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Tim Friehe
Eric Langlais
Elisabeth Schulte

UMR 7235

EconomiX - UMR7235
Université Paris Nanterre
Bâtiment G - Maurice Allais, 200, Avenue de la République
92001 Nanterre cedex

Email : secretariat@economix.fr

On consumer preferences for (partial) products liability

Tim Friehe Eric Langlais Elisabeth Schulte*

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Abstract

Traditional law and economics analyses of products liability find that different liability regimes lead to the same market outcome, implying that risk-neutral consumers are indifferent between products liability and no products liability. We present a setup in which a group of consumers supports the implementation of products liability although its enforcement is costly. All consumers may prefer the same level of (partial) products liability.

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*Tim Friehe and Elisabeth Schulte: Marburg Centre for Institutional Economics (MACIE), University of Marburg. E-mail: tim.friehe@uni-marburg.de, elisabeth.schulte@uni-marburg.de. Eric Langlais: EconomiX-UMR CNRS & Paris Nanterre. E-mail: eric.langlais@parisnanterre.fr. Part of this paper was written while Friehe and Schulte were visiting EconomiX and University Paris Nanterre. Their support is gratefully acknowledged.

1 Introduction

Both the size and the scope of the potential liability have increased over the past fifty years (e.g., Rubin 2005). Potential explanations are an optimal adaptation of the legal system to changing circumstances (e.g., Landes and Posner 1985) or rent seeking. Traditional law and economics analyses of products liability find that different liability regimes lead to the same market outcome in terms of product safety and output (e.g., Daughety and Reinganum 2018). This irrelevance result practically excludes rent seeking on part of the consumers as an explanation for the above observation. The very small literature on the political economy of products liability so far focuses particularly on lawyers' efforts in changing the structure of the law (Epstein 1988, Rubin and Bailey 1994, Rubin 2005).

We present a setting in which products liability is costly and show that, nevertheless, some consumers strictly benefit from products liability, and in some constellations all consumers do. Our formal analysis can support the informal discussion in Osborne (2002) that recent developments of products liability may be largely due to efforts by consumers.

2 The model

Consumers Consumers may purchase a product that generates gross consumption benefit v. Consumers may suffer harm h after an accident due to the consumption of the product. The probability of an accident is $1 - x$, where x denotes (observable) product safety. Consumers may sue the firm under strict liability for damages amounting to δh, thereby incurring litigation costs ℓ where ℓ is distributed according to $G(\ell)$ on $[0, L]$. We assume $L < h$, $\delta \in [0, 1]$, and $g'(\ell) \leq 0$.

Firm A monopolist chooses the product safety x and the price p. Producing the product with a safety level x implies a per-unit cost of $c(x)$, with $c', c'' > 0$. In case the firm is sued by a consumer after an accident, it incurs litigation costs y and pays damages δh.

Timing In Stage 1, the firm chooses x and p. In Stage 2, consumers make their purchasing decisions and accidents may occur. Consumers who had an accident decide whether or not to sue the firm in Stage 3.

Efficiency We assume $v > h + y + c(0)$ which guarantees that the firm always wants to serve the market. The allocation is efficient if the entire market is served and if the level of product safety maximizes the joint surplus. Products liability exhibits a built-in inefficiency because its enforcement is costly.

3 The analysis

Stage 3 After an accident, consumers with $\ell \leq \delta h$ sue the firm for compensation δh. We will refer to consumers who (do not) sue the firm as type S (N) consumers.

Stage 2 Consumers S obtain an expected net benefit

$$U_S(x, p, \delta) = v - p - (1 - x)h + (1 - x)[\delta h - \ell] \tag{1}$$

from consuming the product. Consumers N obtain an expected net benefit

$$U_N(x, p, \delta) = v - p - (1 - x)h = U_S(x, p, \delta) - (1 - x)[\delta h - \ell]. \tag{2}$$

Consumers purchase the product only if $U_J \geq 0$, $J = N, S$.

