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Unmanifested Harm in Business-to-Consumer Transactions

Geoffrey Miller¹

Abstract: Consumer products sometimes display the quality of unmanifested harm: they have not yet failed or caused harm, but they have a statistical probability of failing prior to the expiration of their expected useful life or of causing harm to exposed persons. In this situation, should consumers be entitled to an immediate remedy, or should they be required to wait until the harm becomes manifest? This article considers four liability regimes for unmanifested harm: (a) delayed damages that require the consumer to wait until the harm occurs; (b) anticipatory damages that award money to a consumer based on the statistical probability that the product will fail or cause harm; (c) injunctive relief prohibiting the manufacturer from producing the product; and (d) trust damages, under which the manufacturer endows a bankruptcy-remote fund for the purpose of compensating consumers if and when harm occurs. It turns out that any of these remedies can be efficient, and that the efficiency implications of the different remedies depend on the facts and circumstances of a given situation. JEL Codes: K12 - Contract Law; K13 - Tort Law and Product Liability; K42 - Illegal Behavior and the Enforcement of Law.

Introduction

Products break prematurely or perform worse than expected. People who have been harmed by either type of product failure have legal rights to relief. They may or may not exercise those rights, but their entitlement is reasonably clear. But what happens when a product has not failed but has a statistical probability of causing harm? Should a buyer be required to wait until the product actually fails before exercising legal rights, or should the law provide a remedy prior to failure?

This problem is pervasive in product markets. Consider the recent controversy over Toyota's accelerator pedals. These products allegedly are subject to a small probability the pedal will stick in the "down" position, creating runaway acceleration and the risk of horrifying death. Several hundred accidents and a few dozen fatalities have been reported

¹ Stuyvesant Comfort Professor of Law, New York University. This paper was prepared for the 28th International Seminar on the New Institutional Economics, held at Andr ssy University in Budapest, Hungary on June 09 - 12, 2010. I gratefully acknowledge the feedback from participants at that conference, and especially the comments of Professors Stefan Okruch and Lars Kl hn.

from defective Toyota accelerators – a disastrous consequence for the people involved, but a tiny fraction of the millions of Toyota vehicles on the road. Should the people who own Toyota vehicles that have not failed have a legal remedy against the manufacturer for the loss in value to their automobiles, or for harms such as their fear or anxiety about using the product? Toyota issued a massive product recall, thus muddying the legal issue, but the basic problem remains: to what extent, if any, should the law provide a remedy to the purchaser of a product which is subject to a potential breakdown but which has not yet failed?

The issue with the Toyota accelerators has to do with a risk of personal injury or death. In most cases, however, the question is framed in less dramatic fashion. Someone purchases a new computer for personal use. Later, the buyer learns that the hard drive has a risk of failure and loss of data. The data loss is caused by quantum mechanical effects which create a statistical probability that the drive will fail but that are impossible, even in principle, to predict for any individual product. Should the buyer be entitled to a remedy under the law if her drive has not yet failed? If so, what should the remedy be? A judgment of money damages for the loss in value to her computer that occurred when the public became aware of the potential defect? A warranty claim for repair or replacement? Some other theory?

The problem of unmanifested defects occurs in all transactions for the sale of new manufactured products, including business-to-business and business-to-consumer transactions. It is evident, however, that the concerns are larger when a consumer is involved. The reasons are the following. In the business-to-business setting, the purchaser will typically be a sophisticated party who is able to protect itself by research, inspection, or negotiation. Consumers, on the other hand, typically lack the sophistication to protect

themselves against the risk of unmanifested defects. Business purchasers, in addition, are likely to enjoy the bargaining leverage and expertise needed to negotiate advance protections or to obtain ex post relief even in the absence of express contractual terms. Consumers typically lack this kind of leverage and expertise. Accordingly, the classic setting for the unmanifested defect problem is the business-to-consumer transaction.

