Choice Determination Under Various Price Offer Frames

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Abstract

Studies on prices have indicated varied learning of human behaviour in terms of how buyers perceive prices of products individually and how they think about prices when offered to them in a frame with some price offer combinations. Empirical studies have demonstrated that a buyer is likely to change his/her acceptance of a product due to not only the change in the price of the desired product, but also in part due to the change of prices of other products in a price frame. The buyer may even alter his/her preference in case the options to choose from increase or decrease in a given frame. A significant area of contribution to this subject has been done by Prospect Theory (PT), which highlights the impact of the reference point's influence. The reference point enables a decision maker to evaluate the outcomes of his/her decision, that is, is the decision increasing my gains or reducing my losses ? Changes of frames, therefore, in substance alter a decision maker's choice. This, as the PT concept suggests, is due to the fact that the position of a consumer to assess losses and gains alters within each frame.

Keywords: **price frames, decision making, utility, preferences, choice, referent product, subject product, preferment effect**

Paper Submission Date : March 12, 2016 ; Paper sent back for Revision : October 10, 2016 ; Paper Acceptance Date : November 4 , 2016

The concept of reference point is studied in detail in prospect theory (Kahneman & Tversky, 1979), which holds that individuals make choices in various situations or frames with a reference point for a choice decision in each frame. For instance, should I accept a job with a higher salary with a higher variable component or a lower salary job with a higher fixed salary? The answer could well depend on several factors, such as current fixed salary, risk in the new job, total salary component under both offers, and so forth. A reference point is critical to the theory of human decision making in assessing relative losses or gains made from a decision. A reference locus allows the decision maker to be satisfied with the decision making process in general and the decision in particular.

Objective

The study aims to examine how buyers select offers for the same product combinations, if they were offered in different frames.

↳ **H_0 :** Buyers would follow the principle of invariance (maintain same choice) in selection making between multiple price frame offers with fixed investment.

The paper considers the following in a decision making experiment :

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A price frame where the decision maker is making a choice of a price bundle from three alternate offers. Similarly, the study highlights the effects on choice if the frame were to be extended to four offers. Shoemaker (2005), in his article on pricing and the consumer, raised some key points on buyer's price acceptance decision frames.

How the consumer 'looks at the decision,' or the decision frame, can determine whether the outcome is in the gain domain or the loss domain. Decision frames are controlled by two factors :

(i) By the formulation of the problem,

(ii) By the norms, habits, and characteristics of the decision maker.

From a firm's perspective, there is little a firm can do to control the peculiarities of the decision maker. What the firm can do, however, is change the way in which the consumer frames the decision problem so the outcome becomes favourable to the firm (Shoemaker, 2005).

The experiment was conducted with a generic category product combination of a trouser and shirt, where the quality was unknown to the respondents and price was the only input used to make decisions. The study, as indicated by Shoemaker (2005), attempts to examine the relevance of such frames in choice making.

The Trouser and Shirt Price Frame Experiment

The respondents for this experiment were students of a post graduate class of management. The study was conducted in February 2016. The following slide was shown to the respondents : Assume that you have entered a retail store in an up-market town and you wanted to buy a trouser and a shirt. As you move around the store, you see that the same trouser and shirt are displayed at three / four corners of the apparel section with certain promotion offers.

FRAME 1

Table 1. Price Frames of Trouser and Shirt Offers

	A	B	C
Trouser (Subject)	900	700	1000
Shirt (Reference)	100	300	0
You Pay at the Counter	1000	1000	1000

FRAME 2

Table 2. Price Frames of Trouser and Shirt Offers

	A	B	C	D
Trouser	900	700	550	1000
Shirt	100	300	450	0
You pay at the counter	1000	1000	1000	1000

The respondents were told that the choices to them were *A, B, C* in the first frame and similarly, *D* was added in the second frame. They were told that the tables displayed the prices of the products in ₹. The respondents were asked if they had understood the frames. The respondents were told that there are no right or wrong answers and they could choose any of the above choices. It was also mentioned that any offer chosen would have the same

Table 3(a). Responses of the First Group to Table 1 Choices

	A	B	C
Trouser	900	700	1000
Shirt	100	300	0
You pay at the counter	1000	1000	1000
Group I (N = 38)	**4**	**17**	**17**
Response	**11%**	**45%**	**45%**

Table 3(b). Responses of the Second Group to Table 1 Choices

	A	B	C
Trouser	900	700	1000
Shirt	100	300	0
You pay at the counter	1000	1000	1000
Group II (N = 50)	**5**	**21**	**24**
Response	**10%**	**42%**	**48%**

investment, that is, ₹1000. It was apparent that the price of the shirt, in this case, is the subject item in the frame which changes across the two offering frames and implicitly, the trouser was held as the referent object.

