Consumer Misperceptions, Product Liability Law and Product Safety*

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Abstract : This paper considered the impact of changing the product liability rule from consumer to producer liability on product safety under asymmetric information. In particular, it has been attempted to remove several constraints on antecedent studies. The main results of the study are as follows: under the misperception of the risk on a product, consumers may underestimate the probability of product failure. In this case, the accident rate can be lowered under the producer's liability rule. However, even under the asymmetric information, a consumer's estimation on the probability may be converged with the expected risk level, which could be called the 'rational expectation.' In this situation the probability of product failure can be lowered under the strict liability with contributory negligence. Additionally, it is possible to reduce the probability of product failure when a legal rule that imposes liability on cheapest cost avoider is admitted.

Key Words : Product liability rule, product safety, consumer misperception, risk

I. Introduction

Since early times, consumers have been injured and their property damaged caused by various accidents related to defective products. Death or injury by fuel tank explosions, property damage by electric rice pot fires, finger severances from electronic blenders are good examples. The victim of such product-related accidents can sue the tortious offender for damages under the product liability law.

The product liability law, which originated in Europe and America in the mid 19th century, shifted liability to the offender only if the offender was found to be 'negligent.' Thereafter, the strict liability rule has been formed by two separate means: the gradual increase in the standard of manufacturer's precautions (tort law) and breach of warranty (contract law), and after the mid 1960s, strict liability laws were set in place. Today, many countries have their own form of strict liability law embedded in their legal system.

In Korea, the dominant product liability rule has been negligence according to the provision of Civil Code 750. However, after the new Product Liability Law, which was enacted in December 1999 and went into operation in July 2002, strict liability has been recognized as one of the main liability rules in relation to negligence.

Meanwhile, one of the theoretical issues of product liability was the effectiveness of the rules; in particular,

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there has been a variety of theoretical and empirical approaches on whether the strict liability rule actually prevented or reduced consumer damages triggered by risky products. The topic has mainly been studied by legal scholars because the product liability essentially belongs to the category of tort law, but the necessity of theoretical approaches on the economic aspect of the subject has induced many economists to make profound study of the *law and economics*.

There are some celebrated predecessors which analyzed the liability rules under economic conditions. The analyses of McKean (1970) and Calabresi (1970) were foundations for succeeding studies of Brown (1973), Oi (1973), Goldberg (1974), and Higgins (1978), which were analyzed with more standardized models. After the 1980s, some outstanding researches including Shavell (1984), Polinski (1983), Landes and Posner (1985), and Priest (1988) deal with liability rules under various circumstances.

There are many research papers on the economic impact of liability rules; However there are only a small number of studies available on the impact of the rules to product safety. Only a few papers that theoretically analyze a practical assumption of asymmetric information between consumer and producer have been published. Spence (1977), Polinsky and Rogerson (1983), Landes and Posner (1985), Marino (1988) serve as good examples[1]. However, those papers have some constraints in assumptions of their models. For instance, Spence (1977) demonstrated the effectiveness of product liability rules as an efficient policy measure when the consumer misperception of risk triggered the product failure in the market, but the paper could not set models showing explicitly the impact of both parties' precaution on probability of product-related accidents.

Polinsky and Rogerson (1983) studied the market performance of liability rules when producers have market power under the assumption of consumer's underestimation of risky products. One of the findings of the paper was that the optimal levels of probability of accidents and output of products could be achieved under the strict liability when the market was competitive. However, the paper couldn't explicitly show the impact of consumer's precaution to the probability of product accident and did not attempt to set models under consumer's overestimation or rational expectation on product risk.

Landes and Posner (1985) emphasized the real world of asymmetric information between transaction parties and showed that the strict liability could decrease product riskiness. That is, when consumers have less information on product failure, the producer liability which allows less-cost information gathering by consumers is more effective than the consumer liability rule. However, these points are not the result of the authors' theoretical analysis, but from their investigation on historical process of liability rules. That means, although laying great emphasis on consumers' asymmetric situation, the paper couldn't set models showing the situation explicitly.

