Transaction Utility Theory

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The basic premise of this paper is that a consumer's behavior depends not just on the value of goods and services available relative to their respective prices, but also on the consumer's perception of the quality of the financial terms of the deal. A simple way of incorporating the terms of the transaction is suggested using the features of Kahneman and Tversky's prospect theory. The new concept transaction utility is modeled as depending the difference between the selling price and a reference price. This new concept is used to explain why individuals will sometimes be unwilling to either buy or sell a given product at a given price, why sellers can find it profit maximizing to charge a less than market clearing price, and ways sellers can charge higher prices while minimizing the loss of long run sales.

Consider the following three pairs of questions.

Question 1. You are a big baseball fan. You have always wanted to go to the World Series. Your team has finally won the pennant. The games are on television but you would much rather go in person.

(a) You win a ticket from a local radio station. The retail price for the ticket is $20. Someone offers you $200 for the ticket. Do you sell or go to the game?

(b) You win $200 (after taxes) from a local radio station. A couple weeks later someone offers to sell you a ticket to the game for $200. Do you buy or stay home?

A large majority or subjects say they will go to the game in version (a) but not go in version (b), although the questions are formally identical.

Question 2. You set off to buy a new (radio) [color television set]. At the store where you expect to buy it, you find that the price is ($35) ($650). A clerk informs you that the same item is available at another branch of the same store for only ($25) ($640). The store is a 20-minute drive away and the clerk assures you that they have what you want there. Do you buy here or go to the other store?

A large majority of subjects report that they will drive to the other store to save $10 on the radio but almost no one is willing to make the same trip to save $10 on the TV.

Question 3. You are lying on the beach on a hot day. All you have to drink is ice water. For the last hour you have been thinking about how much you Would enjoy a nice cold bottle of your favorite brand of beer. A companion gets up to go make a phone call and offers to bring back a beer from the only nearby place where beer is sold (a fancy resort hotel) [a small, run-down grocery store]. He says that the beer might be expensive and so asks how much you are willing to pay for the beer. He says that he will buy the beer if it costs as much or less than the price you state. But if it costs more than the price you state he will not buy it. You trust your friend, and there is no possibility of bargaining with the bar tender [store owner]. What price do you tell him?

Not surprisingly, when the two versions of this questionnaire were administered to participants at an executive development program, those receiving the fancy resort hotel version gave significantly higher responses than those receiving the small, run-down grocery version (medians: $2.65 and $1.50). This result occurs in spite of the following features of this example:

1. In both versions the ultimate consumption act is the same - drinking one beer on the beach. The beer is the same in each case.

2. There is no possibility or strategic behavior in stating the reservation price.

3. No "atmosphere" is consumed by the respondent.

4. Care has been taken in oral instructions to make sure that the subjects understand the question and are not answering the related question, "What price do you expect to have to pay?"

The responses to all three of these question pairs are inconsistent with economic theory. This paper presents part of a new economic theory of the consumer in which such responses are not anomalies. Nonetheless most of the traditional results from economic theory (in particular the downward sloping demand curve) remain.
The theoretical model used here is based on Kahneman and Tversky's [1979] prospect theory and the extensions made by this author elsewhere [Thaler 1982]. In particular the prospect theory value function \( v(.) \) is used instead of the conventional utility function. The value function has three important features.

1. It is defined over gains and losses rather than final asset positions.
2. It is concave for gains. but convex for losses. That is, \( v(x) < 0, x > 0 \) and \( v(x) > 0, x < 0 \).
3. It is steeper for losses than for gains. That is, \( v(x) < -v(-x) \). Interested readers should see the papers cited above for details.

The model is an attempt to describe the mental coding of financial transactions. To do this, two theoretical constructs are needed: the value equivalent and the reference price. For the purchase of a particular good \( z \), the value equivalent, denoted \( p \), is defined as the amount of cash the individual would need to make him indifferent between receiving the cash or \( z \) as a gift. The reference price, \( px \), is the amount of money the individual expects to have to pay for \( z \). Alternatively, it can be thought of as an estimate of a fair or just price. The buyer's estimate of the seller's costs will affect \( p^* \). Higher costs increase \( p^* \).

