

# Target Marketing under Information Asymmetry: An Experimental Analysis on Risk Propensities of Buyers\*

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#### **Abstract**

**Purpose:** This study attempts to provide empirical evidences on the effect of buyers' risk propensities on market outcomes under information asymmetry. We have analyzed experimental data to understand how each individual buyer's purchase decision is associated with her risk propensity in order to suggest effective target marketing strategies under information asymmetry. **Research design, data and methodology:** We have examined 362 subjects through an experimental method with detailed purchase scenarios to estimate buyers' purchase decisions under information asymmetry along with the measurement of each subject's risk propensity through their lottery choices focusing on the level of acceptable risk. **Results:** Our experimental analysis has shown that the buyers who prefer to purchase products with revealed negative aspects are actually more risk-averse, and the buyers who choose products with concealed negative aspects are more risk-taking. However, we have not found predicted purchase patterns within the buyer groups of similar risk propensities. **Conclusions:** This study provides meaningful empirical evidences on the theoretical literature about how risk propensities of buyers affect seller's decision to reveal negative information. The finding from this study is thus expected to suggest how to carefully design targeted marketing communications under information asymmetry based on each individual customer's risk propensity.

Keywords: Information Asymmetry, Information Disclosure, Lemon Market, Perceived Risk, Risk Propensity

JEL Classification Code: D81, D83, M31

#### 1. Introduction

As consumer products become more diverse and complicated, buyers get more confused about their purchase and spend more time in finding appropriate product information. In particular, if important product information is related with search or credence attributes, it is usually very hard or even impossible for consumers to get the correct product information. This type of information asymmetry may provide sellers with the advantage of manipulating product information and hiding negative aspects to achieve

maximum profit, and we can observe many real-life examples of sellers' dishonesty.

Although the majority of related studies have generally shown that disclosing negative information hurts sellers' profits, many marketing and economics studies have also shown that honesty can increase profits and pay off for sellers through two-sided effects of advertising (Crowley & Hoyer 1994; Eisend 2006, 2007; Settle & Golden 1974; Steinhart et al., 2013) and enhanced trust in relationships (Andaleeb 1995; Busch & Wilson 1976; Crosby et al., 1990; Dwyer & Oh 1987; Ganesan 1994; John & Reve 1982; Morgan & Hunt 1994; Scheer & Stern 1992; Schurr &

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Ozannffe 1985; Stern et al., 1973). In particular, some recent studies have focused on perceived risk of purchase and theoretically shown that buyers' risk averseness might encourage sellers to voluntarily disclose negative aspects of their products (Huh 2021; Shapiro & Huh 2021).

This study attempts to empirically examine the theoretical findings of the last group of studies on how riskaverse buyers may encourage honest disclosure of negative information. Would a risk-averse customer prefer the product which shares negative information and decreases perceived risk? This is actually a very important question, since any empirical evidences regarding how perceived risk affects customer decision under information asymmetry can offer meaningful explanation about what happens in the market under information asymmetry and provide possible solutions for certain types of market failures. This is also an interesting question for marketing managers since it can suggest effective and customized marketing communication strategies when dealing with negative aspects of products in a market with customers of various levels of risk propensities.

Therefore, we try to empirically investigate how risk propensities of customers actually affect their purchase decisions under information asymmetry, in an experimental setting with purchase scenarios. For this purpose, we measure each customer's risk attitude and examine her purchase decisions under varying amounts of product information (as revealed by the seller) and varying levels of information search cost. More specifically, the goal of this study is to verify the following theoretical predictions: i) the customer who is more (less) sensitive to firm's honest disclosure is more risk-averse (risk-taking), and ii) the riskaverse (risk-taking) customer has a stronger (weaker) preference toward the products of the honest firm. The result of this study is anticipated to suggest how the strategy of sharing negative product information can be customized to match each customer's unique risk attitude.

## 2. Procedure

This study first observes customer's purchase decisions using purchase scenarios in an experimental setting. The method of purchase scenarios have been adopted in many previous marketing studies including Locander and Hermann (1979), Jackson et al. (1984), Mowen et al. (1985), Puto et al. (1985), Murray (1991), and White et al. (2003). The method of using purchase scenarios have many advantages since it can manipulate variables and conditions that cannot be regulated in a real market environment (Murray 1991), avoid any possible bias associated with the choice of an actual seller (Duhan et al., 1997), and test all participants with a standardized stimulus (White et al.,

2003). While observing customers' purchase decisions, each individual customer's risk propensity has also been examined through her lottery choices explained below.