Stage 1 The firm maximizes expected profits using p and x. The firm may select to serve either consumers of type S and N (*Scenario 1*) or only consumers of type S (*Scenario 2*).

Scenario 1: If the firm seeks to attract all consumers, it can charge a maximum price of $P^{\max}(x) = v - (1 - x)h$, which is increasing with product safety at the rate h. Charging $P^{\max}$, the firm's profits are

$$\Pi_1 = v - (1 - x)h - c(x) - G(\delta h)(1 - x)(\delta h + y). \tag{3}$$

The first-order condition for the profit-maximizing level of product safety x^* in this scenario reads

$$\frac{\partial \Pi_1}{\partial x} = h - c'(x^*) + G(\delta h)(\delta h + y) = 0. \tag{4}$$

For $\delta\,(>) = 0$, x^* is (in)efficient. The firm effectively considers own litigation costs and that of the marginal consumer just indifferent between suing and not suing (i.e., δh), where the latter exceeds expected litigation costs incurred by suing consumers.

Scenario 2: If the firm chooses $p > P^{\max}$, it attracts only consumers of type S. For any combination of price and product safety, the indifferent consumer is identifiable via the level of litigation costs ℓ_C stemming from

$$v - p - (1 - x)[(1 - \delta)h + \ell_C] = 0. \tag{5}$$

This allows us to consider that firm effectively chooses $\ell_C (\leq \delta h)$ (instead of p) and x to maximize

$$\Pi_2(\ell) = G(\ell_C)(v - (1 - x)(h + y + \ell_C) - c(x)). \tag{6}$$

The level of damages enters the optimization problem only via the constraint. Denote with $\hat{\ell}, \hat{x}$ the profit-maximizing levels of the marginal consumer's litigation costs and safety level, respectively. The former is characterized by

$$\frac{\partial \Pi_2}{\partial \ell_C} = g(\ell_C)(v - (1 - \hat{x})(h + y + \ell_C) - c(\hat{x})) - G(\ell_C)(1 - \hat{x}) = 0 \tag{7}$$

if ℓ_C solving (7) is smaller than δh and the second-order-conditions are satisfied. Otherwise, $\hat{\ell} = \delta h$, or, if $\delta h > L$, $\hat{\ell} = L$. The profit-maximizing product safety is identified by

$$\frac{\partial \Pi_2}{\partial x} = G(\hat{\ell})(h + y + \hat{\ell} - c'(\hat{x})) = 0, \tag{8}$$

and, again, is inefficiently high since the firm incorporates the marginal consumer's litigation costs. In addition, output is inefficiently low if $\hat{\ell} < L$.

Choice between the scenarios: The firm chooses between Scenarios 1 and 2 for a given level of δ. In Scenario 1, the maximal level of profits amounts to

$$\Pi_1^*(\delta) = v - (1 - x^*(\delta))h - c(x^*(\delta)) - G(\delta h)(1 - x^*(\delta))(\delta h + y), \tag{9}$$

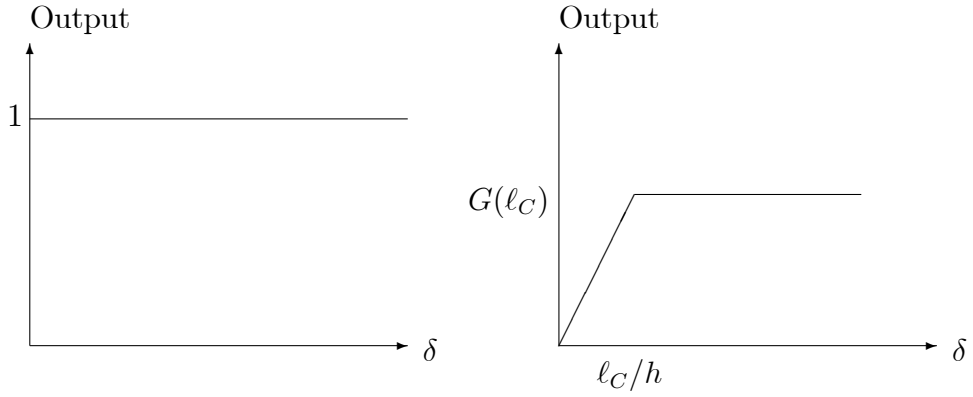

Figure 1: The monopolist's output as a function of δ in Scenario 1 (left) and in Scenario 2 (right)

and changes with δ according to

$$\frac{d\Pi_1^*}{d\delta} = -g(\delta h)h(1 - x^*(\delta))(\delta h + y) - G(\delta h)(1 - x^*(\delta))h < 0. \tag{10}$$

