Free Product as a Complement or Substitute for a Purchased Product—Does it Matter?

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Abstract

The purpose of this paper is to examine whether price discounts or buy one get a different item free (BOG-DIF) offers are more attractive to consumers. This paper examines empirically (through the use of two different questionnaires) the effect that the relationship between the purchased and the free product has on consumer preference. A rational framework is presented and tested empirically for differing scenarios. When comparing a 50% discount to BOGDIF, it is found that the promotion's attractiveness is influenced by the relationship between the products, *i.e.* whether the products are substitutes or complements. Interestingly, we find that the empirical results are inconsistent with the rational framework. This inconsistency is explained by the effect of a desired "gift". The results are important for theoreticians and practitioners who desire to develop efficient tools and innovative avenues for sales promotions.

Keywords: Discount, Present, BOGDIF, Promotions, Substitutability, Complementability

1. Introduction

Producers, sellers, department stores and supermarkets frequently offers sales and promotions, often using direct price reductions (such as a 50% discount) or effective price discounts, using a policy of "buy one get one free" where buying an item at full price grants the buyer a free item. The free item might be another unit of the same item (BOGOF) or a different item ("buy one get a different item free", BOGDIF), of the same nominal value.

The purpose of this paper is to present the rational hypothesis and examine the promotion effect that is derived from the relationship between the purchased product and the free product, including their substitutability or complementability, as well as the attractiveness of the offer being made, either price discount or BOGDIF.

A quick glance at the advertisements to which consumers are exposed in weekend and daily newspapers or by way of snail mail, e-mail, and other media outlets reveals that different discount policies are offered for different items and in varying combined promotions. For example, Kohl's or Macy's stores might send customers advertisements by regular or electronic mail guaranteeing a 50% price discount on some shirts, while other shirts are sold together with another shirt, either identical or not. Still other shirts are sold for full price but bundled with a free pair of trousers. Sometimes the items bundled in a BOGDIF offer seem unrelated to each other, sometimes they are substitutes for each other, and sometimes the items are complements. Moreover, on many occasions we note that pricing policies are "activated" according to seasonal cycles, but sometimes they seem spontaneous, unexpected, random or arbitrarily determined by the supermarket or department store. This may lead an outside viewer to conclude that there is no consistent, solid, mature, or scientific method for promoting brand or store loyalty, or for increasing companies' sales and profits. The confusing facts of pricing policies by practitioners on one hand, and the academic explanations for consumers' attitudes towards gifts and price discounts as reported in the literature of marketing and economics, as described below, on the other hand, motivated us to investigate this issue. The purpose is to develop a guideline for explaining people's behavior that can serve as an efficient tool for successful sales promotions, to the benefit of both sellers and customers. Furthermore, in BOGDIF even

more inconsistency and con- fusion on the part of policy makers was found. Sometimes, the free item has no meaningful relationship to the purchased item, and there is a real question as to whether it is preferable that the items be related, either as substitutes or as complements, or for them to be unrelated. If indeed the relationship between the products has some effect on consumer behavior that should be considered when decid- ing on a promotional policy. To the best of our knowledge, this issue has not yet been discussed in the literature.

Research on the question of discounts versus free units is inconclusive[1]. Some researchers suggest that a discount policy is questionable because it is sometimes "translated" as a devaluation of the product [2-4] discuss a key difference between price discounts and providing a free additional unit (such as BOGOF), since a price discount reduces loss (or saves spending) while an additional unit increases gain (benefit from the free unit). Since loss aversion means that losses loom larger than gains of the same amount, discounts are preferable to a free additional unit. Conversely, [5] found that participants prefer extra units of the product rather than a price discount.

[6] tested the difference between price discounts and free units. They asked students to rank the transaction value of three different possibilities on a scale of 1 - 5. The possibilities were 50% discount, buy one get one free, and buy two and get a 50% discount on both. Participants preferred the 50% discount over the other two promotions. Further, they found a higher transaction value for the BOGOF promotion over the buy two and get a 50% discount on both offers.

