic of voluntary contributions to public good provisions because our focus is on private not on

public goods. An initial search was conducted in 2014, followed by repeated sampling in 2015 and finally in October 2016. The advantage of this repeated sampling was that papers which were initially identified as working papers could be included in this review in their form as published journal articles. To avoid publication bias, we also include relevant working papers that have not been published as journal articles yet.

In contrast to another recent review (Gerpott 2017), we decided to look at individual studies (case studies, experiments, etc.) instead of papers. This is because several papers report results from more than one study. We classify the empirical studies into four categories: laboratory experiments, field experiments, survey experiments, and case studies. We include in the review 5 laboratory experiments, 16 field experiments, 26 survey experiments and 6 case studies. We exclude in this review recent experiments in neuroscience that record functional magnetic resonance imaging data in a PWYW decision (Waskow et al. 2016). In laboratory, field and survey experiments the researcher has full control over the design of the experiment and makes use of random assignment of individual subjects to one or more treatments.

Laboratory experiments take place in an environment over which the researchers has complete control (e.g., a university's laboratory). All laboratory experiments on PWYW pricing are incentivized, i.e., the subject's compensation depends on her choices. In all laboratory experiments the subjects are students.

Field experiments are similar to laboratory experiments, except that they are run in the field. An example is Kim, Kaufmann and Stegemann (2014), who have designed an intervention in the field and ran their treatments at two comparable shopping malls. Hence, in field experiments in contrast to laboratory experiments, the researcher has less control. A survey experiment embeds the experimental design within a survey (e.g., a factorial survey or a survey based on vignettes). Usually, the survey consists of hypothetical purchase scenarios, and each subject responds to one or more scenarios. Survey experiments are easy to administer and, usually, they are computer or internet-based. This allows the researcher to generate a large number of observations within a short period of time. In contrast to laboratory and field experiments, in survey experiments there is no strategic interaction between subjects and the researcher has no control once the experiment has started. Involvement might not be as emotionally intense as it is the case in laboratory and field experiments (Collett and Childs 2011), and, usually, there are no financial incentives linked to the subjects' decisions. In most survey experiments, the subjects are undergraduate students who complete the survey for partial or extra course credit.

In a case study, there is no controlled intervention by the researcher since a case study is an observational study. While in field experiments, the researcher chooses the intervention (i.e., use of PWYW pricing), in case studies the seller choose PWYW pricing and allows the researcher to use the data on sales, revenue, prices, etc. Self-selection is an issue because unsuccessful sellers are driven out of the market (see Kim, Natter and Spann 2010, 152) so that only sellers who use PWYW for short periods and sellers who use PWYW successfully over longer periods are observed.

2.2 Main Results from our Review

Table 1 summarizes the laboratory experiments. For each laboratory experiment, we sketch the design and summarize the main findings. In one of the studies (Machado and Sinha 2013), real products were sold to students and the latter had to fill out a questionnaire regarding their payment motivations. We decided to categorize this experiment as laboratory experiment because the context in which the purchase took place was controlled by the researchers. Although subjects can differ in their valuations for the products, this should not bias the results because subjects are randomly allocated to the different conditions. In the other four laboratory experiments, subjects trade hypothetical goods, for which the value is induced (see Smith 1976), so that, in contrast to Machado and Sinha's laboratory experiment, students' true valuations are controlled. The goal of these studies is not to identify the motives that drive payments. Rather, the goal is to investigate the effect of market structure (Krämer et al. 2015, Schmidt, Spann and Zeithammer 2014, also Tudon 2015) and the strategic interaction between multiple buyers and a seller (Mak et al. 2015).

Table 2 summarizes the field experiments. For each field experiment, we present the experimental design, type of product, payments, duration of the PWYW intervention and the main findings. We use the following acronyms for referring to the types of products most frequently investigated: experience goods (EG), digital goods (DG) which always have quasi zero marginal cost, goods with low marginal cost (LMC). If not indicated otherwise, payments refer to mean PWYW payments. What sticks out is that in the field experiments, PWYW is applied to low-value items and over short periods of time. The highest PWYW payments are payments for a day at a golf resort ($22.95, Machado and Sinha 2013), and payments for a photo portrait (€16.12 » $17.40, Kim, Natter and Spann 2014). In all other field experiments, average PWYW payments are below $10, and in many cases they are even lower than one dollar.

Gautier and van der Klaauw (2012) provide interesting results because they find evidence for self-selection. Guests, who booked a hotel stay under PWYW pricing in advance, pay significantly less in comparison to hotel guests, who have booked the hotel stay at regular conditions, but whom are given the chance to PWYW. A convincing interpretation is that PWYW campaigns of hotels attract buyers whose willingness to pay (WTP) is comparatively low. However, Gautier and van der Klaauw (2012) also report that while the campaign is successful in the sense of increasing capacity utilization for unfavorable days, PWYW is not a feasible long-term strategy as the share of those guests who have little concern to pay anything may increase.

Most field experiments last only for a couple of days. Schons et al. (2013) and Gravert (2014) stick out because they analyze repeated purchases. In Schons et al. (2013), buyers' repeated purchases are observed over 8 weeks, and it is found that, at the individual level, prices decrease over time. Similarly, Gravert (2014) finds that payments decrease from the first to the second purchase.

Table 3 summarizes the survey experiments. For each survey experiment, we summarize data on payments, type of product, experimental design and main findings. In comparison with the field experiments, it becomes apparent that in survey experiments, PWYW payments for higher-value products are also analyzed. The most expensive product is a mobile phone, with estimated production cost of $472 (according to subjects' estimations).

