Pay What You Want – But Pay Enough! Information Asymmetries and PWYW Pricing

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12 December 2013

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Abstract: *Pay What You Want (PWYW) pricing has received considerable attention recently. Empirical studies show that when PWYW pricing is implemented buyers do not behave selfishly in a number of cases and that some sellers are able to use PWYW to increase turnover as well as profits. In this paper we present a theoretical model of buyer behavior under asymmetric information about production costs. Our model shows that information asymmetries provide an explanation for the results found in empirical studies.*

Keywords: *PWYW pricing, information asymmetry, fairness, buyer behavior*

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1. Introduction

Pay What You Want (PWYW) pricing mechanisms have been granted substantial attention both in the literature and in practice recently. PWYW is a form of participative pricing in which buyers[1] are given the opportunity to determine prices. In contrast to other participative pricing mechanisms, such as reverse auctions, PWYW allows buyers to maximize their own utility by doing monetary harm to a seller. Contrary to the prediction of traditional economic theory, but in line with the experimental results from dictator games, many buyers of products[2] sold via PWYW pay positive prices. Sellers, on the other hand, do not seem to be at risk of falling victim to selfish buyers. They may even use PWYW pricing in order to attract more buyers and enhance revenues as compared to fixed price systems.[3]

In recent empirical studies buyers' behavior is interpreted by preferences for fairness, inequity aversion, shame, reciprocal behavior, income level of buyers, or moods. The role of information asymmetries in PWYW pricing has not been addressed yet. Our goal is to show the importance of information asymmetries in the context of PWYW. We outline a theoretical model, which we use to show how information asymmetries affect prices paid under a PWYW pricing mechanism. In particular, the model reveals that under certain circumstances, PWYW pricing can be profitable in the long run. This implies that PWYW can be used not only as a marketing strategy that brings a new product or company to the attention of potential customers, but also as a viable long-term pricing strategy.

In the second section we briefly summarize the recent literature on PWYW pricing. In section three we outline information asymmetries which influence the effectiveness of PWYW pricing and provide a model. In section four we discuss some implications of the model and the final section concludes.

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[1] Throughout the text we apply the terms buyer also as a synonym for customer.
[2] For simplicity we speak of goods or products. However, it would be more precise to speak of bundles since all goods dealt with in this paper are in fact offered as part of a bundle (e.g., the meal at a restaurant consists of, at least, the food, the service, and the atmosphere).
[3] Our arguments refer to prices and revenues as most of the empirical literature does. The literature provides only limited information about the profitability of different pricing mechanisms for the seller. Our arguments refer to production costs only. The cost of using a specific pricing mechanism determines the profit as well. PWYW pricing and fixed pricing generate low transaction costs in contrast to individual bargaining.

2. Review of the Literature

Kim, Natter, and Spann (2009) pioneered the empirical investigation on PWYW pricing. In three short-term field experiments they test the applicability of a PWYW mechanism to different goods, a lunch buffet at a restaurant, a movie at a cinema, and a hot beverage at a delicatessen (2009: 45). They observe buyers' behavior in a time-span between three days (cinema) and six weeks (delicatessen). Particularly at the cinema, PWYW pricing may be rather problematic, while it seems to have positive effects in the restaurant and at the delicatessen (2009: 48). There, sellers' advantage of implementing a PWYW pricing mechanism is an *increase* in revenues (see also Kim, Natter, and Spann 2010a). Other recent studies support the finding that the PWYW pricing mechanism may be beneficial for sellers. Riener and Traxler (2012) are the first who test a PWYW pricing mechanism in the long run. They analyze buyers' payments in a restaurant for the period of two years and find that despite an average decline of payments, total revenues increased. Thus, PWYW pricing may offer a long-term business strategy.

