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A New Proposal for the Reform of Commercial Air Crash Litigation

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A NEW PROPOSAL FOR THE REFORM OF COMMERCIAL AIR CRASH LITIGATION

BY ANDREW J. CHALK*

I. INTRODUCTION

IN RECENT YEARS the tort litigation of major commercial air crashes has been one of the most controversial issues in the field of air law. The existing system has been called "outmoded, anachronistic and frequently unworkable"[1] and "the tortured, torturous, even torturing tort system"[2] by prominent practitioners. Although the system's problems are many, its two most serious are the inconsistent treatment that the system of multiple state laws gives to victims from different jurisdictions and the protracted delay from the time of loss until judgment. These problems, among others, account for the flurry of proposals for reform from academics and practitioners alike.[3]

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[1] Kennelly, *Litigation Implications of the Chicago O'Hare Airport Crash of American Airlines Flight 191*, 15 J. MAR. L. REV. 273, 276 (1982) [hereinafter cited as Kennelly].

[2] J. O'CONNELL, ENDING INSULT TO INJURY - NO FAULT INSURANCE FOR PRODUCTS AND SERVICES 67 (1975) [hereinafter cited as O'CONNELL].

[3] *See generally id. See also* Kennelly, *supra* note 1; Milford, *A No-Fault Aviation Insurance Plan*, 41 J. AIR L. & COM. 211 (1975); Kennedy, *Accidents in Commercial Air Transportation - A Proposed Reform of the Liability and Compensation System*, 41 J. AIR L. & COM. 247 (1975); Schmidt, Ince & Richbourg, *Piercing the Aluminum Overcast: A Case for Strict Liability for Commercial Air Carriers*, 9 LINCOLN L. REV. 37 (1974) [hereinafter cited as Schmidt]; Corrigan, *From A To B - The Aviation Industry's Responsibility to Passengers*, 34 J. AIR L. & COM. 506 (1968) [hereinafter cited as Corrigan]; Note, *Domestic Commercial Aircraft Tort Litigation: A Proposal for Absolute Liability of the Carriers*, 23 STAN. L. REV. 569 (1971).

The more modest of these proposals advocate the adoption of uniform legislation[4] or the imposition of strict liability on the carriers.[5] The more radical proposals advocate the replacement of the tort system with some kind of no-fault plan.[6]

This paper is another proposal, which I shall term the *market insurance plan*, for the reform of air carrier litigation, but the plan proposed in this paper is of a very different character from those suggested hitherto. It may be considered as radical as the O'Connell no-fault plan,[7] and it is somewhat similar in operation. Like the O'Connell plan, this proposal assures speedy compensation of the victim and uniformity of application. However, it differs from no-fault proposals, and has more in common with an "ideal" tort system, in that it fully compensates the victim and provides deterrence. The reason that the market insurance plan has not received wide discussion until now is that it is derived from new evidence which challenges some traditional assumptions about air carrier safety. Specifically, this paper presents results from recent research[8] that cast doubt on the reasonableness of a system of recovery that takes years to compensate accident victims. The evidence further suggests that the compromise to the conflicting purposes of compensation and deterrence represented by no-fault insurance is not the best alternative. The rapid recovery permitted by no-fault

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[4] *See, e.g.*, Kennelly, *supra* note 1; Corrigan, *supra* note 3.

[5] *See, e.g.*, Schmidt, *supra* note 3; Note, *supra* note 3.

[6] *See, e.g.*, J. O'CONNELL, *supra* note 2; Milford, *supra* note 3.

[7] Under the O'Connell plan, legislation would permit a firm to elect no-fault coverage for some or all types of accidents associated with its products. The firm could specify not only the type of accidents covered by no-fault but also limit the geographic distribution of no-fault coverage for certain types of accidents. Consumers could not "elect out" (i.e., bring suit for damages), except in the case of intentionally caused injuries. The whole plan would be regulated by an insurance commissioner who would presumably approve the level of coverage provided.

[8] *See* A. Chalk, Producer Reputation and the Regulation of Airline Safety (1983) (unpublished manuscript) [hereinafter cited as Producer Reputation]. *See also* A. Chalk, Market Forces and Aircraft Safety: The Case of the DC-10 (1983) (unpublished manuscript) [hereinafter cited as Market Forces].

insurance[9] can be achieved with the deterrence created by tort liability. An attraction of the insurance plan is its flexibility. Although this paper proposes one form of the market insurance plan, the minute details are not discussed because they can be designed to address problems peculiar to particular types of accidents. This paper emphasizes the key features of the market insurance plan and gives their rationale; it is up to individual legislators to tailor the details to fit special circumstances.

Section II of this paper describes the economic framework for the analysis of product safety. The principal finding is that the choice of optimal legal structures for the regulation of product safety depends on the state of consumer information about product hazards. If product hazards are known with certainty, then the unregulated market will provide the optimal amount of safety. However, if consumers are completely ignorant of product hazards, then strict liability results in higher consumer welfare than *caveat emptor*.[10] The empirical evidence presented in Section III bears directly on the state of information available to air carrier consumers. This evidence shows that the assumption underpinning *all* existing aviation accident proposals, that consumers are ignorant of hazards, is incorrect. It is this new finding that jusitifies the market insurance plan outlined in Section IV.

II. An Economic Framework to Analyze the Costs of Accidents

The economic analysis of tort liability systems can be

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[9] Since no-fault plans specify the compensation awarded for particular types of injury in advance of the consumer's participation in the activity and do not make such compensation contingent on anything more than proof of injury, the only delay in compensating the plaintiff is the time necessary to prove the injury was associated with the product.

