Substituting Piracy with a Pay-What-You-Want Option: Does it Make Sense?

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Abstract: Rather than tolerating piracy, an artist can release his product directly to consumers by allowing them to download it under a 'pay-what-you-want' online strategy. We show analytically that this strategy can (1) be more profitable than a strategy with perfect or imperfect intellectual property rights enforcement for the artist and (2) change the organization and allocation of added value between artists and publishers along the supply chain. A brief case study of Radiohead's experiment is developed to support these theoretical insights. Some implications regarding the re-organization of the supply chain and property rights regime are drawn.

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Introduction

In October 2007, the famous UK band Radiohead announced publicly that fans could directly download their new album *In Rainbows* from their website, under a 'pay-what-you-want' or 'pay-what-you-think-it-is-worth' agreement [1]. Concretely, fans could pay from nothing (plus a trifling administrative fee) upwards. As for fans interested in the complete package - called "Discbox" – they were informed that it would be available for purchase a few months later at the cost of $80. Interestingly, this strategy allowing the free downloading of the album was well received by consumers and made piracy seem irrelevant, at least for this album. Nevertheless, the music industry viewed the initiative as a threat for its survival[2], especially for fear of contagion effects. Interestingly, several well-known artists like Prince, The Crimea or the Charlatans adopted similar strategies to distribute some recent creations (Gibson, 2007). As opposed to the conventional theoretical prediction where all *homo oeconomicus* consumers are expected to download the album for free, it is observed that some consumers pay more and significantly more than zero dollars. Consequently, the main question addressed in this paper can be formulated as follows: Can a 'pay-what-you-want' strategy be more profitable than other alternatives and for whom? The main other alternative considered is the conventional release of an album with a realistic level of piracy. We show analytically that the 'pay-what-you-want' strategy can be more profitable for both the artist and the user, although it is likely to change profoundly the profit and role of publishers[3].

The remainder of this paper is organized as follows. The next section introduces the model and derives the main results. Section 3 briefly presents the case of Radiohead and confronts it with our model predictions. We will enrich the discussion with insights from behavioral and

experimental economics that can explain the observed behaviors. The last section focuses on policy implications and serves as a conclusion.

I. THE MODEL

We have developed a model inspired from Gayer and Shy (2006), in which we have introduced a 'pay-what-you-want' strategy. This allows us to analyse the implications of this strategy on the profits of the artist and the publisher. Let us consider a market for musical recording composed of a professional music artist and a recorded media publisher. It is widely admitted that the main role of record labels is to achieve economies of scale in manufacturing, distribution, marketing and finance costs over time (Burke, 2003) and to serve as quality signal for potential buyers facing the information paradox (Shapiro and Varian, 1999). The artist's income is constituted by both sales of recorded music and tickets for live performances whereas the publisher only earns revenue from the sales of legal records. Let c (c > 0), be the unit production cost of each record financed and sold by the publisher.

The demand with piracy

Consumers might use the record or not. To obtain the record, consumers have two options: they can either buy the record at the price p_r, or pirate it and pay nothing[4]. The demand is generated from a unit mass of consumers (potential users) indexed by a type parameter x. We consider that the parameter x is uniformly distributed over the interval of $[0, \overline{N}]$ according to raising preference for obtaining this record. The number of users (respectively non-users) is N (respectively $\overline{N}$ -N). The consumer's utility is affected by the way he/she obtains the product. This argument is consistent with a growing literature on procedural utility which argues that satisfaction does not only depend on commodities, but also on the conditions in which these were obtained (e.g., Anand, 2001; Benz et al., 2004; Frey and Stutzer, 2005). More

satisfaction is said to be gained when the product is legally purchased. Indeed, being compliant with regulations is frequently perceived as delivering higher quality products, as a better way to get the product and legal versions are frequently bundled with additional items such as manuals or lyrics. We assume that the utility of each consumer is enhanced by the artist's popularity which is depicted by the number of users (N). Let λ, ($\lambda > 0$) be the marginal utility derived from the network size. In this context, the utility of type x consumer is the following:

$$U = \begin{cases} \alpha_1 x + \lambda N - p_r & \text{if the consumer buys a legal recording} \\ -\alpha_2 x + \lambda N & \text{if the consumer pirates} \\ 0 & \text{if the consumer does not use the recording} \end{cases} \quad (1)$$

With $\alpha_1, \alpha_2,$ and λ positive parameters. Let us stress that the first part of the utility in (1) for a legal buyer is positive whereas it is negative for an illegal user[5]. The illegal user can experience guilt feelings for committing an offence along with the fear of being caught and punished. Both types of users (legal and illegal) enjoy the same benefits relating to the artist's popularity. At this stage, we make the following assumption regarding the consumer's preferences described in equation (1).

Assumption 1: The publisher's cost (c) is lower than the difference between the consumers' marginal utilities respectively derived from buying and from pirating the record. Formally, c $< \alpha_1 + \alpha_2$. This assumption induces a vertical differentiation between the two products. Indeed, when $p_r = 0$, then $\alpha_1 > -\alpha_2$ implies that any consumer will prefer the legal version to illegal ones. This assumption is also needed to justify the production and sales of legal products.