U.S. law on unmanifested defects is in a state of disarray. The traditional rule, which is in full force even today, is to deny any recovery for pure unmanifested defects. The courts require that the plaintiff wait until the harm actually manifests itself before allowing any right to relief. Yet a substantial number of legal principles and doctrines circumvent this rule in particular circumstances. For example, under the doctrine of anticipatory breach, a plaintiff may sue a defendant who, prior to the time of breach, has unequivocally manifested an intention not to perform the contract. Persons who have not yet manifested any injuries from exposure to a toxic agent may be entitled to compensation on a medical monitoring theory. Courts award injunctions against defendants who are merely threatening to commit a harmful act against the plaintiff but who have not yet carried out the threat. Class action defendants have sometimes paid millions or even billions of dollars to consumers to compensate them for the loss in value of their products due to unmanifested defects. Given the pervasive nature of the problem and the lack of coherent guidance from the courts, the law in this area cries out for clarification.

This article offers an economic and legal analysis of the law of unmanifested defects. I begin with a simple model of a consumer transaction and develop the analysis by progressively relaxing the assumptions. The object of the exercise is to identify the efficiency consequences of different possible legal remedies. It turns out that there is no simple solution to the problem. Several forms of relief can be efficient depending on the

specification of the model. What is apparent from the analysis, however, is that the outright preference for one sort of relief – damages for actual manifestation of physical harm – so often found in American judicial decisions is an inadequate response to the public policy dilemma. American courts would do better to engage in a more careful and nuanced analysis of the pros and cons of different potential remedial regimes, including the remedy of anticipatory damages – damages based on the expected harm suffered by the consumer in advance of any manifestation.

I. The Model

Let's start with an informal model of harm due to product defect. A consumer purchases or is exposed to a product. The product is sold in a market which is competitive aside from information conditions. It has a useful life in ordinary use, at the end of which it is no longer used by consumers. The product is "defective" if it has a risk of failure prior to the expiration of its useful life; otherwise it is "not defective." Non-defective products increase social welfare if used moderately and with care; defective products reduce social welfare. The manufacturer knows the risk of the product's failure and the harm to consumers given failure. It can choose to produce either a defective or a non-defective product. The manufacturer earns a rent if it produces a defective product but earns no rent if it produces a non-defective product.

The consumer does not know the product's risk of failure at the time of purchase or exposure but learns this information later. The consumer's marginal benefit declines with use. The expected cost of product failure increases with the amount the consumer uses the product and also with the care the consumer takes during use. Moderate use and reasonable care by consumers are efficient but heavy use and low care are inefficient. All parties are solvent, self-interested, rational, uninsured, risk-neutral, and informed about

applicable law. The parties cannot bargain around the legal rule. Third parties are not affected. The only enforcement occurs in a court which provides costless and perfectly accurate enforcement of the parties' legal rights and duties.

The court can award the consumer two general types of relief. First, it can award damages based on some measure of the buyer's harm at the time of product failure ("delayed damages"). Second, it can award anticipatory relief – some type of remedy prior to the product's failure. Anticipatory relief can take three general forms: (a) damages based on some measure of the buyer's expected harm from product failure ("anticipatory damages"), (b) a legally segregated fund protected from the claims of the manufacturer's or buyer's creditors, which will pay some measure of the buyer's damages if and when a failure occurs ("trust damages"), or (c) the award of an injunction prohibiting the manufacturer from continuing to sell a defective product ("injunctive relief").

A. First Iteration

Given these assumptions, what are the consequences of different forms of relief? Consider first the possibility that the legal system will offer no remedy at all for defective products. It is straightforward to see that in such a case the manufacturer will produce only defective products until such time as the defect is brought to light, since consumers cannot distinguish between defective and non-defective products and the manufacturer earns a greater profit from the defective product. This will result in the inefficiency of defective products being placed in to the market.