In addition, Marino (1988) who analysed the effects of precaution levels, activity levels and liability rules on the possibility of product failure under the consumer's misperception, is excellent in that the paper attempted to unburden the restraints of existing papers. However, Mariano's analysis couldn't be explained without an implicit assumption that consumer's precaution was given too.

With these backgrounds in mind, this paper raises a question on the impact of liability rules to product-related accidents: what liability rule actually would be more effective to promote product safety? In particular, under the assumption that consumers have incomplete information on product risk, this paper will attempt to alleviate several nonrealistic assumptions of the antecedent papers which are mentioned above.

The organization of this paper is divided into five sections. In Section II the efficiency of product liability rules is examined when consumers do not pay optimum level of precaution mainly due to their misperception of transaction costs and/or product risk.

1) In addition, there are few empirical studies on impact of liability rules to product safety including Higgins (1978), Priest (1988), Graham (1991) and Lee & Lee (2000).

Section III analyzes the impact of liability rules on product safety when the consumer underestimates the product risk on the assumption that both parties of the accident have taken their own precaution, and also, when the consumer rationally expected the product risk. This discussion continues in Section IV where different conditions of precaution costs between the injured and the offender are discussed. Concluding remarks will follow in Section V.

II. The impact of strict liability rule on product safety under the asymmetric information

We usually quote the Coase Theorem as an economic principle in *law and economics* study. The Coase Theorem is well conformed to the matter of product-related accidents; that is, when transaction costs are zero, an efficient use of resources results from private bargaining, regardless of the legal assignment of tort liability. This version can also be stated in a different way; when transaction costs are high under asymmetric information (i.e., in the Non-Coasian world), the efficient use of resources may not be achieved regardless of the legal assignment of liability. There are some antecedent papers discussing points of the argument[2].

Even then, what liability rule would be most effective to promote product safety under the assumption of asymmetric information?

Suppose the probability of product-related accident(π) as an index of the product safety and assume only in this section that the bargaining parties, producer and consumer, do not engage in negotiation due to the transaction costs.

The consumer may perceive the π correctly when fully informed about the product-related risk. The total burden of a consumer will be termed full-price, P^f. Then the full-price under symmetric information may be the same regardless of the types of liability rules. However, in the real world, it's very hard for the consumer to perceive the actual safety level of products because of their lack of information on the riskiness of a product versus the producer.

When a specific consumer product such as a household power tool, q, has no risk, in other words $\pi = 0$, the reverse demand function of q is $D(q) = \alpha - \beta q$. Then the demand function of a risky product, i.e, $\pi \neq 0$, of q is $D(q) = \alpha - \beta q - \lambda h\pi$ where h is the loss by accident and λ is the level of consumer's perception on product risk. The $\lambda \neq 1$ assumed. Next, the marginal cost of producer is preconditioned as $MC = c(\pi)$, where $c'(\pi) < 0$ and $c''(\pi) > 0$[3].

Assuming perfect information, the social welfare function can be defined by

$$W(q, \pi) = \int_0^q (\alpha - \beta q - h\pi)dq - c(\pi)q. \qquad (1)$$

The first-order condition for maximization of W requires;

$$\pi\ ;\ -c'(\pi) = h \qquad (2)$$

resulting in π^*[4].

Let's first consider the social welfare function under the consumer liability rule (*caveat emptor*). Under the doctrine of *caveat emptor*, the social welfare function can be defined by

$$W(q, \pi) = \int_0^q (\alpha - \beta q - \lambda h\pi)dq - c(\pi)q \qquad (3)$$

because the consumer expects to undertake damages through her expenses regardless of her risk information level, while the producer is free from any damages. The first-order condition maximizing equation (3) of π is $-c'(\pi) = \lambda h$ and mark it π'. Comparing the equation (3) with equation (1) results $\pi^* \neq \pi'$ so far as $\lambda \neq 1$.