In Scenario 2, the monopolist's profits are increasing in δ for $\delta \leq \hat{\ell}/h$ and constant for $\delta > \hat{\ell}/h$. The product is offered at price $p = v - (1 - \hat{x})h + (1 - \hat{x})(\delta h - \hat{\ell}) \geq P^{max}$. If $\hat{\ell} = \delta h$, $p = v - (1 - \hat{x})h$. At this price, type N-consumers are willing to buy, too. Hence, for $\delta \leq \hat{\ell}/h$, the monopolist is clearly better off in Scenario 1.

As $\Pi_1^*(\delta)$ is strictly decreasing in δ and $\Pi_2(\hat{\ell})$ is constant for $\delta > \hat{\ell}/h$, it may be optimal for the firm to switch to Scenario 2 at some level of $\delta \geq \hat{\ell}/h$. Consider $\delta = L/h$, and note that $\Pi_1^*(L/h) = \Pi_2(L) \geq \Pi_2(\hat{\ell})$. There is a threshold $\delta' \leq L/h$ such that the firm strictly prefers Scenario 2 over Scenario 1 for $\delta > \delta'$ and vice versa for $\delta < \delta'$.

Consumers' liability preferences Consumers consider their payoff as a function of δ, anticipating how the firm's instruments adapt to changes in δ. We assume that consumers know their litigation costs such that they can anticipate their type (i.e., N or S) at specific values of δ. Thereafter, we comment on consumers' liability preferences when consumers are under the veil of ignorance regarding their level of litigation costs.

For *Scenario 1* (i.e., for $\delta \leq \delta'$), the condition (4) yields

$$\frac{dx^*}{d\delta} = \frac{g(\delta h)h(\delta h + y) + G(\delta h)h}{c''(x)} > 0. \tag{11}$$

Via its influence on x, δ changes the price charged in Scenario 1:

$$\frac{dP^{\max}}{d\delta} = h\frac{dx^*}{d\delta} > 0. \tag{12}$$

With these results at hand, we can consider how consumers' equilibrium payoffs

$$U_N^1 = 0 \tag{13}$$

$$U_S^1(\delta, \ell) = (1 - x^*(\delta))(\delta h - \ell) \tag{14}$$

change with the level of damages as long as the firm adopts Scenario 1:

$$\frac{dU_N^1}{d\delta} = 0 \tag{15}$$

$$\frac{dU_S^1}{d\delta} = -\frac{dx^*}{d\delta}[\delta h - \ell] + (1 - x^*)h. \tag{16}$$

Consumers of type N are unaffected by a variation of δ as the monopolist always adjusts the price to extract their rent. Type N consumers with ℓ close to δh become type S consumers as δ increases. Consumers of type S obtain a rent. An increase in δ directly increases their compensation after an accident, but also reduces the probability of being compensated. At low levels of δ, the former effect unambiguously dominates the latter. In particular, (16) is strictly positive at $\delta = 0$. Consequently, for low levels of δ, some consumers support an increase in δ and no consumer objects. If the direct effect in (16) dominates the indirect effect for all levels of δ, all consumers of (potential) type S prefer the highest implementable δ in Scenario 1. The direct effect dominating the indirect one can be ensured by having product safety be sufficiently unresponsive to changes in δ, which essentially requires that $c(x)$ is sufficiently convex. Assuming that this holds, we obtain that all consumers with $\ell < \delta' h$ have a common bliss point at $\delta = \delta'$.