[10] Literally, "let the buyer beware". Black's Law Dictionary 202 (5th ed. 1979). However, the term is used in economics to describe some approximation to a free market. In the context above, the term implies that accident costs stay on the party who initially bears them unless the parties *voluntarily* contract to shift the burden via compensation of the injured.

traced back to the 1972 work of Demsetz,[11] who applied the more general analysis of Coase.[12] Economic analysis treats accidents, for analytical purposes, as involuntary interactions between people that entail a loss to one of the parties.[13] As such, the social cost of accidents is the sum of all losses plus prevention activities.[14] The assignment of liability is the decision whether to leave the loss on the victim or to transfer some or all of the loss to the injurer. Different liability assignments can have different implications for the size of accident costs.[15]

Assume, for example, that consumers are fully aware that they can easily injure a hand in the course of using a knife for its legitimate purpose of chopping vegetables. Assume that the law imposes only one of two polar liability standards on kitchen knives: strict producer liability or no producer liability. If the law assigns liability to producers, then knife producers will take all precautions that reduce their liability cost by more than the cost of the pre-

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[11] Demsetz, *When Does the Rule of Liability Matter?*, 1 J. LEG. STUD. 13 (1972).

[12] *See* Coase, *The Problem of Social Cost*, 3 J. LAW AND ECON. 1 (1960). This classic article is widely regarded as the piece of scholarship that established economic analysis of law. Coase proved the theorem that the allocation of resources to productive activity is independent of the initial assignment of property rights so long as economic agents can bargain without transaction costs. Given the assumption of costless transactions, economic agents will always allocate resources in a way that achieves production in the least costly manner, even if the initial allocation is cost inefficient. The importance of the Coase theorem in the economic analysis of law is exemplified by R. POSNER, ECONOMIC ANALYSIS OF LAW (2d ed. 1977).

[13] It is difficult in practice to value the losses suffered by the injured, but it is a useful analytical tool to ignore these problems for the present and assume that the plaintiff's loss can be immediately and precisely measured at some dollar amount. Later, this assumption is relaxed. *See infra* notes 69-79 and accompanying text.

[14] The terms have the following definitions:

L = dollar amount of plaintiff's loss per accident.
Cp = dollar amount spent on safety precautions by plaintiff per year
Cd = dollar amount spent on safety precautions by defendant per year.
N = number of accidents per year.

The social cost of accidents per year is: A = NL + Cp + Cd (i.e., the sum of accident and accident prevention costs). This simplification of the problem emphasizes that the cost of accidents born by society as a whole is not limited to plaintiff losses. Resources used in prevention (Cp + Cd) and L are all likely to be under the control of one or both of the parties to an accident, and not exogenous.

[15] *Id.*

cautions. Remaining injuries will be compensated out of revenues from the sale of kitchen knives, financed by raising the price *above* the cost of production by enough to fund this compulsory insurance policy. Consumers will theoretically take no care, assuming the law fully compensates them for the cost of accidents. In the case of no producer liability, consumers will take all cost-justified precautions and bear the cost of or insure against injuries that are too costly to prevent. Producers will provide safety precautions to the extent that consumers are willing to pay the producers' costs of production.

The economic difference between these liability standards is the different cost that each imposes on society. Because consumers may be better able to take safety precautions in their use of kitchen knives than producers can in their design, the costs of accidents will differ with liability. Oi[16] has proven that the efficient[17] standard under perfect consumer information[18] is no liability.[19] In such a scenario consumers would induce producers to take care through the marketplace, rewarding manufacturers of products with desirable risk characteristics and penalizing those who manufacture products that are too risky, or not risky enough, given the product's price. The imposition of strict liability in a marketplace with perfect information reduces consumer welfare by eliminating desired prod-

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[16] Oi, *The Economics of Product Safety*, 4 BELL. J. ECON. 3 (1973).

[17] Efficiency, in economics, has the technical meaning of attaining an allocation of resources that maximizes social welfare. *See generally* J. HIRSCHLEIFER, PRICE THEORY AND APPLICATIONS (2d. 1980).

[18] Perfect consumer information means that consumers know exactly the size of the loss, L, if an accident occurs, and the probability, p, of a loss for every level of care. Perfect consumer information is an abstraction which establishes *sufficient* conditions for this conclusion. Perfect information may not be *necessary* for the result. For example, there are occasions when consumers use kitchen knives with which they are not perfectly familiar, and therefore expose themselves to imperfectly known hazards. Nevertheless, the perfect information abstraction is the closest approximation to the true state of consumer information.

[19] A standard of no liability will induce the optimal amount of care at the least cost. Under the perfect information theory, consumers take the optimal amount of care, Cp, and purchase products that have the optimal amount of safety built in, Cd, so as to minimize total accident costs A. *See supra* note 14.

ucts from the market.[20]

The situation of imperfect consumer information[21] is more troublesome. To keep the problem traceable, consider the worst case scenario of complete consumer ignorance of all product hazards. Producers are assumed to be perfectly informed about product hazards but unable to communicate this information to consumers. If the courts establish a no-producer-liability standard, then ignorant consumers, believing that a product is safe, will take no care and will not pay a higher price to producers to cover the costs of manufacturing less hazardous products.[22] As a result, no care is taken by either party — clearly a suboptimal outcome. In this situation of complete consumer ignorance, strict producer liability is superior to no liability. Strict producer liability reduces the social cost of accidents by creating producer incentives to

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[20] There is an important exception to the superiority of no liability over strict liability. If courts honor exculpatory clauses, then the allocative effects of the two rules are identical and there is no economic reason to prefer no liability over strict liability. This is an application of the Coase Theorem, which states that, given zero transaction costs, the initial allocation of property rights is irrelevant to the final allocative outcome. *See* Coase, *supra* note 12. In the products liablity context, it is the law's refusal to honor exculpatory clauses that creates high transactions costs, thus invalidating the irrelevance of the initial allocation of property rights (liability). *Id.*