Now, consider the social welfare function under the

2) See Hamada (1976, 228~229), Landes and Posner (1985), and Shin (1992, 105~108).

3) Of course, the unit production cost of the product is included in the cost $c(\pi)$ i.e., $c = c(\pi, q)$.

4) The equation (1) is a synthetical model maximizing the utility function of the consumer and profit function of the producer and can be replaced by $W(q, \pi) = \int_0^q (\alpha - \beta q)dq - [c(\pi) + h\pi]q$. In other words, the accident loss, $h\pi$, be accounted by only one party of transaction between consumer and producer, and the result of equation (1) is independent of to whom the loss is accounted.

strict liability rule (*caveat venditor*). Under this rule a consumer does not undertake the loss of accident because she already knows she is exempted from liability. This is true regardless if the consumer has perfect information or not. On the other hand, the marginal cost of a producer is $MC = c(\pi) + l^x h\pi$ where l^x is the producer's share of the accident losses. Therefore, the social welfare function under the strict liability rule can be defined by

$$W(q, \pi) = \int_0^q (\alpha - \beta q)dq - [c(\pi) + l^x h\pi]q \qquad (4)$$

The first-order condition maximizing equation (4) of π is $- c'(\pi) = l^x h$ and mark it π^s. Comparing π^s with π^* which obtained from equation (2) results $\pi^s = \pi^*$ because $l^x = 1$ under the strict liability rule.

The standard analysis thus far leads to the following proposition.

> Proposition 1: *Assuming that a consumer misperceives the probability of product failure insufficient information of product risk, the socially optimum level of accident probability (π^*) can't be attained under the consumer liability rule; however, the π^* can be achieved if the liability law assigned damages to the producer.*

Proposition 1 shows that the socially desirable level of accident can be achieved if the product-related accident costs are assigned to the producer by strict liability when the consumer is faced with asymmetric information of a risky product. It means that the overall losses could be reduced by shifting the liability rule from consumer to producer liability[5]. However, proposition 1 is insufficient because it does not explicitly consider the likelihood of the impact of the precaution level of players on product failure. In other words, the precaution level of producer (x) is reflected in $c(\pi)$ as a safety cost, but the consumer's precaution (y) does not reflect explicitly in demand function: It is an insufficient model which does not reflect the consumer's moral hazard. Proposition 1, therefore, may not work when the precaution levels of both parties are considered simultaneously.

III. Bilateral care models

In this section, I assume that product-related accidents are affected by consumer's precaution (y) as well as by the producer's level of precaution (x), i.e., $\pi = \pi(x, y)$. For instance, an automobile accident can occur not only because of defective designing of safety equipment (x) but because of a lack of consumer precaution while driving on the road(y).

In order to analyze, I define the accident probability function as $\pi(l) = \pi[x(l), y(l)]$ where the liability, l, is given exogenously and $\pi_x<0$, $\pi_y<0$. I assume x and y are substitutes for each other reducing the probability of an accident, i.e., $\pi_x = \pi_y$.

1. When consumers underestimate the level of product failure

Suppose that a consumer underestimates the level of product risk caused by imperfect information, i.e., $\lambda<1$[6]. This assumption will be removed later.

Let's assume first that the law on product liability is *caveat emptor*, and then a producer takes reasonable care satisfying the following equation,

$$\min_x \; [c(q) + w_x x + l^x h\pi(x, y)]q. \qquad (5)$$

Under the doctrine of caveat emptor, producers are free from any burden of accident loss, that is $l^x = 0$, therefore the minimizing value of x in equation (5) is 0[7]. On the other hand, if a consumer has less information then the producer may not perceive the risk level correctly. Therefore, the consumer's full price(P^f) means a consumer has to pay for the selling price as well as the expected accident cost.

$$P^f = [p + w_y y + \lambda l^y h\pi(0, y)]q. \qquad (6)$$

5) Also see Spence (1977, 562~566), Polinsky & Rogerson (1983, 585~586).

