Reference-point formation: The effect of social comparison in a marketing scenario

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Abstract

It is widely accepted the role of reference prices in marketing. The goal of this paper is to understand how decision makers update their reference points, given a sequence of information. The paper provides some novel experiments in the marketing scenario to advance the knowledge of reference point formation over time. In the design of the experiment we control for the effect of social comparison as a driver of the final choice. In fact participants knew what other people paid for the same service (reservation of a room in a hotel). The factors used to predict reference points are first price, last price, average price, highest and lowest price. In addition, the effect of some trend patterns in the data, which can influence the final decision, will be checked. The research is between a middle and a late stage. Suggestions in some implications of the results are appreciated.

Academic and managerial marketing issue

When we recognize the role of reference price we have to understand what are the strategy of firms to increase revenues and what are the strategy of consumers to obtain discounted prices. Greenleaf (1995) shows that the optimal pricing trend for a monopolist to increase revenues is to adopt a cyclical pricing policy. This behavior holds also for an oligopoly even with some problems of heterogeneity. The loss aversion plays a role also here. In a world (setting) dominated by loss aversion, the optimal strategy is a constant price because loss adverse customers tend to easily adapt to a downgrade but they hardly adapt to an upgrade of prices.

In online settings is easy for a firm to make experiments. Firms can present a default option to create an anchor and then to control the subsequent variation of attributes. In this case the value that can be obtained through bundling is the following: firms can capture consumers' interests by framing a low price for the core component (e.g., a personal computer) that serves as an anchor to evaluate bundles (e.g., a personal computer plus a printer).

There are ways to encourage and discourage users to consume. In services like utilities one can inform users that their usage exceeded their norms to discourage usage while commercial retailers can use advertising to increase usage and revenues. Moreover, some firms can decide to apply a

combination of fix and variable fees where a heavy variable fee may discourage the massive use of the product or service.

Different segments of customers have different reference prices so firms should use appropriate strategies to target each segment. Nevertheless every segment judges according to the value obtained for the money. We saw that consumers may retain internal reference price in non numeric forms and price communication messages need to be consistent with these qualitative and quantitative representations.

Finally firms must consider a possible social comparison effect: If the good or service is bought by other people in the same environment of the consumer, then the consumer can be highly influenced by what other closed people paid.

Research question

What are the drivers of reference price formation in the consumer? What is the impact of social comparison in the final decision?

Literature review

Reference points were introduced into the economic debate by Kahneman and Tversky (1979, 1991). They are substantial determinants in the process of decision making, as preference highly depend on them. The literature on prospect theory, over the last years, advanced in this issue. Nevertheless the core element of prospect theory remains the same across time: decision makers behave differently when being in a loss or a gain situation. In the former situation individuals are on average risk seeking, while the latter situation coincide with risk-averse attitudes.

In a finance context this concept is pretty straightforward. When a person holds a stock has to decide on his following actions of selling or keeping it. Depending on his or her reference point in terms of the value of the assets, one can take a risky decision or a decision which is more toward risk aversion (e.g., selling the stock).

In a pricing context, actual prices are perceived cheap, expensive or fair relative to these reference prices (Nasiry and Popescu, 2009), thus reference prices play a central role. If consumers are used to really low prices for a certain product, a sudden increase in price might scare away demand, because some individuals might have built a low expectation on the price according to its reference points. Therefore when firms decide how they should charge their consumers they have to consider how reference points arise in light of the price history of the good. Particular pricing strategy can lead to positive effects on demand in the same scenario. For example reference points can adapt to price change if prices are increased gradually.

There are several ways of behavioral approach to model reference point formation. Following Nasiry and Popescu (2009) the so called "end rule" yields reference points (r_t) that averages ($\sigma \epsilon$ (0,1)) the lowest ($m_{t-1} = min(m_0, p_1, ..., p_{t-1})$) and most recent price (p_{t-1}) of a history of prices that are known to the individual:

$r_{t+1} = \sigma m_t + (1-\sigma)p_t$

Knowing what prices matter more than others is relevant because firms can incorporate these finding to a better estimation of the demand dependence on prices.

