Satisfaction and Disappointment in Consumer Choices

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Abstract

This article investigates the role emotions play in economic decisions. In a computer based experiment our participants were the consumers of a fictitious service bearing resemblance to that offered by mobile phone operators. In each of 17 rounds a participant had to choose between retaining the current supplier or changing it with a competitor, based on information about expected and actual prices to be paid. We recorded participants' self-assessed satisfaction or disappointment on a psychometric scale. Logit models are used to explain and predict individual choices based on prices, previous decisions, and emotions. Our findings show that prediction of choice is significantly better if information about the participants' emotions is considered. We analyse how disrupted satisfaction treadmills make people feel disappointed at the face of financial discount and mildly satisfied when they have to pay more than expected.

Keywords: consumer choices, emotion, satisfaction, disappointment, hedonic treadmill

1. Introduction

Over the last decades plenty of empirical data have exposed the vulnerability of Homo Economicus as a realistic model for economic decision making. One after another, the tenets of rationality have become problematic, which has led to the creation of more sophisticated postulates and more refined empirical studies. The latter have focused primarily on two areas – quantitative analysis of consumer behaviour databases, and experimenting in laboratory conditions.

Both areas have the same foundation – people's thinking about their own utility, perhaps connected with the economy in general. The individual does not relate prices to production costs, scarcity, and market structures, but simply to ethics: whether a price is fair or not. Depending on the answer, one responds with positively or negatively valenced emotions affecting one's final decision as a consumer or businessman. Gradually, economists begin to acknowledge the existence of causal links between expectations, prices, emotions, and economic choices.

Although 'emotion' is not a term in economics, it has dealt with emotion in various ways. A number of studies have used psychophysiological proxies for it such as heart rate, skin conductance, and blood pressure both in laboratory (Smith and Dickhaut, 2005) and real market experiments (Lo and Repin, 2002). Likert-type scales for self-assessed feelings in economic circumstances are very popular – a 1999 study counted more than 90 of them (Larsen and Frederickson, 1999). These techniques are also the most easily accepted in traditional economic analyses (Frey and Stutzer, 2005; Bosman and Riedl, 2003; Elster, 1998). One idea, perhaps closest to emotional response, has been the concept of consumer price sensitivity (Kim et al., 1995). According to it the purchase motivation is unique for each consumer and depends nonlinearly on the difference between expected and actual prices of a product. This insight has been included in complex marketing models with demographic and personality attributes, some used even in multi-agent computer simulations (Zhang and Zhang, 2007). Finally, neuroeconomics is beginning to discover how brain regions and systems interact when a person thinks about economic decisions (Camerer et al., 2005), and is already offering psychophysiological interpretations to established theories of decision making (Trepel et al., 2005; Knutson and Peterson, 2005).

It is not yet clear how exactly the emotions interfere with economic decisions. One research direction is to study the instances of inconsistent behaviour in experiments with repeated choices (see a review by Rieskamp et al., 2006). A mechanism possibly contributing to the choice variation there is the hedonic or satisfaction treadmill (Kahneman, 1999). This is the adaptation to a positive or negative trend in a process causing diminished emotional response, eventually ending in indifference. It is natural then that repeated choices are made with evolving moods and need not be the same, either for participants in experiments or for consumers in markets. A number of interesting phenomena can be observed in such studies.

This paper presents a laboratory experiment about consumer decision making. It is computer based and investigates the links between (1) economic expectations, monetary outcomes, and the disappointment or satisfaction they provoke, and (2) the emotional responses and decisions to retain or abandon a supplier of a fictitious service. The experiment was conducted in May 2007 and involved 129 students of economics from Sofia University. Its content bore a slight resemblance to the Bulgarian market of mobile phone services where two leading providers offered indistinguishable quality and prices at the time of the study. However, similarities to other markets in other countries could have been found as well.