[21] Imperfect consumer information is the opposite analytical assumption of perfect consumer information. Consumers improperly estimate accident losses, L, or the probability of an accident, p. *See supra* note 14. The legal literature generally assumes that if consumer information is imperfect, then consumers underestimate L and/or p. *See, e.g.*, Henderson, *Coping with the Time Dimension in Products Liability*, 69 CALIF. L. REV. 919 (1981); Shapo, *A Representational Theory of Consumer Protection: Doctrine, Function, and Legal Liability for Product Disappointment*, 60 VA. L. REV. 1109 (1974). Although the underestimation case is important, the social cost of improperly estimating p and L is symmetrical — overestimation of the hazards associated with a product is also socially costly. Furthermore, there are cases in which consumers may systematically overestimate product hazards. For example, if one brand of a product is associated with injury, consumers may attribute the same hazards to other brands of the same product. There is some evidence that this occurred when research associated Proctor and Gamble's *Rely* tampon with toxic shock syndrome. *See Laboratory Evidence Linking Toxic Shock to Tampons is Found*, Wall St. J., Dec. 8, 1981, at 1, col. 6.

[22] Stating that consumers will take no care is again a simplification made for analytical convenience. The important point is that, in real-world situations, consumers underinvest in care.

take care.[23]

Although this example involves products liability, the analysis is equally applicable to tort claims, such as the personal injury and wrongful death actions so prominent in commercial air crash litigation. Put differently, the state of consumer information is as relevant to the efficient determination of liability in air crash accidents as it is in products liability cases.

The existing proposals for the reform of the aviation tort liability system[24] all share the same assumption that consumers are ignorant of the risks of airline or air crash hazards. This assumption leads to the erroneous conclusion that airline consumers are incapable of imposing the market discipline necessary for a no-producer-liability system to operate efficiently. Far from being unique to reform advocates, this consumer ignorance conclusion is the most prevalent view in public policy discussions of commercial air carrier safety.[25] If this assumption of consumer ignorance is accepted, then strict producer liabil-

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[23] An example would be the safety of nuclear electricity generation. Electricity consumers are generally ignorant of the operation of a nuclear power plant, whereas utilities have accurate knowledge. Hence, strict liability on utilities would be the appropriate standard.

[24] *See supra* note 3.

[25] Consumer ignorance underpins the rationale for the federal agency with specific responsibility for air safety, the Federal Aviation Administration (FAA). *See* A. CHALK, THE ECONOMICS OF AIRLINE SAFETY, ch. 3 (1983) (available through University Microfilms, Ann Arbor, Michigan); Comment, *The Crashworthiness Doctrine and the Allocation of Risks in Commercial Aviation*, 52 S. CAL. L. REV. 1581 (1979) [hereinafter cited as Comment]. The following comment is typical of proponents of the market failure view:

> The potential influence [of consumers on air safety], however, is not great because passengers lack both the opportunity and the knowledge to provide effective input into the design of a commercial airliner. . . . Even if passengers had an opportunity to express a preference for more crashworthy aircraft, most of them lack the knowledge to do so. Many would not perceive the possibility of the plane's design causing deaths and injuries after the crash had occurred. And if a passenger did recognize a potential problem, it is unlikely that he would have the engineering knowledge that would be necessary to determine whether the plane's design did, in fact, create an unreasonable risk of second collision deaths and injuries.

Comment, *supra* at 1609-10. As a result, "the market for air travel is unlikely to affect the amount of crashworthiness that is produced because consumers of air

ity should govern air carrier activities because consumers do not know the risks of air travel and take no care to insure against these risks. Imposing strict liability reduces the social costs of accidents by inducing producers to take care. The rationale for a no-producer fault-liability is less direct, but similarly assumes that the market does not function efficiently.

The striking aspect of the assumption that the market fails to provide air safety is that it does not rest on any empirical evidence. Certainly, individual instances of inadequate safety provision are cited in the literature,[26] but these cases could be unrepresentative of normal market responses. This "market failure" view appears to rest on the assumption that the highly complex technology of commercial aviation is beyond the ordinary consumer's comprehension.[27] Therefore, consumers are incapable of monitoring the amount of care provided by air carriers or aircraft manufacturers.

A different implication, however, may be drawn from this information problem. The "market response" view of air carrier safety asserts that the inability of consumers to measure the input to safety will lead consumers to substitute the measurement of output. Specifically, observable signals attesting to the safety of *existing* products become the basis for expectations about the safety of *future* products. There is a growing body of economic literature concerning the operation of such a "reputation" or "brand name" effect.[28] An interesting conclusion of that literature is that although a loss of reputation occurs *ex post*,[29] the *threat* of this loss of reputation provides incen-

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travel generally lack the opportunity and the knowledge to assess the crashworthiness of commercial airlines." *Id.* at 1617.

[26] *See, e.g.*, Kreindler, *Our Tort System and Aviation Safety*, 34 J. AIR L. & COM. 497, 503 (1968).

[27] *See* Comment, *supra* note 25, at 1609-10.

[28] *See, e.g.*, Klein & Leffler, *The Role of Market Forces in Assuring Contractual Reputation and Product Quality* 14 BELL J. ECON. 508 (1983); Heal, *Do Bad Products Drive Out Good?*, 90 Q. J. ECON. 499 (1976).

[29] That is, after one or more accidents involving a product have already occurred.

tives for producers to manufacture safe products *ex ante*.[30] Thus, no product failures need occur for this mechanism to efficiently assure product safety. In this respect reputation is similar to a bonding arrangement in which the bond is posted up front and forfeited if the party fails to perform the specified terms of the agreement.

There are numerous examples of products whose brand name connotes a certain level of quality aimed at a specific market segment.[31] But is the reputation mechanism effective in commercial aviation? The market response view, like the market failure view, has remained an untested hypothesis.

