Price Discounts versus Unit Premiums: Differences in Evaluation Considering Consumers' Intertemporal Choice

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Abstract

Price discounts or unit premiums? Two alternative approaches to offer and design subscription tariffs. A firm can offer subscriptions of different durations with specific price discounts, the longer a customer subscribes, the lower the price per time unit. Alternatively, a firm can design and differentiate subscriptions of different periods applying the same price per time unit and offering customers of longer subscription periods a time period of free usage (premium). In this paper, we analyze, whether these two presentations are equivalent in terms of consumers' evaluation, or, if there are any differences that have major managerial implications for firms offering subscription plans. Our results show that consumers have different expectations when talking about price discounts or unit premiums. Further, we derive implications for firms' optimal pricing policy of subscriptions.
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Keywords: unit premium; price discount; discounting behavior; intertemporal choice; subscription tariff

Track: Pricing and Financial Issues in Marketing
1. Introduction

Considering subscription tariffs, pricing policies involving quantity discounts are a common pricing scheme firms employ. As a potential target group of purchasing subscriptions, say for gyms, online services and newspapers, we are all familiar with advertisements phrased like “Subscribe a gym membership for 12 months and get three months for free”, “Register for our online movie database for 6 months and get 20% off your monthly payment” and “Save 10% and purchase our news service for an entire year”. As a matter of fact, consumers expect quantity discounts, when breaking it down to unit prices (Granger & Billson, 1972; Nason & Della Bitta, 1983; Wansink 1996; Widrick, 1979; Sprott, Manning, & Miyazaki; 2003) and are even subject to a misbelief of quantity discounts with respect to quantity surcharges (Manning, Sprott, & Miyazaki, 1998). In the context of subscription tariffs, the incentive for choosing a longer subscription period comes from the discounts that are usually offered for purchasing longer subscription durations. Due to the nature of subscriptions, customers’ choice of a specific subscription tariff is an intertemporal decision about future consumption. The literature about intertemporal choice (Loewenstein, 1987; Loewenstein & Prelec, 1992; Frederick, Loewenstein, & O’Donoghue, 2002; O’Donoghue & Rabin, 1999; Thaler, 1981; Zauber, 2003; Zauber, Kim, Malkoc, & Bettman, 2009) shows how consumers discount utility of future periods in their intertemporal consumption decision, and how customers’ choice of intertemporal tariffs is influenced by uncertainty of future needs (DellaVigna & Malmendier, 2006). In terms of tariff pricing, it is of interest, whether discount behavior changes concerning different designs of subscription tariffs and over time. In this paper, we endeavor to give insights about the effect of pricing presentation on consumers’ evaluation of quantity discounts in intertemporal choice. More graphically, we ask, if customers prefer price discounts, or additional units of the good or service at no extra charge, and if these preferences change over time. We do not attempt to explain the origin of different quantity discount expectations, and the purpose of our research is not to look at the quantity discount as a pricing policy itself, but rather at the effect and implications of its presentation and the design of subscription tariffs.

2. Literature Review

In the marketing and management literature quantity discounts have been discussed for physical goods in different contexts. Quantity discounts have been attracting interest since many decades. Dolan (1987) gives an overview about motivation, examples for discount schedules, and further research. He mainly emphasizes the importance of a general understanding of the effect and consequences of quantity discounts in the economic community, such as competitive advantages, resulting costs and consumers’ evaluation. Further, much of the older work focusing on optimal pricing policies and pricing schemes consider quantity discounts (e.g., Dada & Srikanth, 1987; Lee & Rosenblatt, 1986; Monahan, 1984). More recently, several studies analyze quantity discounts or related pricing policies regarding consumer behavior. Binkley and Bejnaroivicz (2003) study consumer price awareness, or Manning, Sprott, and Miyazaki (1998) analyze consumer response to quantity surcharges. Hardesty and Bearden (2003) also include the aspects of promotion type and price presentation into their consideration, and show that price discounts and bonus packs were valued similarly for both low, and moderate promotional benefit levels, while price discounts were preferred when high promotional benefit levels were employed. The existing literature covers the development of optimal pricing policies involving quantity discounts (e.g., Dada & Srikanth, 1987), consumer response to quantity surcharges (e.g., Binkley & Bejnaroivicz, 2003), or the relative attractiveness of price discounts versus bonus packs for physical goods.
Insights about the differences in evaluation of promotion types and pricing presentations with respect to subscription tariffs for goods and services, considering consumers’ intertemporal choice, are to our best knowledge missing. In this paper, our objective is to fill this gap and show - from a firm’s perspective - which implications consumer behavior has on the optimal tariff design and firm’s resulting profits. Thus: Does design and resulting presentation of subscription tariffs have an effect on consumers’ evaluation of quantity discounts, and is consumers’ evaluation changing over time and lead to different decisions?