In the experiment a participant received a service from one of two suppliers. In each round the current supplier announced an advertised price which served as orientation about what actual price could be expected. The latter was announced on the screen a few seconds later and was always different from the advertised one. The participant had to assess his or her own disappointment or satisfaction in a Likert scale. Then he or she had to decide if the supplier should be retained for the next round, or should be abandoned in favour of the other supplier. The change did not bear any costs. The game was played for 17 rounds. All choices were hypothetical in the sense that no real money was involved.

Our main hypothesis was that in a sequence of such decisions the difference between advertised and actual prices would impact the participant's emotions substantially. Further, both price difference and emotional condition would be key factors for the choice of next supplier. It could also be expected that developments in the preceding rounds along with the current one might influence the decisions. To investigate these issues, we designed four

experimental treatments. In two of them the actual prices varied above and below the advertised prices, and in the other two they varied only above or only below the advertised prices. The latter two cases created sequences of events that could lead to 'mini' satisfaction treadmills. For example, having observed only situations with actual price below the advertised price led a participant to expect a 'discount' also in the current round. Provided such a discount was offered but judged to be too small, it could cause disappointment rather than satisfaction. This might encourage a participant to change the supplier, but also might not. The symmetric situation is interesting for the same reason. A person accustomed to being asked to pay more at the end of each round might be pleasantly surprised if in a particular round his or her 'loss' is just negligible. This might cause a mild satisfaction and a wish to continue with the current supplier. Thus the number of reactions not conforming to the 'loss–disappointment' and 'discount–satisfaction' patterns might increase in the experimental conditions with satisfaction treadmills.

In spite of the experimental character of this study, it taps on the real market experiences of our participants. In the following sections we describe the experiment in detail, present our findings, and conclude by showing the implications of our experiment.

2. Experiment

2.1 Experimental Design

Testing our hypothesis required that our experimental design possessed certain features. First, it had to contain sufficient variability not only to allow generality of conclusions, but also to provide enough opportunities for the participants to create expectations about price movements. Second, there had to be treatments with favourable and unfavourable developments from a customer point of view. Third, a session could not last too long, yet it had to contain changes in a trend and allow the emotional response to be recorded. Finally, we had to measure the emotions reliably and timely. To meet all these requirements we used a computer based experiment. Each participant attended only one treatment of 17 rounds. The participants were randomly assigned to the treatments.

Here Figure 1.

In each round the supplier chosen by the participant at the end of the preceding round advertises a price p_a (Figure 1). The actual (or final) price p_f is shown to the participant in a few seconds, and is always different from p_a. A few weeks before the experiment we asked a different sample of 40 students to state three typical monthly bills each, and we used that information to adapt our price levels to the average student bill. In all treatments p_a was 40 plus or minus 5 Bulgarian leva, and 1 lev is 0.5 euros.

Here Figure 2.

Each person finds oneself in one of four experimental treatments (Figure 2). In treatment A the price differences vary slightly, unlike D, where they fluctuate substantially. The other two treatments are homogeneous in the sense that in all rounds only discounts are offered (B), or more money is asked for (C). As these cases bear some resemblance to real life circumstances, we call them 'Saturated', 'Favourable', 'Hostile', and 'Fluctuating' markets. We achieved a good balance among the number of participants in each treatment, which ranged from 28 people in treatment D to 36 in treatment C.

One feature of our design is that the prices and price differences shown on the screen are predetermined and do not depend on the participant's decisions. In other words, should he or she choose for example to change supplier A with supplier B, in the next round he or she would receive exactly the same offer (Figure 1) as if supplier A had been retained. With this experimental design each participant generates a sequence of unique ordering of both suppliers. Such a randomization with respect to the combinations of suppliers and price differences allows to test if a previous decision to opt for a change has an impact on the next decision. This proves to be a question of relevance as far as consumer behaviour is concerned.