The next section explains and reports a critical test between these two views. It suggests that an observable signal of safety used by consumers is the public information revealed in aircraft accidents. Consumer responses will ultimately be reflected in the wealth of the owners of the firms that produce suspect aircraft. We can thus measure the size of the reputation effect by the change in the market value of the firm's stock.

III. Measuring Consumer Demand for Safety

This section proposes a test of the validity of the market failure hypothesis[32] and the market response hypothesis. Specifically, the "market response" hypothesis asserts that although aviation is too complex for consumers to master all the technical details, consumers can react to the safety information revealed by a crash. Consumers respond to negative safety information by substituting different airlines or makes of plane, for the apparently unsafe airline or plane make.

In cases in which the type of plane is at issue, this re-

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[30] This is to say that, knowing the potential costs of an accident to the firm, producers take safety precautions *in advance* to prevent accidents from occurring.

[31] Everyday examples that come to mind are the value of the department store name on the products it sells, Kodak paper for the printing of color pictures, and the IBM name in the personal computer market.

[32] The "market failure" hypothesis is discussed *supra* at notes 24-28 and accompanying text.

sponse can lead to reduced airline demand for the plane in the future. This paper consolidates results from the economics literature[33] in a form designed to emphasize their relevance to air crash litigation. Technical details are confined to the appendix. The purpose of the tests is to show that there is a consumer response to air crashes in which a design flaw of the aircraft may have contributed to the crash. Furthermore, the methodology also generates a point estimate of the size of this effect.

Economic theory suggests that if consumers cannot ascertain the quality of goods or services by pre-purchase inspection, then they may form expectations of quality based on the producer's reputation.[34] A reputation for quality, in this case safety, is an asset to the firm. That is, it is something of value to shareholders of the firm that they acquire when they purchase shares, and dispose of when they sell their shares. The market response view suggests that if reputation is important in the passenger aircraft market, then the aircraft manufacturer's reputation will be decreased (i.e., depreciated in the economic sense of the term) when consumers receive information that a certain type of airplane is less safe than previously believed. As a result, the value of the firm to its owners decreases, as manifested by a decrease in the stock price. The tests conducted here use a stock price model from modern finance theory to detect and measure this stock price effect.

The first study[35] used a sample of 72 fatal accidents that comprised all Boeing, McDonnell Douglas and Lockheed crashes in the United States between 1966 and 1979.[36]

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[33] *See* A. Chalk, *Producer Reputation*, and A.Chalk, *Market Forces*, *supra* note 8.

[34] *See supra* note 28 and accompanying text.

[35] A. Chalk, *Producer Reputation*, *supra* note 8.

[36] The study used contemporaneous news reports from The New York Times to establish whether the immediate events surrounding the crash suggested that the manufacturer was culpable, or that the crash was attributable to airline, environmental or air traffic control factors. It is not the eventual National Transportation Safety Board or court determination that is at issue, but consumer expectations at the time of the crash.

This sample of 72 accidents was split into two subsamples of "suspect" (manufacturer culpable) and "control" (other cause) crashes, thus allowing a comparison between the two types of crashes to account for any stock price effect common to all crashes. A model of manufacturer stock returns was estimated over a period preceding each crash[37] and used to predict returns over the 30-day period consisting of the crash and the following 29 days. If a crash has no effect on stock performance, then the forecast errors from the model are random fluctuations around zero. However, if the reputation effect operates, the firm's stock price will fall as news of the accident reaches the stock market. Stock price effects for each crash are averaged across all crashes in both the control sample and the suspect sample to generalize to results that are valid for the average crash, rather than a special case.[38]

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[37] The technical details of the estimation and prediction of the stock market model are given in the appendix.

[38] The result for the suspect crashes is statistically significant at greater than the 1% level (one-tailed test). The control group result is statistically insignificant at any conventional significance level.