Assuming rational, selfish and materialistic buyers, the predictive payment in PWYW pricing is zero because no minimum threshold price is employed. However, nearly no buyer pays zero. Theoretical explanations for the observed behavior can be found in behavioral economics, sociology, and psychology. Most theoretical explanations are based on social preferences, such as a preference for fairness, reciprocity, or inequity aversion. In addition, the quality of the product, buyers' income levels, and the availability of reference prices affect the prices paid (for a discussion on the relevant literature in experimental economics and psychology see Kim, Natter, and Spann 2009: 45-48). Results of field experiments indicate that buyers' fairness perceptions and satisfaction with a product positively influence prices paid, i.e. prices at which products are sold are higher. Particularly, at the cinema, buyers' perceived fairness of the price seems to have an important influence on prices paid.[4] This finding is remarkable for our aim because we show how asymmetric information influences the price that buyers consider as fair.

Regner and Barria (2009) investigate the payment behavior of buyers in respect of online music. In this case, a positive minimum price and a reference price were provided. They find that, on

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[4] For the cinema they note: "The level of fairness significantly and positively influences prices paid. Although the buyers paid only 66% of their reference price to the seller, they believed that they had behaved fairly; the survey data show that approximately 90% of the buyers considered a price ≤ € 6 fair." (Kim, Natter, and Spann 2009: 52).

average, buyers pay more than the price recommended by the seller. They explain their findings with the reciprocity, which drives buyers' decisions (see additionally Regner 2010). Kim, Natter and Spann (2010b) emphasize the role of buyers' reference prices[5] and find that reference prices as well as satisfaction with the product do have an influence on the prices paid.

Recently, buyer and seller behavior under a PWYW pricing mechanism has also been tackled in experimental studies. Schmidt, Spann and Zeithammer (2012) test in their experiments whether it is outcome-based social preferences, intention-based reciprocity or self-interest strategic behavior that affect buyers' payment decisions. In a monopoly treatment one seller interacts anonymously via a computer with six buyers. The seller decides first whether to offer the product under PWYW and later whether to invest in the product. The buyers decide if they want to purchase the product and what price to pay after they have been informed about the seller's marginal costs and their own (buyers') valuation of the product offered. These interactions are repeated for five periods. Their results show that there is a high heterogeneity in buyers' behavior. Positive prices paid are in line with the predictions of outcome-based prosocial theories such as altruism and inequity aversion. The result that is important for the purpose of our main argument is that fair-minded buyers paid more when they benefited from the product, or when they were aware of the higher costs on the side of the seller. However, participants did not pay higher prices to reciprocate for investments undertaken by sellers as intention-based models of reciprocity would predict.

Chen, Koenigsberg, and Zhang (2009) investigate the profitability of PWYW in an industry with low marginal costs. They show that PWYW can be used as a price discrimination mechanism and their theoretical model reveals that zero or low marginal costs is not a precondition for using PWYW. In fact, PWYW can be beneficial to sellers as compared to fixed prices when there are enough fair-minded customers willing to purchase the product, or when buyers' willingness to pay is rather low. Also, in industries where there is high competition, mainly because of low product differentiation, PWYW can bring more revenues to sellers than the traditional pricing mechanism.

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[5] We use the definition of reference price as a price previously paid by buyers for an identical good or a close substitute. We do not distinguish between internal and external reference price since for our purpose it is irrelevant whether the reference price has been formed by a buyer's previous experience with the same good or with similar competing goods.

Jang and Chu (2012) investigate the role of self-signaling motives and perceived 'socially correct' actions of buyers' fairness in PWYW pricing mechanism. For this purpose they asked participants about their payment of a range of products (recording album, mobile phone, cake, DVD title and canned coffee) offered under PWYW mechanism. Participants were divided into control and experimental groups with no, low or average information on the products' costs. Two out of five experiments tested whether it was fairness motives or self-signaling which makes buyers pay more. They found that buyers paid more when informed about the seller's costs, which shows that byers care about seller's costs and fairness perceptions do influence buyers' behavior. The results also revealed that when faced with higher seller's costs and the understanding that appearing fair will require considerate payment, buyers were still willing to pay less in spite of the awareness that they would incur losses to the seller. This implies that self-signaling motives are stronger than fairness ones. In the other three experiments participants were given hints about 'fair' prices or other buyers' payment behavior. Jang and Chu found that clues about "socially correct" actions also affect buyers' behavior in PWYW. Buyers paid more when hinted that most of their peers behaved fairly and decreased the prices paid when realized the others behaved selfishly.