[7] examined experimentally the extent to which different framing increased perceptions of deal values. They found that consumers often consider the discount price rather than the initial price claim to be the true price of the item. However, when a free gift is offered, consumers establish their quality judgment as to the full price of the item without accounting for the value of the gift. They claim that the free gift offer maintained quality perceptions, whereas the discounted product was vulnerable to negative quality inferences. As a result the free gift offer increases the value of the deal relative to the control conditions, while the discount frame does not.

[8,9] conducted experiments that tested responses to products that were offered as free gifts in conjunction with the purchase of a different product. She shows that when a product is given away free upon buying another product at full price, participants tend to infer that it is merely a cheap gift and assume a low production cost for the free product. Based on this assumption, costumers may reduce the demand for the product in the future and

be willing to pay a lower price. In another paper, [10] examined whether the economic value of discount coupons is considered a reliable source of information for consumers. She further examined whether an introductory price plus the coupon's value serve consumers as an indicator of quality. She found that increasing the coupon's value does not necessarily improve the product's evaluation. This reflects the general tendency of people to under-evaluate a free item that is given as a gift when making subjective value judgments. The acceptance of such a gift by consumers may lead to a lower evaluation of the product in the future.

As mentioned before, to the best of our knowledge there is no research that examines empirically the effect of the relationship between the purchased product and the free product (substitutability or complementability) on the attractiveness of the offer. Based on the rational hypothesis we argue that the degree of attractiveness of a 50% discount when the consumer has to buy the two items simultaneously and BOGDIF are in effect identical. The rational argument is true for complementary products as well as for substitute products. For the same item an offer of a 50% discount dominates the offer of buy one and get another unit of the same item free (BOGOF). These are a-priori rational hypotheses and we test them in two questionnaires. We find that the attractiveness of the promotion is influenced by the substitute and complement relationships between the products. However, we do find different results regarding promotion ranking where "customers" revealed preferences towards BOGOF rather than s 50% discount offer. We suggest that consumers are affected by the "free" item in BOGDIF or BOGOF [11,12]. The desire for a "free" gift increases the attractiveness of BOGDIF or BOGOF. However, for complement products the effect of "free" product does not hold since the two complement products are perceived as one in the eyes of the customer.

In the next section, we describe the formal rational hypothesis, followed by a section where we report details on the questionnaires' evidence that tests the predictions and suggest some behavioral explanations. We end with a general summary.

2. The Rational Hypothesis

We can apply the above scenario to the consumers' behavior. Assume a consumer who considers buying two products X and Y. Assume also that the price of each product is 1 and C represents the total expenditure on other goods.

The utility function is U(X, Y, C), while the budget is given by *I*.

For the simple case assume that X and Y are the same

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[1]For a meta-analysis of the impact of price presentation see [1].

product. If a person pays 50% of the price for each unit of the same product or buys one unit and gets another unit of the same product for free (BOGOF), both promotions should be the same if the person buys the same amount. However 50% is a promotion without any restriction on how many units must be purchased, while BOGOF forces the customer to buy units in pairs. This means that the 50% discount should be more attractive due to more degrees of freedom. For any given utility function all possible solutions in the BOGOF promotions are contained in the 50% discount promotion.

To conclude we argue that *Scenario* 1 is preferred over *Scenario* 2 for the same item.

Scenario 1 (50% discount): U(X,C), s.t 0.5X+C = I, for $0 < X = 1, 2, 3, 4, \cdots < I$
i.e; X is integer)
and
Scenario 2 (*BOGOF*): U(X,C), s.t 0X+1X+C = I, $0 < X = 2, 4, 6, 8, \cdots < I$
(*i.e*; X in pairs)

Hypothesis 1: *A 50% discount on a product is preferable to buying one unit and getting another unit of the same product free* (*BOGOF*).

Next, we compare the policy of offering a 50% discount when the consumer buys two items simultaneously to a BOGDIF policy.