Figure 1
CUMULATIVE AVERAGE FORECAST ERRORS

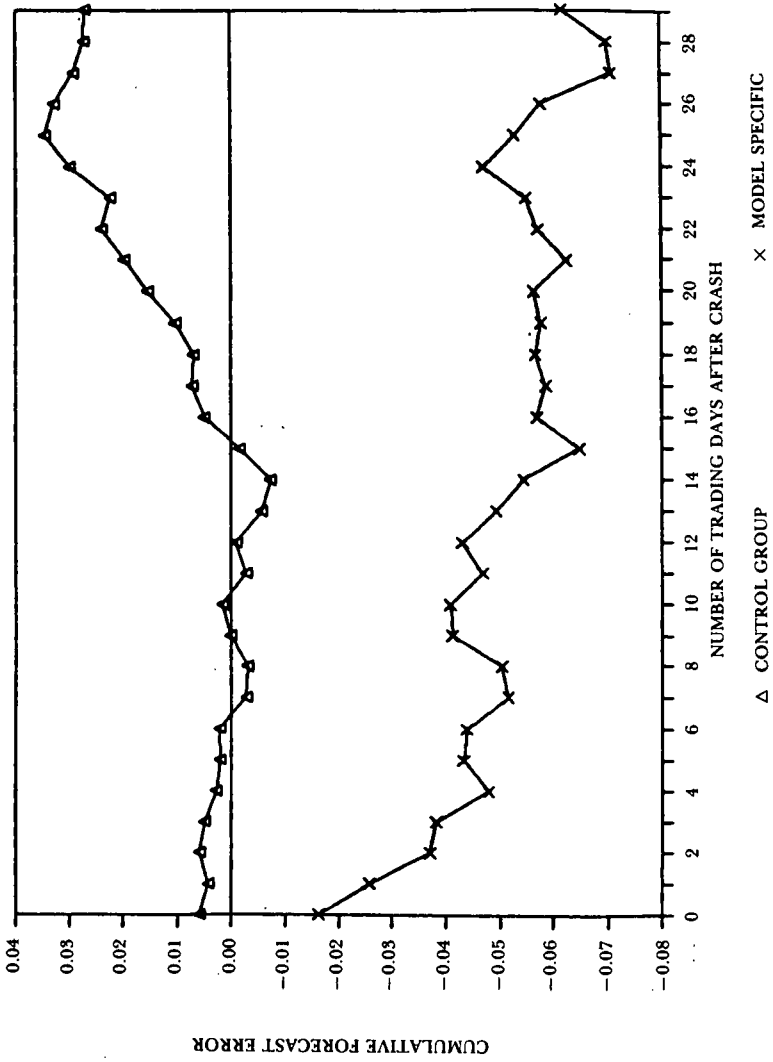

Figure 1 plots the cumulative forecast errors for the two subsamples against time. Day O, on the horizontal axis, is the day of the crash and subsequent stock trading days are marked in intervals of two. Figure 1 shows that the mean forecast error on the day was -1.62% for the decrease in the stock price of the manufacturer relative to the prediction of the model.[39]

Subsequent days indicate generally insignificant forecast errors, suggesting that there was no later effect and that the initial negative impact on the suspect firm's stock price was not eradicated in subsequent trading.[40] The second conclusion to be drawn from Figure 1 is that the performance of the suspect group is different from the performance of the control group. The cumulative forecast errors for the control group are insignificant throughout the prediction period. In particular, there is no evidence of negative abnormal performance on the day of the crash. Taken together, the results of these two samples reject the hypothesis that there is no market response to aircraft accidents and are consistent with the hypothesis that accidents reveal information to consumers through the depreciation of a suspect manufacturer's reputation. To transform the fall in a suspect manufacturer's stock price into the dollar decrease in the value of the firm's equity, multiply the price change by the numer of outstanding shares. This procedure applied to the data in Figure 1 yields an average decrease in market value of $57,000,000.[41]

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[39] This is the *mean* stock market response from a sample in which some crashes showed smaller responses and others much larger responses.

[40] The forecast errors for days 1 and 2 are -0.95% and -1.12% respectively and each is statistically significantly different from zero at the 5% level in a one-tailed test. This post-crash date negative stock performance may be due to further bad news or a failure to correctly "time" the result that news reached the stock market. For example, if an accident occurred at 2:15 p.m. Eastern time, is it correct to assume that news reached the stock market that trading day, or was the news carried by the wire services after the market's 4:00 p.m. close?

[41] Not all of this amount can be explained by the legal costs of accidents. There has never been a successful punitive damages suit against a commercial airplane builder, so the large components of legal costs are insured. Any change in the stock price results from a change in expectations, such as a change in insurance

Reputation effects can be much larger than the mean value, as in the case of the May 25, 1979, Chicago DC-10 crash.[42] It was widely believed at the time that the intrinsic design of the aircraft was to blame. As one observer stated:

> The apparent structural failure of a modern jetliner caused reverberations throughout the world. Hundreds of DC-10s carrying thousands of passengers were being flown millions of miles each day by scores of domestic and international airlines. The accident took place in normal weather. There could be no contention of low level wind shear, vortex turbulence, sabotage or any other outside cause.[43]

Twelve days after the accident the Federal Aviation Administration (FAA) reinforced this initial impression when it took the unprecedented step of grounding the DC-10 by withdrawing its type certificate.[44] Although it was later discovered that improper maintenance was the proximate cause of the accident and the plane's design was only a contributing factor,[45] the DC-10 planes remained grounded for a total of five weeks. If reputation effects are operative, then this is the case in which they should be most apparent.

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premiums. Estimates of the size of this, in present value terms, vary from $0 to $33 million. *See* A. Chalk, *Producer Reputation*, *supra* note 8.

[42] In this accident, the No. 1 engine fell from the wing of the plane at low altitude (1,000 feet) in clear weather as the plane was taking off. *See The Worst U.S. Crash*, TIME, June 4, 1979.

[43] Kennelly, *supra* note 1.

[44] *See FAA Suspends Design Certification, Grounds DC-10's, Prompting a Dispute Over Cause of Plane's Problems*, Wall St. J. June 7, 1979, at 2, col. 2.

[45] National Transportation Safety Board, Aircraft Accident Report: American Airlines, Inc., DC-10-10, N110AA, Chicago-O'Hare International Airport, Chicago, Illinois, May 25, 1979 (1979).