## 2.1. Experiments

In the experiments, each subject was asked to decide which product she would like to purchase among provided options, or if she wants to postpone the purchase. Used-car market is selected as the product of choice since the context matches the purpose of this study very well; the market for used cars has a clear information asymmetry between buyers and sellers, and the products can show varying levels of perceived risk.

In order to maintain the distribution of risk propensities of subjects under different scenarios and also parallel actual market settings, a 2 × 2 within-subjects design has been employed. In the control condition, two products were suggested as purchase choice set while both of them conceal negative aspects of their products. On the other hand, in the treatment condition, one of the two products voluntarily disclosed negative aspects and perceived risk levels were manipulated; the seller shares negative information either without any proof (high perceived risk) or with a proof (low perceived risk). Moreover, the levels of information search cost were also manipulated in the treatment conditions through two different scenarios; the central issue was accident history in the first scenario and a noise from the car in the second scenario. The difference in these two scenarios controls the amount of information search cost as past accident history can be considered as a credence attribute having extremely high information search cost (customers will never figure it out themselves) while a noise from the car can be considered as an experience attribute having moderate level of information search cost (customers can check the sound of the engine).

Therefore, two levels of perceive risk and two levels of information search cost construct  $2 \times 2$  within-subjects design and actual purchase options presented to subjects were as follows. The first purchase scenario was related with accident history. In the control condition, both sellers claimed that there had been no past accident with their cars. In the first treatment condition, however, one seller revealed that there actually had been one accident in the past without showing any proof, while, in the second treatment condition, one seller revealed the same negative information (past accident) but showed an official history report. The second purchase scenario presented the same control and treatment conditions but the only difference was that the negative information was related with noise of cars.

After presenting these purchase options, we have first observed whether each subject chooses to purchase the honest product/the dishonest product, or postpone the

purchase. According to the theoretical findings of related literature mentioned above, buyers may show different purchase decisions with respect to seller's honesty according to their diverse risk propensities. In other words, risk-averse customers would prefer the product revealing negative aspects, while risk-taking customers would prefer the product concealing negative aspects (and claiming flawlessness). We thus have also examined each subject's risk propensity to understand whether and how risk propensities affect actual purchase decisions. Since the theoretical studies have predicted that the customer with high risk-aversion would appreciate the negative product information more than the customer with low risk-aversion (and vice versa), it is expected that the customer who chooses to purchase the product which has shared negative information has higher risk-aversion (and vice versa). Therefore, if the observed risk propensities of the customers who purchase honest product are shown to be more riskaverse than the customers who do not purchase honest product, the theoretical explanations about the effect of risk propensities can be verified. Another way to verify the prediction is to look within the customer group according to their risk propensities. In other words, we can observe whether the customers with high risk-averseness would actually prefer honest products to dishonest products. Therefore, our experiments with suggested purchase scenarios along with the measurement of risk propensities are supposed to provide sufficient empirical evidences regarding these theoretical predictions about the effects of customers' risk propensities in a market with information

asymmetry.

#### 2.2. Measuring Risk Propensities

In order to precisely estimate theoretical predictions, we have developed a method to measure risk propensities based on the definition of perceived risk in the marketing literature. Perceived risk of purchase has been generally defined in marketing as the function of the probability and the size of loss from purchase (Dowling 1986; Markin 1974; Peter & Ryan 1976; Peter & Tarpey 1975; Ross 1975; Srinivasan & Ratchford 1991; Taylor 1974). Therefore, risk should be measured in the context of loss to correspond with this related literature. More specifically, we have adopted the concept of the acceptable (tolerable) level of perceived risk, which is a very important concept in understanding perceived risk of customers (Markin, 1974; Pras & Summers, 1978; Schaninger, 1976; Urbany et al., 1989). The acceptable level of risk has been defined by Dowling and Staelin (1994) as the amount of perceived risk above which each subject would like more information before purchase. The literature has also found that customers usually attempt to reduce the probability of loss to acceptable levels (Cox 1967; Ross 1975; Schaninger 1976; Urbany et al., 1989), since the size of loss is not controllable in most cases, and that the risk rarely affects consumer behavior once it falls into the acceptable range (Conchar et al., 2004; Markin, 1974). In other words, a customer only cares about the probability of loss when it is higher than her acceptable level, and usually does not try to reduce the probability of loss when the risk is within the acceptable level.