The problem is exacerbated, moreover, by a lemons effect. If consumers know that they cannot distinguish defective from non-defective products and also know that they will have no remedy for a defective product, they will discount the amount they are willing to pay for any similar product to compensate themselves for the expected cost of getting a

defective one. Because they pay less than the competitive price for a non-defective product, all manufacturers will be forced to sell only defective products – thus generating the perverse result that all products will be defective.²

Consider now the award of delayed damages equal to the full harm suffered by the consumer at the time the defect becomes manifest. Suppose that the manufacturer's liability is strict in the sense that damages are payable regardless of whether the product is defective or non-defective. Since in each case the manufacturer will internalize the costs of product failure, it has an incentive to manufacture non-defective rather than defective products. At first glance the strict liability delayed damages remedy appears to offer efficient incentives to the parties. But this analysis fails to account for the consumer's behaviour. Since the consumer knows that he will be fully compensated for any harm, and since the consumer gets a (declining) benefit from using the product, he will continue to use the product past the point where the expected harm from product failure exceeds the marginal benefit. The right product will be manufactured, but it will be used too much and without due care. This problem can be rectified if we award delayed damages only for defective products. Given damages, the manufacturer will produce only non-defective products. If the product is not defective, the consumer will receive no compensation for harm stemming from product failure. Because the consumer internalizes all the risk of product failure, she will use the product moderately and will exercise due care when she does so – the socially desirable result.

What about trust damages? If trust damages are based on strict liability, the consumer has no incentive to take due care when using the product and no incentive to use the product moderately. The problem is exacerbated if the amount in the fund represents

² See George Akerlof, *The Market for Lemons: Quality Uncertainty and the Market Mechanism*, 84 *Quarterly Journal of Economics* 488-500 (1970).

the manufacturer's full liability, because now the consumer also has an incentive to cause the harm to occur early in order to have first claim on a potentially limited fund. Even more use and less care would be expected.

Injunctive relief delivers efficient behaviour provided that the standard for issuing an injunction is that the social harm from the product exceeds the social benefit. Applying this standard, the court will issue an injunction against the sale of a defective product and refuse to issue an injunction against the sale of a non-defective product. Since we are assuming that the court decides accurately and without cost, this generates the efficient solution. Socially undesirable products are prohibited and socially desirable products are permitted. Moreover, consumers have the right incentives to use the product moderately and with due care, since under injunctive relief they incur the full costs of product failure.

Under anticipatory damages the results are as follows. Consider first anticipatory damages based on strict liability. Because the consumer bears all the costs and incurs all the benefits after the payment of the damages award, the consumer will use the product efficiently both in terms of frequency and care. The manufacturer also has the right incentives – it will produce non-defective products because it is better off doing so net of damages. The same result follows if anticipatory damages are conditioned on a finding of negligence. With negligence, the manufacturer will produce only non-defective products and the risks of failure are thereafter entirely borne by the consumer, who has the right incentives as to frequency and care.

Another consideration here is the degree to which consumers can vary their frequency of use or level of care with respect to the product. In cases of exposure to a harmful drug or chemical that has been withdrawn from the market, the consumer will have no capacity to engage in inefficient activity or care levels. In such cases there would be little

basis for concern that the consumer will use the product too much or fail to exercise due care when using the product. Accordingly, the defects of delayed damages and trust damages would not be present. In other cases, such as products with a long useful life which have not been withdrawn from the market, or which have widespread distribution even after withdrawal, injunctive relief or anticipatory damages might be preferred in order to deter socially inefficient behaviour by consumers.

B. Risk-Aversion

Let's drop the assumption that the parties are both risk-neutral and consider the case where the consumer is risk-averse and the manufacturer is risk-neutral.

Delayed damages and trust damages perform well in this setting. If the product does not fail, the consumer has no harm; if the product fails the consumer is harmed but fully compensated. In either case the consumer is protected against risk. The manufacturer, on the other hand, incurs the entire risk of product failure, but since we assume that the manufacturer is risk-neutral, this is a risk that the manufacturer rather than the consumer should bear.