As in Gayer and Shy (2006), we consider that the demand of live performance is determined by the network size which corresponds to the number of users N (be they legal and illegal). Let us respectively denote by p_p and q_p the ticket price and the demand for these tickets. We assume that the demand for live performances is linear and takes the following form $q_p = \delta N - p_p$ where the parameter δ measures the marginal effect of the network size on the demand of live performance. In respect of live performance activity, the artist is assumed to act as a monopoly and he bears no production costs. Consequently his profit is: $\pi_p = p_p(\delta N - p_p)$. Given the number of users N, the maximisation of the artist's profit yields to the price p_p and profit level π_p of equilibrium:

$$p_p = \delta N / 2 \text{ and } \pi_p = \delta^2 N^2 / 4$$

These results show the interaction that exists between live performance and the size of the artist's network. Indeed, the more users of the record, the higher the price of live performance. Under these conditions, the artist's profit increases quadratically with N.

Equilibrium with piracy

In order to obtain the demand functions both for the legal and the illegal users, we must identify the preference types of marginal consumers. A potential consumer x receives a positive utility from making an illegal copy if $-\alpha_2 x + \lambda N > 0$ or $x > \hat{x}_1$ whereby $\hat{x}_1$ indexes the marginal consumer indifferent between enjoying an illegal item and becoming a non-user that is, $\hat{x}_1 = \lambda N / \alpha_2$. Note that that $\hat{x}_1$ is affected by the total number of users N which is expressed by $N = \overline{N} - \hat{x}_1$. Therefore the number of users is determined by $-\alpha_2(\overline{N} - N) + \lambda N = 0$. Hence $N = \alpha_2 \overline{N} / (\alpha_2 + \lambda)$ which implies that

$$\hat{x}_1 = \lambda \overline{N} / (\alpha_2 + \lambda).$$

Let us now consider the buyers. The consumer who is indifferent between buying a legal record or using a pirated copy is determined by $\alpha_1 x + \lambda N - p_r = -\alpha_2 x + \lambda N$. Formally, we have $\hat{x}_2 = p_r / (\alpha_1 + \alpha_2)$. Since a higher value of x represents a greater preference for obtaining the record, one can suppose that $\hat{x}_1 < \hat{x}_2$. Figure 1 illustrates how consumers are divided among non-users, illegal users and buyers, when piracy prevails implying that consumers with $x \in \left[0, \hat{x}_1\right]$ do not use the record, those with $x \in \left[\hat{x}_1, \hat{x}_2\right]$ use the pirated record and those with $x \in \left[\hat{x}_2, \overline{N}\right]$ buy a legal version.

The demand functions for users of pirated records (D_P) and for legal users or buyers (D_B) can respectively be derived as follows:

$$D_p = \hat{x}_2 - \hat{x}_1 = [(\alpha_2 + \lambda) p_r - \lambda \overline{N}(\alpha_1 + \alpha_2)] / (\alpha_1 + \alpha_2)(\alpha_2 + \lambda)$$

$$D_B = \overline{N} - \hat{x}_2 = [\overline{N}(\alpha_1 + \alpha_2) - p_r] / (\alpha_1 + \alpha_2)$$

[Insert figure 1 around here]

The recording firm sets the price of the recorded medium p_r to solve:

$$\max_{p_r} \pi_r = (p_r - c) D_B = (p_r - c)[\overline{N}(\alpha_1 + \alpha_2) - p_r] / (\alpha_1 + \alpha_2)$$

In this situation, the price, sales of legal copies, and total profit, are respectively given by:

$$p_r^p = [\overline{N}(\alpha_1 + \alpha_2) + c] / 2 \qquad\qquad D_B^P = [\overline{N}(\alpha_1 + \alpha_2) - c] / 2(\alpha_1 + \alpha_2)$$

$$\pi_r^p = [\overline{N}(\alpha_1 + \alpha_2) - c]^2 / 4(\alpha_1 + \alpha_2)$$

We assume that the publisher (respectively the artist) receives a share of (*1-s*) (respectively *s*) of the profit from recording sales, then the publisher's (respectively, the artist**'s**) profit is expressed as follows:

$$\pi^p_{pub} = (1-s)[\overline{N}(\alpha_1 + \alpha_2) - c]^2 / 4(\alpha_1 + \alpha_2) \quad (2)$$

$$\pi^p_a = \pi^p_p + s\pi^p_p = [\alpha_2^2 \overline{N}^2 \delta^2 / 4(\alpha_2 + \lambda)^2] + s[\overline{N}(\alpha_1 + \alpha_2) - c]^2 / 4(\alpha_1 + \alpha_2) \quad (3)$$

Both the artist's and the publisher's profits are positively related to the difference between the marginal utility from buying the recorded medium and the marginal disutility from pirating it $(\alpha_1 - (-\alpha_2))$. Furthermore, the artist's profit is positively related with the marginal benefit of the network size with respect to both live performance (δ) and acquiring the recording medium (λ). However, this analysis implies that when the artist chooses live performance as a strategic variable, he will not be interested at all in whether there is piracy or not. He may even encourage piracy for the sake of increasing his popularity which ultimately increases the ticket price. This constitutes a possible argument for beneficial piracy or for pay-what-you-want strategies.