Chance of Paying the \$500 Risk Propensity Lottery Price Risk Propensity Processing Fee Level Lottery 1 \$40 10% Extremely Risk-Averse 1 Lottery 2 \$30 30% Fairly Risk-Averse 2 Lottery 3 50% Moderate 3 \$20 4 Lottery 4 \$10 70% Fairly Risk-Taking Lottery 5 \$0 90% Extremely Risk-Taking 5

Table 1: Probability-of-Loss Options

Therefore, our method attempted to directly assess the level of "acceptable risk" through observing each subject's attitude toward the probability of loss. After making purchase decisions, each subject was asked to indicate her preference among lottery choices given to her. The lottery options were designed to measure how much each individual subject was willing to pay to decrease the

probability of loss. As a subject would agree to pay as much as to reduce probability of loss to her acceptable level, the level of acceptable risk could be measured by the maximum amount of money a subject is willing to pay for this. More specifically, we told the subject that one should pay the processing fee of \$500 to close the used-car contract depicted in the purchase scenario, and that the dealer

additionally provided several lottery options which could reduce the chance of paying the processing fee. The subject could decrease the chance of processing fee payment by purchasing one of the lotteries where the chance of paying \$500 decreased by 20% for every \$10 she spent, as shown in Table 1. For example, the subject with very high acceptable risk would not pay any amount and accept the 90% chance of paying the \$500 fee, while another subject with very low acceptable risk would want to purchase \$40 lottery option to decrease the chance of paying the \$500 fee to 10%. Therefore, observing these lottery decisions is expected to tell us about each individual customer's acceptable level of risk.

In total, 362 undergraduate students at a major public university have participated in the experiments.

## 3. Analysis

As is explained above, this study basically attempts to confirm the theoretical predictions regarding the effect of risk propensity of individual customer on her purchase decisions. Therefore, we establish the following hypotheses to understand whether and how risk propensities affect actual purchase decisions.

#### 3.1. Hypotheses

Theoretical studies have claimed that the customers who purchase the products which have shared negative information are expected to show higher risk-aversion, compared to the customers who do not purchase those products. This theoretical explanation regarding the effect of individual customer's risk propensity can be validated if the customers who purchase the products are shown to be more risk-averse than the customers who do not purchase the products. We can also verify the prediction by examining the purchase decisions of the customers with same levels of risk propensities. In other words, we can observe whether the customers with high risk-averseness would actually prefer honest products to dishonest products. Therefore, we can establish the following hypotheses regarding risk propensities of customers:

H1: The customers who purchase the products that have shared negative information are more risk-averse than the customers who purchase the products that have not shared negative information.

**H2**: A risk-averse (risk-taking) customer has a stronger preference toward the products that have shared (concealed) negative information.

## 3.2. Classification of Subjects

For the purpose of our study, we have grouped subjects using two different criteria, one for testing *H1* and the other for testing *H2*.

The first grouping is based on each individual customer's purchasing decision, in order to check *H1*. If risk propensities of customers affect their purchase decisions under information asymmetry, we can expect that the customers with different purchase decisions show different risk propensities. In other words, the customers who purchase the products which have shared negative information are expected to show higher-risk aversion compared to the customers who do not purchase the products, and vice versa. Therefore, we first group the subjects according to their purchase decisions and then measure the risk propensities among those groups, which can be explained by Figure 1.



Figure 1: Classification of Customers by Purchase Decisions

Figure 1 shows the demand in the market with information asymmetry. The horizontal lines indicate levels of risk and the risk level gets higher as it goes farther to the right. Each customer is characterized by her own level of acceptable risk and distributed throughout the horizontal line. More risk-averse customers are positioned to the left of less risk-averse customers. Among the customers in this market, we have picked three groups according to their purchase decisions. Group A consists of the people who choose to purchase the dishonest product which does not share negative information. Group B purchases the honest product which shares negative information. Group C never purchases any products, regardless of how much negative information is revealed. According to the theoretical studies, the main reason that has made the customers in Group A, B, and C make different purchase decisions is because their risk propensities differ with each other. This theoretical explanation regarding the effect of individual customer's risk propensity can be validated if the customers who purchase honest products are shown to be more risk-averse than the customers who purchase the dishonest products. Therefore, we expect the subjects in Group C to become more risk-averse than Group A and B, and the subjects in Group A to become more risk-taking than Group B and C.