Anticipatory damages do not perform as well when consumers are risk-averse and manufacturers are risk neutral. The reason is that after the damages are paid the consumer bears all the risk of harm from product failure. Injunctions also do not perform as well. When the injunction is granted – when the product is net socially inefficient – neither party experiences risk thereafter because the product is not produced. But if the injunction is denied, the consumer bears the risk of product failure, which is the wrong outcome from the standpoint of risk-aversion.

Suppose we assume that manufacturers are risk-averse and consumers are risk-neutral. This assumption may appear a bit unrealistic, but it can have a basis in reality. If the

product is a low-cost item with little risk of physical harm or consequential damages – such as, for example, a hairbrush – the consumer may be relatively indifferent to the possibility that the item will fail. On the other hand, if the manufacturer produces many of the items in question, its risk of liability in the aggregate can be large. This situation is illustrative of many where the manufacturer could plausibly be considered to be risk-averse and the consumer risk-neutral. Anticipatory damages become more efficient than delayed or trust damages in such cases because they place the risk of product failure on the consumer rather than the manufacturer.

If both parties are risk-averse, the relative preference for delayed or trust damages, on the one hand, and anticipatory damages or injunctive relief, on the other, depends on the respective degrees of risk-aversion. An important consideration here is the extent of the threatened harm. In cases where the harm to the consumer is only slight, as in the example of the hairbrush, anticipatory damages might be indicated because the added risk imposed on the consumer is small. Where the harm to the consumer is great, as in the case of exposure to a carcinogen, the preferred solutions might be delayed damages or trust damages.

What about injunctive relief and risk-aversion? An injunction against the manufacturer prohibiting it from selling the product would eliminate risk for consumers and for the manufacturer going forward, since the product would not be sold. *Ceteris paribus*, this would be an efficient approach to risk-allocation if either or both of the parties are risk-averse, although the social costs of issuing the injunction could be high in other respects. If the court denies the injunction, the risk of product failure is placed on the consumer, a result that would be efficient if the consumer is risk-neutral the manufacturer risk-averse and inefficient if the manufacturer is risk-neutral and the consumer is risk-averse.

C. Solvency

The model so far has considered that all parties will be solvent at all relevant times. What is the best solution when this assumption is dropped? Suppose that during the time the product is in stream of commerce, after the defect has been disclosed but before the product fails, there is a probability that the manufacturer will become insolvent and unable to pay its debts, including the claims of unhappy consumers. The potential insolvency of the manufacturer could be exogenous to the model – it could be caused by external factors such as falling demand, increased costs, poor investments, or increased competition. The manufacturer's distress could also be endogenous, caused by its liability for defects in the product at issue – a pattern frequently observed in the asbestos industry, where hundreds of manufacturers have become insolvent because of their liability exposure to asbestos claimants.

A positive probability of manufacturer insolvency has the following implications for the analysis. Under delayed damages, the manufacturer has the wrong incentives. Even if the probability of product failure makes the item in question one which society would prefer not be marketed (because the sum of producer and consumer surplus is less than the costs of product failure), the manufacturer may go ahead and market the product if the manufacturer's expected liability discounted by the probability of insolvency is less than its expected profit from selling the item net of liability. On the other hand, when the potential for manufacturer insolvency is considered, the perverse incentives for consumers to use the product too much under delayed damages is mitigated because consumers are no longer fully assured that they will be fully compensated for their harm regardless of their activity levels or exercise of care.

The potential for manufacturer insolvency has no effect on the other forms of relief. Anticipatory damages are paid out before the product fails and before the manufacturer becomes insolvent, so are not generally subject to the claims of the manufacturer's other creditors. The same goes for trust damages: even though these are not paid out to consumers until incurred, we stipulate that these sums are sequestered in a bankruptcy-remote vehicle that is insulated from the claims of the manufacturer's creditors. As for injunctive relief, this again is granted or denied prior to any bankruptcy by the manufacturer.