Equilibrium with a 'pay-what-you-want' option

Consider now a situation where it is legitimate to download albums and pay whatever the consumer wants. In such a world, the artist's income depends on the consumers' propensity to pay a positive price and publishers play no role in this world. More precisely, in such strategy, the consumer can pay from nothing to any amount he wants. We assume that this strategy eliminates the motives behind piracy. Consequently, the consumer can enjoy the benefits delivered by piracy without suffering from the drawbacks tied to it, like behaving illegally. Moreover, consumers choose the price they are willing to pay. Interestingly, departing from the traditional *homo economicus* rationale, we consider that some consumers are willing to pay not only for the record but also for the way the product is delivered (Tobias and Javia 2009). Indeed, we assume that a significant fraction of consumers is interested not only in the output but also in other values conveyed by the way the output is delivered leading to a

positive willingness to pay (Benz et al., 2004). Rather than adopting an opportunistic behaviour by paying nothing, cognitive consonance at the individual level can be achieved by paying a positive price[6]. Beyond the exchanged product itself, the relationship between the artist and the consumer is different, the latter being allowed to become a price maker rather than a price taker. This strategy can help the artist to address consumers' concerns regarding excessive prices imposed by music houses or the moral imperative to have cultural goods accessible to all. Under these conditions, each consumer has three options, that are (i) downloading the record free of charge (ii) downloading the record and paying a voluntary contribution, v (iii) choosing not to get this record at all.

The utility function of a consumer indexed by x corresponding respectively to each situation is given by the following expressions:

$$U = \begin{cases} \beta_1 x + \lambda N - v \\ \beta_2 x + \lambda N \\ 0 \end{cases} \qquad (4)$$

What does the voluntary contribution (v) in a 'pay-what-you-want' strategy mean? Is it the amount of money resulting from the individual's willingness to pay? A careful observation of the functioning of this strategy suggests that the individual contribution works as a price rather than as a willingness to pay. Indeed, as soon as the group released the product from its website, chats and forums started debating the appropriate amount to tender. Besides, specialised magazines were frantically required to assess the album value. So, a general tendency related to the record value emerges, similarly to an anchoring bias. Consequently, for a representative consumer, v measures the average voluntary monetary transfer to the artist in return for his/her offer of the record under a 'pay-what-you-want' option. Since this

average contribution is considered as a charge, it can be considered as playing the same role as the record price in the utility function.

Interestingly, the first part of the utility function ($\beta_i(x)$, with i=1,2) is positive for all user types, even for those who download for free ($\beta_2 > 0$) because this download is completely legal. Indeed, unlike the previous situation where free downloading was illegal and generated a disutility ($-\alpha_2 < 0$), the 'pay-what-you-want' option eliminates any sense of guilt or fear of legal sanctions. Regarding the consumers' preferences described by β_i, some assumptions must be made. For the sake of clarity, we will present each assumption and justify it.

Assumption 2: (a) First, we consider that $\beta_1 > \beta_2 > 0$. Indeed, we assume that consumers prefer paying something when they download the record to getting it completely freely. This argument is supported by the fact that consumers understand that the artist's survival requires rewards or want to reward procedural utility resulting from a pay-what-you-want option, even if other reasons like severe budget constraint may 'force' them not to behave in accordance with their preference.

(b)   Second, we assume that the voluntary contribution paid by consumers is lower than their additional utility gain associated with paying a certain amount instead of obtaining the product free of charge. Formally, v < ($\beta_1 - \beta_2$). This assumption is naturally needed as otherwise there cannot be any personal incentive to justify the payment of a voluntary contribution.

In order to obtain the demand functions for different types of users, we identify the preference types of marginal consumers. Let us consider a potential consumer $\widetilde{x}_0$ representing the marginal consumer who can indifferently either download free of charge or not use the record at all. As $\widetilde{x}_0 = (-\lambda N / \beta_2) < 0$, then we conclude that the marginal consumer $\widetilde{x}_0$ is at the left of x = 0 implying that the market is covered and the number of users is equal to the number of consumers : $N = \overline{N}$. Hence the change from piracy to 'pay-what-you-want' strategy induces that the market becomes recovered.

Proposition 1: The change from piracy to 'pay-what-you-want' strategy implies that the market becomes recovered.

The insight behind this proposition is straightforward: if every individual type can download, the whole population will get the product and the artist will benefit from the highest possible popularity. Let us now consider the marginal consumer $\widetilde{x}_1$ who will indifferently download free of charge or pay a voluntary contribution, thus $\widetilde{x}_1 = v / (\beta_1 - \beta_2)$. The following figure depicts the repartition of users under different regimes.

[Insert figure 2 around here]

Figure 2 illustrates how consumers are divided among downloaders who contribute and downloaders who do not contribute. In a 'pay-what-you-want' strategy, consumers with $x \in [0, \widetilde{x}_1]$ download the record free of charge and those with $x \in [\widetilde{x}_1, \overline{N}]$ download the record and pay a voluntary contribution. Let us now derive the demand function for each consumer's category.