For the second grouping to check *H2*, we have assigned the subjects into three groups according to their risk

propensities (risk-averse, moderate, and risk-taking). We then try to verify the prediction from theoretical model by comparing the purchase decisions of the customers between the risk-averse and risk-taking group. In other words, we test whether purchase decisions of the risk-averse customers are significantly different from the decisions of risk-taking customers. For example, if the ratio of customers in Group 1 (risk-averse) who do purchase honest products is significantly higher than the ratio of those customers in Group 3 (risk-taking), then the theoretical predictions can be verified.

#### 4. Results

Now we observe the results of the experiments and test the suggested hypotheses through first and second groupings. *First Grouping (H1)*.—The first grouping result is

shown in Table 2. According to the classification criteria, the customers in Group A always purchase the dishonest products, customers in Group B make purchase only when negative information is shared, and customers in Group C never purchase regardless of whether negative information is shared or not. Table 2 shows the size of the groups in two different cases according to the information search cost.

First, let's look at the first case when the information search cost is high (which is related with accident history). The numbers of subjects in Group A, B, and C are 48, 161, and 35, respectively. Table 2 also shows the result of measurement of risk propensities of each group. We have measured the risk propensities of subjects and rated them using Risk Propensity Level ranging from 1 (extremely riskaverse) to 5 (extremely risk-taking) as shown in Table 1. When the information search cost is high, the mean Risk Propensity Levels for Group A, B, and C are 1.63, 1.52 and 1.29, respectively.

Table 2: Classification of Subjects by Purchase Decisions

	High Info Cost (Accident History)			Low Info Cost (Engine Noise)		
	Group A	Group B	Group C	Group A	Group B	Group C
Observed Mean Risk Propensity Level	1.63	1.52	1.29	1.35	1.55	1.12
Group Size	48	161	35	48	135	57
Mean Difference	Significant**			Not Significant		

<sup>\*</sup> p<0.1.

We can check various things from this result. First, the directions of the differences in the Risk Propensity Levels are consistent with what is predicted in the theoretical model. Since the customers in Group A purchase the dishonest products, they are supposed to show the most risk-taking attitude. Moreover, the customers in Group C are supposed to show the most risk-averse attitude as they do not purchase any products regardless of whether the perceived risk is reduced or not. The observed mean Risk Propensity Levels show the predicted pattern as Group A is shown to be more risk-taking than Group B and C, and the mean Risk Propensity Level of Group C is lower than that of Group A and B. Therefore, observed risk propensities of the three customer groups can confirm the theoretical predictions. Moreover, we have also found that the mean differences in Risk Propensity Levels among these three groups are statistically significant. Therefore, these results strongly

support the H1 when information search cost is high. Second, we now look at the second case when the information search cost is low (which is related with noise of the car). The numbers of subjects in Group A, B, and C are 48, 135, and 57, respectively. Table 2 also shows the result of measurement of risk propensities of each group. When the information search cost is low, the mean Risk Propensity Levels for Group A, B, and C are 1.35, 1.55, and 1.12, respectively. Again, we can check various things from this result. First, the directions of the difference in the Risk Propensity Levels are not consistent with what is predicted in the theoretical model. Since the mean Risk Propensity Level of Group A is lower than that of Group B, observed risk propensities do not confirm the theoretical predictions. We have also found that the mean differences among these three groups are not statistically significant. Therefore, the theoretical predictions cannot be supported when

<sup>\*\*</sup> p<0.05.

<sup>\*\*\*</sup> p<0.01.

information search cost is low. Again, this result is somewhat expected since the effect of reduced risk has been predicted to become stronger with higher information search cost and weaker with lower information search cost.

Second Grouping (H2).—We now look at the second classification of subjects according to their risk propensity levels as shown in Table 3.

Group 1 consists of the customers who chose the first and second lotteries in Table 1 and are believed to be risk-averse while Group 3 consists of the customers who chose the fourth and fifth lotteries and are believed to be risk-taking. The numbers of subjects in Group 1, 2, and 3, are 306, 38, and 18, respectively, and we compare the choices of risk-averse customers and risk-taking customers. Table 4

shows the purchase decisions of the two groups in both high and low information search cost cases.

Table 3: Classification of Subjects by Risk Propensities

	Group 1	Group 2	Group 3
	(Risk-Averse)	(Moderate)	(Risk-Taking)
Group Size	306	38	18

Table 4: Purchase Decisions according to Risk Propensities

	High Info Search Cost (Accident History)			Low Info Search Cost (Engine Noise)			
	Product with Negative Info	Product without Negative Info	No Purchase	Product with Negative Info	Product without Negative Info	No Purchase	
Risk-Averse Customers	70.9%	14.7%	14.4%	62.7%	21.2%	16.0%	
Risk-Taking Customers	77.8%	22.2%	0%	83.3%	0%	16.7%	
Difference	Not Significant			Not Significant			

<sup>\*</sup> p<0.1.