D. Limited Damages

So far we have considered a case where the delayed damages remedy award the consumer the full costs of product failure. Let's now consider the possibility that the legal system will award the consumer less than full economic damages. Suppose that the consumer's remedy under delayed damages is limited to the damages that consumers would incur from the failure of a product used moderately and with due care. Putting aside the fact that these damages may be difficult to calculate, this modification of the delayed damages remedy would resolve the problems of excessive use and insufficient care. Because a consumer knows that he would receive no compensation for harms incurred as a result of the failure of a product used negligently, the consumer would use the product carefully. Similarly, because the consumer knows that he would receive no damages for his harm from the failure of a product used excessively, the consumer would use the product only moderately.

E. Third Party Effects

So far we have assumed that there were no third party effects – that the only harm from product failure would be to the purchaser of the product and that no other parties would suffer injury. In reality, of course, this is not the case. Nearly any failure of a product

has some third-party effects; some failures have very large effects. A recent example is the alleged Toyota accelerator defect, where others riding in the car could be killed or injured when the product fails. What happens if we recognize that third parties could be harmed?

Here, all the damages remedies perform poorly if the third parties are not able to participate in the relief. In the case of anticipatory damages, the consumer has an incentive to engage in moderate use and to take reasonable care with the product, because he will not be compensated for the harm he suffers if the product fails. But the consumer will not fully internalize the harm threatened to others and so will still have inadequate incentives to moderate his activity levels and to exercise socially optimal levels of care. Full delayed damages and trust damages behave even worse because the consumer doesn't even have an incentive to minimize his own harm. Delayed damages subject to restrictions can resolve this problem, assuming that the limitation on damages is set so as to incentivize the consumer to engage in the activity levels and undertake the level of precautions needed to provide socially optimal protection for all affected parties.

Another candidate here might be the injunctive remedy. We have assumed that the court decides on the availability of injunctive relief based on a weighing of the costs and benefits to everyone in the society. If the aggregate social costs exceed the aggregate social benefits from the product, the court would grant the injunction. The result would be to protect both consumers and third parties against harm. If the court concludes that the aggregate social benefits exceed the social harm, the court would deny the injunction and allow the product to be sold. This would lead to consumers internalizing the costs of product failure to them but not to internalize the cost to third parties. Consumers would take too little care and engage in too much activity in this regime, but their tendency to engage in such behaviours would be checked by the fact that they are co-insuring against

harm. In any event, even with inefficient activity and care levels the aggregate benefits to society would exceed the harm if the injunction is denied.

F. Error

The discussion thus far has assumed that courts always reach accurate decisions. Courts, however, often do not reach accurate decisions. They may impose the consequences of a harmful event on the wrong person, or may fail to accurately assess the amount of damages even if they correctly determine the issue of liability. What happens when we include judicial error into the mix?

A first observation is that the possibility of judicial error tends to favor damages remedies over injunctive relief. The reason is that the standard for injunctive liability requires an assessment of the costs and benefits to all concerned – at least if the purpose is to deny the injunction when the product is socially beneficial and to grant it when it is not. If third party effects are involved, this would require the court to consider the benefits and harm to these people as well. In the case of damages, the court does not need to consider the schedule of the manufacturer. The effects on people injured or potentially injured by the product are the only things that matter. Because the court needs less information, damages have a built-in advantage over injunctive relief in the presence of judicial error.

On the other hand, injunctive relief only requires to court to get the liability issue right – to assess, correctly, whether society would be better off in the aggregate if the product were sold than if it were withdrawn from the market. Because this is simply an ordinal judgment, requiring the court to assess relative costs and benefits, there is plenty of room for error while still generating the correct ruling on liability. Damages, on the other hand, require that the court assess the harm to the injured party with a reasonable degree of precision. Otherwise the incentive effects for both the injurer and the injured party can

be distorted. If there is grave uncertainty about the injured party's harm, the injunctive remedy may be preferred even though the court must assess the schedules of all affected parties.