It should be noted that most survey experiments are based on hypothetical decisions, which might result in subjects overstating the prices they would pay (Harrison and Rutström 2008, Murphy et al. 2005). Such a hypothetical bias might not be a problem if one only looks at treatment differences to see whether a specific variable (like the availability of a suggested price, for example) affects prices that subjects are willing to pay. Exceptions are studies 3 and 4 in Kunter (2015) and Regner (2015), where subjects are surveyed after they have made a real PWYW purchase.

Most survey experiments identify variables that influence PWYW payments. Variables that positively affect payments are fairness, buyers' satisfaction (product quality, service quality), social norms, information about prices paid by other buyers and information about cost. Variables that negatively affect payments are social distance and anonymity. The effect of external reference prices is ambiguous and seems to depend on whether the reference price is perceived as reasonable or too high.

Another pattern that emerges from Table 3 concerns the types of products. Many products are experience goods, like tickets for sauna, cinema, concert, zoo or museum, or drinks or meals at restaurants, where quality is known only after consuming the product. In line with this is study 1 in Machado and Sinha (2013) in which subjects pay what they want for a dinner in an upscale restaurant. Subjects buy a bundle consisting of (at least) the dinner and the quality of service. Both parts of the bundle are experience goods, and it is found that the quality of the service has the largest effect on payments.[3]

Table 4 summarizes the case studies. For each case study, we summarize data on payments, type of product, duration and main findings. All products investigated are experience goods, and some of them are digital goods (e.g., e-books and music) with almost zero marginal cost. There are three case studies which report payments over longer time horizons: The e-book seller in Krawczyk, Kukla-Gryz and Tyrowicz (2015), the seller of music downloads in Regner and Barria (2009), and the restaurant in Riener and Traxler (2012) report results from environments where PWYW has been used for 18 months or more.

The study by León, Noguera and Tena-Sánchez (2012) stands out because in this study holiday packages with regular prices between $40 and $2,938 are offered under PWYW

3 There are numerous empirical studies on voluntary contributions to public goods, which do not explicitly refer to PWYW. One study, which is noteworthy because of its similarity to PWYW is Borck et al. (2006). They conducted a survey among readers of an online newsletter. The newsletter is available free of charge but subscribers are asked for voluntary donations. Borck et al. find evidence of conditional cooperation: subjects state that they give more if they expect others to give more.

pricing. León, Noguera, and Tena-Sánchez (2012) show that holiday packages with a market value of more than €137,000 earned slightly more than €7,000 under PWYW pricing. For the seller, the use of PWYW was everything but a success because 46.5% of buyers paid nothing, and only 3.3% paid more than 40% of the regular price. Based on the comments in the seller's blog, the authors argue that buyers chose low prices because they perceived reference prices as too high, and because they thought that marginal costs were low. Also, cannibalizing effects might be at work: For example, if subjects buy one part of a bundle (e.g., a flight) under PWYW and buy another part (e.g., dinner) at regular pricing, but have to pay the flight after they have paid the dinner, they might pay less because their budget for the bundle is already depleted.

Table 1: *Laboratory Experiments*

	Reference	Experimental Design	Main Findings
1	Krämer et al. (2015)	subjects' risk aversions and social preferences were measured; several treatments in which sellers with various pricing mechanisms competed, focus on sellers' choices of pricing mechanism, resulting market structure, prices and profits	compared to name-your-own-price (NYOP), PWYW achieves higher market penetration but lower profit; sellers choose PWYW if costs are low; PWYW prices depend on buyers social preferences
2	Machado and Sinha (2013) (Study 2)	subjects were told to watch and evaluate a movie, before that they could buy a snack; contextual factors (seller type, payment time, payment appeal, payment visibility) were varied	average payments were \$0.30, 60% paid nothing, possibly because subjects felt entitled to consume the snack for free; buyers paid more for local products if payment is made after the snack is consumed, buyers paid more if buyers were satisfied with quality, no evidence for image concerns
3	Mak et al. (2015) (Experiment 1)	PWYW as a threshold public good game; seller was simulated; an infinitely repeated game; 8 buyers with high or low valuation; if revenue falls below a known threshold the seller switches from PWYW to fixed pricing; market information was provided (i.e., buyers' valuations were common knowledge); each period buyers chose prices; full feedback (i.e., after each period buyers are informed about other buyers' prices and the earnings from previous period); treatments different by framing and by communication (no communication, suggested payments, chat)	no effect of framing, average number of periods was around 190, mean number of periods for which PWYW was sustained is 10.50 (no communication), 35.88 (suggestion) and 167.50 (chat); results are driven by buyers with high valuations for the good; these buyers pay significantly more in chat-treatment; in chat-treatment subjects often coordinate on prices resulting in equal earnings
4	Mak et al. (2015) (Experiment 2)	similar to experiment 1 but all treatments with chat, with or without market information and with or without full feedback	the possibility to communicate via chat facilitates the sustainability of PWYW pricing even if buyers have less than full information about other buyers' valuations and prices paid by other buyers; chat helps to establish a "social contract" about appropriate prices
5	Schmidt et al. (2014)	effect of competition is analyzed in two sets of treatments: (i) no competition treatments: repeated game with 1 seller and 3 buyers, seller chooses whether to enter the market or not, seller could invest in quality; (ii) competition treatments: 2 sellers and 6 buyers	buyers are motivated by outcome-based social preferences and strategic concerns (keeping the seller in the market); no evidence for intention-based social preferences; with competition prices are lower; sellers who invest in quality made positive profits on average in all treatments

