

Accepted Manuscript

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Riccardo Ferretti, Francesca Pancotto, Enrico Rubaltelli

PII: S2214-8043(17)30088-5
DOI: [10.1016/j.socec.2017.08.002](https://doi.org/10.1016/j.socec.2017.08.002)
Reference: JBEE 297



To appear in: *Journal of Behavioral and Experimental Economics*

Received date: 16 May 2016
Revised date: 6 May 2017
Accepted date: 29 August 2017

Please cite this article as: Riccardo Ferretti, Francesca Pancotto, Enrico Rubaltelli, Persuasion in Financial Advertising: Behavioral or Rational?, *Journal of Behavioral and Experimental Economics* (2017), doi: [10.1016/j.socec.2017.08.002](https://doi.org/10.1016/j.socec.2017.08.002)

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Highlights

- We test the behavioral versus the rational model of advertising in financial markets.
- Granger causality between the number of ads and the stock is used to test whether advertisements precede or follow the stock index.
- We separate risky and non-risky products advertising and find that risky products ads follow the stock index while non-risky products are unrelated to the stock index.
- The behavioral model of advertising applies for risky products ads while the rational model applies for non risky products ads: the two models are complementary rather than alternative.
- A dual process of reasoning is at the base of investors' behaviors, anticipated by advertising companies.

Persuasion in Financial Advertising: Behavioral or Rational?

Riccardo Ferretti^a, Francesca Pancotto^{b,*}, Enrico Rubaltelli^c

^a *University of Modena and Reggio Emilia and Cefin*

^b *University of Modena and Reggio Emilia*

^c *University of Padova and Cefin*

Abstract

In this paper we test whether a behavioral or a rational model is used in financial advertising. We run Granger-causality tests separately for risky and non-risky products advertising, finding that the behavioral model of advertising is supported when the ads of risky financial products and services are considered, while the rational model is true for the non-risky products ads. We ascribe this result to the dual process of reasoning operating at the level of the investor: when an investor evaluates the decision to buy risky financial products and services, he/she activates the automatic, rapid decision making process. Advertising companies anticipate this trait and implement an advertising strategy that responds to market trends, confirming the use of a behavioral model. Consistently we find that the stock index Granger-causes risky financial products ads. When non-risky financial products ads are considered, a slow and sequential process, operates, compatibly with a rational decision making process: advertising companies are aware of this and implement a strategy unrelated to the stock index. Coherently, no significant relationship is found between the stock index and non-risky financial products and services ads.

Keywords: advertising, stock market, dual process, financial institutions, risk

JEL-Classification: G02, G20, M37, O51

1. Introduction

Advertising is meant to convince people to make choices which favor the advertiser. But how do advertisers choose the persuasion model that will prove successful? In the rational/traditional model of the advertiser's behavior (Stigler, 1961, 1987), the advertising message conveys objective information that is useful to judge the product/service. Consumers use this information to update his/her beliefs about

*Corresponding Author: francesca.pancotto@unimore.it. Department of Communication and Economics. Viale Allegrì 9, 21414, Reggio Emilia, Italy.

the product and decide his/her buying behavior. The rational consumer should interpret in a negative way the lack of disclosure of relevant information (Akerlof, 1970; Grossman et al., 1980).

On the opposite side, the behavioral model suggests that persuasion exerts leverage on the prevailing beliefs of consumers (Petty and Cacioppo, 1986). Prevailing beliefs can be inaccurate, but it does not matter: *'In the behavioral model, far from trying to convince the audience that it holds erroneous beliefs, the persuader attempts to benefit from such beliefs'* (Mullainathan and Shleifer, 2005). The advertising message contains what consumers want to hear in that precise moment in time: The content can be misleading or incomplete without fear of negative reactions from the receivers which are not supposed to be perfectly rational, but with limited rationality, and consequently being prone to be influenced by emotions. Mullainathan and Shleifer (2005) find support of the behavioral model of persuasion by looking at financial ads published on two popular American magazines (Business Week and Money) during the years of the internet bubble, from 1994-2003. They study the correlation between the content of advertising of mutual funds and the stock market index, considering mutual funds as a risky financial asset that should appeal to investors in periods of optimistic beliefs. They find that the response of advertisers is related to the dynamics of stock returns as predicted by the behavioral model, finding a positive correlation between the growth of the stock market and the share of mutual funds ads promoting growth funds. More in general, Mullainathan et al. (2008) test the behavioral versus the rational model of persuasion in a theoretical framework, exploring in particular the case of mutual funds advertising. They use the number and content of mutual funds advertising and find that advertisers provide data about past returns only when the stock market grows: returns are associated with the idea of *grabbing an opportunity*, which in down markets cannot be associated with any state of mind that leads to buying more financial products. Even companies with positive past returns, decide to exclude this information from their advertising in negative stock market periods (Mullainathan et al., 2008).