6) There are some papers that develop models with the assumption of risk underestimation: Marino (1988, 913, 921), Polinsky and Rogerson (1983, 581~589), Landes and Posner (1985), and Viscusi (1991,1993).

7) See Brown (1973, 337~339).

Facing P^f, her optimum strategy for utility maximization is taking care to minimize P^f, that is, $-\lambda^y h\pi_y(0, y) = w_y$. It will be denoted as y^n.

Behaviors of producer and consumer under *caveat emptor* can be illustrated in a supply and demand curve. In figure 1, the supply curve, $MC^n = c(q)$, is denoted as S^n; It is the same as S^* which is a supply curve when $\pi = 0$. The demand curve can be defined by

$$D^n(q, y) = \alpha - \beta q - [w_y y^n + \lambda^y h\pi(0, y^n)]. \quad (7)$$

Under the consumer liability, demand curve, $D^n(\lambda < 1)$ may shift down from D^* and a market equilibrium is achieved in E^n.

Secondly, let's see both parties' behavior under the doctrine of *caveat venditor* (strict liability). Under this rule, wherein the liability of any product-related accident cost is attributed to the producer, the consumer has no incentive to care regardless of her level of risk information. It results $y^s = 0$, where y^s is consumer's precaution level under the strict liability rule[8]. The producer, on the other hand, may take care by satisfying the first-order condition of equation (5) which requires $-l^x h\pi_x(x^*, y) = w_x$.

The demand curve under the strict liability is

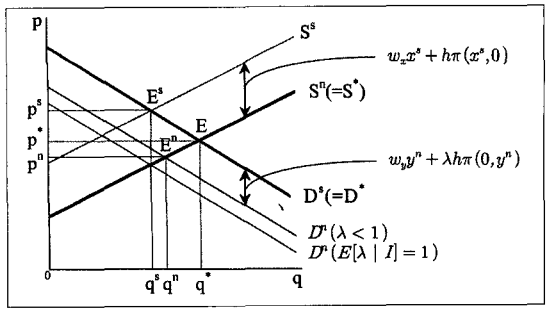
$$D^s(q) = \alpha - \beta q : D^s(\lambda < 1) = D^* \quad (8)$$

and the supply curve can be defined by

$$MC^s = c(q) + [w_x x^s + h\pi(x^s, 0)] : S^s \quad (9)$$

that is the producer's marginal cost added by expected accident costs shown in <Figure 1>. Under the strict liability, the market equilibrium comes into E^s in <Figure 1> at the intersection of two curves, equation (8) and (9).

Now, let's calculate the effect of changing liability rules on product safety. When the law on product liability changes to strict liability, the market equilibrium is going to shift from E^n to E^s in <Figure 1>, because it decreases consumer's expected accident costs equal to $w_y y^n + \lambda h\pi(0, y^n)$ and increases producer's one equal to $w_x x^s + h\pi(x^s, 0)$. Supposing $|y^n| = |x^s|$ under both liability rules, shifting of liability from consumer to producer may induce



<Figure 1> The impact of shifting liability on market equilibrium[9]

dropping the probability of an accident because the net change of precaution levels of both parties is positive[10]. The standard analysis thus far leads to the following proposition.

Proposition 2: *Assuming that a consumer underestimates the level of product-related risk by insufficient information on the possibility of product failure, a shifting law on product liability from consumer to producer leads to a decrease of the probability of product failure* (π).

Proof: Viewing this intuitively, the changing law from consumer to producer liability triggers shifting both supply curve ($S^n \rightarrow S^s$) and demand curve ($D^n \rightarrow D^s$) in Figure 1. When a consumer underestimates the product risk($\lambda < 1$), the portion of increasing expected loss of the producer[$w_x x^s + h\pi(x^s, 0)$] will be greater than the portion of decreasing expected loss of the consumer[$w_y y^n + \lambda h\pi(0, y^n)$]. Therefore, the sum of both parties precaution($x + y$) would be positive under

8) See Spulber (1989, 403) and Polinsky & Rogerson (1983, 583).