Table 2: *Field Experiments*

	Reference	Experimental Design	Product Type	Payments	Duration	Main Finding
1	Gautier and van der Klaauw (2012)	hotel stays are sold via a promotional campaign in 36 hotels	EG, LMC	involuntary participants: €48 voluntary participants: €24 regular prices are €80, €120, or €150	2 days	promotional campaigns with PWYW attracts customers with few pro-social reputational concerns
2	Gerpott and Schneider (2016)	waffles and crêpes at a university campus are sold with a posted price or under PWYW	EG, LMC	posted price: € 0.50 PWYW waffles: € 0.67 PWYW crêpes: € 0.61	2 days	customers who decided themselves to purchase via PWYW paid on average higher unit prices than posted prices; offering a product via PWYW does not increase demand in case close substitutes are available
3	Gneezy et al. (2010)	photos in amusement park are sold under fixed price or PWYW, in 2 out of 4 treatments half the revenue is donated to charity	LMC	merchandise revenue per individual p=$12.95: $0.40 p=$12.95 + charity: $0.40 PWYW: $0.42 PWYW + charity: $0.45	2 days per treatment	merchandise revenue per individual is highest when part of the PWYW price is donated to charity
4	Gneezy et al. (2012)	in three treatments subjects could buy photos in amusement park at different fixed prices ($5 or $15) or under PWYW pricing	LMC	ratio of individuals who bought product/average profit p=$15: 23% / $3.45 p=$5: 64% / $3.20 PWYW: 55% / $3.50	boat tour: data from 20 cruises per treatment	in PWYW fewer individuals buy compared with $5; this opting-out is driven by image-concerns (not knowing the appropriate price)
5	Gravert (2014), published as Gravert (2017)	books at charitable bookstore are sold under PWYW, two treatments depend on whether subjects are reminded of their membership status	EG, LMC	$1.50 (pooled over treatments)	2 months	members of the bookstore paid 75 cents more when reminded of their membership; members pay less when they purchase a second book
6	Jang and Chu (2012) (Study 5)	subjects buy canned coffee, information about cost and reference price (i.e., prices paid by previous buyers) are provided	EG, LMC	$0.37 information about cost $0.42 reference price > cost $0.30 reference price = 0	3 days	on average, buyers paid less when informed that 72% of previous buyers paid nothing

	Reference	Experimental Design	Product Type	Payments	Duration	Main Finding
7	Kim, Kaufmann and Stegemann (2014) (Field Exp. 1)	restaurant meals in high-priced restaurant (drinks excluded) were sold, external reference price (i.e., information about regular price) and social distance regarding payment (personal interaction with waiter or anonymity) were varied	EG, LMC	€4.20 for products with regular price < €5.00 €7.63 for pr. w. € 5.00 < regular price. < €10.00 €10.29 for products with regular price > €10.00	3 weeks	external reference price and reputation of seller (quality of the good) have positive effect on PWYW prices; product value has negative effect
8	Kim, Kaufmann and Stegemann (2014) (Field Exp. 2)	sandwiches were sold, external reference price (i.e., information about regular price) and social distance regarding payment (personal interaction with waiter or anonymity) were varied	EG, LMC	€1.19	two days per week at lunchtime, for 4 weeks	see above
9	Kim, Natter and Spann (2009)	buffet lunch cinema ticket (regular) cinema ticket (discount) deli	EG, LMC	€6.44 €4.87 €3.11 €1.94	2 weeks 2 days 1 day 2 weeks	face-to-face interaction, fairness considerations and reciprocity increase PWYW payments; at the restaurant loyalty, price consciousness and income drive payments
10	Kim, Natter and Spann (2014) (Exp. 1)	comparison of free sampling and PWYW for Gilette razors; participants were surveyed 5 weeks and 1 year later		€1.41	2 days (promotional campaign)	PWYW yields higher repeat purchases and is more entertaining than free sampling
11	Kim, Natter and Spann (2014) (Exp. 2)	comparison of free sampling, 40% discount and PWYW for photo portraits	LMC	PWYW: €16.12 sampling: €0.00 discount: €26.00	3 weeks (promotional campaign)	compared to the discount treatment, the PWYW treatment attracted more buyers and resulted in higher revenue