2.2 Assessing Satisfaction and Disappointment

Since we sought to quantify the link between price differences and emotional reactions provoked in each round, we needed a quick and convenient way to measure the latter. As already stated, self-reporting is experimentally practical due to its unique advantages over

other possible measurement procedures (Larsen and Fredrickson, 1999). We adopted that approach in our study. We needed a suitable psychometric scale for the Bulgarian language as our 129 participants were native Bulgarian speakers, except two, who were fluent in Bulgarian but had Turkish as mother tongue. In this effort Encho Gerganov who had conducted a number of psycholinguistic studies of the Bulgarian language helped us by developing a psychometric scale for our study (see Figure 1). It is interval and can be used in regression analysis. At its ends it has two exactly opposite adjectives in Bulgarian. Also its nine points contain such adverb-adjective compounds that make the segments between points equidistant in line with Cliff's (1959) multiplicative rule. Note that this may not necessarily be the case for the English translation in Figure 1, but it is so for the original (Gerganov, 2007). The idea that the segments should be considered of equal length by the respondents is reinforced by the whole numbers ranging from –4 to +4 below the scale. Finally, an instruction on the computer screen immediately above the scale stresses that the participants should indicate their emotional response "due to this particular outcome". In this way people's reactions were differentiated round for round.

2.3 Procedure

The experiment was carried out in a computer laboratory with 15 workplaces. An instruction (see the appendix) was read aloud to the participants and they were given the opportunity to ask if clarifications were needed. Then they started up the software application on their own. No communication in the room was allowed except for questions to the experimenter.

The first round started always with supplier A while in the next rounds the choice was up to the participants. They were not informed about the total number of choices in order to avoid strategies affected by awareness of an approaching end. Typically all 17 rounds took about 5 to 10 minutes to complete. Each participant had all the time needed to assess his or her emotion, and then to decide on the next supplier. No time limit was given in the software for the two decisions. We placed the 'No' button indicating the decision not to change the supplier below the disappointment part of the scale, and the 'Yes' button below the satisfaction part (Figure 1). Thus we avoided that a mere convenience in navigating the mouse between the areas of disappointment and abandoning could cause additional correlation between the answers to these two questions.

3. Results and Discussion

3.1 Factors for Supplier Choice

Our first question was what affected consumer decision to abandon or retain the current supplier for the next round. Potentially quite a number of variables could be significant: prices p_a, p_f, and their difference in the current and previous rounds, as well as the participants' choices in the immediately preceding or even previous rounds. Because the dependent variable is binary (1 for abandoning a supplier and 0 for retaining it) we used logistic regression.

Each participant's records from the first 10 rounds were taken for calibration sub-sample, that is, all logit models were calibrated on these 1290 observations. Because in the first round the supplier was predetermined, the actual number of observations reduced to 1161. The remaining 7 rounds formed the validation sub-sample of 903 observations. We used backward regression starting with the complete set of potential factors and excluded the insignificant ones from various subsets, one variable at a time.

First we were interested in a more traditional economic view with no emotion self-assessments. The end result was the 'Model without Emotion' in Table 1. What it shows was expected: the last decision about who should be the supplier and the current price difference are significant. An indication of the amount of unexplained variance is the larger intercept b_0 compared to the other factors.

Here Table 1.

Next we introduced the disappointment and satisfaction (DS) variable for the current and some previous rounds, and did another backward regression. The end result was the 'Model with Emotion' in Table 1. There we show one intermediate model to illustrate the idea that presumably highly influential variables were in fact insignificant. Having specified the two models using data from the first 10 rounds, we tested them with the remaining seven. A number of measures were available to do so, including direct counting of successful

predictions, McFadden's pseudo R^2, rank correlations etc. For models of only two or three coefficients and 903 observations as test sample, direct counting was quite adequate.

Here Table 2.

Table 2 shows how successful the two logit models were with predicting all choices in the calibration and validation sub-samples. It is interesting that both did better with the unknown data in the last seven rounds than with the first ten. Our explanation is that a slight learning effect has occurred – the participants have adjusted themselves to the experiment in the course of rounds and decisions.[1]

Back to Table 2, we observe that the DS-containing 'Model with Emotion' performs better, with prediction success rate of 0.8549 on the entire sample of 129 people. The difference on validation data between the latter figure and the 'Model without Emotion's figure 0.8283 is approaching significance: $F(1, 1804) = 2.3968$, $p = 0.1218$. Each model shows similar prediction levels in all four experimental conditions. The 'Model with Emotion' retains a lead of 2 – 5 % in all of them.