9) For reader's information, the shift of liability in Figure 1 increased the price of consumer products which means that the assigning of risk on producer under the strict liability is fully imputed to the market price.

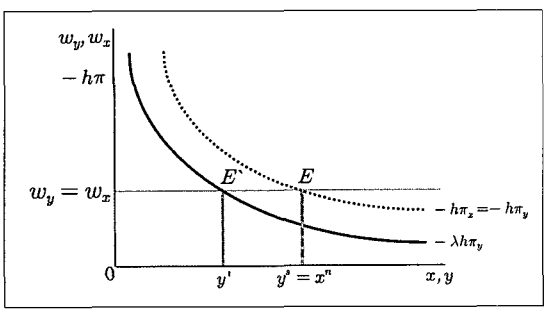
10) This is not about the efficiencies between the liability rules, but a comparison of relative magnitude of safety level under the different liability rules.

the $\pi_x = \pi_y$ assumption, which will lead to lower the π.

Proposition 2 can also be proved by using the expected accident cost (C^e) function defined as $C^e(x, y) = w_x x + w_y y + h\pi(x, y)$. The optimum strategies of producer and consumer who face the C^e are to take care of satisfying equation $w_x = -h\pi_x$ and equation $w_y = -h\pi_y$, that is denoted at point E in <Figure 2>. However, the consumer who underestimates the product risk may take care satisfying its marginal cost equal to marginal benefit, that is, $w_y = -\lambda h\pi_y$ that is denoted at point E'. Therefore, the shift of product liability rule from consumer to producer liability leads to the decrease of the probability of product failure.

2. When consumers rationally expect the level of product failure

Now, the lambda $\lambda < 1$ assumption is alleviated. That is, a consumer can estimate the product-related risk correctly in large part by purchasing an item repeatedly (learning by doing) akin to the views of Schwartz (1988) and Oi (1973)[11]. Therefore it is possible that the estimated probability of an accident to a consumer is equivalent to actual probability of the accident even though the consumer doesn't know the expected value of accident risk. This situation will be described as $E[\lambda\pi|\mathrm{I}] = \pi$ or λ^e, which means that a consumer rationally expects the product-related risk under the given information[12].



<Figure 2> Full-cost and full-price minimizing level of precaution

Under the $E[\lambda|\mathrm{I}] = 1$ assumption, if the liability rule shifts from consumer to producer liability, the expected probability of an accident will not be changed because the consumer's precaution level under the consumer liability($y^n[\lambda^e]$) will be the same with the producer's precaution level under the strict liability(x^s).

However, the result will not be the same in case of the strict liability rule with the defense of contributory negligence. Under the law, the compensation liability on damages will be reverted to the producer if he fails to prove the consumer's negligence[13].

When liability of damages is assigned to the consumer, a producer has no incentive to take precautionary measures; on the other hand, under the strict liability with contributory negligence, a consumer will take appropriate care to avoid liability for damages even if the product risk is rationally estimated, that is

11) Schwartz (1988) accepts that consumers are usually underestimate the product-related risk but the disposition would not be continuous. That is, "courts and commentators commonly assume to cause harm: consumer optimism. Optimism refers to a consumer's belief that product-related risks are less serious than they really are (p.374)". However, the assumption of consumer's underestimation of the product-related risk is not always correct; because they can also overestimate the risk sometimes. "Evidences drawn from surveys and actual market behavior more strongly support the view that consumers are informed than the view that they are ignorant. They sometimes over- or under-estimate the risk but may converge on right perception of them (p.380)". Oi (1973) as well has same point of view with Schwartz saying a consumer who regularly buys the risky product will eventually learn the expected level of product-related risk.

12) Here, I use the word 'rationally' in that the consumer may not repeat the same mistakes by optimally using the given information. In other words, due to the asymmetric information an expected error, ε_t, between π and its expected value, $E[\lambda\pi|\mathrm{I}]$, may occur; But limiting the value of the error may converge to 0 ($\lim_{t\to\infty} \varepsilon_t = 0$).