✓ D_{DP} is the demand function for consumers who download and pay a contribution and is expressed as follows: $D_{DP} = \overline{N} - \tilde{x}_1 = [(\beta_1 - \beta_2)\overline{N} - v]/(\beta_1 - \beta_2)$. Let us discuss briefly the negative relationship between this demand and the level of contribution (v). Indeed, when this contribution increases, the demand for the product decreases. Since we have considered (v) as an average contribution, it plays the role of a 'price' in the demand function. Nevertheless, beyond these technical considerations the intuition behind this behaviour simply implies that only a few persons pay an important contribution, whereas the majority of paying users will pay small amounts of money.

✓ D_{DF} is the demand function for consumers who download for free and is given by $D_{DF} = \tilde{x}_1 = v/(\beta_1 - \beta_2)$. Let us emphasize that the demand function of non-contributors depends on the contribution (v). This relies on the fact that this demand is a residual one as it is the difference between total users and contributing users.

The artist, in this specific context, earns profit from two sources: first, from selling tickets for his/her live performances, π_p^f; second, from voluntary contributions $\pi_{DP}^f = vD_{DP}$. In sum, we have $\pi_a^f = \pi_p^f + \pi_{DP}^f$. By replacing each profit type by its expression, we obtain the following expression:

$$\pi_a^f = [(\delta^2\overline{N}^2/4) + [\overline{N}(\beta_1 - \beta_2)v - v^2]]/(\beta_1 - \beta_2) \quad (5)$$

This expression reaches its maximum when $v = v^* = \overline{N}(\beta_1 - \beta_2)/2$. This implies that the artist's profit increases with the voluntary contribution v if it is less than the half of users weighted by the marginal utilities differences. When the voluntary contribution exceeds this

v*, the profit will decrease. Surprising as it may seem, this result is straightforward regarding the utility and demand functions mechanisms. In fact, when (v) increases, the average income increases and the profit increases too. This is the increasing phase of the profit function. However, when (v) exceeds (v_{max}), those who contribute with large amounts become fewer, mechanically reducing the overall profit. The last mechanism is due to the conception of (v) as an average contribution. The maximum level of demand from payers is reached when v= v* and is equal to $D_{DP} = \overline{N}/2$, that is half the users. This level of demand corresponds to the maximum artist's profit $\pi_a^f = (\delta^2\overline{N}^2/4) + [\overline{N}^2(\beta_1 - \beta_2)]/4$. When the number of users exceeds the half then the artist's profit decreases.

Proposition 2: In a 'pay-what-you-want' situation, the artist's profit increases with the voluntary contribution, reaches a maximum with $v = \overline{N}(\beta_1 - \beta_2)/2$ then decreases. The maximum value of the profit is $\pi_a^f = (\delta^2\overline{N}^2/4) + [\overline{N}^2(\beta_1 - \beta_2)/4]$.

This proposition means that the success of a 'pay-what-you-want-strategy' is not always guaranteed. It depends both on the demand size and the contribution level.

Equilibrium when there is neither piracy nor a 'pay-what-you-want' option

Assume a hypothetical situation where due to a perfect copyright enforcement, piracy of the recorded medium is completely eliminated. In this case, all users purchase it from conventional retailers at a price p_r.

In this context, the utility of a type *x* consumer is the following:

$$U = \begin{cases} \alpha x + \lambda N - p_r & \text{if the consumer buys a legal recording} \\ 0 & \text{if the consumer does not use the recording} \end{cases} \quad (6)$$

An assumption must be made at this stage regarding the consumer's preferences described in equation (6).

Assumption 3: (a) $\alpha > \lambda > 0$. This restriction on λ to be bounded below the marginal utility parameter α is needed to ensure that the number of users does not approach infinity.

(b) $c < \alpha$. The publisher's cost (c) is lower than the consumer's marginal utility from buying the record. This assumption is needed to justify the production and sales of legal products.

[Insert figure 3 around here]

As illustrated in figure 3, the number of users N is equal to the number of buyers. In order to obtain the demand functions for users, we identify the preference type of the marginal consumer. A potential consumer x receives a positive utility from buying the recording if $\alpha x + \lambda N - p_r > 0$ or $x > \bar{x}$ whereby $\bar{x}$ indexes the marginal consumer who will indifferently buy the recording or not buy it at all. It is expressed as the following: $\bar{x} = (p_r - \lambda N)/\alpha$. Note that $\bar{x}$ is affected by the total number of users (N) where $N = \bar{N} - \bar{x}$. By replacing $\bar{x}$ by its expression, we obtain $N = (\bar{N}\alpha - p_r)/(\alpha - \lambda)$. Consequently, the publisher chooses a price p_r to maximize his profits :

$$\max_{p_r} \pi_r = (p_r - c)N = (p_r - c)(\bar{N}\alpha - p_r)/(\alpha - \lambda)$$