3. Empirical Study

3.1 Data collection

For our empirical study forty one college students participated in a survey which is designed in a similar and accepted fashion of other studies about consumers’ intertemporal choice (see Zauberman, Kim, Malkoc, & Bettman, 2009). The survey contained two different types of questions about subscriptions for gym memberships; (i) the respondents were asked to state their willingness to pay (WTP) for given subscription periods, e.g., 3, 6, 9, 12, 15, 18, 21 and 24 months, and (ii) they were asked to state the amount of time units, here months, they expect free usage, when subscribing for given periods, e.g., 3, 9, 12, 15, 18, 21 and 24 months, at a fixed monthly price. All questions are based on a tariff with duration one and monthly price 100 MU\(^1\). The order of the questions was counterbalanced, there were no order effects.

3.2 Data analysis

In the analysis of the data, we concentrate on two measures to account for differences in consumers’ expectation concerning price discounts and/or unit premiums. The first measure is the WTP which is (i) directly obtained from the survey data, for the first type of questions, and (ii) implicitly calculated from the months customers want to get for free, for the second type of questions. In order to do so, we derived the discount factor \(\delta\) which is applied to the monthly baseline price (100 MU) for any given subscription period, e.g., 3, 6, 9, 12, 15, 18, 21 and 24 months. The monthly WTP that can be compared to the monthly WTP stated directly, is determined by \(WTP(t) = \delta(t) \times 100 = \left(\frac{t}{t+x}\right) \times 100\), with \(t\) the subscription period and \(x\) the additional expected amount of units. The second measure, we look at, is the monthly discount rate \(r\), at which the prices are discounted, with respect to the contract durations. Since we now have the monthly WTP for both pricing presentations, namely for price discounts obtained directly from the data and for unit premiums calculated as shown above, the monthly discount rate \(r\), with respect to subscription periods is then given by \(r(t) = -\frac{\ln(WTP(t)/100)}{t}\), with \(t\) the subscription period of interest.

For further analysis, analog to Zauberman, Kim, Malkoc, and Bettman (2009), we conduct sequences of paired t-tests in order to (i) determine an underlying discount pattern or discount behavior individuals follow considering two different designs of subscription tariffs, and (ii) specify, if existent, significant differences in the discount behavior considering price discounts on the one hand and unit premiums on the other. The sequence of t-tests for the underlying discount patterns consists of one-sided paired t-tests. The t-test sequence for comparative reasons consists of two-sided paired t-tests. The results are presented in the next section.

\(^1\) MU = Monetary Units.
4. Results

4.1 Discounting behavior

The monthly discount rates, for both pricing presentations, reveal a significant decreasing pattern. The differences between the discount rates for three and six months, six and nine months, and nine and twelve months are statistically significant (p-values: <.10) for the price discount presentation. In the case of a unit premium presentation, the decreasing pattern is statistically significant (p-values: <.10) for all differences, except for the difference between 15 and 18 months. Such a result seems to be consistent with previous findings in the intertemporal choice literature (Loewenstein, & Prelec, 1992), where a decreasing pattern of discount rates is an evidence for the presence of hyperbolic discounting (Zauberman, Kim, Malkoc, & Bettman, 2009). Considering the monthly WTP, the results for the price discount presentation is still consistent in terms of hyperbolic discounting. We get statistically significant (p-values: <.05) decreasing WTP’s for all differences, except for the differences between six and nine months, and 15 and 18 months. For the WTP’s in the unit premium theme, we get contrariwise results. The monthly WTP does not decrease, but significantly increase. The differences are statistically significant (p-values: <.10) for the differences between three and six months, six and nine months, 18 and 21 months, and 21 and 24 months. This implies a major difference in quantity discount expectations among the two pricing presentations under investigation, with respect to changing subscription periods. We are mainly interested in differences between the discount rates and between the WTP’s, resulting from the two tariff designs.