Similarly to Mullainathan et al. (2008) and Mullainathan and Shleifer (2005), we propose a test between the two models of advertising, the behavioral and the traditional model. Differently from Mullainathan et al. (2008), we find that the two models are not competing but complementary at least when considering decision making in financial markets. We believe that when faced with the decision to buy products and services provided by financial intermediaries, investors activate the dual process accounts of reasoning (Evans, 2003; Kahneman, 2011). Depending on the type of product or service that they are considering, they activate one or the other system. When investors evaluate the decision to buy risky financial products and services, they activate the automatic, rapid decision making process, heritage of

animal evolution and generating behavioral responses to decisions (Kahneman, 2011).¹ In this case, the behavioral model of advertising is active, as suggested in Mullainathan et al. (2008). The second process of reasoning is instead activated when non-risky financial products and services are considered: This mental process requires slow and sequential reasoning which is compatible with a rational decision making process.

Our hypothesis is that the dual system of beliefs operating at the level of the investor is anticipated by the advertisers. In a dual system of beliefs, subjects switch their decision making process according to the type of activity they are engaged in. Advertisers are aware of this and use it as a strategic tool to sell their products. When faced with Risky Financial products/services ads (RFP&S-Ads from now on), investors are fast thinkers that respond with investment strategies based on beliefs confirmation, framing and so on. On the contrary, when Non-Risky Financial products/services ads (NRFP&S-Ads from now on) are concerned, investors activate a slow thinking process that allow them to strategize better and be rational. Since advertisers are aware that this dual mechanism is at work when considering this type of investments, they plan their advertising strategy coherently: increase the number of RFP&S-Ads when the market performance is positive and vice versa, while keeping a NRFP&S-Ads strategy which is independent from the market dynamics.

To test our hypothesis we run a set of Granger causality tests which allow us to verify the timing between the performance of the stock market and advertising of financial products and services, RFP&S-Ads and NRFP&S-Ads separately. Using the number of advertisements appeared in the most important Italian financial newspaper and magazine from January 2006 to the end of March 2015, we find support for our hypothesis, namely that the stock market precedes - Granger causes - investment in risky financial products and services ads, while there is no relations between the stock market and non-risky financial products and services ads.

Our results are coherent with the theoretical framework of Mullainathan et al. (2008) which explores both the incentives of advertisers and investors in being rational versus behavioral. Similarly to Mullainathan and Shleifer (2005) we implicitly assume that advertisers are rational and are consequently investing efficiently on the type of advertising message that exactly matches the current preferences of the investors.

¹The capabilities of System 1 include innate skills that we share with other animals' page 21, *Thinking Fast and Slow*, Kahneman (2011).

The remainder of the paper is the following: Section 1.1 reviews the literature on financial advertising, Section 2 describes the database used in the paper and the methodology implemented for the empirical analysis; Section 3 discusses results and Section 4 concludes.

1.1. Literature review on financial advertising

Contributions covering financial products and services ads in turn mostly deals with the influence of advertising on mutual fund flows. The main conclusion of this literature is that mutual fund advertising works, at least for heavy advertisers. Most contributions study the effects of expenses on mutual fund flows: Sirri and Tufano (1998) consider total fees, Khorana and Servaes (2012) and Barber et al. (2005) marketing costs through 12b-1 fees, Gallaher et al. (2006) advertising expenditures across mutual fund families instead of individual funds. Sirri and Tufano (1998) and Gallaher et al. (2006) find that mutual fund flows have a piecewise linear relation with a fund's (or fund family's) past performance: i.e. the past performance exerts a positive effect on mutual fund flows for top-performer funds only. The advertising effect is independent of the past-performance effect and short-lived Gallaher et al. (2006).