For a given purchase of good \( z \) at price \( p \), two types of utility are postulated. Acquisition utility represents the economic gain or loss from the transaction and is a function of \( (p - p) \). When \( p > p \) the price exceeds the value to the consumer and thus acquisition utility \( v(p - p) \) is negative. If \( p < p \) then acquisition utility is positive. Acquisition utility captures the usual results from the economic theory of the consumer.

The other type of utility associated with a purchase (or sale) is called transaction utility. It represents the pleasure (or displeasure) associated with the financial terms of the deal per se. It is a function of the difference between the selling price and the reference price. If \( p < p^* \) then the purchase is a bargain and the transaction utility is positive; conversely if \( p > p^* \) then the price is a "rip-off" and the transaction utility is negative. Mathematically this is formulated either as \( v(p) - v(p^*) \) except when there is a "small" bargain \( (p < p^*) \) in which case it is coded as \( v(p^*) - v(p) \). [For details on this see Thaler [1982].] Notice that when \( p > p^* \) the transaction disutility is smaller for a given absolute difference \( p-p^* \), the greater is \( p \). That is, the disutility of being charged $10 more than was expected is greater on a $25 purchase than on a $100 purchase. This of course is consistent with the choices exhibited in question 2 above.

The total utility or a purchase is just the sum of the acquisition utility and transaction utility.

**GENERAL IMPLICATIONS**

In the standard economic theory of the consumer, if income effects and transactions costs are ignored, then all behavior can be predicted by the use of just the market price, \( p \), and the reservation price, \( p \). If \( p < p \) then a consumer will buy the good in question and if \( p > p \) he will sell the good if he has any. If \( p = p \) then no transactions will be made. In contrast, the current theory yields two quite different propositions.

**Proposition 1.** a) A good may not be purchased even if \( p < p \). b) A good may be purchased even if \( p > p \).

Both results follow directly from the above model. An individual may not buy a good even if the price is less than the individual's value equivalent if \( p \) is sufficiently larger than \( p^* \). This is the behavior illustrated in the beer on the beach example. No matter how desirable the acquisition of the beer may be, it can be offset by a sufficiently large loss in transaction utility when the price is higher than the reference price. In contrast, for a good enough deal, a purchase can be made even if \( p < 0 \), that is, the item is useless or worse! Everyone has something lying around the house that was bought on sale and is never used.

**Proposition 2.** There can exist a wide range of values for \( p < p \) where the individual will neither buy nor sell the good.

A typical example of the behavior in proposition 2 would be displayed by someone to do this: that an article in his possession has greatly appreciated in value. He is unwilling to sell at the new high price but also would be unwilling to buy another at the same price were his stolen, even if it were fully insured. This behavior is exhibited in the responses to question 1 above. The asymmetry between buying and selling prices was noted in Thaler [1980] and called the endowment effect. The explanation offered was the general underweighting of opportunity costs. If the opportunity to sell an object is viewed as a gain while the purchase of it is viewed as a loss, then the fact that \( v(x) < v(-x) \) yields the behavior just described.

The current theory elaborates on this explanation and suggests why it is so strong. Suppose someone bought a hand-stitched quilt for $300 and now finds that it is worth $5000. Holding on to the quilt will not impose high psychic costs, especially if a serious offer is avoided. ("It is not for sale!") However, replacing the quilt would be psychologically costly if the reference price remained at $300 yielding transaction disutility of \( v(-3000:300) \).

Another syndrome that seems to afflict many individuals is the unwillingness to hire others to do labor around the house—from gardening to painting. They are unwilling to pay someone $50 to do something even though they wouldn't choose to take on an additional such task themselves elsewhere for $100 (even after taxes). Again, the underweighting of opportunity costs is a partial explanation, here accentuated by the likely use of zero as the reference price for hiring the labor.

**SELLOUTS AND SCALPING**

It is well known that some public events are always sold out: The Super Bowl and World Series, Rolling Stones and Vladimir Horowitz concerts, dinner reservations for Saturday evening at 8:00 at most popular restaurant in town, the first week's showing of the latest Star Wars epic. Why are these events underpriced? Why do the sellers knowingly charge a price that creates a large excess demand? Why do they let scalpers keep the profits that could be theirs by simply raising the price? These questions are frequently asked by economists (especially at restaurants with long lines during the American Economic Association meetings), but there has been up to now no satisfactory answer.