4.2 Differences for different pricing presentations

Table 1 presents the statistics for the comparisons of different discount rates, and WTP’s, respectively. The discount rates and WTP’s significantly differ for the first three and the last two subscription periods offered, e.g., 3, 6, 9, 21 and 24 months. Further, we see that the discount rates for the unit premium pricing presentation are significantly higher for three, six and nine months, and the WTP therefore is significantly lower, respectively. The mirrored image, when the contract durations exceed twelve months, is statistically supported for periods of 21 and 24 months. Between twelve and 18 months, there must be a change point in consumers’ evaluation of pricing presentations. Figure 1 provides the results in a graphical fashion for easier interpretation. We see that on average consumers are willing to pay more per month for tariffs presented in a price discount scheme until the subscription period exceeds twelve months. For durations longer than twelve months we get the opposite result, and consumers are willing to pay more per month for contracts presented in a unit premium theme.

Interpreting the results, we can derive that a firm, offering subscription tariffs, is better off to apply a price discount tariff design for shorter contract durations, here until twelve months are exceeded. For longer subscription periods, the firm is well advised to offer subscriptions advertised in unit premium design. If the pricing presentation is done the right way, firms can skim additional profit. We refer to this additional profit as tariff design surplus. If firms offer a portfolio of subscriptions with different durations they have to take into account that there exists a point where the optimal pricing presentation changes from price discount presentation to unit premium presentation. If this point in time is known, consequently a firm should be able to skim both tariff design surpluses. We refer to this point as tariff design switch-over. Finally, the results shed light on our research question and reveal differences in the effect of pricing presentations, as well as the contrariwise change of that
effect over time. Thus, a firm should be motivated to specify the tariff design switch-over for its potential pool of customers in order to absorb the tariff design surpluses.

**TABLE 1**
Comparison of the Monthly Discount Rates and WTP’s for the two Tariff Designs.

<table>
<thead>
<tr>
<th>Contract Period</th>
<th>Price</th>
<th>Discount Rate r (Price Discount)</th>
<th>Discount Rate r (Unit Premium)</th>
<th>Diff.</th>
<th>Contract Period</th>
<th>Price</th>
<th>WTP (Price Discount)</th>
<th>WTP (Unit Premium)</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>300</td>
<td>5.56%</td>
<td>17.15%</td>
<td>-11.59***</td>
<td>3</td>
<td>300</td>
<td>85.52</td>
<td>61.91</td>
<td>23.62***</td>
</tr>
<tr>
<td>6</td>
<td>600</td>
<td>3.60%</td>
<td>5.96%</td>
<td>-2.36***</td>
<td>6</td>
<td>600</td>
<td>81.58</td>
<td>70.34</td>
<td>11.23***</td>
</tr>
<tr>
<td>9</td>
<td>900</td>
<td>2.40%</td>
<td>3.30%</td>
<td>-0.9***</td>
<td>9</td>
<td>900</td>
<td>81.35</td>
<td>75.18</td>
<td>6.17***</td>
</tr>
<tr>
<td>12</td>
<td>1200</td>
<td>2.11%</td>
<td>2.29%</td>
<td>-0.18***</td>
<td>12</td>
<td>1200</td>
<td>78.60</td>
<td>76.44</td>
<td>2.16***</td>
</tr>
<tr>
<td>15</td>
<td>1500</td>
<td>2.05%</td>
<td>1.84%</td>
<td>0.21</td>
<td>15</td>
<td>1500</td>
<td>75.11</td>
<td>77.66</td>
<td>-2.55***</td>
</tr>
<tr>
<td>18</td>
<td>1800</td>
<td>1.84%</td>
<td>1.65%</td>
<td>0.19</td>
<td>18</td>
<td>1800</td>
<td>73.26</td>
<td>74.82</td>
<td>-1.56***</td>
</tr>
<tr>
<td>21</td>
<td>2100</td>
<td>1.79%</td>
<td>1.32%</td>
<td>0.48***</td>
<td>21</td>
<td>2100</td>
<td>70.21</td>
<td>76.33</td>
<td>-6.12***</td>
</tr>
<tr>
<td>24</td>
<td>2400</td>
<td>1.76%</td>
<td>0.30%</td>
<td>1.46***</td>
<td>24</td>
<td>2400</td>
<td>67.43</td>
<td>93.05</td>
<td>-25.62***</td>
</tr>
</tbody>
</table>