The simple economic approach assumes consumers' neutrality towards the financing sources (*i.e.*, consumers are indifferent between the consumption of a purchased item versus an item that is received as a gift) of a specific product that they consume. This indicates that the utility will be the same if a person pays 50% of the price for each product or pays full price for one of the products and gets the other for free if both products have the same price.

This means that a consumer is indifferent to these two different budget constraint scenarios:

Scenario 1 (50% discount): U(X,Y,C), s.t. 0.5X + 0.5Y + C = I,
and
Scenario 2 (BOGDIF): U(X,Y,C), s.t. either 1X + 0Y + C = I or 0X + 1Y + C = I.

Hypothesis 2: *When purchasing two different products with the same price, the consumer is indifferent between 50% off the price of each product and paying full price for one of the products and getting the other free* (*BOGDIF*).

3. Preliminary Test of the Rational Hypothesis

3.1. Questionnaire 1

3.1.1. Sample Data Collection
Before using the questionnaire, we conducted a survey in economic classes (105 students) and asked the participants to rank the degree of substitutability or complemetability for several pairs of goods. Based on the students' answers we chose two pairs of goods. The first one was elegant shoes and sneakers, which were ranked as having a high degree of substitutability in the preliminary survey. The second one was laundry detergent and fabric softener which the preliminary survey ranked as being very complementary.

The next step was to prepare another questionnaire testing the preferences of individuals for different types of promotions.

Sample: The sample included 66 non-student participants (64% males). The age range was 21-51 and the average age was 29.6.

Questionnaire: On this questionnaire, we asked the participants to rank the attractiveness of different sales promotions for each pair of products on a scale of 1 to 10 (1 = completely unattractive; 10 = extremely attractive)[2]. 10-point numerical scale is used in European Customer Satisfaction Index (ECSI) [16,17] and in the framework of American Customer Satisfaction Index (ACSI) [18-20].

For each product, we asked the participants to rank the attractiveness of a 50% discount and BOGOF. Next we asked them to rank the attractiveness of buying one product at full price and getting a unit of a different product for free (BOGDIF). In the last problem, participants were asked to rank the attractiveness of 50% discount on both products only if buying both products. Since the customer in a BOGDIF deal actually gets two products for the 50% discount, the last option is also be restricted to buying both products. To avoid any ambiguity regarding the products' prices we asked the participants to assume that the prices of both types of shoes were the same, and that the laundry detergent and fabric softener were also identically priced. (See Appendix 1 for the questionnaire).

3.1.2. Results
Table 1 compares the average attractiveness index (*STDV*) of a 50% discount on a single product to buying one unit of the product at full price and getting one unit of the same product for free (BOGOF).

In general participants were indifferent between the

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[2]Regarding the use of a10-point numerical scale instead of a 5-point numerical scale, some studies such as [13,14] argue that questions with a large number of response alternatives can reduce the quality of the responses. [15] argues that "it is usually accepted that a small number of points does not allow a good discrimination of responses (limiting the ability to find significant differences between segments) and may limit the data analysis methods that can be used. More points improve the data metric, enrich the possible data analyses and facilitate the calculation of covariance between variables, which are used in most multivariate data analysis methods".

two promotions or preferred the option of BOGOF over the option of a 50% discount. This preference is inconsistent with economic theory since buying a product at a 50% discount without any restriction as to how many units must be purchased should dominate the restricted option of BOGOF.

Next, in **Table 2** we compare the average attractiveness index (*STDV*) of the two possibilities: 1) Buying one product at full price and getting the other product for free (BOGDIF), and 2) a 50% discount on each product with the restriction of having to buy both products.

For complementary products, the average attractiveness of the 50% discount on both products (when buying both of them) and BOGDIF are not significantly different, which is consistent with the rational hypothesis. For substitute products we find that BOGDIF is more attractive than the 50% discount on both products, which is inconsistent with the rational hypothesis.