First, let's look at the part of Table 4 showing the results under high information search cost. When one of the firm shares negative information (and the perceived risk is low), the risk-averse customers are supposed to purchase more of the honest products than the risk-taking customers. According to the results in Table 4, these predictions are not supported. While 70.9% of the risk-averse customers purchased honest products, 77.8% of the risk-taking customers made the same decision. However, the differences in these choices are not statistically significant. Therefore, when the information search cost is high, the patterns of customer choices do not seem to support *H2*.

Second, let's look at the part showing results under low information search cost. When negative information is shared (and the perceived risk is low), the risk-averse customers are supposed to purchase more of the honest products than the risk-taking customers. According to the results in Table 4, these predictions are not supported. 62.7% of the risk-averse customers purchased honest products while 83.3% of the risk-taking customers made the same decision, when negative information is shared. Just like the case of high information search cost, the differences in these

choices are not statistically significant when the information search cost is low. Therefore, when the information search cost is low, the patterns of customer choices do not seem to support *H2* either.

In summary, the results of the analysis of risk propensities of individual subjects seem to strongly support *H1* when information search cost is high. Therefore, we can see that customers who prefer honest products are actually more risk-averse than the other customers, and vice versa. However, observed risk propensities of customers do not support *H2*, and we cannot confirm that risk-averse customers actually have stronger preferences on honest products than risk-taking customers.

#### 5. Discussions

While many studies in marketing and economics have produced interesting and important findings about how seller's information disclosure is accepted in the market, they have not sufficiently examined whether the effect of information disclosure is related with risk propensities of

<sup>\*\*</sup> p<0.05.

<sup>\*\*\*</sup> p<0.01.

customers. Therefore, this study has tried to understand this question by empirically observing how risk propensities of customers actually affect their purchase decisions under information asymmetry. The experimental results of this study have generally shown the predicted patterns and provided some evidences that the change in demand caused by information disclosure of a firm is actually originated from the diverse risk profiles of customers. More specifically, our observation has shown a strong support for the first hypothesis that the customers who prefer honest products are actually more risk-averse. However, our findings have not supported the second hypothesis and we cannot thus strongly claim that risk-averse customers actually prefer honest products.

Therefore, the findings from this study are somewhat complicated since it shows that the customers who prefer honest products are actually more risk-averse, but the riskaverse customers do not seem to prefer honest products more than risk-taking customers do. One of the reasons of this complicated result is that the number of observations might not be big enough and therefore the result has only shown the predicted pattern without enough statistical power. This issue might be solved by a bigger-scale field experiments and more observations of market transactions. Also, we should improve the validity of the measurement of the risk propensities of customers. Although measurement method has been carefully designed to match the definition of perceived risk in marketing literature, the operational validity of the measure should be re-considered. One possible issue can be found from the way lottery price was originally set. As shown in Table 1, the lottery price was set at the minimum level so that the actual acceptable levels of risk can be observed. In other words, the lottery price was set in such a way that customer can pay only \$10 for each incremental expected saving of \$100 (i.e., decrease the chance of paying \$500 processing fee by 20%). Although the definition of acceptable level of risk is that a customer would not be interested in paying even a single dollar once the risk is lower than her acceptable level, this assumption might have been too strict and the lottery price might have been too low to precisely observe the actual acceptable risk levels of the subjects. It might be the reason why the current method classifies a lot of customers to be risk-averse, which makes it harder to observe more realistic distribution of risk propensities among this customer group. Re-designing the payoff structure and options of the measure might allow more validity and feasibility.

Even with these issues, we believe that the findings of this study can contribute to the related literature since they have verified some of the theoretical explanations about the effect of seller's information disclosure that the main cause of the observed effect from sharing negative information is diverse risk profiles of the buying population. This result thus shows that the theoretical findings from related studies are actually feasible in explaining real market situations. Therefore, these results can also contribute to both public policy and marketing strategies. For example, policy makers may suggest practical solutions for market failures from information asymmetry through carefully assessing risk propensities of the consumer groups of diverse product and service markets. For marketing managers, our findings can provide important implications regarding how to target each individual customer with different marketing communication strategies based on each customer's level of risk propensity. Although it might be a daunting task to effectively measure each individual customer's risk propensity, the idea of customized and personalized information disclosure might offer a new prospect for effective marketing strategies.

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