

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

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**Abstract:** Pay What You Want (PWYW) pricing has received considerable attention recently. Through PWYW, companies entrust the buyers in determining the prices of specific products. 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. The technique may also be used to attract more customers and increase revenues. In this paper we present a theoretical model of buyer behavior under asymmetric information about production costs. Starting from the assumption of 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, our model shows that information asymmetries in relation to costs provide an explanation for the results found in empirical studies. The theoretical model can be expanded such as to embody uncertainty with respect to the scale of production.

**Keywords:** PWYW pricing, information asymmetry, fairness, buyer behavior, willingness to pay (WTP).

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## 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. Although there is a literature on PWYW pricing, showing how reference prices, sellers' reputation, and product quality affect buyers' behavior, the role of information asymmetries with respect to production costs has not been addressed from a theoretical perspective. This is surprising because from the empirical literature (Isik, 2006) it is known that uncertainty is negatively related to willingness-to-pay (WTP), which is defined as the maximum amount of money, for which a buyer is indifferent between the product and the amount of money. 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 with respect to fixed costs 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 conclude.

#### **Prior Investigations on PWYW**

Kim et al. (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 (idem). They observe buyers' behavior in a time-span between three days (cinema) and six weeks (delicatessen). PWYW pricing seems to have positive effects in the restaurant and at the delicatessen (idem). There, sellers' advantage of implementing a PWYW pricing mechanism is an *increase* in revenues (see also Kim et al., 2010a). At the cinema, PWYW pricing may be rather problematic. Although buyers paid positive prices, these prices were too low to cover the costs, resulting in a loss in revenue.

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 by enhancing buyers' loyalty (see also Trif, 2013).

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 [4]. 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, inequity aversion, or image concerns (Gneezy et al., 2012, see also Lim et al., 2012). 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 et al., 2009). 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. Fairness preferences and reference prices, however, are not sufficient for the success of PWYW pricing, as the PWYW study at the cinema reveals. The authors state that: "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  $\leq$  € 6 fair." (Kim et al., 2009, p. 52). 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 average, buyers pay more than the price recommended by the seller. They explain their findings with reciprocity, which drives buyers' decisions (see additionally Regner 2010). Kim et al. (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 et al. (2014) 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 three 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 pro-social theories such as altruism and inequity aversion. However, participants did not pay higher prices to reciprocate for investments undertaken by sellers as intention-based models of reciprocity would predict. These results are important for the purpose of our main argument because they

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reveal that fair-minded buyers condition their prices on sellers' costs, i.e. buyers pay more when sellers' costs are high. However, since in all treatments buyers are informed about sellers' costs, the experiment provides no insight into PWYW pricing under asymmetric information.

Chen et al. (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.

Jang and Chu (2012) conduct a series of experiments to investigate the role of fairness in PWYW pricing and show how fairness perceptions are affected by social cues. To the best of our knowledge, they present the first experiment aimed at investigating the role of information about production cost on PWYW, and their results can be explained by the theoretical framework which we provide in this paper. In their experiment 2a they ask participants about their WTP and the prices they would be willing to pay under PWYW pricing for different products (a recording album and a mobile phone). Participants were divided into control and experimental groups and only participants in the experimental group received information about the cost of the products. The results show that the price/WTP-ratio is significantly higher in the experimental group [6].

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.

Taken for granted that the availability of reference prices affects the prices buyers are willing to pay under PWYW pricing, one way to reduce the information asymmetry would be to provide a reference price equal to average cost. This, however, is problematic if the reference price is not perceived as fair. Experimental evidence (Bolton et al., 2003) indicates that buyers overestimate profits and underestimate costs. Hence, a reference price might not be a good

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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 (Bolton et al., 2003).

Similar fairness considerations to price changes are studied by Kahneman et al. (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 that buyers have a moral obligation to pay a higher price if costs are high, but buyers frequently underestimate costs.

In contrast to the above computer and laboratory experiments, León et al. (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, p. 395). They explain the results by buyers' preferences and by framing effects (2012, pp. 401-402). Framing effects occurred as a consequence of the presentation of the campaign, e.g. by slogans such as "Go on holiday without paying" (2012, p. 303). 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.

### **Information Asymmetries in PWYW Pricing**

As Kim et al. (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 [7]. 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 [8]. 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 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 [9]. 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) [10]. 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 complete information case is given by

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

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

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

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

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

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

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

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,  $N$  will be higher and  $\Delta_L$  will be lower. If buyers overestimate the scale of production,  $\Delta_H$  will be lower but will remain positive and  $\Delta_L$  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.

### Implications and Conclusions

In this paper, we have shown the importance of information asymmetries with respect to production costs 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, our two main findings relate to buyers' expectations about costs and to the scale of production.

First, we find that 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. It follows directly that 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. Hence, 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, 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 finding concerns the distribution of information about production costs and reveals that PWYW is more suitable for products for which buyers have information about costs. The second finding concerns the scale of production and reveals that PWYW is more suitable for products produced on a large scale.

We theoretically demonstrated how the (un)observability of production costs and of quality can influence the price a buyer is willing to pay for a good. Our theoretical argument provides an explanation for buyers' behavior in the field experiment conducted by Léon et al. (2012). Since production costs of holiday packages are difficult to observe, the rather selfishly oriented behavior of customers fits into our explanation. Also, our theoretical explanation is compatible with the behavior observing in Jang and Chu's (2012) laboratory experiments, especially experiment 2a, where subjects indicate a higher WTP if information about production costs are provided.

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 are of different types and signal their true type. One 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 (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. The argument presented in this paper 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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**Notes**

[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.

[4] In the laboratory study by Schmidt et al. (2014) between 19.4 percent and about one-third of all buyers choose a price of zero. In field experiments, where there is no anonymity, the numbers are much lower. In Regner and Barria (2009) 14.5 percent of all buyers pay the minimum price of \$5, in Riener and Traxler (2012) only 0.63 percent of all buyers paid less than €1, and in Kim, Natter and Spann (2009) no buyer pays a price of zero.

[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.

[6] Higher price/WTP-ratios in the experimental treatment could also be driven by the hypothetical nature of the decisions and an experimenter-demand effect. It is possible that participants think that the experimenter expects them to choose PWYW prices which are not too far away from costs. Assuming that the experiment was not double-blind, it is also possible that participants state higher prices in order to be perceived as fair by the experimenter.

[7] 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.

[8] 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).

[9] 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.

[10] 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.

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**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.

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## M & M

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,  $UC_p$ . 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.