The above was administered to separate groups of students in two sections. The responses and the sample sizes are depicted in the Table 3(a). For the Table 1, which was administered to two separate groups, choices *B* and *C* were the most preferred as indicated in Table 3(a) and Table 3(b) responses, respectively. The respondents did not prefer choice *A* as gains appeared marginal in terms of the price paid to the referent object (the trouser) even though the final price to be paid for any offer was equal and fixed, that is, ₹ 1000.

The same test was conducted with Group 1 (as above) and Group 3 respondents. However, in this case, Table 2 was used with a stretched frame to include an additional choice. The responses are tabled in Table 4(a) and Table 4(b).

Table 4(a). Responses of the First Group (*N* = 38) for a Stretched Price Frame (Table 2)

	A	B	C	D
Trouser	900	700	550	1000
Shirt	100	300	450	0
You pay at the counter	1000	1000	1000	1000
Group I (N = 38)	**1**	**8**	**11**	**18**
Response	*3%*	*21%*	*29%*	*47%*

Table 4(b). Responses of the Third Group for a Stretched Price Frame (Table 2)

	A	B	C	D
Trouser	900	700	550	1000
Shirt	100	300	450	0
You pay at the counter	1000	1000	1000	1000
Group I (N = 41)	**3**	**5**	**17**	**16**
Response	*7%*	*12%*	*41%*	*39%*

Group 1 (N = 38) had already marked the test for the first frame and there was a shift in favour of choice *C*, indicating bias of price equality between the trouser and the shirt prices in the stretched frame as seen by comparing results of Group 1 responses between Table 3(a) and Table 4(a). In this group, the majority still preferred choice *D*. The responses were altered in case of the third group who preferred choice *C* in comparison to choice *D*, although marginally, as seen in the Table 4(b).

The second frame (Table 2) was again administered to a new fourth group. The results of the study are as presented in the Table 4(c). The responses are altered in case of the fourth group who preferred choice *C* in comparison to choice *D*, as seen in the Table 4(c).

Table 4(c). Responses of the Fourth Group for a Stretched Price Frame (Table 2 above)

	A	B	C	D
Trouser	900	700	550	1000
Shirt	100	300	450	0
You pay at the counter	1000	1000	1000	1000
Group I (N = 42)	**0**	**9**	**22**	**11**
Response	*0%*	*21%*	*52%*	*26%*

Remarks

The respondents technically should have been unbiased in their responses with more or less equal percentage favouring all choices in both the above frames since the final payment for any offer was fixed. This did not happen, and the respondents were biased to price selection points and also altered their choices between frames. We, therefore, reject the null hypothesis (H0) and accept the alternate hypothesis (Ha), indicating that buyers or respondents in comparative cases of offers do not consider only the final value of the offer, but are significantly influenced by the structure of the price offer. This case, as treated above, clearly exhibits failure of invariance, thereby substantiating the rejection of the null hypothesis.

It was apparent that the respondents conceived some utility gains when the shirt was free as compared to when it was priced very low in the offer. Also, the percentage responses were spread with a selection bias clearly between choices *C* and *D* in the four price frame (Table 2) choices.

Since only price had to be used as information inputs by the respondents, the choices altered when the stretched frame was included. Group 1 answered both the frames, while Group 2 answered the first frame (Table 1) ; Group 3 and Group 4 answered the second frame (Table 2) with the stretched choices. The Table 5 depicts the summary of the test conducted on the groups.