Baucells *et al.* (2009) proposed a different set of weights to determine the derivation of reference points within individuals:

$$r_{t+1} = \sum_{i=1}^{t} \pi_i p_i$$

with $\quad \pi_i = w(\frac{(n-i+1)}{n}) - w(\frac{n-1}{n})$

where *w* are weights, determining how one price out of the history of prices influences the individual's decision making. A first application of this model was used in the finance setting, where people purchase a stock at a given price, observe how the price rises and falls for a given period and are asked about their reference point (at what price they feel neither happy or unhappy of selling the stock). The empirical finding in the finance setting supported the hypothesis that the most recent price is a driver of referent point formation. On the other hand, they did not find a significant effect of the minimum price while what seems to matter more is the purchase price.

This whole argument captured my attention because in marketing when consumers observe price variation for a product over a given period of time and are then surveyed upon prices, if the order matters then marketers should pay attention when changing prices. Therefore we want to test if in a different managerial setting, marketing, the same effect is present.

In addition the experiment will also deal with the effect of social comparison on reference point formation. Literature on consumption and happiness is using consumption of others to explain that utility of consumption depends on how much others can consume (Baucells and Sarin, 2008). Let's clarify this concept with an example: if I have to pay a master half of the price I will judge this offer positive or negative not only according to my budget constraints but also according to what discount obtained other people who applied for the same master. If they have to pay the full price my utility of consumption is higher than if they have not to pay it at all (full scholarship). It is also tested that individuals prefer an absolute lower lifetime income when the social environment earns relatively less, and an absolute higher lifetime income when the social environment earns relatively more.

With the use of dynamic pricing and the internet, people are used to pay different prices for the same product. Therefore testing if reference points on prices depend on how much the social environment paid for the same consumption seems really interesting. When looking at price variation over time we can think of obtaining different prices which could affect individuals differently than just the plain price information.

The second part of the experiment will deal with the setting where individuals observe price histories through price experiences of their friends and colleagues at work.

Framework

Consider a consumer who observes a sequence of prices $y_i = 1, \ldots, n$. We assume this consumer observes one unit of one service/product in period one at price y_i. In subsequent periods $i = 2, 3, \ldots$, the consumer observes the other pieces of the sequence and he updates his reference price.

We use an integrated approach where there is a single reference point, r_{n+1}, which is a function of the information observed in the past. The experienced utility $n + 1$ is given by

$v (y_{n+1} - r_{n+1})$, where

$r_{n+1} = f (y_1, y_2, \ldots, y_n)$.

We seek to elicit $\hat{y}_{n+1}$, the price that would produce zero experienced utility at period $n + 1$. This price is the solution that equates y_{n+1} to r_{n+1}. We tell subjects that they will observe a series of dynamic price for an hotel. There is a four-second delay before each new price is added to the sequence from the first price (left) to the last price (right). The length varies between 4 and 8 periods. The total number of sequences is 24 and we randomized the order in which each subject observes the sequences.

After the sequence, subjects are asked to indicate what price would produce zero experienced utility. We cannot ask people directly the value that produces "zero experienced utility" because our subjects are undergraduate students and they cannot recognize the meaning of this concept. Therefore we ask "at what selling price would you feel neither happy nor unhappy about the sale". Nevertheless this elicitation may perform poorly: some subjects interpret gains and losses from an accounting viewpoint. We will check that in the result session.

We followed a structure similar to Baucells *et al.* (2011) where the reference price is influenced by several factors. In our case: the first price (y_1), the last price (y_n), the average price ($\sum_{i=1,\ldots,n} y_i / n$), the

highest price ($\max_{i=1,\ldots,n} y_i$), and the lowest price ($\min_{i=1,\ldots,n} y_i$). In addition we consider the potential effect of one pattern on the intermediate prices: dashed hopes versus false alarms (prices increase then decrease versus decrease then increase). We artificially designed 24 price sequence in

order to create 12 pairs comparisons. The two sequences in each pair are identical in respect to all investigated factors but one, which takes a higher value in the first sequence. To clarify this setting we now present one table which represents the 24 price sequences used in the experiment. Columns y_i contain the i_{th} price of each sequence and price units are euros. We remind that subjects saw the 24 sequences in random order. In addiction the table highlights what factor or pattern is investigated for each couple of sequences.