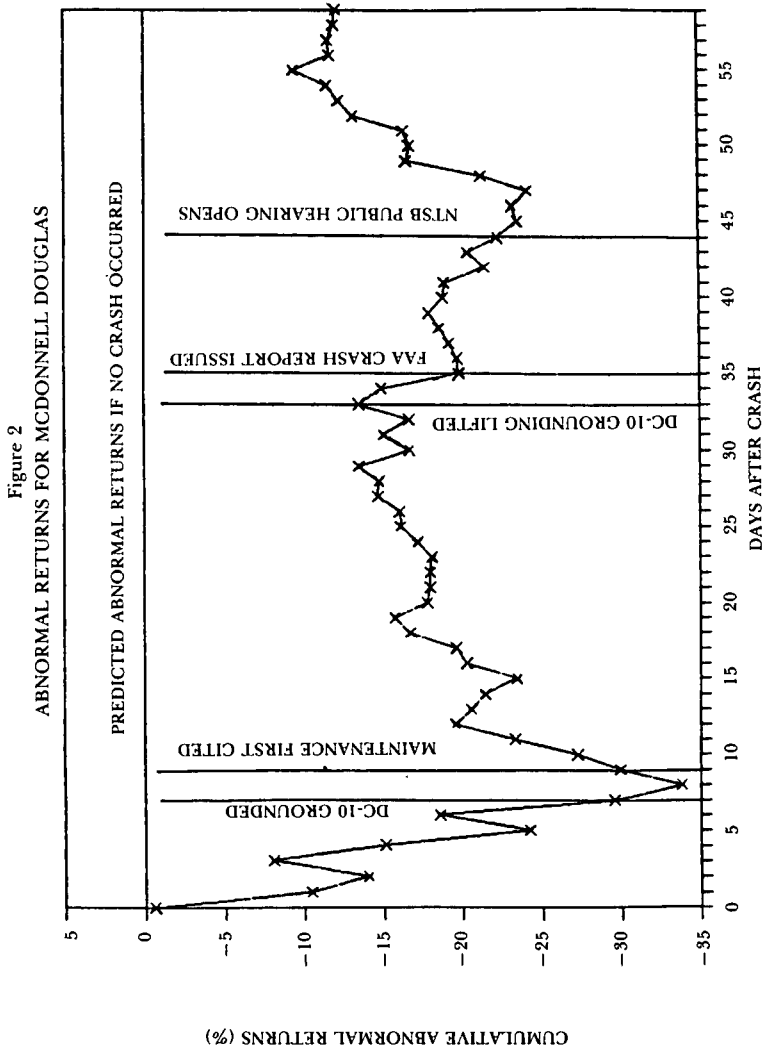
Figure 2
ABNORMAL RETURNS FOR MCDONNELL DOUGLAS
PREDICTED ABNORMAL RETURNS IF NO CRASH OCCURRED
DC-10 GROUNDED
MAINTENANCE FIRST CITED
DC-10 GROUNDING LIFTED
FAA CRASH REPORT ISSUED
NTSB PUBLIC HEARING OPENS
CUMULATIVE ABNORMAL RETURNS (%)
DAYS AFTER CRASH
5
0
−5
−10
−15
−20
−25
−30
−35
0
5
10
15
20
25
30
35
40
45
50
55

Table 1

Major Events Surrounding the DC-10 Crash of 25th May 1979 and Corresponding Abnormal Returns of McDonnell Douglas Corp.

Date	Event	Abnormal Return (%) (Z-statistic)		
		McDonnell Douglas	Boeing	Lockheed
5/25/79, Friday	McDonnell Douglas DC-10 owned by American Airlines crashes in Chicago shortly after take-off from O'Hare Airport (4:04 p.m. EDT).	−0.55 (−0.28)	−0.36 (−0.17)	−0.97 (−0.28)
5/28/79, Monday	FAA issues AD instructing all U.S. DC-10 operators to inspect engine mounting bolts (10:58 a.m. EDT).			
5/29/79, Tuesday	FAA grounds all DC-10s for further inspections by issuing a second AD (8:59 p.m. EDT).	−9.90 (−5.02)	1.33 (0.63)	0.06 (0.01)
5/30/79, Wednesday	Some DC-10s return to service after second grounding	−3.58 (−1.81)	−0.80 (−0.38)	−0.88 (−0.26)
5/31/79, Thursday	"Bolt" theory dismissed. FAA tallies the results of the second inspection. Safety defects were found in 37 of 138 U.S. registered DC-10s (revealed after close). Also, *Wall Street Journal* reports on company's bid to supply F18s to Canada and a $3.9m Army contract.	6.01 (3.04)	0.62 (0.29)	0.61 (0.18)

Table 1 (Continued)

Date	Event	Abnormal Return (%) (Z-statistic)		
		McDonnell Douglas	Boeing	Lockheed
6/1/79, Friday	The Airline Passengers Assn. (APA) announces it will file suit to ground all DC-10s until the problem(s) that caused the crash of Flt. 191 can be found and corrected	−7.10 (−3.60)	0.15 (0.07)	−0.87 (−0.25)
6/4/79, Monday	NTSB issues its safety recommendations publicly. FAA announces that the second inspection it ordered may have caused more damage. Some DC-10s are regrounded at 9:00 p.m. EDT.	−9.07 (−4.60)	0.57 (0.27)	−0.74 (−0.22)
6/5/79, Tuesday	Federal judge orders all DC-10s be grounded until the cause of the Chicago crash is found and the problem cured (4:45 p.m. EDT). FAA wins a stay of the order (9:30 p.m. EDT) to contest it in court the following day.	5.67 (2.87)	1.10 (0.52)	5.46 (1.59)
6/6/79, Wednesday	At 3:00 a.m. EDT and FAA decides to ground all DC-10s and starts informing operators immediately. McDonnell Douglas learns of it at 5:45 a.m. EDT. At 9:00 a.m. EDT the FAA announces that it does not object to the temporary restraining order. AT 2:00 p.m. EDT the FAA explains its position at a press conference.	−10.93 (−5.53)	3.71 (1.76)	1.44 (0.42)

Table 1 (Continued)

Date	Event	Abnormal Return (%) (Z-statistic)		
		McDonnell Douglas	Boeing	Lockheed
6/7/79, Thursday	Two DC-10 customers rumored to be ready to cancel orders to 10 DC-10's worth $400m. McDonnell receives $110m Air Force Contract.	−4.24 (−2.15)	0.62 (0.30)	0.95 (0.25)
6/8/79, Friday	Maintenance emerges as the principle cause of the crash. Court battles to lift the grounding figure prominently. McDonnell wins Allegheny order to 10 DC-9's valued at $115m.	3.92 (1.99)	−0.28 (−0.13)	0.77 (0.22)
6/11/79, Monday	Congressional Hearings start	2.69 (1.36)	−0.14 (−0.06)	−1.32 (−0.39)
6/15/79, Friday	Judge Robinson issues order staying further proceedings.	−0.86 (−0.44)	−0.26 (−0.09)	−1.47 (−0.43)
6/18/79, Monday	The NTSB tells a Congressional hearing that the American Airlines DC-10 that crashed was probably damaged during maintenance in March.	−1.98 (−1.00)	0.35 (0.16)	2.33 (0.68)
	European airlines agree on a maintenance plan that would allow their DC-10s to fly again — but no in U.S. airspace.			
6/19/79, Tuesday	FAA clears the Boeing 747, Airbus A300B and Lockheed L-1011 of faults similar to the DC-10s.	3.12 (1.58)	−0.88 (−0.42)	−1.28 (−0.35)
	European airlines resume non-U.S. DC-10 flights.			