Very few studies analyze directly the number or the content of financial advertisements. Among them, Jain and Wu (2000), examining the mutual fund ads published in Barron's or Money magazine, find that the advertised funds have higher net inflows compared to funds without ads, after controlling for prior performance, lag flows, and size. Cronqvist (2006) shows that fund ads affect investors' portfolio choices, although providing little information about fund's characteristics relevant for rational investors; Jordan and Kaas (2002) find that adding emotional appeals to mutual fund advertisement stimuli also lowers the perceptions of risk.

As summarized by Cronqvist (2006), the efficacy of advertising can have three theoretical explanations: a) advertising as direct information that reduce search costs; b) advertising as a signal of quality; c) advertising as a mean of attention grabbing. As far as mutual fund ads are concerned, the evidence does not support the first two hypotheses based on rational arguments: usually ads do not provide rational information (Cronqvist, 2006; Wu, 2009; Palmiter and Taha, 2011) and there is no superior performance in the post-advertisement period (Jain and Wu, 2000; Cronqvist, 2006). Barber et al. (2005) argue that investors buy funds that attract their attention through exceptional performance, marketing, or advertising; this behavioural hypothesis is coherent with the findings that the positive effect of advertising on mutual fund flows is restricted to heavy advertisers and not persistent (Gallaher et al., 2006). The reported literature has a potential weakness being limited to a single financial product: mutual funds.

To overcome this bias in testing the behavioral versus the rational model of advertising, we collect advertisements covering different types of financial products and services, which we collect under the broad categories of risky and non risky financial products and services advertisements. We describe in detail our database, in the next paragraph.

2. Methods

2.1. Data description

We group advertisements by banks, insurance and financial companies in two categories. We call Risky Financial Products and Services Advertisements (RFP&S-Ads), those advertising concerning investment products such as mutual funds, pension funds, index or unit linked insurance policies, corporate bonds, ETF, certificates, covered warrants or online trading platforms. In all these cases, the suggested investment decision will expose the ads receiver to some risk. We call Non-Risky Financial Products and Services Advertisements (NRFP&S-Ads) all the residual ads of financial products, such as checking accounts, bank deposits, payment services, loans, casualty insurance policies, brand ads. Following these definitions, we created two time series, RFP&S-Ads and NRFP&S-Ads, hand collecting the number of ads obtained from two sources: the Italian financial newspaper ‘Il Sole 24 Ore’ and the weekly magazine ‘Plus 24’, both belonging to the same publisher, from the 2nd of January 2006 to the 14th of March 2015.

From ‘Il Sole 24 Ore’ we collect daily ads.² For ‘Plus 24’ we collect one observation per week. The total number of advertisements observed in the period is 15165, out of which 5249 are from the weekly magazine (‘Plus 24’, 34.6%) and 9916 from the newspaper (‘Il Sole 24 Ore’, 65.4%). To merge these two sources of information, we calculated the weekly cumulative sum of all advertisements observed in the week, normalizing for the presence of both daily and weekly data and removing possible intra-week seasonality. The weekly cumulative figure is also needed to solve the problem of missing values caused by holidays in which the newspaper is not printed. We obtain 480 observations for the latter variable. The properties of the two distributions of ads are reported in Table 1, where we show the distribution per journal as well as between RFP&S-Ads and NRFP&S-Ads. Milan Comit Global Price Index is used to proxy for the performance of the stock market. In Figure 1 RFP&S-Ads, NRFP&S-Ads and the stock index are plotted against time.

²We excluded from the database Sundays and Mondays because these two editions do not contain stock market quotes.

Table 1: RFP&S-Ads, NRFP&S-Ads, and Stock Index.

	Il Sole 24 ore	Plus 24	RFPS-Ads	NRFPS-Ads
N. observations	480	480	480	480
Minimum	4	0	0	0
Maximum	58	23	34	42
Mean	20.66	10.94	14	16.75
Median	20	11	14	16
Sum	9916	5249	7125	8040
Stdev	8.9	4.73	6	8

Notes: Basic statistics on weekly cumulative data collected for RFPS-Advertising and NRFPS-Advertising, from 'Il Sole 24 Ore' and 'Plus 24'. Observations are from January 2006 to March 2015.