The effects of external reference prices - such as minimum, maximum or recommended prices - were investigated by Johnson and Cui (2012). The authors asked undergraduate students about the price they would pay on a hypothetical purchasing scenario of concert tickets offered under PWYW. Participants in experimental groups were given information about a minimum or maximum accepted price or a recommended price. Analyzing the results from four field experiments, Johnson and Cui found that providing external reference prices in PWYW may shift buyers' paying behavior toward the provided prices, i.e. these external reference prices may act as an anchor on the prices paid. More interestingly, Johnson and Cui find that sellers' profits are the highest if no reference price is provided. A minimum recommended price decreases the prices paid. On the contrary, a maximum recommended price may work as a price-ceiling which influences negatively the average price paid of those buyers who are willing to pay high prices.

In contrast to the above computer and laboratory experiments, León, Noguera, and Tena-Sánchez (2012) conduct a field experiment with PWYW pricing for holiday packages in Spain. In the experiment the buyers exhibit a much stronger selfish behavior in comparison to previous studies. They pay only 5.1% of the value of the products (2012: 395). León, Noguera, and Tena-Sánchez

try to explain the results by buyers' preferences and by framing effects. In line with the results of this field experiment we offer a possible alternative explanation below. We consider information asymmetries between buyers and sellers, an aspect which has not been specifically addressed in the above mentioned literature.

3. Information Asymmetries in PWYW Pricing

As Kim, Natter and Spann (2009) show, PWYW pricing is a pricing strategy which is suitable for some goods but not for others. They outline that fairness perceptions are important for prices paid by buyers. Here, we offer a more conventional economic explanation and a model and we argue that information asymmetries influence prices paid under PWYW pricing.[6] We contend that the '*observability*' *of fixed and marginal costs* can influence buyers' payment decisions.

Our argument is related to information asymmetries with respect to production costs. Let us assume a not-completely-selfishly motivated buyer who follows individual fairness perceptions when asked to pay for a product which she has consumed or will consume. As a consequence, she may pay (within a PWYW pricing mechanism) a price which she *considers fair* according to her set of information.[7] However, if she has incomplete information about the cost function of the seller, the price which she perceives as fair may be too low or too high (or, more precisely, higher or lower than the price the buyer would pay if she had complete information about production costs). Note that information asymmetries *cannot* be solved by reference prices because without information about cost, buyers have no information in order to judge the fairness of the reference price. And if buyers assume that the reference price is the fair price, the fair price will be distorted unless the reference price accurately reflects the seller's costs.

Let us provide an example: restaurant visitors have, in most cases, a fairly good experience in

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[6] Our explanation does not depend on buyer heterogeneity in reservation prices. In our model, we compare the price paid by a buyer with complete and incomplete information, and the price based on the seller's cost. In other words, we look at individual transactions, which give rise to profits or losses. Of course, there can be buyers who are heterogeneous with respect to their willingness-to-pay (WTP) or their fairness preferences. In this case, the profitability of each individual transaction depends on a buyer's WTP and fairness preferences, and the seller's total profit is given by the sum of profits over all transactions. Whether PWYW is profitable depends on the distribution of WTP and fairness preferences.

[7] A seller's cost is only one out of several determinants of price fairness. For a review of price fairness perceptions, see Xia et al. (2004).

how much the price of ingredients are, how much labor is required to prepare a meal and how much approximately the rent for a restaurant in a given area could be. So they may have a reasonable guess about the overall costs of running a restaurant and preparing a meal. Restaurant visitors are able to calculate a price which can cover part of the costs and which they perceive as fair. Quite in contrast to the case of a restaurant visit, a buyer who goes to the cinema is rather unable to calculate the costs which the owner of a cinema faces when showing a movie. Buyers are normally unable to provide an educated guess about the fixed costs for running a cinema, e.g. monthly rent, capital costs, costs for renting movies, etc. However, buyers *are* able to observe that the marginal cost for a visitor in a cinema is zero – as long as capacity utilization is below 100%. The general '*observability*' of production costs in one case and the '*unobservability*' of production costs in the second case lead to different results when buyers are asked to pay under a PWYW mechanism.[8] In fact, a PWYW mechanism is likely to improve revenues and profits *if* information asymmetries are low on the side of buyers and the same mechanism may lead to contrary results if information asymmetries are high. The latter applies only if the price regarded as fair by a buyer is too low with respect to costs, which is most likely to happen when fixed costs of production are relatively high. If this is not the case and the price considered as fair is higher than the costs, the seller should have an interest in preserving information asymmetries. The problematic case from the perspective of the seller is the first one, where buyers consider a price as fair that is lower than production costs.