Table 1 (Continued)

Date	Event	Abnormal Return (%) (Z-statistic)		
		McDonnell Douglas	Boeing	Lockheed
6/25/79, Monday	At hearings before an administrative law judge of the NTSB, the FAA and McDonnell Douglas agree to a one week postponement to try and reach an out-of-court settlement.	−2.06 (−1.04)	−0.84 (−0.40)	−0.20 (−0.06)
7/4/79, Wednesday	FAA announces it will tighten its supervision of carrier maintenance procedures.			
7/6/79, Friday	FAA announces it hopes to lift grounding order on Tuesday, 10th July. Planes would not fly until 24 hours later due to court imposed moratorium.	−0.02 (−0.01)	2.15 (1.00)	−0.17 (−0.05)
7/10/79, Tuesday	FAA says that the design of the DC-10 pylon assembly poses safety hazards and recommends changes.	−3.22 (−1.63)	−2.04 (−1.00)	−1.21 (−0.36)
7/13/79, Friday	DC-10 type certificate reinstated. Planes start flying again.	3.16 (1.60)	−1.15 (−0.54)	−0.59 (−0.17)
7/17/79, Tuesday	FAA charges McDonnell Douglas made manufacturing mistake, quality control broke down. American Airlines defends its maintenance practices, which were also critized.	−4.93 (−2.49)	−2.54 (−1.20)	−3.65 (−1.06)
7/30/79, Monday	A metallurgist at NTSB hearings blames American Airlines for the Chicago crash.	−1.86 (−0.94)	1.57 (0.75)	0.83 (0.24)

The results in this case are much more dramatic than in the previous case. Figure 2 and Table 1 show the significant events from the date of the crash until 60 days thereafter. Note that the forecast errors of the model are much larger in magnitude than the mean forecast error in the large sample. The forecast errors are statistically significant, and have the correct coefficient in virtually every case.[46] At its lowest point, June 7, the day after the announcement of the grounding, McDonnell Douglas experienced a cumulative forecast error of -33% since the crash. This amounted to a decrease of $350,000,000 in the market value of McDonnell Douglas stock. The market value of McDonnell Douglas stock subsequently recovered when it was announced that improper maintenance was the major cause of the accident; the loss in market value had shrunk to $157,000,000 by July 13.

These results dramatically reject the hypothesis of no market response and are consistent with the alternative hypothesis of a negative reputation effect. The decrease in the stock price measures the reduction in owner wealth and, although the stock market is the place of measurement, this is a reflection of changes in the product market.[47] These results cannot show that the information conveyed to the public through aircraft accident publicity is sufficient for the market to adjust completely, but the results do indicate that the traditional assumption of complete market failure is misguided.

This evidence of consumer information responses has immediate implications for products liability law and the reform proposals cited earlier.[48] The optimal liability rule[49] depends on the rate of consumer information.

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[46] The lone exception is Tuesday, June 5.

[47] This is an implication of economic theory's assumption of stockholder wealth maximization. If aircraft accidents did not cause a product market impact, then no wealth impact would result and there would be no reason for investors to revalue stock prices downwards. *See generally* T. COPELAND & F. WESTON, FINANCIAL THEORY AND CORPORATE POLICY (2d. ed. 1983).

[48] *See supra* notes 3, 7 and accompanying text.

[49] *See supra* notes 12-30 and accompaning text.

Wrongful death and personal injury cases in aircraft accidents are litigated under a negligence standard that almost invariably leads to the plaintiff's recovery from one or more of the defendants.[50] The alleged absence of consumer information argued against the transfer of any liability to the plaintiff, or, equivalently, that the market can solve aircraft safety problems unassisted. However, the data presented above is the first systematic evidence to bear directly on the issue of airline consumer responses and it indicates that the assumption of complete consumer ignorance is false. Alternative legal approaches are now up for consideration as better, even if not ideal, ways to deal with the losses from commercial airplane accidents.

IV. AN ALTERNATIVE FRAMEWORK FOR AIRCRAFT ACCIDENT LITIGATION — THE MARKET INSURANCE PLAN

A. *Procedural Aspects*

The present system should be replaced with an insurance-based system which allows each consumer to determine his desired level of coverage and purchase insurance up to that amount. In the event of a fatal crash, the insurer would remit the insured amount to the beneficiaries named in the policy. Insurance policies would be sold by commercial insurance companies on the same basis as other lines of insurance.[51] The insurance rates, or cost per dollar of coverage, would be set to reflect the risks involved. The involved risks would depend on the amount of flying done by the insured, the carrier and the type of aircraft flown.

Travel insurance is either implicitly or explicitly part of

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[50] *See generally* J. KENNELLY, THE LITIGATION AND TRIAL OF AIR CRASH CASES (1968).