Table 5. Summary of the Tests Administered

Frames	1 Frame (Table 1) (Three choices)	2 Frame (Table 2) (Four choices)
Group1 (*N*= 38)	Yes	Yes
Group 2 (*N*= 50)	Yes	No
Group 3 (*N*= 41)	No	Yes
Group 4 (*N*= 42)	No	Yes

When Table 1 choices were offered, the answers of the respondents were close in choosing choice *C* over *B* for Group 1 and 2.

Group 1 preferred choice *C* over *B* in the three price choice (Table 1) frame exposure and chose *D* in the four

price choice (Table 2) frame. However, a substantial portion of the respondents in this group moved to the new choice *C* in this frame from the earlier *B* which was chosen in the Table 1 frame. In case of Group 3 and Group 4, for whom the Table 2 was exhibited, choice of *C* was clear over *D*, even though the percentage margin respondents differed. In all frames, choice *A* was hardly regarded by the respondents.

Model

To explain this phenomenon, we use the classical standard risk function of utility, that is, $\sqrt{x}$ to denote utility derived from gains, where the outcomes are reduced to their minimum deviations to derive utilities for the choices made individually as products and collectively as a bargain value over the price paid in the offer.

(1) The Super Additivity Model : The proposed super additivity model concerns the addition of gains. The model is based on the assumption that the decision maker views gains under two counts. First, he/she views gains from the choice itself (experience utility) and then subsequently views gains as benefit of the difference in price of the offer and the price of referent product in the offer. In this instance, it would be the price of the trouser, which is deducted from the offer price to arrive at "gained utility".

The model explains the motivations of the decision maker to make comparisons between the choices which have a free offer and an almost price equal offer. It also attempts to explain why other offers had low acceptance amongst decision makers.

A simple choice maximizing model in domain of gains for a buyer is proposed as under :

Total Utility derived is considered as;

$$TU(x) = \sqrt{xd} + \sqrt{xm} + \sqrt{Px - xm} \qquad (1)$$

By manipulating :

$$TU(x) = 2*\sqrt{xd} + \sqrt{xm} \qquad (2)$$

where,

xd = price of the discounted item in the frame,
xm = price of the main item in the frame,
Px = price paid for the offer

Therefore;

$$TU(x) - \sqrt{Px - xm} = \sqrt{xd} + \sqrt{xm} \qquad (3)$$

(2) A Comparison of the Utilities for the Decision Maker : The classical utility function can assume several forms. One of the forms to derive utilities in lotteries is as under :

$$TU(x) = 1 - \exp(-x/R) \qquad (4)$$

where:

x = Value of the lottery (in this case ₹ 1000) or the investment done in purchase,
R = risk tolerance value (in this case the price of the referent product).

Risk tolerance is price of the referent product which the buyer prefers. Consequentially, higher is the risk tolerance level, lower would be utility extraction and vice versa.

We can assume that the price of free goods can be half the value of lottery or offer value since it is in a single offer, that is, the trouser and shirt is valued together as ₹ 1000. In the last frame, when the shirt is free, we could consider the price of the trouser to half the value of the offer of ₹ 1000. The results for the second frame are displayed in the Table 6.

Table 6. Summary of the Classical Utility Values for the Various Offers

	A	B	C	D
Trouser	900	700	550	500
Shirt	100	300	450	500
You pay at the counter	1000	1000	1000	1000
Model derived utility values	**50.00**	**61.10**	**65.88**	**63.25**
Classical utility derived values	**0.67**	**0.76**	**0.84**	**0.86**

The utilities derived above are by both functions and have to be studied by their trends rather than absolute value. The classical utility model quotient is a probability of extraction of utility in the offer, and the utility derived by the model in this paper is based on prices paid and relative gains. The models differ in results of utility where the classical utility function appears as an increasing function of risk tolerance or the price for the referent good. If we consider this result for decision making, it gives us results in choice preference, which are contradictory to the findings in the second frame (Table 2) study. The classical model shows that the utility derived indicates that choice *D* would be more preferred than *C* for all respondents, which does not happen regularly in the study. Comparing the results of the model proposed in this paper above, it explains why the respondents preferred choice *C* over D.

(3) Choice Confusion : If the values between the offers are too close for comparison, decision making process becomes complex and blurred. In other words, buyers might be confused between offers of slightly unequal prices to a free good in the offer.