Factor or pattern investigated	Sequence k	y_1	Y_2	y_3	y_4	y_5	y_6	y_7	y_8
First price	1	150	100	50	100				
	2	50	100	150	100				
	3	150	100	50	100	60	100	140	100
	4	50	100	150	100	140	100	60	100
Last price	5	100	50	100	150				
	6	100	150	100	50				
	7	100	50	70	100	150	130		
	8	100	150	130	100	50	70		
Average price	9	50	100	100					
	10	50	50	100					
	11	50	100	150	140	140	140	140	120
	12	50	100	150	100	100	100	100	120
Highest price	13	50	50	100	150	100			
	14	50	100	100	100	100			
	15	100	50	100	60	100	140	100	
	16	100	50	100	90	100	110	100	
Lowest price	17	150	100	100	100	100			
	18	150	150	100	50	100			
	19	150	130	100	100	100	100	100	100
	20	150	130	100	120	120	100	60	100
Dashed hope vs. false alarm	21	100	50	100					
	22	100	150	100					
	23	100	50	100	150	100			
	24	100	150	100	50	100			

Note that the average price of the two sequences in each pair is the same. The only two exceptions are the two cases where we want to manipulate this fact: the factor average price and the pattern dashed hopes versus false alarms. In the former case obviously we want to test if a mean difference

in prices influences the reference price. In the latter we want to have an equal starting and ending point but intermediate prices need to be distributed in an opposite way.

Proposed Methodology

A pilot experiment was conducted in April and May 2011 at the Pompeu Fabra University. Subjects were 60 undergraduate students from a course in business administration. The average age was 22, with a range from 21 to 28. We randomly divided students into two groups: an "individual group" and a "social" group. The only difference between these groups was that in the "individual" group we told people that prices shown were prices found surfing on the internet while in the "social group" we told people that prices shown were prices really paid by colleagues in the past. The reason to do so was to control if it was present a social comparison effect when people are judging prices. In particular, we expect that people are sensitive to low prices paid by colleagues and, on average, they show lower reference prices because they perceive unfair to pay higher prices than other colleagues. We also controlled for gender, looking for structural differences in reference prices between males and females. In the section appendix of this chapter we present all the detailed instructions of the experiment for the two groups. We expect also that the first price is a driver in the reference point formation and updating because it creates a first reference. Note that in a marketing scenario the meaning of first price could be also the price the consumer sees the first time for a particular product or services. This price can differ from the launch price simply because the consumer saw the product or service for the first time in a following period.

Subjects received a fixed payment of €5 for their participation. Because of the pure psychological nature of the reference point it made no sense to use variable payment. Individuals are monitoring the series of prices and they cannot trade the reservation (see the instructions in the appendix). The predesigned sequences we presented to individuals are obviously not random. Nevertheless, the variations are in line with dynamic pricing in the hotel industry when the check in becomes closer and closer. Before receiving the financial reward, students were asked to indicate if the instructions were clear, on a scale from 1 (completely unclear) to 5 (completely clear). The average score across the 30 subjects was 4.3, so we believe that subjects understood the presented procedure. The average processing time was 20 minutes.

The proposed methodology to interpret the data by means of descriptive analysis is a Wilcoxon Matched-Pairs Signed-Ranks test because of the low sample while for the statistical inference it is used regression analysis and an adaptation of the Prelec's model

H1) People in the social group tend to show a lower average reference price

H2) The first price is a driver in reference point formation but also the trend matters

H3) Gender plays a role (reference prices are significantly different between males and females)

Anticipated results or preliminary findings or results

Hypothesis one is clearly confirmed by the data while for the second hypothesis more interpretations and extensions are possible. First of all, results are slightly different in the individual and in the social case. Secondly, the first price counts but it is the highest price which stands out among all the factors.

Gender doesn't play a significant role. However, future research can analyze the same hypothesis with a bigger sample because s certain difference (not sufficient to derive conclusions) between the two cases is present.

Regression analysis confirms descriptive statistics, allowing for multiple comparisons. Finally, the Prelec's model is more efficient than regression in the prediction, using less parameters.

Expected theoretical and managerial implication and anticipated contribution to knowledge

Complete results of this experiment will allow to suggest to firms marketing pricing strategies, in particular about dynamic pricing strategies to keep an high reference price in the mind of the consumer.

From a methodological point of view new approaches to data, considering prospect theory and not linear models, allow a more flexible study of the behavior of the consumer.

Even following the rigorous sets of hypotheses made before, final results can influence the implications, advancing the knowledge in this area.

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