It is also reasonable to assume that the prices of shoes and sneakers are higher than the price of laundry detergent and fabric softener, so the 50% discount has a higher monetary value for shoes and sneakers than for laundry detergent or fabric softener. However, the average attractiveness index for a 50% discount on both products is significantly higher for the laundry detergent and fabric softener which are complementary products (6.85 for the powder and softener) than for the shoes and sneakers which are substitute products (5.07 for the shoes) (two-tailed T-test: $t(66) = 5.28$, $p = 0.00$). This indicates that when selling two different products, complementary products have some added value over substitute products. When complementary products are sold together, they are worth more than substitute products sold together. As a result, discounts on both products are worth more for complementary products even if they are worth less money.

3.2. Questionnaire 2

3.2.1. Sample Data Collection

To test the reliability of our results, we repeated the survey using another questionnaire and a sample drawn from students studying economics. Students of economics are more familiar with the rational thought processes regarding the relationships between products (complement or substitute), income and substitution effect, and this knowledge might affect their decisions.

Sample: The sample included 217 individuals (47% males) drawn from economics classes. The average age was 19.8. The participants were divided into three groups and each group was asked about different pairs of product.

Questionnaire: The complementary products were a shaving set and deodorant for males (65 male participants) and perfume and cosmetics for females (66 female participants). The substitute products were New Balance sneakers and Nike sneakers (86 participants, 45% males).

As in the first questionnaire, we asked the participants to rank the attractiveness of different sales promotions for each pair of products on a scale of 1 to 10 (1 = completely unattractive; 10 = extremely attractive). For each product we asked the participants to rank the attractiveness of a 50% discount and buy one get the same product for free (BOGOF), and the attractiveness of buying one product at full price and getting a unit of the other product for free (BOGDIF). In the last problem, participants were asked to rank the attractiveness of a 50% discount on both products only if buying both products. Again, to avoid any ambiguity regarding the products' prices we

Table 1. Attractiveness of 50% discount on each product and BOGOF.

Product	50% discount	BOGOF	Two tailed paired T-test
Sneakers	6.87 (2.21)	6.15 (2.84)	$t(66) = 2.03$, $p = 0.05$
Elegant shoes	6.07 (2.42)	5.69 (2.64)	$t(66) = 1.25$, $p = 0.22$
Washing powder	6.60 (2.41)	6.93 (2.62)	$t(66) = 1.03$, $p = 0.31$
Fabric softener	6.67 (2.32)	6.96 (2.64)	$t(66) = 0.86$, $p = 0.39$

Table 2. BOGDIF and 50% discount on both products.

Group	Full price	Free	BOGDIF	50% discount on both products	Two-tailed paired T-test
Substitute products	Sneakers	Elegant shoes	5.90 (2.85)	5.07 (2.73)	$t(66) = 2.63$, $p = 0.01$
	Elegant shoes	Sneakers	6.09 (2.85)	5.07 (2.73)	$t(66) = 3.48$, $p = 0.00$
Complementary products	Washing powder	Fabric softener	7.15 (2.50)	6.85 (2.40)	$t(66) = 1.00$, $p = 0.32$
	Fabric softener	Washing powder	7.27 (2.48)	6.85 (2.40)	$t(66) = 1.45$, $p = 0.15$

asked the participants to assume that the prices of the products are the same.

3.2.2. Results

Table 3 compares the average attractiveness index (*STDV*) of a 50% discount on a single product to buying one unit of the product at full price and getting one unit of the same product for free (BOGOF).

As in the first questionnaire, participants in general are indifferent to the two promotions or preferred the option of BOGOF over the option of a 50% discount. This was also true for students of economics who are familiar with economic theory and the advantage of buying a product at a 50% discount without any restriction on how many units must be purchased, in comparison to the restricted BOGOF option. For the second questionnaire we again compared the attractiveness index of the two possibilities: 1) buying one product at full price and getting the other product for free (BOGDIF), and 2) a 50% discount on each product with no restrictions of buying either or both. The results are displayed in **Table 4**.