For instance, the following value equation given below would hold for some respondents ; for others, the left hand side might outweigh the right hand side where μ is a utility function :

$$\mu(550)+\mu(450) = \mu(1000)+\mu(0) \qquad (5)$$

This is evident in the respondents' split choices of *C* and *D* in the second (Table 2, Table 4 prices) frame.

As opposed to the above, the decision maker would easily form a value equation that favors a particular choice.

$$\mu(100)+\mu(900)<\mu(1000)+\mu(0) \qquad (6)$$

Evidence of the above is in fact that none or few respondents selected choice *A* in any of the frames (Table 1 or Table 2), which supports the rejection of the null hypothesis, as indicated in the aforementioned portion of the paper.

Observations

Buyers often view the term "free" in an offer combination almost equally or slightly lesser to a heavy discount on the referent product in the price combination. The term "free" in itself may not induce purchase incidence if there are alternate price offer combinations displayed alongside. The marketer, in case of giving multiple price offers in the same class, can be assured that equal price discount offers can induce a purchase almost effectively as or even better than "free" offers. A possible explanation being that though the buyer desires a "free" good, he/she views the value of such a product lower than he/she estimates the value of the same good if offered at a discount in a price frame.

↳ **Preferment Effect :** The preferment effect (PE) concerns itself with utility of the goods sought in the purchase. The effect places weight on the referent product which is the desirable good in the transaction and the corollary becomes the point of reference to establish gains or losses in the choices. It (referent good) also determines the risk tolerance in the offer. The preferment effect values the free good in conjunction with the referent good by accounting the gains derived from the savings made in price of the offer over the price of the referent good.

↳ **Mental Arithmetic :** In the process of evaluating a price frame, the buyer segregates the offers as referent and subject products and proceeds by mental arithmetic to deduce that the lower price product is the subject product, as happened in the choice frames in this experiment. The preferment effect stems from the desirability of gains in the purchase of the referent product, as the shirt is the subject, or second choice item in the offer which is regarded more or less as a "free good" in the offer aimed to increase the sale of the referent product.

The buyer evaluation process of the price frame considers the utility value of the referent product higher when it is offered at a discount along with the subject product since the buyer mentally adds the utility derived from both products and weighs the gains as being more in comparison to the combination of the free shirt offer. Therefore, the buyer estimates gains in the shirt through the price of the offer minus the price of the trouser, the referent product.

Implications for Marketers

As mentioned in Shoemaker's (2005) article, the objective of the study is to investigate whether the offers can be framed differently. In light of the evidence emanating from the experiment, the following can be some observations a marketer could consider in framing of an offer :

(i) Free goods in the offer may not always be viewed favorably.

(ii) Discounts on products are seen as stronger motivation as compared to free goods in the offer.

(iii) Corollary, the study indicates that if both offers are launched simultaneously, discount offers would attract larger or equal share of acceptance as free offers.

(iv) Free goods offer would work best in case of extreme comparisons (in this case, where the shirt is free with the trouser as opposed to a choice where the shirt is ₹ 100 and the trouser is ₹ 900).

(v) The marketers can prime their buyers in case they are selling two offers in the store, where the store requirement is to sell one particular offer more than the other. In such cases, the extreme offer type, as suggested under point (iv) above can be used.

Conclusion

Marketers should view discounting of products more seriously. As evidenced from the study, free goods are over discounted and actually translate in negative returns in the buyer's mental arithmetic. Discounting seems to be a better option where the buyer holds the value of sought goods positively. Also, discounting is considered as a short term prescription and the buyer views such purchases as positive savings. In summary, it is better to avoid "free" offers and use them on "last resort" basis as compared to "discount offers," which could be more freely tried without depreciating the value of the brand.

Limitations of the Study and Scope for Further Research

The model assessment could be more rigorous with a larger sample size of respondent data. The conclusions derived from such large sample studies would provide robust interpretations to the efficacy and interpretative logic of the model. The current area of study limited itself to hedonic articles such as a shirt and trouser buying offer. However, future studies could consider products with negative connotations such as medicines or dental treatment products.

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