The possibility of judicial error also affects the choice between anticipatory and delayed damages. The anticipatory damages remedy relies on statistical inference. The plaintiff has not in fact suffered any harm at the time of the lawsuit. He is claiming compensation for harm expected in the future. To establish the extent of that harm, the plaintiff must rely on proof of harm that has occurred to others, or on scientific or engineering models about the performance of the item in question. These elements of proof are inherently more complex, and potentially less reliable, than the proof required when the harm has actually occurred. Proof by statistical inference, for example, will usually require the court to draw conclusions based on a sample drawn from a broader population; questions about the representativeness of the sample and about statistical power and reliability are inevitably presented in such cases. The predictions of scientific or engineering models are only as good as the models; and in American litigation, with its adversary system of justice, the court must carefully scrutinize the opinions of the expert for both parties to evaluate their credibility under recognized standards in the field.³ Anticipatory damages also confront the problem of time: since the plaintiff is being compensated for the expected costs of harm that will occur (if it occurs at all) some time in the future, the court must apply an appropriate discount to reflect the fact that the plaintiff is receiving present compensation for future harm. Compounding the problem is the fact that anticipatory

³ Proof by statistical inference, for example, will usually require the court to draw conclusions based on a sample drawn from a broader population; questions about the representativeness of the sample and about statistical power and reliability are inevitably presented in such cases. The predictions of scientific or engineering models are only as good as the models; and in American litigation, with its adversary system of justice, the court must carefully scrutinize the opinions of the expert for both parties to evaluate their credibility under recognized standards in the field.

damages may depend on subjective testimony from the plaintiff as to the harm he or she would experience if the product failed – testimony that is inherently compromised by the self-interest of the witness.

Delayed damages pose fewer problems of proof. The consumer's harm under delayed damages should largely be determined on the basis of objective evidence (costs of repair, medical bills, objective testimony from business partners, treating physicians or others with the capacity to analyze the plaintiff's harm). Proof by statistical inference will form a smaller part of the litigation and may not be required at all. On the other hand, we have seen that delayed damages generate effective incentives for the consumer to engage in optimal activity levels and to take appropriate care only if the measure of damages is limited to compensation for socially desirable frequency and care of use. These items are inherently difficult to quantify.

What about the trust remedy? This remedy is also prone to problems of judicial error. It is set at a time when the plaintiff has not incurred actual damages, so all the problems of statistical inference are present in determining the proper amount that the defendant should be required to pay into the trust. At the same time, there is a second stage of the trust remedy where an injured party makes a claim. Here, the decision maker will probably not be a court, but rather will be a trustee or other party who may have neither the skill nor the power to conduct a reliable inquiry into the actual amount of the plaintiff's harm. The problem is exacerbated if the trust is to be distributed among a group of potentially injured victims instead of reverting to the defendant in the event that no claim is made, since here (due to collective action problems) there may be no counterparty with an effective incentive to contest excessive claims for relief.

G. Enforcement Costs

The discussion thus far has assumed that enforcement is costless. Consumers always sue to enforce their rights if the manufacturer does not recognize them by other means; and a lawsuit, if it is brought, costs nothing for any party (including the public). As anyone who has been involved in litigation knows all too well, these assumptions are far from realistic. In the real world, people often do not enforce their rights, and the entire process is grotesquely expensive for all concerned. Accordingly, it is useful to examine what happens if we drop the assumption of costless enforcement.

The first problem here is that of under-enforcement. The analysis of costly enforcement turns in part on the applicable rule for compensating litigation counsel. Under the “American Rule” applicable in the United States, each party pays his or own attorney in litigation, win or lose.⁴ Under the “loser-pays” system used in most of the rest of the world, the losing party pays the winner’s reasonable fees. The incentive effects of these two rules are complex and debated. American law also allows attorneys to represent clients on a contingency basis, with the fee coming only out of any eventual recovery; much of the rest of the world does not allow contingency fees (although arrangements functionally similar to contingency fees are increasingly used). Regardless of the formal rules, it is clear that much litigation that could be brought on injured parties is not brought.