13) Sometimes, it's very difficult for a producer to prove consumer's negligence. For instance, recently in Korea a judicial precedent on medical malpractice in which the supreme court required victim's negligence to the defendant (*See Yonhap News* of 16th February 2005). In this case, the medical doctor, defendant, failed to prove the patient's negligence, then the case was decided in favor of the patient.

$E[\lambda|\mathrm{I}] = 1$. In this case the net care level of both parties($x + y$) will be positive, which leads to a lowering of the product risk. Based on analysis so far we get the following proposition.

Proposition 3: *Expecting that a consumer rationally assumes the level of product risk by the way of insufficient information of the product risk, the probability of a product-related accident(π) may not change even if the liability is shifted to the producer, but the π would be lowered when the liability is contingently shifted to the consumer under the strict liability with contributory negligence.*

Proposition 3 implicitly shows that, under the strict liability with contributory negligence and a consumer's rational expectation of the product risk, both parties of the transaction should engage in implicit negotiation. In other words, the fully informed court knows the socially optimum level of a consumer's precaution (y^*), therefore set y^* as a *legal precaution level* to depress the consumer's moral hazard and let the producer take enough care to avoid his liability. Therefore, the strict liability with contributory negligence can bring efficient distribution of risks as well as lower the probability of product failure.

IV. Conditions of precaution cost and product safety

In this section, the point of discussion is extended to the different conditions of precaution costs between producer and consumer. Moreover, under the condition that a consumer expects the risk rationally and takes proper action although with insufficient risk information, changing the law on product liability may lead to different effects in case of different conditions on precaution cost.

Actually, the risk-avoiding cost of precaution between producer and consumer may not be the same. The producer can prevent product-related accidents with lower levels of expense than the consumer because, from a practical view, the producer has more product-related risk information than the consumer. In other words, the cost of a unit precaution taken by a producer (w_x) can be smaller than that of the consumer (w_y)[14]. Here is a proposition that is verified based on the previous analysis.

Proposition 4: *Assuming that a consumer rationally understands the level of product risk through insufficient information of the product risk, and the precaution cost is different from that of the producer, the probability of product risk(π) can be reduced when the legal obligation is shifted to the producer liability rule.*

Proof: The overall effect of changing the law on product liability to the doctrine of caveat venditor, wherein the liability for any product-related accident cost is assigned to the producer can be defined as

$$\pi_x \cdot |(x^s - x^n)| < \pi_y \cdot |y^s[\lambda^e] - y^n[\lambda^e]|. \qquad (9)$$

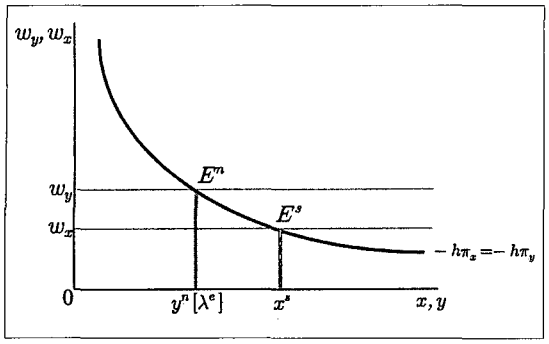
From $x^n = 0$, $y^s[\lambda^e] = 0$, equation (9) can be rearranged to $\pi_x \cdot |x^s| < \pi_y \cdot |-y^n[\lambda^e]|$, then, based on $\pi_x = \pi_y$ assumption, the equation can be simplified as follows.

$$|x^s| > |-y^n[\lambda^e]| \qquad (10)$$

The marginal costs of both parties(w_x, w_y) are invariable regardless of the precaution levels. Therefore equation (10) is always valid as long as $w_x < w_y$ which is also shown in <Figure 3>.