3.2 Affective Reactions

Since emotion was a significant factor in our experiment and by extension, in real life, we asked what influenced it. Table 3 shows the statistically best linear regression model for DS. Its main result confirms other research findings i.e. that emotion is a relatively slow process. In this case it depended on the last three price differences as well as on DS values in the two preceding rounds. It is remarkable that the dummy variable 'Previous Change of Supplier' was statistically insignificant here. While, as we saw in Section 3.1, the decision was influenced by emotion, the current emotion did not depend on the last action towards the supplier.

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[1] An alternative division with only five rounds for calibration and twelve for validation yielded similar results. There the 'Model without Emotion' predicted correctly 74% of the cases in both sub-samples, while the 'Model with Emotion' achieved 79% on the calibration data and 78% on the validation data.

Here Tables 3 and 4.

We tested that model with the calibration and validation sub-samples. In Table 4 correlations between the actual data and the predictions from the model in Table 3 are presented. The essential result is that the emotion (DS) was predicted a lot worse in treatment B 'Favourable', and to some degree in C 'Hostile', than in the other two treatments. What could be the reason? One source of instability in people's choices generally is their unfolding emotion in the decision process. Looking back at Figure 2 we observe that the discount offered in the seventh round of treatment B 'Favourable' is a lot smaller than in all preceding rounds. Moreover, it represents an abrupt change in what has been an upward trend. Naturally many people could feel disappointed, and our participants literally said so by choosing negative marks in the DS scale. Rounds 9, 13 and 17 are similar. Treatment C 'Hostile', in contrast, offers opportunities for small satisfaction when more money is asked for. In rounds 5, 6, and especially 9 and 13 one has to pay only slightly more than expected, unlike some preceding rounds.

Here Table 5.

Certainly, the 'loss–disappointment' and 'discount–satisfaction' patterns were dominant, however a number of cases with the opposite emotional responses could also be expected. Table 5 shows the number of cases of disappointment at the face of discount, and satisfaction when more money was asked for. Apparently markets with only favourable events like B or mostly unfavourable events like C create small hedonic treadmills. When disrupted, they give rise to emotional reactions opposite to the common patterns. It should be noted that markets A and D also cause these effects to a lesser degree.

4. Conclusions

This experiment showed that in their choices consumers are influenced by their own positive or negative emotion alongside the economic expectation. A logit model accounting for emotions predicted the experimental consumer behaviour significantly better than a more

traditional model without psychological variables. A quantitative analysis of the self-assessed satisfaction or disappointment due to price information showed that they influence not only the current decision situation, but also impact the next two or three such decisions, at least when they are taken soon enough.

We could also cast some light on a different aspect of the emotion – its manifestation in satisfaction treadmills, albeit in their very simple form. When we provoked treadmill destructions we observed that people more often than usual reacted contrary to the dominant patterns of (1) disappointment after a financial loss and (2) satisfaction after receiving a discount.

Our finding that not only the current but also previous emotions affect the decision to continue or not with a supplier, together with the finding that a supplier change creates no emotional consequences for the person, has interesting implications. If consumers in real markets tend to emotionally remember for a certain time how they have been treated, and at the same time abandon their suppliers at no emotional cost, then this is a challenge for these suppliers. They would need to develop better understanding of the satisfaction dynamics in the minds of their consumers.

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Appendix

Experiment Instructions Read Orally To the Participants (Translation from Bulgarian)

Dear Participants,

In this experiment you will assume in the role of consumers who take a sequence of decisions. Besides taking those decisions, you will be asked to report how intense are your emotions related to a specific market situation. Imagine that you are customers of a service offered by two companies: Company A and Company B. In each time period (round in the game) you will have to choose to be served by one of the companies. This situation resembles to some degree a real market in which two mobile operators seek to become your supplier.

The experiment lasts for about 20 rounds. You have the opportunity to abandon or retain your current supplier at the end of each round. You "pay" no costs when you change the supplier. The experimental conditions are preset so that you always start the first round as client of Company A. After that all of your decisions as customers are up to you.