**FIGURE 1**
Monthly WTP for the two Tariff Designs.
5. Discussion

Theoretical implications: Our results validate existing findings in the intertemporal choice literature, and support the estimation of discount patterns. Our empirical analysis shows that customers’ discounting behavior is changing due to time preferences (Loewenstein, 1987). We observe significant differences in consumers’ evaluation of unit premiums and price discounts. Consumers evaluate and frame contrary the two different approaches of tariff design. That means consumers access information differently in the two tariff designs. In further research we have to analyze these behavioral patterns at a higher level of abstraction to provide an explanation according accepted theoretical constructs (Loewenstein, 1988; Kassam, Gilbert, Boston, & Wilson, 2008).

Managerial implications: The main objective of our research is to give insights about how pricing presentations affect consumers’ evaluation, and consequently their choice of whether purchasing the subscription, or not. Hardesty and Bearden (2003) have already shown that pricing presentations have an effect for physical goods. We extend these findings and show that this effect is also relevant for services or products offered as subscriptions. The effort to think about different tariff designs and related presentation of prices is reasonable due to the fact that price discount presentations can lower customers’ reference prices (Hardesty & Bearden, 2003). We also show that consumers’ sensitivities related to the two different tariff designs have a major impact on firms’ revenues which can be increased by the tariff design surplus. For explanatory reasons, let us consider the following example: Assume that two gyms want to offer two different subscriptions of durations of six and 24 months. Gym A follows a price discount design, and gym B follows a unit premium design. We assume that both gyms offer approximately equivalent quantity discounts. Based on our findings, we construct the following offers. Gym A offers the subscriptions “6 months for 81 MU per month” and “24 months for 67 MU per month”, and gym B offers the subscriptions “6 months for 100 MU per month and get the first 1 ½ months for free” and “24 months for 100 MU per month and get the first 4 months for free”. For simplicity we neglect the presence of costs. Consequently, gym A has a profit of 6*81=486 per customer for the first offered subscription and a profit of 24*67=1’608 per customer for the second offered subscription. Gym B, respectively, has a profit of 4.5*100=450 for the first offered subscription and a profit of 20*100=2’000 for the second offered subscription. In the context of this paper, gym A misses to skim a tariff design surplus of 392 per customer for the second contract, and gym B misses to generate a tariff design surplus of 36 per customer for the first contract. Concluding, a gym that has the knowledge about the point of tariff design switch-over for its, say 1’000 customers, 500 for each subscription, is able to generate and skim overall 214’000 MU of tariff design surpluses. This is an easy generated revenue by just offering subscriptions according the optimal tariff design.

Limitations: Concerning the results, we can only draw conclusions for common subscription periods, e.g., 3 up to 24 months. We cannot state that the discounting patterns determined hold for unreasonably long subscription periods. To better approximate real life decisions a choice-based conjoint (CBC) analysis including a none-option for the decision behavior can also be an appropriate way of collecting data for further analysis since in real life you always have the option to not subscribe at all. Nevertheless, our results are a first evidence that a difference in evaluation of price discounts and unit premiums exists which has managerial implications for designing optimal tariffs.
References