Figure 1: RFP&S-Ads, NRFP&S Ads and Milan Comit index

2.2. Research question

Our research question states that there must be a different behavioral pattern that advertising industry expect from the general public of investors. One behavioral pattern is related to periods when the stock market is growing: in this case, investors are propense to invest and to take on more risk. Consequently, advertising directed towards financial products that are more risky in nature increase in these periods, provided that the public is more prone to interpret this message as a profit opportunity. Conversely, financial products and services which are not risky, should not be advertised differently if the market is bull or bear.

In order to test our research question, we propose two hypothesis:

HP 1. *The stock market index Granger-causes RFP&S-Ads. RFP&S-Ads does not Granger-cause the stock market index.*

This hypothesis provides a test of the behavioral model of advertising, compatibly with what found by Mullainathan and Shleifer (2005), but with the advantage of using a Granger methodology which provides information on the timing of the relationship between the two variables rather than the simple association provided by the analysis of correlations. With Hp. 1 we test whether the stock market dynamics influences the model of persuasion of financial advertisers, inducing them to an increase or decrease of RFP&S-Ads as a result of stock market ups and downs. The second part of the hypothesis controls that only one direction of causation is true. The second hypothesis tested is the following:

HP 2. *The stock market index is not Granger-related to NRFP&S-Ads.*

Hp. 2 intends to verify whether advertisers expect a different type of reasoning from investors involved in the decision to buy NRFP&S-Ads. The advertising industry expects the rational model of advertising to be active when investors consider to buy NRFP&S, coherently with a traditional model of advertiser's behavior (Stigler, 1987). Therefore, advertisers do not plan a different advertising strategy depending on the stock market performance - as opposed to what happen for RFP&S-Ads - and then we should not see any relevant relationship existing between the stock market and the decision to advertise NRFP&S. The joint verification of Hp. 1 and Hp. 2, would provide evidence on our statement that advertising in financial markets is characterized by a mixed strategy, justified by the presence of a dual process of reasoning (Kahneman, 2011) in the decision process of investors, anticipated by advertising companies.

2.3. Estimation procedure

The Granger Causality test (Granger, 1980) that we implement is the Toda and Yamamoto (1995) version which avoids the bias of invalid asymptotic critical values present when series are non-stationary or co-integrated. The procedure requires estimating an augmented VAR irrespective of whether the time series is integrated or co-integrated.³ To do that, it is necessary to determine the optimal lag length for the estimated VAR, performed using standard information criteria. Provided that information criteria tests are highly sensitive to the number of lags used in the VAR estimation, and considering that the choice of a number of lags which is less or more than the true lag length can cause biased estimates, we perform a battery of tests which include a number of lags from 2 to 16: the time span hypothesized for the timing of financial advertising responds to what is custom in reality, according to information obtained from operators of the field. Considering the fact that we use cumulative weekly data, a lag of 16 would correspond approximately to 4 months, a reasonable backward horizon to consider the effect of stock market dynamics on the advertising strategy of the financial industry. Then we run a Modified Wald test for restrictions on the parameters of the VAR(p) model for a reduced number of lags (15 in this case) as the procedure requires.⁴ The augmented VAR that we estimated is the following:

$$Y_t = a_0 + a_1 Y_{t-1} + \dots + a_p Y_{t-p} + b_1 X_{t-1} + \dots + b_p X_{t-p} + u_t, \quad (1)$$

$$X_t = c_0 + c_1 Y_{t-1} + \dots + c_p Y_{t-p} + d_1 X_{t-1} + \dots + d_p X_{t-p} + v_t. \quad (2)$$

where X is the stock market index and Y is the number of advertisements. The Granger-causality test that we perform for the first equation is the following,

$$H_0 : b_1 = b_2 = \dots = b_p = 0 \quad \text{against} \quad H_A : \text{Not } H_0. \quad (3)$$

H_0 tests whether the coefficients in the VAR model related to the variable X (all lags) do not have a significant effect on the behavior of the Y variable, i.e. that *X does not Granger-cause Y*. Rejection of this hypothesis implies that *there is* Granger Causality and therefore the X variable Granger-causes the

³Notwithstanding that, the procedure requires to verify whether integration is present in the time series considered in the analysis. We verified this and found that the series are I(1). Results are available upon request to the authors.