The price level, sales volume, and total profit are given by the following expressions:

$$p_r = (\bar{N}\alpha + c)/2 \qquad N = (\bar{N}\alpha - c)/2(\alpha - \lambda) \qquad \pi_r = [\bar{N}\alpha - c]^2/4(\alpha - \lambda)$$

The publisher's profit is then: $\pi_{pub} = (1 - s)[\bar{N}\alpha - c]^2/4(\alpha - \lambda)$

The artist who earns profit from royalties from the publisher's sales of the records and from selling tickets for his live performances is given by:

$$\pi_a = \pi_p + s\,\pi_r = [\delta^2(\overline{N}\alpha - c)^2/16(\alpha - \lambda)^2] + s[(\overline{N}\alpha - c)^2/4(\alpha - \lambda)] \quad (7)$$

As expected, profits increase with the marginal benefit from the network size and with the marginal utility from buying the records. The main findings regarding the artist's and publisher's profits under the three options (piracy, 'pay-what-you-want' option and perfect intellectual property rights enforcement) are recapitulated in the following table.

[Insert table 1 around here]

II. IS PERFECT COPYRIGHT ENFORCEMENT ALWAYS BENEFICIAL FOR ALL PARTIES?

To address this issue, we compare the profit levels under different scenarios that are (i) 'pay-what-you-want' versus 'piracy'and (ii) 'pay-what-you-want' versus 'perfect enforcement of intellectual property rights'. Obviously, for the publisher, a "pay-what-you-want strategy" is the "worst case scenario" that can arise because he is left out from the equation. Thus, in the following , we will only address the artist's profit.

Comparing the 'pay-what-you-want' option with the 'piracy' option

As $[\alpha_2^2/(\alpha_2 + \lambda)^2] < 1$, the first term in the artist's profit expression in the piracy context $(\alpha_2^2 \overline{N}^2 \delta^2/4(\alpha_2 + \lambda)^2)$ is lower than the first term in the same expression under a 'pay-what-you-want' option ($\delta^2 \overline{N}^2/4$).

Proposition 3: The artist's profit from live performance is higher under a 'pay-what-you-want' strategy compared to a piracy option.

However, comparing the profits resulting from the 'pay-what-you-want' procedure with the piracy case is less clear-cut. Comparing the second term in equations (3) and (5) implies that the 'pay-what-you-want' procedure is profitable to the artist if and only if:

$$[\overline{N}(\beta_1 - \beta_2)v - v^2]/(\beta_1 - \beta_2) > s[[\overline{N}(\alpha_1 + \alpha_2) - c]^2/4(\alpha_1 + \alpha_2)] \quad (8)$$

For the sake of computational simplicity, and without loss of generality, we suppose that (i) the publisher's production cost is nil and (ii) the consumer's additional utility gain associated with paying for a record instead of obtaining it free of charge are identical in the 'pay-what-you-want' option and in its equivalent under a 'piracy' regime. Formally, $\beta_1 - \beta_2 = (\alpha_1 + \alpha_2)$. Under these conditions, inequality (8) is equivalent to the following expression

$$4v^2 - 4\overline{N}(\alpha_1 + \alpha_2)v + s\overline{N}^2(\alpha_1 + \alpha_2)^2 < 0 \quad (9)$$

This equation is verified for $4\overline{N}(\alpha_1 + \alpha_2)(1 - \sqrt{1-s})/2 < v < 4\overline{N}(\alpha_1 + \alpha_2)(1 + \sqrt{1-s})/2$ (10)

[Insert figure 4 around here]

Figure 4 illustrates condition (9) in the (v, s) space. The left member of inequality (10) is represented by the increasing convex curve, while the right member is represented by the decreasing concave curve. Thus, higher values of the artist's profit share parameter (s) associated with high or low values of (v) make the artist better off under a piracy regime. However, lower values of the artist's profit share parameter (s) coupled with intermediate values of (v) make the artist better off under a 'pay-what-you-want' regime. This leads us to the following proposition.

Proposition 4: Lower values of the artist's profit share parameter s with intermediate values of v make the artist's profit from record sales higher with a 'pay-what-you-want' regime.

The pay-what-you-want strategy could be regarded as a reaction of the artist toward the excessive profits made by record labels and their alleged unfair allocation along the chain. The artist wants a bigger "slice of the cake".

Comparing the 'pay-what-you-want' option with the 'perfect enforcement of property rights' option

Since $\alpha > \lambda > 0$, the profit related to live performance in the 'perfect enforcement property rights' context ($\delta^2(\overline{N}\alpha - c)^2/16(\alpha - \lambda)^2$) is lower than its correspondent under a 'pay-what-you-want' option ($\delta^2\overline{N}^2/4$). Interestingly, the artist's profit from the live performance is higher when a 'pay-what-you-want' strategy prevails.

Proposition 5: The artist's profit from the live performance is higher under a 'pay-what-you-want' option compared to a situation of perfect enforcement of intellectual property rights.

Since the artist's profit from live performance is related to the size of his network, and since only in a 'pay-what-you-want' strategy the market becomes covered, then this strategy generates the highest profitability from live performance. Simply put, one of the main findings is that the artist's profit from live performance is higher under a 'pay-what-you-want' strategy compared to both piracy and a strict property right regime.