The three explanations that have been suggested seem unconvincing.

First, "The lines and general talk of ticket unavailability provide free advertising." While this is no doubt true, it does not seem that any of the above cited events can benefit much from free advertising (except perhaps the first few days of a new movie). The other two explanations...
can be discussed together: “The sellers are altruistic,” and “The sellers are dumb” (they don’t realize they could make more money by raising the price). While there are surely accurate examples of each of these types or sellers, not many economists would want to ascribe these characteristics to sellers generally nor to the National Football League in particular. Rather than explain these phenomena by resorting to seller idiosyncracies, the explanation offered here is based on the underlying utility function of the buyers using the concept of transaction utility.

Consider the plight of the most famous former student of the London School of Economics, Mick Jagger of the Rolling Stones. Suppose that the price or most rock concerts is $12 and that the market clearing price for a Rolling Stones concert is $75. What would happen if the Stones charges $75? First or all, many fans who wouldn’t sell their $12 ticket for $100 would nonetheless refuse to pay $75 because of the large negative transaction utility that would accompany the purchase (as in question 1 above). Not only would they not go to the concert, more importantly they would probably be angry with the Stones. These fans who actually bought the tickets would probably share their feelings. (They would still suffer negative transaction utility even though their value equation For the concert must have been sufficiently high for the total utility to be positive—at least ex ante.) In sum, while the revenue for the concert might be maximized at a price of $75, the long-run revenues to the Rolling Stones are probably maximized at a lower price. In essence, postulating the existence or transaction utility, and the presence or a reference price much, below the market price, creates a long run negative externality to a seller who charges a price higher than the reference price. This notion is testable in the following indirect way. Prices should be lower (excess demand greater) the smaller is the share or the seller’s revenue produced by the specific event in question. Consider three types of events: sports league championships (World Series and Super Bowl), annual events (Indianapolis 500), and one-time only events (championship rights). The theory predicts that since the league championships represent a small portion or total league revenue, prices should be relatively close to the reference price. The Indianapolis 500 represents an intermediate case since the sponsors get most or their revenue from the one big race but do have other year’s races to consider. Many racing fans go to the 500 every year. Highest prices should be found at one time only events such as heavyweight championship rights. While very high prices-at such fights might hurt other boxing events, this externality is of little concern to the particular fighters and promoters involved. Even when a rematch is held, it is rarely in the same city as the original fight. Thus the long-term cost of very high prices seems fairly small in this instance. As can be seen from Table 1, actual prices are in line with the theoretical prediction.

TABLE 1 (/volumes/v10/10231t01.gif)

PRICES FOR RECENT SPORTING EVENTS (/volumes/v10/10231t01.gif)

Even if transaction utility theory can explain why sellers might want some events to be underpriced, inevitably the market does intervene through the actions of the risk bearing entrepreneurs known as scalpers. If scalpers are getting $200 or more for a ticket to the Super Bowl then what sense does it make to have a $40 ticket price? There are two answers to this question. First, buyers don’t blame the organizers for the prices charged by scalpers. Thus there are no long-run repercussions from scalpers’ prices. Second, in many cases the organizers may in fact be sharing the profits with the scalpers, directly or indirectly, in the case of the Super Bowl, a number or tickets are distributed to the owners of each team in the league. Undoubtedly some of these tickets are resold for a profit. Similarly, some tickets to the NCAA basketball tournament are given to the competing teams who then give them to “loyal” alumni. The implicit price on these tickets is probably thousands or dollars.

METHODS OF RAISING PRICE

Consider the problem faced by the owner of the grocery store in the beer on the beach example discussed earlier. He has a local monopoly. His potential customers value the beer he is selling very highly. In other circumstances they would pay $2.50 a bottle, yet if he charged that he would sell little beer and would face a constant stream of expletives from unhappy patrons. What can he do to increase his profits? His goal should be to increase price without increasing the elasticity of demand. Transaction utility theory leads to two kinds of advice he might be given. The first suggestion would be to take steps to increase the perceived p*. This might involve investing in seemingly superfluous luxury or installing a bar. If p* can be increased at a nominal cost then the elasticity of demand will fall and a higher price will increase profits. This advice would not be generated from standard utility theory without references to ambience and so forth. Such factors have been abstracted from in the example.