⁴The R code used to perform the test, is available upon request to the authors.

Y variable. In our case this would imply that the stock index Granger-causes ads. Consistently, testing:

$$H_0 : d_1 = d_2 = \dots = d_p = 0 \quad \text{against} \quad H_A : \text{Not } H_0, \quad (4)$$

is a test that *Y does not Granger-cause X*. Again, a rejection of the null implies there is Granger causality, Y Granger-causes the X variable, i.e. that the ads Granger-cause the stock index. We first estimate Eq. 1 and Eq. 2 and run the Wald test for Granger causality for RFP&S-Ads, which corresponds to testing Hp. 1. Then we estimate Eq. 1 and Eq. 2 for NRFP&S, and this correspond to testing Hp. 2.

3. Results

In Table 2, column (7) we see that the Wald test for rejecting the hypothesis that the stock market index does not Granger cause Advertising, is always significant (except lag 2) for a VAR model with lags from 2 to 16 included. Provided that the hypothesis that the index does not Granger cause ads is rejected, this means that the index Granger causes the ads for RFP&S-Ads. The results of the test of the second part of Hp. 1 are reported in Table 2, column (4): the Wald test for rejecting the hypothesis that the ads do not Granger-cause the index, is not significant at any lag, verifying the hypothesis that RFP&S-Ads do not Granger-cause the stock index. Consequently, we can state the following Result 1, confirming the validity of Hp 1:

Result 1. *The stock market index anticipates (Granger-causes) the investment in RFP&S-Ads. The reverse is not true.*

In Table 3, column (7) we see that the Wald test for rejecting the hypothesis that the stock market index does not Granger cause Advertising, is significant only for three lags. Provided that the hypothesis that the index does not Granger cause ads is almost always accepted, we conclude that the index does not Granger causes the ads for NRFP&S-Ads. The results of the test of the second part of Hp. 2 are reported in Table 3, column (4): the Wald test for rejecting the hypothesis that the ads do not Granger-cause the index, is not significant at any lag, verifying the hypothesis that RFP&S-Ads do not Granger-cause the stock index. Consequently, we can state the following Result 2, confirming the validity of Hp 2:

Result 2. *The stock market index is not Granger-related to RFP&S-Ads.*

Table 2: Granger Causality test between RFP&S-Ads and Milan Comit index

lag	H0: Adv. does not Granger-cause Index			H0: Index does not Granger-cause adv.		
	chi2	df	P	chi2	df	P
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2	1.76	1.00	0.18	0.05	1.00	0.82
3	1.88	2.00	0.39	6.50	2.00	0.04**
4	2.67	3.00	0.45	9.33	3.00	0.03**
5	2.65	4.00	0.62	10.43	4.00	0.03**
6	2.48	5.00	0.78	10.69	5.00	0.06*
7	2.66	6.00	0.85	10.85	6.00	0.09*
8	3.24	7.00	0.86	15.53	7.00	0.03**
9	5.81	8.00	0.67	22.10	8.00	0.00***
10	9.41	9.00	0.40	22.74	9.00	0.01***
11	10.09	10.00	0.43	22.68	10.00	0.01***
12	10.61	11.00	0.48	23.65	11.00	0.01***
13	12.59	12.00	0.40	25.66	12.00	0.01***
14	15.32	13.00	0.29	24.65	13.00	0.03**
15	14.99	14.00	0.38	26.00	14.00	0.03**
16	14.60	15.00	0.48	26.52	15.00	0.03**