III. THE CASE OF *IN RAINBOWS* BY RADIOHEAD: A NATURAL FIELD EXPERIMENT[7]?

Radiohead is a famous United Kingdom alternative rock band with total sales approximating 30 million albums as of 2008 and an impressive number of nominations and awards. In autumn 2007, the band walked out of their official label EMI and decided to release independently their seventh album entitled *In Rainbows*. Originally, it was offered as a digital download for whatever fans wanted to pay. The release was announced with a short message from guitarist Jonny Greenwood on the Radiohead website, revealing that the album would be available to download from October, 10 under a pay-what-you want agreement from nothing (plus a $1 administration charge) upwards (Gibson, 2007). During the month of October, estimates indicate that around 1.2 million people worldwide visited the Rainbows site with a significant percentage of visitors ultimately downloading the album. Regarding this arrangement, an online research group, comScore, derived data and measured the success of the strategy by analysing the behaviour of nearly 1000 people (extracted from their database of more than 2 million people who explicitly allowed comScore to monitor their true online behaviour), including several hundreds of downloaders. According to the released report, comScore indicated that 62% of fans chose to pay nothing for the album and 38% paid something (Table 1).

[Insert table 2 around here]

Regarding the amount paid by downloaders, the average contribution for those who were willing to pay was $6. The estimates regarding average amounts in different locations and the distribution of price paid among downloaders are provided in tables 2 and 3. An alternative survey based on stated behaviours (by opposition to revealed behaviours in the comScore experiment) achieved by Record of the Day (http://www.whatpricedidyouchoose.com/) from

a panel of 5,000 Radiohead download buyers shows that the average price paid for the download by those who had no immediate plans to buy the Discbox was $5,70. Moreover, the pay-what-you-want arrangement did not prevent people from pirating, maybe because of habits (a kind of piracy addiction or familiarity with usual sites *versus* the new Radiohead website devoted to this release) and the 'costs' tied to the Radiohead website (e.g., giving names, contact information, administrative fees and so on).

[Insert table 3 around here]

[Insert table 4 around here]

Interestingly, the band's representatives contest the estimates of comScore stating that they are 'speculative', 'inaccurate' and 'in no way reflect definitive market intelligence or, indeed, the true success of the project'. Without providing clear-cut results, the band representatives contend that these numbers are underestimated and misrepresent the reality that is better than what is announced by comScore.

In addition to the original download under a pick-your-price arrangement, fans were proposed to order and purchase later a complete package called the Discbox (vinyl copy, a bonus CD plus assorted band goodies) or the album at conventional in-store or on-line outlets. According to Warner Chappell's Head of Business Affairs Jane Dyball, "the digital publishing income from the first licence (for the Radiohead pay-what-you-want site) alone dwarfed all the band's previous digital publishing income and made a 'material difference' to Warner Chappell UK's digital income. (…) The topline figure, though, is that, after about four months from the exclusive release of the record on the website, there were three million purchases of *In Rainbows*, including physical CDs, box-sets, and all downloads - including those from the band's own website and from other digital music stores" (Music Ally, 2008).

Moreover, after giving away their album practically for free for three months the album was ranked #1 in the UK and in the US (Music Ally, 2008). To date, 'official estimates' claim that Radiohead sold 100 000 boxsets and that this strategy increased the band's overall fan base, which was likely to generate incremental album and concert ticket sales. Besides, information on downloaders such as their place of residence can help to better organize the tour. Estimates indicate that 1.2 millions fans were expected to attend the tour. In sum, whatever the perimeter and estimates considered, Radiohead's strategy for marketing *In Rainbows* was obviously a commercial success. Our model correctly predicts this huge number of users in that we show that the passage to a 'pay-what-you-want' regime implies a covered market (proposition 1) which does not exist under piracy or under a perfect enforcement of intellectual property rights. Moreover, the live performance success of *In Rainbows* was expected from the point of view of our modelling in that the artist's profit generated by this activity is higher in the case of the 'pay-what-you-want' strategy compared to the strict intellectual property rights or piracy regimes.

In addition, Radiohead bypassed several costs tied to a record label representation, making a higher percentage of sales going back to the band. All other things being equal, a lower average sale price is fully compatible with higher profits for the band, but not for the record label (Lipsman, 2007). Moreover, our theoretical model clearly shows how intermediate values of (v) are consistent with the profitability of the 'pay-what-you-want' strategy and how extreme contribution values (because of the demand characteristics) lead to an unfavourable situation for the artist. Furthermore, our model demonstrates that the artist's and the publisher's profits do not always follow the same path. Indeed, while the artist could be better off in a 'pay-what-you-want' strategy compared to strict intellectual property rights enforcement, the publisher's fate in that case can mean his 'extinction'.