Meanwhile, if the law imposes strict liability with contributory negligence under the same condition in

14) We are able to set $w_x > w_y$ situation as well. Calabresi (1970) referred that a law imposing liability on the cheapest cost avoider can lead to bring down both the strength of accident and the probability of product failure.



<Figure 3> Full-price minimizing level of precaution

proposition 4, the probability of product-related accidents will necessarily be lowered. Besides, changing to the strict liability with contributory negligence effectively decreases the possibility of accidents more than shifting to the strict liability rule because it induces consumer's precautions as well as the producer's. Therefore, it is possible to bring a lemma from proposition 4 as follows.

Lemma 1: *The results of proposition 4 strongly hold when the law on product liability is changed from caveat emptor to strict liability with contributory negligence.*

Proof: From <Figure 3> we obtain $y^n[\lambda^e] < x^{sc}$ when $\frac{w_x}{w_y} < 1$ because the marginal benefit curve of precaution slopes downward. $x^{sc} > y^n[\lambda^e] > y^{sc}[\lambda^e]$ is obvious since the precaution variables x^{sc}, $y^{sc}[\lambda^e]$ and $y^n[\lambda^e]$ have positive signs and $y^n[\lambda^e] > y^{sc}[\lambda^e]$[15].

From proposition 4 and lemma 1, we get a general proposition as follows: assuming that a consumer who has limited information on product-related risk and expects the level of product failure rationally, changing the law on product liability to strict liability or strict liability with contributory negligence can lead to decrease product-related risk, thus increasing product safety.

Proposition 4 is based on the actual assumption that the producer's cost of precaution (accident prevention cost) is smaller than that of the consumer's under the asymmetric information between them. However, it doesn't mean that the reduction of accident costs ($h\pi$) caused by changing liability is always efficient.

V. Conclusion

This paper considers the impact of changing product liability rule from consumer to producer liability on product safety under asymmetric information. In particular, it has been attempted to remove several constraints related on transaction parties' precaution level (x, y), information level (λ), and condition of precaution cost (w_x, w_y) in preceding studies.

The results of this paper could be summarized as follows: under the misperception of product risk, a consumer may underestimate the possibility of product failure. In this case, the probability of accident can be lowered if the law is shifted to the strict liability rule (*prop. 2*). However, even under the asymmetric information, the consumer's estimation on the probability can be converged on the expected risk level, which could be called the rational expectation. In this situation the probability of product failure can be decreased under the strict liability with contributory negligence (*prop. 3*). Additionally, it is possible to bring down the probability of product failure when a legal rule that imposes liability on cheapest cost avoider is admitted (*prop. 4 and lemma 1*).

The results of this study coincide with the views of preceding papers such as Goldberg (1974), Spence (1977), Landes and Posner (1985), Posner (1992) in that assigning stricter liability to the producer results in reduced product-related accidents.

The main implication of the study is that it removed or alleviated several nonrealistic assumptions of previous papers and, analyzed with an explicit assumption of consumer's misperception of product risk and different conditions of precaution costs between victim and injurer. Particularly, this

15) The equation $y^n[\lambda^e] > y^{sc}[\lambda^e]$ will be obvious even when the consumer's moral hazard is taken into consideration.

paper can contribute to the analysis of the impact of liability rules on product safety when the consumer underestimates, and also, when the consumer rationally expected the product risk on the assumption that both parties of an accident take their own separate precautions. The result of propositions 3 and 4, and lemma 1 that shows the superiority of the strict liability (with contributory negligence) doctrine suggests some meaningful implication to policy-makers when the strict liability has been recognized as one of the main liability rules along with the negligence doctrine.

This paper, however, did not explicitly consider the impact of activity levels such as the equilibrium quantity(q). In addition, there are a few insufficiencies including the exemption of the consumer's level of information and the third parties' damages in the model. Above all, this paper could not compare the comparative negligence doctrine that reduced a victim's recovery proportionally to the damage attributable to her, with other liability rules analyzed above. Despite those limitations, this paper is able to render some meaningful provisions to the succeeding studies.

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