In *Scenario 2* (i.e., for $\delta > \delta'$), neither firm's profits nor the level of demand or product safety are affected by a variation of δ as the share $(1 - \delta)h$ directly borne by the consumer will complement the expected harm δh directly borne by the firm in terms of the firm's price-cost margin. Whereas consumers with litigation costs $\ell \geq \hat{\ell}$ always have a zero rent, consumers with litigation costs $\ell < \hat{\ell}$ earn

$$U_S^2 = (1 - \hat{x})(\hat{\ell} - \ell) \tag{17}$$

where both $\hat{x}$ and $\hat{\ell}$ are independent of δ, implying that the rent is independent of the level of damages.

We distinguish two cases with respect to the threshold δ' at which the firm switches from Scenario 1 to Scenario 2, $\delta' < L/h$, and $\delta' = L/h$. In the latter case, $\hat{\ell} = L$ and $\hat{x} = x^*(L/h)$, such that at $\delta = L/h$, $U_S^2 = U_S^1$ for all ℓ. If $\delta' < L/h$, consumers with $\ell \in (\ell_C, \delta' h)$ lose their rent as δ increases beyond δ'. For consumers with $\ell < \ell_C$, there are two effects on their rent as δ increases beyond δ', amounting to a difference in their payoff of: $(1 - x^*(\delta'))(\delta' h - \ell) - (1 - \hat{x})(\ell_C - \ell)$. If $\hat{x} \geq x^*(\delta')$, all consumers with $\ell < \ell_C$ lose part of their rent as δ increases beyond δ'. Otherwise, consumers with $\ell < (>)\ell_C - (\delta' h - \ell_C)(1 - x^*(\delta'))/(x^*(\delta') - \hat{x})$ are positively (negatively) affected by an increase in δ above δ'.

To summarize: All consumers weakly prefer some positive level of products liability to no products liability. If $c(x)$ is sufficiently convex such that x^* is not elastic to changes in δ, all consumers with $\ell < \delta' h$ strictly prefer δ' to lower levels of δ, and all other consumers are indifferent. If x^* is elastic to changes in δ, consumers with low litigation costs may prefer $\delta < \delta'$, while consumers with higher litigation costs prefer higher levels. If the firm does not decrease product safety as it starts serving only consumers S (for $\delta > \delta'$), all consumers with $\ell < \delta' h$ strictly prefer δ' to higher levels. Again, all other consumers are indifferent. Levels higher than δ' are preferred only if the firm reduces product safety when serving only consumers of type S and only by consumers with low litigation costs.

Under the veil of ignorance – i.e., when litigation costs are revealed only after the preferences regarding δ have been formed but prior to the buying decision – all consumers agree on the preferred level of δ. They strictly prefer some positive level of δ over no products liability. The possibility to sue for compensation after an accident benefits consumers with litigation costs below the marginal consumer's litigation costs. In contrast, consumers receive no rent without products liability. With products liability, consumers are sometimes better off and never worse off than with no products liability. When all consumers weakly prefer δ' to all other values for δ, it follows that all consumers strictly prefer δ' under the veil of ignorance.

4 Conclusion

We present a simple framework that describes consumer preferences for products liability, finding that some consumers support and no consumer objects its introduction despite its inefficiency. We sketch a constellation in which all consumers prefer the same partial compensation of losses. In our framework, products liability reduces efficiency due to litigation costs, distorted product safety levels, and a possible contraction of output.

Our analysis is limited in several ways. We abstract from the preferences of lawyers as this has been the subject of previous research. It can be expected that lawyers will support consumers in their quest for products liability. In addition, we consider a market with a monopolistic supplier, where rents are redistributed from the firm to consumers. In a simple setting in which competition induces prices equal to expected total costs (including expected liability payments), some consumers gains at the expense of other consumers (and at a loss of efficiency). An interior value of δ is preferred by the beneficiaries of this redistribution if exceeding that value induces the firm to stop delivering the market. More elaborate analyses are left for future research.

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