Interestingly, several artists were inspired by the Radiohead experiment (Gibson, 2007). For example, the album *Ghosts of Nine Inch Nail* was released in March 2008 under a Creative Commons licence. Concretely, this licence allows anyone to legally copy, distribute, display, and perform the work. The first nine tracks of the album were, and still are, available for download for free on the band's site and on traditional downloading websites. Despite the fact that *Ghosts* could be legally downloaded, the most interesting fact is that it was 2008 Amazon's best selling album (Castiglione, 2009). In the cases mentioned, the pioneering bands benefited from a 'surprise effect' and extensive media coverage to help promote their albums. Despite the supporting anecdotal evidence, we cannot conclude in a definitive way that a 'pay-what-you-want' strategy is always sustainable over time and for any artist.

IV. CONCLUSIVE REMARKS

Let us return to our main question: can a 'pay-what-you-want' strategy be more profitable? The answer is 'yes' but not an unconditional 'yes'. Indeed, the answer is likely to differ substantially for artists (and even among artists) and record labels. More profits for the former can mean fewer profits for the latter. These innovative strategies are likely to profoundly redefine the allocation of value among partners in the music industry. The Radiohead experiment and similar ones can be used by artists to negotiate better contracts with record labels by threatening to leave them and distribute their music by themselves. Record labels which can perceive this alternative business model as a threat are likely to oppose it. Record labels can attempt to stop these initiatives by labelling them as anti-competitive. Indeed, record companies frequently argue that the higher prices charged per album allow them to support and promote less-known artists (cross subsidies) (Rambonilaza, 2007). At the same time, this strategy can redefine the functions devoted to record labels. They are likely to

develop specific skills in order to implement 'pay-what-you-want' strategies, ensure sufficient voluntary contributions of downloaders and increase overall profits through derivatives (e.g. concerts, other goods and services than cannot be delivered digitally). Our model does not mean the elimination of publishers, but indicates a possible profound change in their functions in the music industry. Consumers also play a different role because they are not only listeners but they can also enjoy procedural utility (cultural goods accessible for all, regardless of price considerations) and encourage bands by offering monetary 'incentives' to artists accordingly. Even small monetary incentives can have a huge effect because they are compensated by a great number of contributors. Moreover, this strategy can have strong effects on sales of derivatives (e.g., packages, concerts and so on).

Nevertheless, even if this business model seems very promising, it is premature, at this stage to conclude whether such a model is economically sustainable over time and can be applied to all artists. Indeed, the real-world examples developed above may have benefited from a 'surprise effect'. A natural and challenging extension to this contribution is whether a 'pay-what-you-want' procedure can perform so efficiently if it generalized on a broad scale. Given that several alternative models are currently emerging in the music industries but also in other creative industries and challenge the one-size-fits-all model of intellectual property rights, time is needed to identify which one will prevail.

Notes

1. Interestingly, the pay-what-you-want procedure has recently been applied to other products such as the Singapore Ibis hotel (http://paywhatyouwant.com.sg/) or the Little Bay restaurant,

in Farringdon, London (http://www.timesonline.co.uk/tol/life_and_style/food_and_drink/eating_out/article5767771.ece).

2. "This feels like yet another death knell. If the best band in the world doesn't want a part of us, I'm not sure what's left for this business." An A&R executive at "a major European label" (Tyrangiel, 2007).

3. The economic literature develops several rationales where piracy might be beneficial for the pirated firm. These arguments are mainly related to network effects (Conner and Rumelt, 1991; Slive and Bernhard 1998, Gayer and Shy 2003), sampling and exposure effects (Leibowitz,2004; Peitz and Waelbroeck 2004), and Coase's time inconsistency effects (Takeyama 1997).

4. This scheme applies mainly in developed countries (Europe, Australia and North America) while in developing countries, many people either purchase a pirated product at a small price or pirate themselves the product.

5. We do not consider the possible utility that results from 'distinction' effects where there is **a** utility increase because of the small number of users.

6. Interestingly, this assumption is consistent with public goods experiments showing that people for different reasons (e.g., altruism, reciprocity, commitment to social norms) do no not adopt the free riding behavior predicted by conventional neoclassical economics, but contribute significantly to public goods provision (see e.g., Croson, 2007).

7. In addition to the sources quoted in this section, the authors have gathered and structured information from several websites, notably, the sites of comScore (http://www.comscore.com) and Rolling Stone (http://www.rollingstone.com).

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TABLE 1

Artist and publisher profits under different regimes

	Artist's profit	Publisher's profit
Piracy	$[\alpha_2^2 \overline{N}^2 \delta^2 / 4(\alpha_2 + \lambda)^2] +$ $s[[\overline{N}(\alpha_1 + \alpha_2) - c]^2 / 4(\alpha_1 + \alpha_2)]$	$(1-s)[\overline{N}(\alpha_1 + \alpha_2) - c]^2 / 4(\alpha_1 + \alpha_2)$
'Pay-what-you-want' strategy	$(\delta^2 \overline{N}^2 / 4) +$ $[\overline{N}(\beta_1 - \beta_2)v - [v^2 / (\beta_1 - \beta_2)]]$	0
Perfect enforcement of intellectual property rights	$[\delta^2 (\overline{N}\alpha - c)^2 / 16(\alpha - \lambda)^2] +$ $s[(\overline{N}\alpha - c)^2 / 4(\alpha - \lambda)]$	$(1-s)[(\overline{N}\alpha - c) / 4(\alpha - \lambda)]$

TABLE 2

Radiohead *In Rainbows* Online Album Downloads (October 1-29, 2007) (Source: comScore, Inc.)