In the beginning of each round your supplier offers you a price for their service called Advertised Price. They retain the right to offer you a Final Price at the end of the round, which may be different from the Advertised one. You will have to "pay" the Final Price. It may be higher or lower than the Advertised. All prices are in Bulgarian leva.

After you learn the Final Price we ask you to report your satisfaction or disappointment by the manner in which the supplier has treated you in this round. You will be able to express your emotion in a scale varying from 'Extremely disappointed' to 'Extremely satisfied'. Then you must choose a supplier for the next round. You will be having enough time to take your decisions. Do you have any questions? …

If there are no further questions, please start the experiment by clicking on the icon CF on your desktop. Since this experiment is anonymous, you should fill the 'Participant No' with a random 10-digit combination of your choosing, and we suggest that you alternate 2-3 letters with 2-3 digits. Please select 'ReadTestData1.txt' in the field 'Test No'. Then start working. Please do not communicate with each other and if you have questions turn to us.

Figure Captions

Figure 1. Experimental screen of the software application. The downward arrow indicates how events unfold in time by appearing on the screen one after the other during one round. Once a No or Yes is chosen, a new round starts with a blank screen. Immediately the new supplier is shown.

Supplier in this round is company **A**

Advertised price: **38**

Final price: **40**

Please indicate your satisfaction or disappointment due to this particular outcome according to the following scale:

Extremely disappointed	Very disappointed	Disappointed	More disappointed than satisfied	As much satisfied as disappointed	More satisfied than disappointed	Satisfied	Very satisfied	Extremely satisfied
-4	-3	-2	-1	0	1	2	3	4

Would you like to change your supplier?

Treatment A:
'Saturated' Market
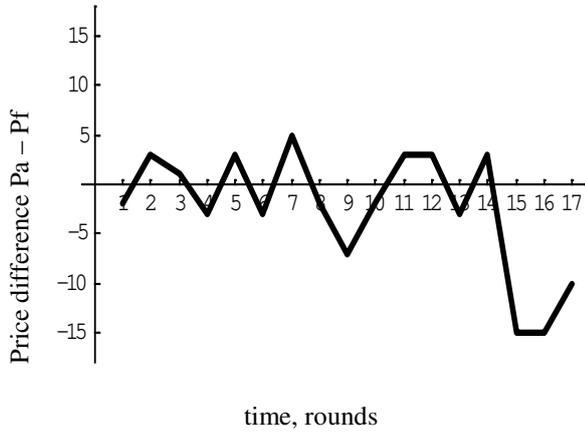
Treatment B:
'Favourable' Market
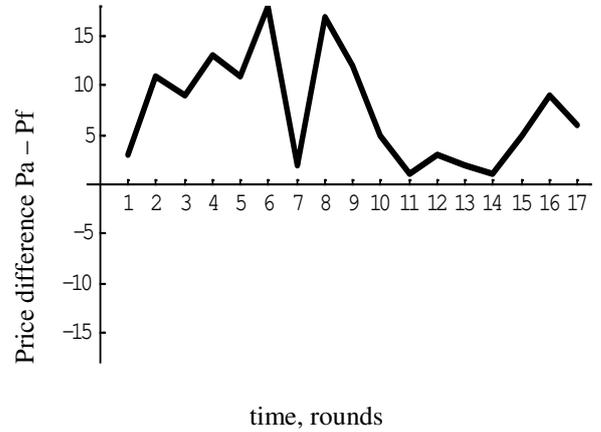
Treatment C:
'Hostile' Market
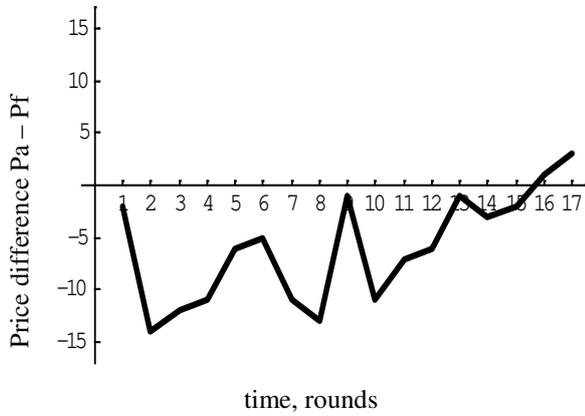
Treatment D:
'Fluctuating' Market
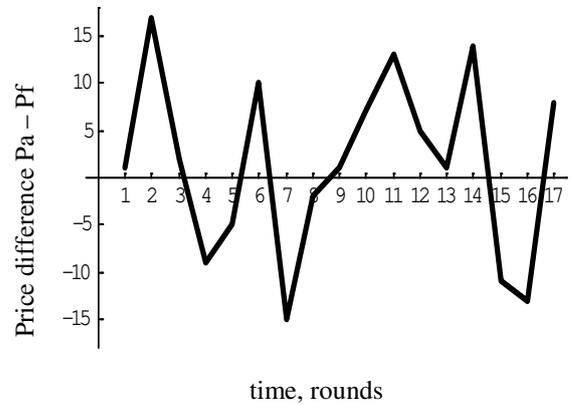
Table 1. Logit Models with and without emotion for prediction of consumer choice based on first 10 rounds (n = 1290). An intermediate variant contains insignificant variables. All coefficients are given with t-statistics in parentheses.