	Reference	Experimental Design	Product Type	Payments	Duration	Main Finding
12	Kunter (2015) (Study 5)	potential buyers had to fill out a questionnaire before they purchased a zoo ticket; 5 treatments varied textual cues in the questionnaire	EG, LMC	control: €5.75 economic: €5.51 avoid neg. feelings: €5.69 pro-social behavior: €5.98 making excuses: €5.91	10 days	pro-social cues yield significantly higher payments than economic cues; avoiding feelings of guilt is an important factor
13	Machado and Sinha (2013) (Study 3)	payments are made after playing golf	EG, LMC	PWYW: $22.95 fixed price: $31.07	6 Saturdays	with PWYW average payments are lower, in combination with fixed pricing PWYW attracts more buyers and increases revenue
14	Schons et al. (2014)	during the 8 weeks buyers made 1-4 purchases of iced coffee	EG	first purchase: €0.88-0.99 second purchase: €0.62-0.88 third purchase: €0.50-0.76	8 weeks	in aggregate, prices do not decline over time but decline on the individual level until the 4th transaction; buyers have difficulties determining seller's cost
15	Park, Nam and Lee (2017)	best-selling beverage items are sold in 5 treatments: (i) traditional PWYW, (ii) PWYW with charitable giving (PWYW-C), (iii) PWYW with charitable giving plus a suggested price (PWYW-CS); benchmarks are (iv) fixed price scheme with (FP-C) and without (FP) charitable giving	EG	recorded revenues/net revenues (revenues minus charity) per customer in $ (n=928) FP: 5.62/5.62 FP-C: 5.61/4.77 PWYW: 4.59/4.59 PWYW-C: 5.04/4.30 PWYW-CS 6.46/5.44	5days	PWYW and PWYW-C attracts slightly more customers than FP; revenues are highest under PWYW-CS, however net revenues are highest under fixed prices and lowest under PWYW-C; suggested prices are important for the profitability of PWYW pricing schemes
16	Schröder, Lüer and Sadrieh (2015)	in 2 treatments buyers of soft drinks either paid via PWYW or reduced a given price by as much as they want (mark-of-your-own price, MOYOP)	EG	PWYW: €0.90 MOYOP: €0.69	4 x 40 min. per treatment	prices are significantly lower with MOYOP

DG = digital good, EG = experience good, LMC = good with low marginal cost.

Table 3: *Survey Experiments*

	Reference	Experimental Design	Product Type	Payment	Main Finding
1	Armstrong Soule and Madrigal (2015) (Study 1)	subjects are presented with a hypothetical online concert ticket purchase scenario; treatments differed as to the level of external reference prices ($10 or $25) and whether they are presented as a descriptive norm ("what others have paid") or injunctive norm ("what you should pay")	EG, LMC	$17.44 low ref. price and descriptive norm $25.06 high ref. price and descriptive nom $21.21 low ref. price and injunctive norm $36.76 high ref. price and injunctive norm	in situations without social pressure payments are influenced by norms and reference prices; when reference prices are high, payments are closer to the reference price when the norm is framed as a descriptive norm
2	Armstrong Soule and Madrigal (2015) (Study 2)	a pretest was used to determine the expected price for a concert ticket; treatments differed as to the level of external reference prices and as to whether they are presented as a descriptive or injunctive norm	EG, LMC	reference price = $20 < expected price $21.44 descriptive / $23.06 injunctive reference price = $45 = expected price $34.18 descriptive / $42.09 injunctive reference price = $70 > expected price $52.93 descriptive / $53.59 injunctive	when reference prices are equal to the expected price, payments are closer to the reference price when the norm is framed as injunctive norm (in contrast to the results of study 1)
3	Dorn and Suessmair (2016)	McDonald's Big Mac, in a within-subjects design each subject is presented with three scenarios which differ in the level of social presence and observation, first scenario was anonymous payment, second scenario was direct contact with seller, third scenario was being observed by third party, after each scenario subjects were asked to rank factors that influenced their price	low cost	not reported	social agreeableness was more important in scenarios with high social presence and observation, willingness to pay (WTP) increases from scenario 1 to scenario 2 to scenario 3
4	Hilbert and Suessmair (2015)	in a 3 (social interaction: low, medium, high) x 3 (norm compliance: low, medium, high) factorial design subjects indicated their WTP for a travel mug	low cost	€12.80 high social interaction €11.92 medium social interaction €9.15 low social interaction (regular price €17.95)	with high and medium social interaction subjects' WTP are higher as compared to low social interaction; norm compliance is not significant
5	Jang and Chu (2012) (Study 1)	for four products (recording album, mobile phone, cake, DVD), 70 subjects were asked about their WTP and the price they would pay under PWYW	varying	not reported	the distribution of the ratio price-paid/WTP is similar to the distribution of offer/ endowment in dictator games

	Reference	Experimental Design	Product Type	Payment	Main Finding
6	Jang and Chu (2012) (Study 2a)	for recording album and mobile phone 60 subjects were asked about their WTP and the price they would pay under PWYW; half of the students had information about cost	varying	not reported	price-paid/WTP ratio is higher in cost provision treatment
7	Jang and Chu (2012) (Study 2b)	in a pretest, subjects estimated the cost of the mobile phone; average estimated cost was $470;in three treatments 120 students were asked about their WTP and the price they would pay under PWYW; treatments differed according to information about cost ($260, $470, $680). Subjects in a control treatment received no information	high cost	price-paid/WTP ratios 40.23% control 73.18% (cost inf. $260) 72.00% (cost inf. $470) 48.48% (cost inf. $680)	the relation between price-paid and cost information is interpreted as buyers signaling fairness; buyers pay less if signaling fairness is more costly
8	Jang and Chu (2012) (Study 3)	in three treatments subjects were asked about their WTP and the price they would pay under PWYW for a mobile phone; treatment variation with respect to information: (i) none, (ii) information about cost, $180, (iii)information about cost together with information that most subjects would pay nothing	high cost	price-paid/WTP ratios 40.00% (i) 60.00% (ii) 34.00% (iii)	when injunctive norm (information about cost) and descriptive norm (most subjects pay would nothing) are in conflict, subjects react stronger to the descriptive norm
9	Jang and Chu (2012) (Study 4)	PWYW for Starbucks coffee; treatments differed according to the information subjects received: (i) fair price is $4.00-4.50, (ii) fair price is $4.00-4.50 but most subjects would pay nothing, (iii) fair price is $4.00-4.50 and most subjects would pay fair price	EG, LMC	price-paid/WTP ratios 72.00% (i) 46.00% (ii) 70.00% (iii)	the influence of a injunctive norm (information about fair price) is not enhanced by the descriptive norm