A second kind or advice derived from the theory is more subtle. The owner should be advised to sell the beer in unusually large containers, perhaps 16 ounce cans instead of the usual 12 ounces. The reason for this is straightforward. Suppose he try to charge 50c a can more than the usual retail price. The theory stipulates that the 50c surcharge will seem smaller (and thus less aversive) when integrated with the larger price rather than with the smaller price. Using an unusual size has the additional effect of obscuring the perceived p*. Consumers probably know the normal price for 12 ounce cans but not for 16 ounce cans. This will tend to attenuate the transaction disutility term.

One example of this strategy in action can be found at the candy counter in most movie theaters. Two features are usually present: high prices and large, unusually sized containers. The Large, unusually sized containers are exactly what the theory predicts. Another example can be found when special events such as the Super Bowl in New Orleans or graduation in Ithaca create an excess demand for hotel rooms. The common practice in such situations is to require a minimum stay. In the case of the Super bowl a three-night minimum is standard. So instead of charging $200 for a $50 room for one night, hotels charge $300 for three nights. This keeps the complaining down (which has long-run benefits) as well as encouraging longer stays with accompanying fringe benefits to the hotel owners.

The National Football League also seems to understand this principle. Most of the tickets to the Super Bowl that are available through normal channels are sold in conjunction with travel tours that include airfare and hotel lodging. This package may serve to both disguise a premium paid for the ticket and to mitigate any resulting loss of transaction utility.

SUGGESTED RETAIL PRICE

The strategy of raising p* can be accomplished in other ways in addition to the provision of superfluous quantity or luxury. One simple expedient is the use of the "suggested retail price," SRP. [The ideas in this paragraph were stimulated by a conversation several years ago with Dan Horsky.] The strategy or announcing a high SRP and then discounting it is an obvious application of the theory and is widely observed. It is most likely to be successful when the SRP serves as a proxy for both the expected price p* and the value equivalent p. The SRP is more likely to be used as a proxy for p* the less frequent is the good purchased (and thus the less likely is the consumer to know about actual price dispersion). The SRP is more likely to be used as a proxy for quality (i.e. p) the greater is the difficulty with which the
consumer can judge quality by himself. Together these analyses suggest that the difference between the SRP and the actual selling price will be greatest for infrequently purchased goods that are difficult to assess in terms of quality. Two examples that seem to fit this description are phonograph cartridges where 50% "discounts" are common, and home furniture which seems to be dominated by almost constant "sales.

Another example is silver flatware. [This example was suggested by Leigh McAlister.] A recent article in business Week (March 29, 1982) reports that "deep discounting-selling merchandise to consumers at 40% to 85% below the manufacturer's 'suggested retail price' has become widespread in the industry." The strategy of high "discounts" was initiated by some sellers and proved so successful that others felt forced to follow. The result has been a discount war.

While it might seem that the dynamics of this phenomenon are explosively unstable, there is an offsetting factor. At some level discounts become so big as to be unbelievable. At this point the SRP probably loses its value as a proxy for \( p \) and \( p^* \). The maximum believable discount probably varies with the merchandise being sold, but generally discounts over 50% would be running the risk of taking the idea too far.

**CONCLUSION**

The relationship between the theory offered here and the examples which started the paper illustrates the context in which the theory should be judged. Transaction utility theory incorporates the behavior illustrated by question 2, that people often react to proportional savings rather than absolute differences. It also offers a possible explanation for the kinds of behavior illustrated in questions 1 and 3.

The marketing applications of the theory lie in two areas. First, observed successful marketing techniques that are puzzling can be understood by taking transaction utility into account. Second, improved marketing concepts can be suggested by analyzing the effects of various pricing and marketing variables on consumer transaction utility. Simply put, the theory can be used to help understand why some practices exist and to suggest new ones.

Of course this theory has not undergone any comprehensive empirical testing. Such testing, though, is most effectively done in actual market settings. I hope this paper will stimulate such tests.

**REFERENCES**