To illustrate the importance of information about production costs, assume that a risk neutral representative buyer knows the seller's cost structure, i.e., she is aware of the fixed costs, F, and marginal costs, MC, which are constant. The buyer's willingness to pay (the maximum price she is willing to pay) is given by WTP. For simplicity we assume a buyer whose WTP exceeds the seller's unit costs, UC, which are given by UC = F/N + MC (N is the scale of production).[9] The gains from trade are given by the difference between WTP and UC, WTP - UC > 0. Assume that the buyer who is not completely selfish is willing to split the gains from trade so that her own share is q (with 0 < q < 1) and the seller's share is (1-q). Then, the price perceived as fair in the

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[8] In the case of the restaurant, the price buyers consider to be fair may coincide with the reference price. In the case of the cinema, the price considered as fair is lower than the reference price if buyers underestimate fixed costs.

[9] In the text we model the simplest case. For further cases, in which the WTP is smaller than the seller's unit cost, see the Appendix.

complete information case is given by

$$p(complete\ information) = (1 - q)WTP + q\ UC = (1 - q)WTP + q\left(\frac{F}{N} + MC\right).$$

Now assume that the buyer has only incomplete information about fixed costs, which are low (F_L) with probability r (with $0 < r < 1$) and high (F_H) with probability (1-r). F is replaced by the expected value $E(F) = r\ F_L + (1-r)\ F_H$, and the price which the buyer considers a fair price is (in the incomplete information case) given by

$$p(incomplete\ information) = (1 - q)WTP + q\left(\frac{rF_L + (1 - r)F_H}{N} + MC\right).$$

Assuming that fixed costs are high ($F = F_H$), the difference between both prices is

$$\Delta_H \equiv p(complete\ information) - p(incomplete\ information) = \frac{qr}{N}(F_H - F_L) > 0,$$

and assuming that fixed costs are low ($F = F_L$), the difference between both prices is

$$\Delta_L \equiv p(complete\ information) - p(incomplete\ information) = \frac{q(1 - r)}{N}(F_L - F_H) < 0.$$

If fixed costs are high (or low) but buyers have incomplete information about them, they underestimate (or overestimate) the costs. Hence, with asymmetric information about fixed costs and fixed costs being high, PWYW pricing results in lower revenue and profits (compared to the situation in which buyers and sellers have symmetric information).

For given q and r, the difference in revenue will depend on the scale of production, N, and the difference F_H-F_L. The latter can be interpreted as a proxy for uncertainty, which means that with increasing uncertainty, PWYW pricing is less likely to increase revenue. Regarding the scale of production, it follows that if production takes place on a larger scale (higher N), it is more likely to increase revenues, because a larger scale allows for fixed costs to be covered by a larger number of units sold.

The model can be extended to incorporate uncertainty with respect to the scale of production, N. Assume that buyers have incomplete information about N, and let the buyer's estimate be given by $\hat{N}$. If buyers underestimate the scale of production, Δ_H will be higher and Δ_L will be lower.

If buyers overestimate the scale of production, Δ_H will be lower but will remain positive and Δ_L will be higher but will remain negative. Hence, uncertainty regarding the scale of production does not affect our main result: With fixed costs being high and buyers having incomplete information about the cost structure, the price that buyers consider as fair is below the unit cost.

Note that the argument above relies solely on the amount of information that buyers have about the seller's cost structure. This does not imply that fairness considerations are unimportant, but it shows that *in addition to fairness* the distribution of information is a crucial variable for explaining the success or failure of PWYW pricing. Indeed, in order to allow buyers to realize their preference for fairness, they need information about production costs.