	Reference	Experimental Design	Product Type	Payment	Main Finding
10	Johnson and Cui (2013) (Study 1)	PWYW for concert tickets in four treatments; treatments differed according to the information subjects received: (i) no reference price, (ii) minimum price = $20, (iii) maximum price = $50, (iv) suggested price $35	EG, LMC	$45.80 (i) $34.45 (ii) $29.67 (iii) $34.31 (iv)	reference price has negative effect and reduces variance
11	Johnson and Cui (2013) (Study 2)	PWYW for concert tickets in a 2 (minimum price present or absent) x 2 (maximum price: present or absent) x 2 (suggested price: present or absent) design	EG, LMC	$43.77 (no information) $49.90 (suggested price only) $47.00 (minimum price only) $35.77 (maximum price only) $32.11 (minimum and maximum) $42.67 (suggested and minimum) $39.53 (suggested and maximum) $34.06 (minimum, maximum, suggested)	external reference prices have negative effect on prices paid;if external reference price is provided, prices paid are closer to the reference price (less variance)
12a	Johnson and Cui (2013) (Study 3)	PWYW for concert tickets, in a 2 (minimum price $10 or $20) x 2 (maximum price: $50 or $60) x 2 (suggested price: present or absent) design	EG, LMC	$33.04 minimum price = $10 $38.25 minimum price = $20 $33.30 maximum price = $50 $37.99 maximum price = $60	significant effect of minimum and maximum price but no effect of suggested price;the extremity of anchors influences buyers' chosen prices
12b	Johnson and Cui (2013) (Study 4)	PWYWfor concert tickets;in all three treatments minimum price = $20 and maximum price = $60;treatments differed according to the suggested price: (i) $30, (ii) $40, (iii) $50	EG, LMC	$32.62 (i) $33.58 (ii) $37.56 (iii)	suggested price affects prices buyers actually pay
13	Kim, Kaufmann and Stegemann (2014)	PWYW for several products (cinema tickets, DVD, digital album, flight tickets, hotel, rental car, opera, wine), online survey which varied social distance, product value, external reference price, seller's reputation and sales promotion; subjects were asked for the price they would pay under PWYW, their WTP and the regular price	different	subjects paid 65.85% of the regular price and 77% of their WTP with respect to all products	PWYW prices increase with lower social distance, low value products and external reference prices; seller's reputation and sales promotions had no significant effect

	Reference	Experimental Design	Product Type	Payment	Main Finding
14	Kunter (2015) (Study 1)	PWYW for tickets to animal park (sold in lecture); real payments but subjects received €11.50 show-up fee; study explores "motivation-related payment factors"	EG, LMC	PWYW prices not reported; regular price € 4.00	three most frequent answers: fairness (58%), reference prices (46%), customer satisfaction (31%)
15	Kunter (2015) (Study 2)	PWYW for day ticket for wellness and sauna, survey and interview with 91 subjects	EG, LMC	PWYW prices not reported; regular price €20-25	most frequent answers: reference prices (71%), customer satisfaction (47%), fairness (37%)
16	Kunter (2015) (Studies 3 and 4)	survey with 153 and 205 subjects; survey with paired comparisons took place in museum or zoo after subjects purchased tickets, in contrast to other surveys prices paid are not hypothetical; prices are not recorded	EG, LMC	not applicable regular prices: €4.50 museum €14.00 zoo	most important motives for making positive payments: customer satisfaction, fairness, income
17	Machado and Sinha (2013) (Study 1)*	PWYW for dinner in an upscale restaurant, in a conjoint analysis, 258 subjects ranked 12 different profiles; profiles differed in characteristics of the meal, quality of service, pricing (fixed or PWYW) and price paid	EG, LMC	not applicable	quality of service and fairness have significant effect; reciprocity is not significant; the effect of quality of service is largest
18	Marett, Pearson and Moore (2012)	buyers downloaded projects for an app (iProduct) from iTunes App Store, made their PWYW payments and completed a survey	DG, LMC	$0.43	structural equation modeling is used; loyalty influences buyers' WTP; price consciousness and usage affect the price actually paid
19	Regner (2015)	227 frequent customers (ten or more purchases) of an online music label are asked in a survey about their payments and motives; survey answers are compared with the purchases of these subjects in the past to control for self-serving biases	DG, LMC	recommended price $8.00	three types of customers are found: those who pay the minimum price, the recommended price and above the average price; customers more inclined to follow social norms are more likely to pay the recommended price; the possibility to try the product (listen to the music) before the purchase positively affects prices and is interpreted as evidence for reciprocity