Notes: Wald test for Granger Causality Test according to Toda and Yamamoto (1995) procedure between weekly cumulative RFP&S-Ads and Milan Comit index. VAR estimation with constant and trend included. Tests results reported for lags from 2 to 16. Sample size n=480. Symbols ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 3: Granger Causality test between NRFP&S-Ads and Milan Comit index

lag	H0: Adv. does not Granger-cause Index			H0: Index does not Granger-cause adv.		
	chi2	df	P	chi2	df	P
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2	0.63	1.00	0.43	2.35	1.00	0.12
3	1.78	2.00	0.41	3.25	2.00	0.20
4	3.32	3.00	0.34	4.41	3.00	0.22
5	6.40	4.00	0.17	8.89	4.00	0.06*
6	5.89	5.00	0.32	11.39	5.00	0.04**
7	6.23	6.00	0.40	11.01	6.00	0.09*
8	5.77	7.00	0.57	12.02	7.00	0.10
9	6.50	8.00	0.59	12.35	8.00	0.14
10	6.36	9.00	0.70	12.44	9.00	0.19
11	7.25	10.00	0.70	12.97	10.00	0.23
12	9.41	11.00	0.58	14.87	11.00	0.19
13	9.46	12.00	0.66	15.64	12.00	0.21
14	9.75	13.00	0.71	15.61	13.00	0.27
15	12.52	14.00	0.56	15.67	14.00	0.33
16	13.90	15.00	0.53	17.14	15.00	0.31

Notes: Wald test for Granger Causality Test according to Toda and Yamamoto (1995) procedure between weekly cumulative NRFP&S-Ads and Milan Comit index. VAR estimation with constant and trend included. Tests results reported for lags from 2 to 16. Sample size n=480. Symbols ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

4. Discussion

The evidence presented in Section 3, provides support to our theory that advertising in financial markets is both behavioral and rational, depending on the types of products advertised. First, Result 1 tells us that the behavioral model of advertising is true when RFP&S-Ads is concerned. When evaluating risky products and services, investors activate the behavioral model of decision making. Whether by the use of framing, co-categorizing or other behavioral rules, investors follow the *mood of the market* in their decision to buy risky financial products and services. Advertisers anticipate these emotional beliefs increasing the amount of advertising in RFP&S-Ads, which confirms what found by Mullainathan et al. (2008) and Mullainathan and Shleifer (2005). Result 2 tells us that when NRFP&S-Ads are concerned, a different decision process is expected from investors: when deciding about financial products considered non-risky, they are expected to behave rationally. This is correctly interpreted by the advertising industry which implement an advertising strategy which is independent from what happens in the stock market.

Psychological research supports our theory of complementary strategies for advertisement of risky and non-risky financial products/services. Studies on dual-process theories show that people use different thinking systems to attend to information (Epstein, 1994; Evans, 2003; Kahneman, 2003): System 1 is fast, intuitive, based on associations, and does not require much cognitive effort, whereas System 2 is slow, analytical, based on rules, and requires substantial cognitive resources (in terms of attention, memory, and self-control, (Kahneman, 2003)). People's decision-making, and in particular System 1, is often influenced by feelings (Slovic et al., 2004; Loewenstein et al., 2001). Consistent with the affect heuristic approach, feelings are quick, general reaction that determine whether a product is good or bad and have developed to help individuals make fast approach/avoidance decisions. Feelings are mostly processed through System 1 but can influence the slower deliberative thinking of System 2 when people try to analyze a decision more carefully (Slovic et al., 2004). When feelings are involved, because people are unsure about what to do and anticipate the regret of making a mistake, their ability to process information deliberately and analyze the situation carefully are often reduced (Kahneman, 2011). This is exactly what is supposed to happen when people are assessing risky financial services/products that involve the possibility of making serious mistakes or incurring in a loss. Negative feelings enter the decision-making process and may steer it away from a particular product (Slovic et al., 2004; Greifeneder et al., 2010). As a consequence, advertisement for these products should counteract intuitive, affective reactions to overcome anticipated negative feelings by the investors. A way to make these product or services more

attractive and induce people to update their beliefs is by taking advantage of a general positive sentiment of the market. During bull markets, investors tend to be a little more overconfident (Statman et al., 2006), although they may also under-react to recent positive news (Barberis et al., 1998). Therefore, under these conditions, the behavioral approach should be more effective because it can make a risky financial product more attractive by inducing positive feelings and overcoming the last doubts that hold the investors back from purchasing them. Differently, when people are choosing non-risky financial products/services, they are unlikely to experience intense negative affective reactions since the risk of incurring a negative outcome is substantially lower. When a decision is not too affectively loaded, people are able to better focus their attention and process information deliberatively (Kahneman, 2011). Therefore, the advertisement does not have to counteract fear or anticipated regret as much as provide objective information to help people understand which product suits their needs best.

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