4. Implications of the model

One can pose the question why fix costs should matter at all. According to the standard microeconomic theory, fix costs are sunk costs and should not matter at all. A profit-maximizing seller should set her price equal to marginal costs, so that the profit-maximizing price is determined by the intersection of the upward-sloping marginal cost curve and the downward-sloping demand curve. Contrary to this theoretical prediction, a large number of sellers employ full cost pricing (Govindarajan and Anthony 1983; Shim and Sudit 1995).

Full cost pricing can be difficult, however. The experimental evidence in Bolton et al. (2003) indicates that buyers overestimate profits and underestimate costs. Hence, a reference price might not be a good signal for costs. Although dual entitlement theory (Kahneman et al. 1986) suggests that a seller is entitled to profits and buyers are entitled to buy a good at a certain price, buyers perceive the price as unfair if they perceive profits as being too high. This perceived exploitation can be reduced by making costs more noticeable (cf. Bolton et al. 2003). With more information the seller's claim to a share of the surplus becomes more salient. Since buyers are not obliged to pay a positive price in a PWYW pricing mechanism, seller's entitlement is not a legal but a morally perceived right (Gächter and Riedl 2005).

Similar fairness considerations to price changes are studied by Kahneman, Knetsch, and Thaler (1986) who show that buyers perceive a price increase as fair if higher prices reflect higher costs but perceive higher prices as unfair if they reflect excess demand. Put bluntly, the perception of

buyers is that sellers are entitled to a higher price and buyers have a moral obligation to pay a higher price if costs are high.

The motivations for paying a 'fair' price are preferences for fairness and self-image concerns. The effect of information about costs on entitlements is comparable to the notion that buyers pay a positive price in order to maintain a positive self-image (Gneezy et al. 2012). Viewed from this perspective, one can argue that the loss in a buyer's utility from paying too little increases with the strength of the seller's entitlement. In other words, the more information buyers have about sellers' costs, the stronger the sellers' entitlement is and the larger the buyers' losses in utility are from violating fairness and acting selfishly.

Empirical evidence is collected by Jang and Chu (2012) and Schmidt, Spann and Zeithammer (2012), who investigate PWYW pricing using laboratory experiments. Jang and Chu (2012, experiment 2a) show that more information about costs increases PWYW prices and argue that the rationale behind this is that buyers do not want to hurt sellers because doing it would result in a bad feeling. Schmidt, Spann and Zeithammer (2012) find that buyers are willing to pay higher prices as higher production costs (known to buyers) lead to an increase of buyers' valuations for the good.

The major argument of the preceding analysis is that the success of PWYW pricing depends on buyers' information about costs. A question that immediately comes to mind concerns the implications for sellers: How can sellers credibly signal their cost to buyers? From a theoretical perspective, this is a signaling problem where sellers have are of different types and signal their true type. Telling buyers about the costs would be one way to send a signal, but this would be nothing but cheap talk. Another possible way to send a credible signal about costs is to inform buyers about the quality of the product by using product certification Product certification is a credible signal of quality, and quality is a credible signal of the product's costs.

The case presented in this paragraph reveals that buyers consider a price as fair if the seller's profit is not too high. Profits tend to be overestimated, however this tendency can be reduced if information about costs is more salient.

5. Conclusion

In this paper, we have shown the importance of information asymmetries as an explanation for which products the PWYW pricing mechanism may be a viable alternative to traditional fixed pricing. This aspect has not been mentioned in previous interpretations of empirical findings on PWYW pricing and can complement existing models. In particular we find, that, first, if fixed costs are high, PWYW is more likely to be successful if buyers are informed about seller's fixed costs because if they have such information, the price they will pay reflects costs. This implies that for sellers with high fixed costs PWYW can only be a success if the information asymmetry is low, i.e., if buyers have information about fixed costs. Second, buyers' expectations about fixed costs (i.e., the parameters F_H, F_L, and r, or more generally, the distribution of fixed costs) matter for what they perceive as a fair price. The larger the range of the distribution of fixed costs (F_H - F_L) or the larger the probability that fixed costs are low (r), the lower the price which a buyer is willing to pay. Third, information asymmetries are less important if the scale of production is large (e.g., buying hot beverages at a delicatessen) or if there is no capacity constraint at all (e.g., online music). The first two implications concern the distribution of information about production costs and reveal that PWYW is more suitable for products for which buyers have information about costs. The third implication concerns the scale of production and reveals that PWYW is more suitable for products produced on a large scale.