	Reference	Experimental Design	Product Type	Payment	Main Finding
20	Roy (2015)	paper and pencil survey on a hypothetical restaurant visit with 300 students; willingness to pay (WTP), internal reference price (IRP), product involvement and price consciousness of subjects are recorded	EG, LMC	WTP: AUS$ 22.9 IRP: AUS$ 22.3	IRP has the strongest influence on WTP; subjects with high product involvement pay lower prices compared to subjects with low involvement; highly price-conscious subjects pay lower prices
21	Santana and Morwitz (2013) (Study 2)*	PWYW for 16-ounce cup of fresh-squeezed lemonade, online survey with 205 M-Turk subjects; social value orientation (SVO) was measured and the survey primed the norm: (i) communal norm in which all profits go to charity, and (ii) exchange norm	EG, LMC	$2.81 (i) $1.52 (ii)	subjects pay more when profits go to charity; effect of social norm depends on SVO: with exchange norm pro-socials pay more than pro-selves, with communal norm pro-socials and pro-selves pay the same
22	Santana and Morwitz (2013) (Study 3)*	PWYW for 16-ounce cup of coffee, online survey with 546 M-Turk subjects; social value orientation (SVO) was measured and the survey primed the norm: (i) communal relationship norm, the description focuses on social aspects (e.g., "very warm interaction"), and (ii) exchange relationship norm focusing on economic aspects	EG, LMC	$2.71 (i) $2.22 (ii)	situational relationship norms lead to higher prices, even if profits do not go to charity (cf. Study 2); pro-socials ($2.62) pay more than pro-selves ($2.31)
23	Santana and Morwitz (2013) (Study 4)*	PWYW for coffee plus bagel, online survey with 339 M-Turk subjects; social value orientation (SVO) was measured and the survey primed the norm: (i) communal norm, and (ii) exchange norm; priming took place in an unrelated task	EG, LMC	$3.37 (i) $3.04 (ii) (suggested price $3.00)	subjects primed with communal norm paid significantly more than subjects primed with exchange norm; priming effect carries over; pro-selves react stronger to priming

	Reference	Experimental Design	Product Type	Payment	Main Finding
24	Thomas and Gierl (2014)	WTP for pizza and hotel room is elicited, 2 (perspective) × 3 (reference-price information) × 3 (profit orientation) between subjects × 2 (service category) within subjects design	EG, LMC	€ 11.03 pizza € 62.13 hotel room	reference prices (inform. about what others paid before or minimum prices) have negative effects, no sign. difference between profit and nonprofit sellers
25	Weisstein, Kukar-Kinney and Monroe (2016) (Study 1)	DVD movies, survey study of online purchase scenarios, 2 (familiar or unfamiliar brand) × 2 (product video present or absent) between subjects design, experiment tests how brand familiarity and virtual product experience (potentially reducing uncertainty) affects perceived product knowledge, perceived quality, purchase intentions and PWYW prices	DG, EG	DVD retail price $ 19.99 $ 12.03 (unfamiliar brand, video present) $ 7.86 (unfamiliar brand, video absent) $ 9.84 (familiar brand, video present) $ 9.51 (familiar brand, video absent)	only for the unfamiliar brand the perceived product knowledge, perceived quality, purchase intentions and prices are positively affected by availability of the product video
26	Weisstein, Kukar-Kinney and Monroe (2016) (Study 2)	16 GB USB flash drive, survey study of online purchase scenarios, 2 (familiar or unfamiliar brand) × 2 (suggested price present or absent) between subjects design, experiment tests how brand familiarity and suggested price affects perceived product knowledge, perceived quality, purchase intentions and PWYW prices	LMC	USB flash drive: suggested price $ 17.99 $ 6.53 (unfamiliar brand, suggested price) $ 10.37 (unfamiliar brand, no price sugg.) $ 9.59 (familiar brand, suggested price) $ 9.01 (familiar brand, no price sugg.)	USB flash drive: suggested price for goods with an unfamiliar brand reduces perceived product knowledge, perceived quality, purchase intentions and PYWY payments; for goods with familiar brand the suggested price has no effect on purchase intentions and the PWYW price

DG = digital good, EG = experience good, IRP = internal reference price, LMC = good with low marginal cost, SVO = social value orientation, WTP = willingness to pay.
Additional results to Santana and Morwitz (2013) are reported by Santana and Morwitz (2015) in a comprehensive form.

Table 4: *Case Studies*

	Reference	Description	Product Type	Payments	Duration	Main Findings
1	Krawczyk, Kukla-Gryz and Tyrowicz* (2015)	PWYW for bundles of about 5 e-books, each bundle is sold in a 7 or 14 days campaign, the mean price and the eight buyers who paid the highest prices are listed on the seller's website	DG, EG, LMC	€5.00	about two years	buyers try to match the mean price; due to information about payments of others a social norm may drive payment behavior
2	León, Noguera and Tena-Sánchez (2012)	holiday packages and services (flights, hotel stays) of different price categories	EG, high cost	total payment €7,011, i.e., 5.1% of total value, €137,066	2 weeks	overall very low contributions with 46% of customers who paid zero; explanations for low payment are a framing effect and a cannibalizing effect caused by complementary goods
3	Regner and Barria (2009)	music downloads or CDs are sold, buyers can choose any price between $5 and $18, CD costs additional $4.97 for physical costs	DG, EG, LMC	$8.20 ($8.00 recommended price)	18 months (September 2003 – January 2005)	on average payments are considerably higher than the minimum price of $5 and higher than a recommended price of $8; reciprocity as the driver for voluntary payments is not confirmed; instead warm glow and guilt seem to be motives that drive behavior
4	Regner and Riener* (2012)	as above, but for two weeks, the seller changed its policy so that the artist was informed about buyers' names and prices paid;	DG, EG, LMC	$7.99 with anonymity $8.05 without anonymity	4 months (September – December 2005)	reduced privacy increases payments, but effect is not significant; reduced privacy decreases buyers by 20% per day and decreases revenues by 25% per day
5	Riener and Traxler (2012)	lunch or dinner at a restaurant	EG, LMC	€5.26	2 years	average payments modestly declined since the start of the restaurant but PWYW payments stabilized at about 5€ per meal on average; revenues increased due to more customers; restaurant has been operating for two years in a competitive market with PWYW pricing
6	Santana and Morwitz* (2013) (Study 1)	adoption fee at animal shelter	EG	$110.38 (reference adoption fee is $150)	1 month	buyers consider transaction in PWYW as socially interdependent; outcomes of sellers are considered; communal or exchange norms drive payment decisions

DG = digital good, EG = experience good, LMC = good with low marginal cost
* Working paper

3. GAPS IN CURRENT RESEARCH

The main results of the studies surveyed above can be summarized as follows. PWYW pricing has the potential to increase revenue, even if each single buyer pays less than she would pay under traditional pricing. This is because PWYW can be used as a marketing instrument to attract additional buyers.