These results are similar to our findings for the first questionnaire. For complementary products, the attractiveness of a 50% discount on both products (when buying both of them) and BOGDIF are not significantly different, which is consistent with the rational hypothesis. For substitute products, we find that BOGDIF is more attractive than the 50% discount on both products, which is inconsistent with the rational hypothesis.

4. Discussion

In this paper, we compare the 50% restricted discount which requires increased levels of spending (purchase of both goods) to BOGDIF which is buy one get the other product free. We find that the attractiveness of the promotion is influenced by the interrelationship between the products, if they are substitutes or complements. The findings are inconsistent with the rational hypothesis. There is extensive research regarding sales promotions in the economic and marketing literature, but we have not found much discussion on the effect of the substitute and complementary relationship between products as factors that may affect the attractiveness of the promotion.

Why then do we find differences between complementary and substitute products? In general, our claim is that people like gifts, and often they even ignore the gift's estimated market value. We illustrate this with the following examples: 1) Consider the case of a mother who receives a low value gift from her son for her birthday. Presumably, she will not focus on the monetary value of the gift but rather on the "good will" and the attention that it represents. 2) Wedding gifts in most cases are worse than a cash or check of the same monetary value, since with money the couple can buy the same gifts but also have the flexibility to buy other items

Table 3. Attractiveness of 50% discount on each product and BOGOF.

Product	50% discount	BOGOF	*Two tailed paired T-test*
Deodorant	5.14 (2.21)	5.22 (2.32)	$t(64) = 0.31$, p = 0.76
Shaving set	4.48 (2.31)	4.83 (2.40)	$t(64) = 1.57$, p = 0.12
Perfume	4.24 (2.07)	4.61 (2.29)	$t(65) = 2.24$, $p = 0.03$
Make up	4.27 (2.09)	4.61 (2.25)	$t(65) = 2.67$, $p = 0.01$
New Balance Sneakers	5.44 (2.48)	5.47 (2.58)	$t(85) = 0.09$, $p = 0.93$
Nike Sneakers	5.93 (2.45)	5.99 (2.59)	$t(85) = 0.23$, $p = 0.82$

Table 4. BOGDIF and 50% discount on both products.

Group	Full price	Free	BOGDIF	50% discount on both products	*Two tailed paired T-test*
Substitutes products	New Balance sneakers	Nike sneakers	6.42 (2.40)	5.35 (2.59)	$t(85) = 4.10$, $p = 0.00$
	Nike sneakers	New Balance sneakers	6.03 (2.55)	5.35 (2.59)	$t(85) = 2.86$, $p = 0.00$
Complementary products – Male	Deodorant	Shaving set	5.68 (2.48)	5.97 (2.44)	$t(64) = 1.08$, $p = 0.28$
	Shaving set	Deodorant	5.75 (2.43)	5.97 (2.44)	$t(64) = 0.69$, $p = 0.49$
Complementary products – Female	Perfume	Make up	5.12 (2.43)	5.32 (2.61)	$t(65) = 0.87$, $p = 0.39$
	Make up	Perfume	5.24 (2.41)	5.32 (2.61)	$t(65) = 0.37$, $p = 0.71$

that they may prefer more. However, we will find that some couples will take more pleasure in receiving a particular gift from close relatives and will appreciate it more than receiving a cash gift from those same relatives despite the extra flexibility that cash provides. 3) Receiving a low monetary value present from the American President will be appreciated more than receiving a check of the same amount from an anonymous clerk in the President's office.

[11] extended the research on the psychology of "zero" and examined its effect on customer behavior. In a series of experiments, they demonstrated that when people faced a choice between two products, one of which is free, they "overreact" to the free product, as if a zero price meant not only a low cost of buying the product, but also an increased consumer valuation of the product itself. They suggest that options with no downside (no cost) evoke a more positive affective response than options that involve both benefits and costs. [12] claims that, "free! gives us such an emotional charge that we perceive what is being offered as immensely more valuable than it really is" (p.57). He further notes, "Whether it's products or money, we just can't resist the gravitational pull of FREE!" (p.60). This approach contradicts the approach of [10].