Independent Variable	Model without Emotion	Intermediate Model	Model with Emotion
b_0	-1.22 (-11.40)	-1.64 (-11.60)	-1.57 (-13.22)
Price Difference ($p_a - p_f$)	-0.13 (-12.09)	-0.006 (-0.55)	
Previous Change of Supplier	0.27 (1.97)	-0.12 (0.82)	
Disappointment or Satisfaction		-0.76 (-12.77)	-0.76 (-14.70)

Table 2. Rates of successful prediction of supplier choice by 'Model without Emotion' and 'Model with Emotion'. With 's' we denote the number of participants and with 'n' the number of observations.

Model	Condition	All (s = 129)	Treatment A 'Saturated' (s = 31)	Treatment B 'Favourable' (s = 34)	Treatment C 'Hostile' (s = 36)	Treatment D 'Fluctuating' (s = 28)
Model without Emotion	10 calibration rounds	0.76 (n = 1161)	0.69	0.85	0.70	0.79
	7 validation rounds	0.8283 (n = 903)	0.81	0.82	0.86	0.81
Model with Emotion	10 calibration rounds	0.80 (n = 1290)	0.77	0.89	0.73	0.82
	7 validation rounds	0.8549 (n = 903)	0.83	0.87	0.88	0.85

Table 3. Linear regression model for prediction of disappointment or satisfaction (DS) in the current round. ΔP is the price difference. Subscripts 't' denote current and preceding rounds.

	Estimate	T-Statistic
Intercept	-0.18	-3.69
ΔP_t	0.24	34.40
ΔP_{t-1}	-0.08	-8.96
ΔP_{t-2}	-0.09	-10.09
DS_{t-1}	0.28	9.84
DS_{t-2}	0.26	8.99
$R^2 = 0.6088$; $R^2_{Adj} = 0.6069$		

Table 4. Correlations between actual levels of disappointment or satisfaction, and levels predicted by the model from Table 3.

Condition	All (s = 129)	Treatment A 'Saturated' (s = 31)	Treatment B 'Favourable' (s = 34)	Treatment C 'Hostile' (s = 36)	Treatment D 'Fluctuating' (s = 28)
10 calibration rounds	0.72 (n = 1032)	0.67	0.70	0.71	0.82
7 validation rounds	0.71 (n = 903)	0.78	0.53	0.68	0.87

Table 5. Instances of 'paradoxical' emotion: People are disappointed when discount is offered, or satisfied when they have to pay more than expected.

	Treatment A 'Saturated'	Treatment B 'Favourable'	Treatment C 'Hostile'	Treatment D 'Fluctuating'
Total number of choices	527	578	612	476
Paradoxical choices	36	102	159	46
Paradoxical in total	6.83%	17.65%	25.98%	9.66%