To the extent that costly enforcement results in lawsuits not being brought, manufacturers will not fully internalize the costs of defective products under any theory of damage liability. The result could be that defective products could be sold on the market even though society would be better off if they were not sold. Moreover, the problem of a lemons market could reappear. Consumers, knowing that manufacturers will not fully

⁴ This is modified in some cases by “fee-shifting” statutes that requiring losing defendants to pay the winning plaintiffs’ attorneys in the case of certain forms of litigation deemed to be in the public interest. U.S. courts also have the authority to shift fees against either party as a sanction for bad-faith tactics in litigation.

internalize the costs of products, and unable to distinguish non-defective from defective products, will discount the amount they are willing to pay to account for the risk that the product they purchase is defective. The result, if sufficiently pronounced, could drive non-defective products from the market and leave only defective products behind.

Several strategies could deal with the problem of under-enforcement due to litigation costs. Injunctive relief offers some potential here because an injunction obtained by a single consumer would presumably apply to all. On the other hand the injunctive remedy faces a problem of unequal stakes. For the plaintiff in an injunctive case, the stakes are limited to the benefit the plaintiff could obtain from an injunction. This is presumably minimal, especially since the plaintiff will have already purchased the product and knows of its defect at the time of the litigation. The manufacturer, on the other hand, has potentially very large stakes in the case of a product which is marketed to the public at large. Given larger stakes, the manufacturer is likely to litigate the case much more vigorously, resulting in potentially skewed litigation outcomes.

A perhaps better solution is for the court to consolidate many cases in a single proceeding. Since the issues regarding product defect will presumably be common to all consumers, the questions pertinent to the defect could be resolved once, leaving only the issue of damages for individual litigation. Some countries, such as the United States, Canada and Australia, recognize a class action device which permits such consolidation; others do not. In the case of product defects, the advantages of consolidation as a means for addressing concerns about litigation costs suggest the possible utility of class action procedures. Such procedures favor recognition of anticipatory damages or trust damages as compared with delayed damages. The reasons are that failure occurs randomly over the useful life of the product and products are purchased at different times by consumers. To

encompass all plaintiffs harmed by the manufacturer's sale of a defective product, a class action based on delayed damages would have to wait until the end of the useful life of the last item sold. In the meantime other consumers whose products had failed would have to wait. Such a procedure would be exceedingly difficult to accomplish, although it might be possible to allow individual consumers to opt out of a deferred class action and bring individual litigation. As a practical matter, however, a class action for damages for product defects is more effectively litigated under a theory of anticipatory damages where all class members may sue at one time early in the controversy.

Still another solution to the problem of under-enforcement is presented if we revise our model to allow for public enforcement. Public officials could bring lawsuits or take administrative action against a manufacturer of defective products. If liability and damages are correctly adjudicated and properly enforced, public regulation could also achieve the efficient outcome as far as the manufacturer's incentives are concerned. Problems could remain, however, as regards the consumer's frequency and care of usage under any administrative remedy that compensated consumers for future harm from product failure.

Costly enforcement introduces a problem of over. This is the problem of inefficient over-enforcement as well as under-enforcement. The concern here is that depending on the remedial regime employed, consumers will bring too many lawsuits, thus imposing excessive social costs of dispute resolution and potentially exacerbating the problem of error in enforcement, either because courts are overwhelmed or because defendants settle frivolous cases in order to avoid litigation costs and avoid a small risk of catastrophic liability.

This problem of over-enforcement is not serious in the case of delayed damages because only plaintiffs who have actually experienced harm will be allowed to bring suit. People who will never experience harm cannot recover.

The injunctive remedy creates greater problems of over-enforcement, since a plaintiff need not show current harm in order to obtain relief. But several factors limit its scope. First, the injunctive remedy is only available if the plaintiff establishes that the social costs of allowing the product to be sold outweigh the social benefits. Second, only one lawsuit may be needed to establish injunctive relief, thus eliminating the danger of a flood of cases deluging the courts. Third, litigation under the injunctive remedy can be further controlled if the court requires some reasonably strong showing of probable harm as a condition to granting relief.