Based on the discussion above we derive a possible explanation of our results. Two complementary products are perceived as one product, such that the consumer perceives it as a bundle[3] of products. The consumer perceives the prices of both products as a price of one bundled product. As such the effect of one product free from among the two is negligible since in actual real terms he translates it as a discount on the bundle. Thus the utility in both cases would be the same and consistent with the rational hypothesis.

The literature on bundling discusses the influence of sales promotion when a discount is given to a product within the bundle and determines that the promotion effect depends on which product is discounted [31,32]. However, we suggest another important factor which is the degree of the products' interdependency within the bundle that influences the attractiveness of the sales promotion.

However, for substitute products, receiving a second of the same or a similar product as a gift (BOGDIF) has a positive psychological effect, consistent with the findings of [11]. According to [12], consumers get such an emotional charge from an item being offered free that they perceive it as being much more valuable than it really is. It is possible that this effect offsets the restriction in the BOGOF promotion and as a result the BOGOF is more attractive. This can also explain why we find that

participants were indifferent between the two promotions or preferred the option of one unit of the same product for free (BOGOF) over the option of a 50% discount. This preference is inconsistent with economic theory since buying a product at a 50% discount without any restriction as to how many units must be purchased should dominate the restricted option of BOGOF. The effect of a free item increases the attractiveness of BOGOF and cancels out the advantage of the degrees of freedom of the 50% price discount without any limit on the number of units.

Furthermore, we claim that since the products are substitutes, the subjective value of the purchased product is a good indicator ("witness") for the value of the second product that is given as a gift. As a result, we suggest that the general tendency of people is to over-evaluate the subjective value of a free product, unlike the claim made by [10] that a product that is given away as a gift is undervalued. The above is a good explanation of the finding that in the case of substitute products the utility from BOGDIF is higher than the utility of a 50% discount on each product.

5. Conclusions

Practitioners and marketers are constantly searching for different avenues to promote sales, and thereby achieve higher revenues and profits while utilizing unintended accumulations of inventory, etc. A variety of possible policies can be adopted to achieve these goals, including advertising and price cuts. The rational framework predicts that when considering the best way to cut prices, decision-makers should not consider the relationship between the products. Our findings show that the relationship between the products should also be taken into consideration due to the "GIFT EFFECT" in the case of substitute products.

We suggest that marketers consider the results of our research, when deciding on an appropriate promotion policy and whether the gift item should be a complement or substitute to the main product.

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Appendix 1: Questionnaire

Greetings. We ask that you answer the following questions. All your responses will remain anonymous, and we guarantee that they will be used for research purposes only. Please circle the correct response, or fill in the data requested where applicable.

Personal Details

*Age:_____ *Gender: M/F

Please rank these promotions. Please rank each promotion in a scale of 1 to 10 where 1 is completely unattractive and 10 is highly attractive.

The products are: Sneakers and elegant shoes.

The prices of the Sneakers and the elegant shoes are the same.

1) A 50% discount on Sneakers:
   Rank: 1/2/3/4/5/6/7/8/9/10

2) A 50% discount on elegant shoes:
   Rank: 1/2/3/4/5/6/7/8/9/10

3) One buying a pair of Sneakers at full price gets another pair of Sneakers for free:
   Rank: 1/2/3/4/5/6/7/8/9/10

4) One buying a pair of elegant shoes at full price gets another pair of elegant shoes for free:
   Rank: 1/2/3/4/5/6/7/8/9/10

5) One buying a pair of Sneakers at full price gets a pair of elegant shoes for free:
   Rank: 1/2/3/4/5/6/7/8/9/10

6) One buying a pair of elegant shoes at full price gets a pair of Sneakers for free:
   Rank: 1/2/3/4/5/6/7/8/9/10

7) Someone buying both Sneakers and elegant shoes gets a discount of 50% on each of them.
   Rank: 1/2/3/4/5/6/7/8/9/10