	Worldwide	U.S.	Non-U.S.
Percent Who Paid for Download	38%	40%	36%
Percent Who Downloaded for Free	62%	60%	64%
Total Downloaders	100%	100%	100%

TABLE 3

Radiohead *In Rainbows* Online Album Downloads (October 1-29, 2007) (Source: comScore, Inc.)

	Worldwide	U.S.	Non-U.S.
Average Dollars Spent per Paid Download	$6.00	$8.05	$4.64
Average Dollars Spent per All Downloads	$2.26	$3.23	$1.68

TABLE 4

Distribution of Price Paid Among Downloaders (October 1-29, 2007) (Source: comScore, Inc.)

Dollars Paid	Share of Downloaders	Share of Dollars
$0.00	62%	0%
$0.01 - $4.00	17%	8%
$4.01 - $8.00	6%	12%
$8.01 - $12.00	12%	52%
$12.01 - $20.00	4%	27%

FIGURE 1

Distribution of users under the piracy case

$$\hat{x}_1 \qquad D_P \qquad \hat{x}_2 \qquad D_B$$

0   nonusers   pirates   buyers $\overline{N}$
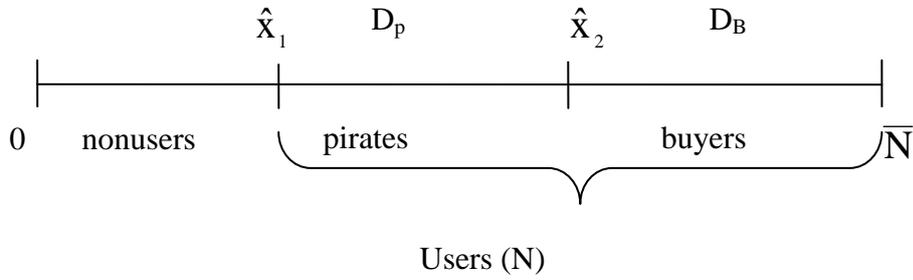
Users (N)

FIGURE 2

Distribution of users under a "pay-what-you-want" situation

$$\tilde{x}_1 \qquad\qquad \tilde{x}_2$$

0   download   download   buyers $\overline{N}$
    For free   and pay
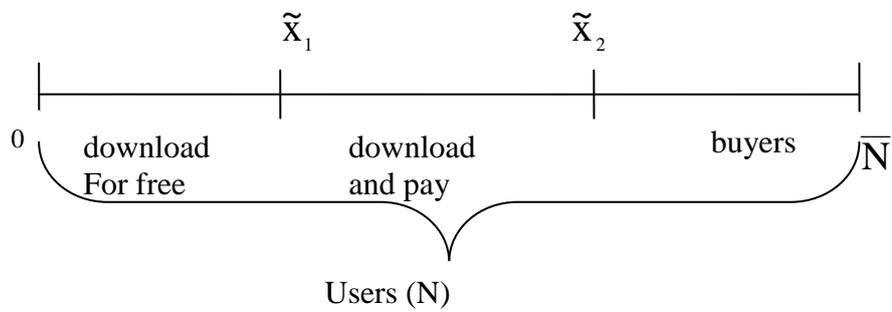
Users (N)

FIGURE 3

Distribution of users under perfect enforcement of intellectual property rights

$$\overline{x} \qquad D_B$$

$$0 \quad \text{nonusers} \qquad \text{buyers} \qquad \overline{N}$$

$$\text{users } (N)$$
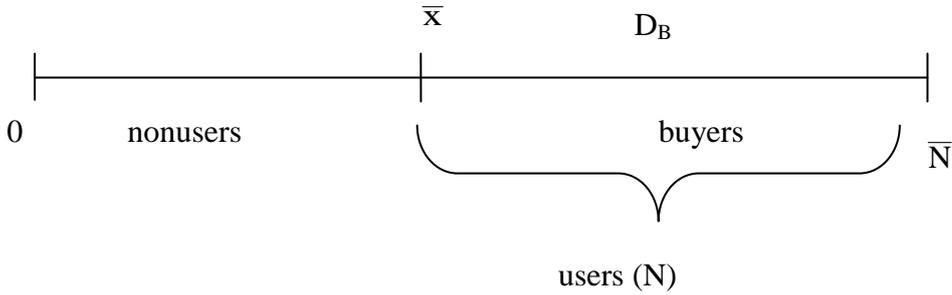
FIGURE 4

Piracy *versus* 'pay-what-you-want' strategy

A 'pay-what-you want' strategy is better for the artist's profit from recording

piracy is better for the artist's profit from recording

V_1

V^*

1

s

v

Where $V^* = \overline{N}(\alpha_1 + \alpha_2)/2 \quad ; \quad V_1 = \overline{N}(\alpha_1 + \alpha_2)$