Anticipatory damages create greater dangers of over-enforcement. If the rule were that anyone can bring a lawsuit against anyone else for creating a risk of harm, there would, in principle, be no limit to the amount of possible litigation. At every moment we are all subject to a present risk that the actions of another person will harm us at some time in the future. Airlines fly overhead all the time, and there is always a risk, however negligible, that one of those planes will crash into our house. Society obviously could not function if people sued other people in every situation where the other person's behaviour created a risk of harm. Accordingly, unless anticipatory damages or trust damages are limited by some principle of causality or legal relationship the world would become unliveable. Negligence is one possible limiting principle: we could require that the plaintiff establish that the product defect created an unreasonable risk of harm before allowing anticipatory damages. Even here, litigation costs could be substantial because often a party creates an unreasonable risk of harm to someone else and the harm never occurs. The remedy of anticipatory damages is less free-floating in cases where the parties have entered into a contract with one another (a point treated in the following section), but the problem of excessive litigation is not avoided. There is always a possibility that the counterparty will breach the contract – indeed, the law

of contract encourages breach when it is efficient. But it does not seem sensible, at least in the ordinary case, to allow a party to sue a counterparty for damages expected from breach when no breach has occurred. A better approach would be to require some minimal present harm or least a physical manifestation signalling an enhanced probability of future harm. Those markers could then be used as means for maintaining the advantages of the anticipatory damages remedy while avoiding the risk of runaway litigation.

The most severe problems of inefficient over-enforcement arise in the case of trust damages. The reason is that this remedy requires not one but two stages: an initial stage where a fund is created based on predicted harm to consumers, and a second stage where the sequestered funds are paid out to compensate the consumer when the product actually fails. The more complex nature of the process increases transactions costs of litigation. Accordingly, one would expect that trust damages, if awarded, would require an especially strong limiting principle to ensure against excessive litigation costs.

H. Bargaining

Another assumption was that the parties could not bargain. In some cases the assumption of no bargaining reasonably describes the world. Tort cases – accidents – are classic settings where bargaining is absent. In many other cases, however, it is possible for manufacturers and consumers to bargain. In fact the majority of manufacturer-consumer interactions arise out of purchase transactions which take the form of contracts. Contracts are classic bargaining settings: to be effective (under U.S. law) they generally require an offer, an acceptance, and a meeting of the minds. What happens when we consider the bargaining setting in which a claim might arise?

In the case of contracts, if bargaining is costless the parties will arrive at an efficient solution regardless of the applicable legal rule. If bargaining is possible but not costless, the

optimal remedy, other things equal, would be the one that the parties would agree to if they could bargain over the issue without cost. Presumably the parties in a perfect bargaining environment would take account of the various factors discussed above, evaluate which of them is most salient to the facts and circumstances of their transaction, and adopt the remedial scheme which maximized the joint value of the contract. The legal remedy, accordingly, can appropriately be designed with reference to the analysis of the terms that would be efficient in the absence of contract bargaining.

Conclusion

This paper has conducted a preliminary investigation into the problem of anticipatory harm in business-to-consumer contracts – the case where a manufacturer has produced a product which has a probability of failing before the expiration of its ordinary useful life or of imposing unbargained-for harm on consumers who have been exposed to the product. Black letter American law suggests that the consumer in such cases must wait until the harm actually occurs before exercising any rights to relief. An analysis of possible remedies suggests, however, that anticipatory remedies such as anticipatory damages, trust damages, or injunctions can sometimes offer superior efficiency advantages as compared with the traditional remedy of delayed damages. In future research I hope to apply the insights of this model to the analysis of particular doctrines in American law where courts have awarded a form of anticipatory relief including anticipatory breach, medical monitoring, emotional distress, battery, unjust enrichment, detrimental reliance, non-dangerous manifestation, and injunctions against future harm.