With regard to the motives behind buyers' payments the following regularities emerge. Prices paid under PWYW pricing are positively influenced by social distance, social preferences, fairness, strategic considerations like loyalty, price consciousness and product quality. With regard to reciprocity and the availability of reference prices the evidence is mixed. Several studies (e.g., Regner and Barria 2009, Machado and Sinha 2013) do not find evidence for reciprocity as a driver of buyers' payments. Regner (2015), however, concludes that reciprocity drives higher payments in a setting where buyers have the opportunity to test the product before deciding about the payment. This suggests that information about a product's quality matters. Also, the effect of reference prices is ambiguous and seems to depend on whether the reference price is perceived as reasonable or too high.

It is interesting to see for which goods PWYW pricing is used. Results from our review suggest that PWYW pricing is used mainly for low-price goods, and most of these goods are experience goods. Moreover, from the review it is apparent that the vast majority of empirical studies is confined to short-term observations. These two insights are related to the following unanswered questions: (1) What conditions are required so that a seller applies PWYW pricing to high-cost goods without making a loss? (2) What are the conditions under which sellers can apply PWYW pricing in the long run?

In the following, we address the two gaps stated previously. Since the results from our review provide only limited insights with respect to the gaps, the discussion is partly speculative. However, we think that the discussion provides fruitful guidance in research since the answers are of central importance for theoretical as well as applied studies on PWYW. On the theoretical level, the answers will contribute to the literature on behavioral pricing (for a game theoretical perspective see Greiff and Egbert 2017). On the applied level, the answers to question (1) are of interest for sellers who want to use PWYW pricing as a short-term or long-term strategy, and the answers to question (2) are of interest for sellers who want to use PWYW pricing in the long run.

3.1 PWYW and High-Cost Goods

If we consider the perspective of a seller, PWYW can, firstly, be considered as a marketing strategy with the goal of creating awareness for a new product. Long term considerations, such as future market penetration, can be reasons for choosing PWYW pricing in the short run. Secondly, in the long term, PWYW can be a viable profit-enhancing pricing strategy for experience goods with low marginal costs, such as services, music downloads or e-books.

As a marketing strategy, PWYW can be successful in the short run because it attracts new buyers and increases sales. Many buyers might be attracted by the innovative character of PWYW pricing (Kim, Natter and Spann 2014), or by the option of making a 'good' bargain (Shampanier, Mazar and Ariely 2007). Another reason why buyers might be attracted by PWYW pricing is the reduced risk of paying too much for a low quality product. This holds especially true for experience goods whose quality is only known after consumption (Nelson 1970). A buyer, who pays before consumption, is at risk to pay a price she would not pay if she knew the quality of the good in advance. This may lead to abstaining from purchasing the good at a fixed price. Egbert, Greiff and Xhangolli (2015) point out that PWYW-ex-post-consumption can be a viable strategy to reduce information asymmetries and to increase sales. This is confirmed in several field and survey experiments, showing that PWYW payments increase with the quality of the good provided (Kim, Kaufmann and Stegemann 2014, Kim, Natter and Spann 2014, Kunter 2015 and Study 1 in Machado and Sinha 2013).

Only a small number of studies examine goods which have relatively high cost and which are normally sold at higher fixed prices (e.g., more than 200 USD per unit). Exceptions are the sales of holiday packages reported by León, Noguera and Tena-Sánchez (2012), with sales between €40 (hotel room for two persons, one night) and €2,938 (a seven-night holiday for two persons in Egypt), the hotel stays reported by Gautier and van der Klaauw (2012), with regular sales between €80 and €160 and, very recently, the study of Stangl, Kastner and Prayag (2017) for dance courses at a dance festival.

To see the relation between PWYW pricing and profits, consider the ratio of average PYWW payment, $\bar{p}$, to average cost, $\bar{c}$, $r = \frac{\bar{p}}{\bar{c}}$. If r>1, a seller makes positive profits, and if r<1, a seller makes a loss. Based on the results summarized in the previous section, it seems that r is smaller for goods that have higher costs.

If applied to goods with a low average cost, PWYW pricing can, in the worst case, lead to minimal losses because $\bar{c}$ is small. For goods with a higher average cost, the risk of making a loss is larger, because buyers have a stronger incentive to free-ride by paying a low price. Although the empirical results show that buyers are sensitive to reference prices and cost information, and that buyers are willing to pay higher prices for goods that come with higher costs, it is unclear from the reviewed studies whether sellers can apply PWYW to high-cost goods without making losses. The results from León, Noguera and Tena-Sánchez (2012) and Gautier and van der Klaauw (2012) provide a pessimistic outlook, but it appears premature to draw any generalized conclusion based on two studies only. Firstly, in both studies, social distance between buyers and seller is rather high and this might lead to reduced payments. Secondly, it is possible that buyers make small payments because they underestimate production costs (Greiff, Egbert and Xhangolli 2014). And, thirdly, buyers might perceive the use of PWYW as a marketing campaign in which they are entitled to make payments below cost.