We demonstrated that the (un)observability of production costs[10] and of quality can influence the price a buyer is willing to pay for a good. The (un)observability of production costs as well as of quality are problems which may cause market failure or moral hazard, both being suboptimal for sellers. Thus, they do deserve attention in the currently evolving debate on PWYW pricing mechanism. This contributes to gaining more insights into the important question about the types of products, for which PWYW is a suitable pricing mechanism.

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[10] Since production costs of holiday packages are difficult to observe, the rather selfishly oriented behavior of customers reported by León, Noguera, and Tena-Sánchez (2012) fits into our explanation.

Appendix

Section 3 shows the effect of buyers' information asymmetries on prices, revenues and profits in a PWYW pricing mechanism. With asymmetric information and fixed costs being high, the price regarded as fair by buyers is too low with respect to production costs. In this situation it is in the seller's interest to inform buyers about costs. In the opposite case, in which fixed costs are low and fair prices are too high compared to costs, preserving the information asymmetry is in the seller's interest. In both situations it is assumed that buyers' WTP (maximum willingness to pay) exceeds product's unit costs (UC) so there can be a positive gain from trade (WTP - UC > 0), which is split between the seller and the non-selfish buyer.

The assumption of WTP exceeding unit costs restricts the analysis to two cases. In this section we relax this assumption and consider other possible cases. Denoting the seller's real unit cost by UC_r and the unit cost as perceived by the buyer by $UC_p = \left(\frac{rF_L + (1-r)F_H}{N} + MC\right)$, the six cases are:

1. $UC_p <$ $UC_r <$ WTP   4. $UC_p <$ WTP $< UC_r$

2. $UC_r <$ $UC_p <$ WTP   5. WTP $< UC_p < UC_r$

3. $UC_r <$ WTP $< UC_p$ 6. WTP $< UC_r < UC_p$

In the above discussed cases 1 and 2 the buyer buys the good and pays $(1 - q)\,WTP + q\,UC_p$.

In case 3, perceived unit costs by buyers are higher than average WTP, which in turn is higher than the product's real unit costs. If buyers know the real unit costs, they will pay a perceived fair price of (1-q) WTP + q UC$_r$, which is lower than the WTP but higher than real unit costs, thus increasing revenue and profit. With asymmetric information, however, the increase in revenue and profit will be even larger since buyers overestimate unit costs and pay a higher price. In this case, it is in the seller's interest to preserve information asymmetries.

In case 4, the products' real unit costs are higher than WTP, despite the fact that buyers regard that the costs as lower than the maximum price they are willing to pay. In this case, with asymmetric information, the price buyers will pay lies between the WTP and the perceived unit

cost but below real unit cost so that the seller will make a loss. And if sellers inform buyers about the product's real unit costs, PWYW pricing makes no sense. Buyers who care about fairness will not be willing to pay the fair price (1-q) WTP + q UC$_r$ because if they would, the seller would suffer losses. They would refrain from buying since the fair price exceeds their WTP. Buyers who do not care about fairness will pay a price lower or equal to their WTP, i.e., a price that is below costs. Thus, with asymmetric information and with symmetric information the price paid by buyers is below the seller's unit cost, resulting in losses. In this case, PWYW pricing mechanism is not advisable since generated revenues will not exceed production costs.

In cases 5 and 6 an average buyer's WTP is lower than both real and perceived unit costs. In these cases the price buyers consider as fair is lower than the cost of production, UC_r. As in case 4 with symmetric information, fair buyers will not buy the good and selfish buyers will buy at a price below cost. This holds regardless of buyers' information about fixed costs. PWYW pricing mechanism should not be used in these cases since revenues will be lower than costs, resulting in a loss for the seller.

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