For the field experiment by Gautier and van der Klaauw (2012), the third explanation seems plausible because PWYW was used as part of a promotional campaign. If buyers

know that a seller does not use PWYW as a short-run marketing strategy, buyers might recognize that the seller will stay in business only if payments are high enough, and hence, they might be willing to pay higher prices in order to keep the seller in business.

Although commonsense might suggest that PWYW cannot be successful for high cost goods because buyers will take advantage of the opportunity to pay low prices, there is no clear evidence for this. Many studies on PWYW pricing suggest that positive payments are driven by social preferences, in particular by fairness and reciprocity. Results from laboratory experiments show that fairness considerations and reciprocity (List and Cherry 2008; Fehr, Fischbacher and Tougareva 2002) are not weakened by higher stakes, suggesting that sellers do not necessarily make losses when offering high cost products at PWYW pricing.

3.2 PWYW in the Long-Run

Our review reveals that most field experiments rely on data that covers comparatively short periods of time – at best several months but mostly only a few days. This is different as with case studies. Three case studies (Krawczyk, Kukla-Gryz and Tyrowicz 2015, Regner and Barria 2009, Riener and Traxler 2012) are based on data about PWYW transaction collected over a period of more than a year.

In these case studies, goods with low marginal costs are sold. It is plausible that for these goods average payments exceed marginal cost. It seems that for goods with a low marginal cost, PWYW can increase profitability by attracting buyers at times when production operates below full capacity utilization. With regard to profitability this makes sense if there are economies of scale (e.g., due to high fix cost) so that average cost decreases with a higher capacity utilization. Digital goods are a specific case because marginal costs are zero and a capacity constraint does not exist. For these goods any additional unit sold at an arbitrary small but positive price increases profit.

The above literature review finds that PWYW can be successfully applied over long periods of time if products have low marginal cost, as in the mentioned case studies. However, based on our review, it is an open question whether PWYW can be successfully applied over longer periods for goods which have comparatively high marginal costs.

Another important factor which could influence the success of PWYW in the long run is the degree of substitutability, which depends on market structure. For instance, if buyers prefer the good a seller offers under PWYW and if substitutes are available, buyers have an incentive to free-ride under PWYW pricing by buying the good at a low price. The seller makes a loss and, eventually, is driven out of business. This is not a problem for buyers because substitutes are available. However, if no perfect substitutes are available, the incentive to free-ride under PWYW is weaker since driving the seller out of the market cannot be in the interest of the buyer.

An example for this situation can be lunch or dinner at a restaurant. Riener and Traxler find that 81% of the customers of the restaurant studied are regular customers who eat there at least once a month, and 50% of customers eat there at least twice per month (Riener and Traxler 2012, 477). These regular customers might be an important factor driving the success of PWYW at this particular restaurant because they are willing to pay prices that cover costs in order to keep the restaurant in business. Arguably, this would be different if there were an exact replica of the restaurant which sells at fixed prices (i.e., a restaurant where customers could eat exactly the same meals in exactly the same atmosphere). Hence, we postulate that over longer time spans, the success of PWYW pricing will depend on the availability of substitutes and, therefore, on market structure. This is a hypothesis right now and further research into this direction is needed. For example, one could design a LE (similar to Mak et al. 2015) in which buyers choose between two goods, one being sold under PWYW pricing and the other one being sold under fixed pricing. Across treatments one could vary the degree of substitutability between the two goods in order to explore how this affects PWYW payments.

Closely related to the discussion of the long run is the question of how buyers' payments develop over time in repeated purchases. Schons et al. (2013) and Gravert (2014) show that prices decrease when purchases are repeated. Decreasing prices do not imply that the seller will eventually realize losses. In fact, Riener and Traxler (2012) find that a slow decrease in average PWYW payments goes hand in hand with an increase in buyers so that revenue increases in total.

4. CONCLUSION

In this paper, we provide a review of the fast growing literature on PWYW pricing. We review empirical studies on PWYW pricing which report data generated in laboratory experiments, field experiments, survey experiments and case studies. We find that PWYW pricing is almost exclusively used in very small segments of consumer goods, mostly for low-cost goods, experience goods, or for bundles of goods and services. Moreover, almost all empirical studies focus on relatively short time periods.

Furthermore, with respect to the four types of studies (Tables 1 to 4) we conclude that the findings are not consistent as regards the identified variables that seem to have an influence on payments in PWYW settings. Future research will be needed for the examined low-price goods due to conflicting results.

With reference to the discussed studies it is also striking that nearly all of those which are documented have been conducted in a few rather developed European and Asian countries and North America, and that studies related to India, China or Africa have not been conducted. This may hint that the level of economic development of a country and cultural aspects play also a role in the feasibility of PWYW pricing. Related to this is the observation that PWYW is applied only in B2C contexts but that results from B2B contexts have not been reported yet.

Our review shows that despite the current fashion to investigate PWYW, there are still several unanswered questions. In particular, it is not clear if sellers can successfully apply PWYW to high cost goods, or over longer time periods. To address these issues, we provided some tentative answers in the previous section. However, so far, the amount of goods sold via PWYW pricing in comparison to other pricing mechanisms is nothing more than marginal.

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