[51] Not only would the administrative aspects of the market insurance plan be virtually identical to such other major lines as life, auto and fire insurance, but insurers are already heavily involved in various types of travel-related insurance. *See* D. BICKELHAUPT, GENERAL INSURANCE 534-563 (10th ed. 1979).

the total cost of air travel to the consumer. Suppliers of air travel services, carriers and manufacturers could be expected to minimize insurance costs by taking all precautions that cost less than the insurance rate.[52] Suppliers can do this more effectively by permitting insurers' risk assessors to perform inspections and examinations of their facilities and safety practices, as is commonly done in other areas of insurance.[53] In effect, the insurance company monitors safety for consumers. Insurers' policies would state rates per miles traveled or departures taken[54] for each carrier or aircraft type, and the publicity given to these "tariffs" would alter consumers' purchase decisions towards safer suppliers. This increases the safety incentives of less safe carriers. Less safe carriers must either become sufficiently safe to be competitive or be economically forced out of business.

The consumer could choose insurance either at the airport, where insurance agents and the airline itself may offer contracts for specific flights, or in advance for a set period of time, possibly as part of a general life insurance policy. Consumers themselves could explicitly weigh the costs and benefits of greater safety, rather than being forced to buy an air carrier's insurance policy as a tied-in product.[55]

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[52] See Rothchild & Stiglitz, *Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information*, 90 Q. J. ECON. 629 (1976) for a more complete explanation of this point.

[53] This willingness of suppliers to voluntarily submit to insurers' inspection activities is an example of a bonding arrangement, as described for financial markets in Jensen & Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305, 323 (1976).

[54] Departures taken may be a better measure of risk than miles traveled, since the risk of an aircraft accident is not independent of the state of flight. In fact, fifty percent of all aircraft accidents occur during takeoff or landing. *See* NATIONAL TRANSPORTATION SAFETY BOARD, ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA (annually, various issues).

[55] A "tied-in" product is a product that must be bought when another product is purchased. For example, automobile safety belts must be purchased, by law, with the purchase of a new automobile.

B. *The Market Insurance Plan Compared to Other Systems*

The prevailing tort liability system has endured harsh criticism. An insurance based system alleviates the major problems associated with the current tort liability system.

1. *Expeditious Settlement*

The most frequently cited injustice of the current tort liability system is the uncertain delay it imposes on plaintiffs.[56] Many observers allege that the current system creates incentives for defendents to deliberately delay judgment because this places emotional pressure on plaintiffs to settle.[57] It is an indication of the serious nature of this problem that one commentator[58] wrote approvingly that the Juneau, Alaska, crash of an Alaska Airlines Boeing 727 on September 4, 1971,[59] took only 30 months to settle.[60] The same author regards the tort system's settlement of the first widebody case, the Eastern L-1011 crash in the Everglades on December 29, 1972,[61] in just over a year [62] as "an amazing performance by the judicial system."[63]

These examples are not typical of the current tort system. Available evidence indicates mean time from crash to the termination of litigation of about four years.[64]

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[56] *See, e.g.*, Kennelly, *supra* note 1, at 317; Kennedy, *supra* note 3, at 248; Speiser, *Dynamics of Airline Crash Litigation: What Makes the Cases More?*, 43 J. AIR L. & COM. 565 (1977); Schwartz, *Professor O'Connell's Method for Ending Insult to Injury: Can it Solve the Air Crash Litigation Dilemma*, 41 J. AIR L. & COM. 199, 201 (1975) [hereinafter cited as Schwartz].

[57] Schwartz, *supra* note 56, at 202.

[58] Speiser, *supra* note 56.

[59] *See, All 109 Are Killed as Jetliner Hits Alaska Mountain*, N.Y. Times, Sept. 5, 1971.

[60] Speiser, *supra* note 56, at 573. Even after this time there were still a few cases outstanding. *In re* Air Disaster, Juneau, Alaska on Sept. 4, 1971, 350 F. Supp. 1163 (J.P.M.D.L. 1972).

[61] *See, Airliner Crashes Into Everglades with 167 Aboard*, N.Y. Times, Dec. 30, 1972.

[62] *In re* Air Crash Disaster at Florida Everglades, 360 F. Supp. 139 (J.P.M.D.L. 1973).

[63] Speiser, *supra* note 56, at 574.

[64] McDermott, *A Plea for the Preservation of the Public's Interest in Multidistrict Litigation*, 37 J. AIR L. & COM. 423, 426 (1971), finds a mean time from crash to termination in commercial air crash litigation prior to 1971 of 3 years and 8 months for

However, some litigation has taken up to a decade to complete.[65]

The market insurance plan, by contracting for such contingencies *ex ante*, rectifies this problem, at least so far as wrongful death claims are concerned. Standard insurance industry practice suggests that such claims could normally be settled in less than a week.[66] Injury claims may take longer due to the difficulty of a definitive medical assessment.[67] However, such problems are already dealt with in other insurance lines and are not new or unsolvable.[68]

2. *More Accurate Determination of Compensation*

A second issue arising from the delay of judgement is the amount of damages plaintiffs can expect to recover if they prevail. The core determinant of the plaintiff's compensation is lost expected future earnings.[69] However, this measure of the value of life has no basis in economic theory.[70] Its only value is as a crude approximation of the value the plaintiff, or the plaintiff's decedents, would have placed on the deceased's life.[71] Some jurisdictions appear to acknowledge this by recognizing other grounds for compensation to injured parties, such as loss of consortium, pre-death pain and suffering, and surviving next of kin's mental pain and suffering.[72] Nonetheless, when each case is over, the court has no idea whether it undervalued or overvalued the deceased's life.

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crashes not transferred under multidistrict litigation, and 3 years and 7 months for transferred cases. *Id.*

[65] *Kennelly, supra* note 1, at 317.

[66] *See* D. BICKELHAUPT, *supra* note 51, at 834-53.

[67] *Id.* at 843-53.

[68] *Id.* at 508-43.

[69] *See* R. POSNER, *supra* note 12, at 134-59.

[70] *Id.* at 149-52; Mishan, *Evaluation of Life and Limb: A Theoretical Approach*, 79 J. POL. ECON. 687 (1971).

[71] This is inferred from the fact that the cost of injury to the plaintiff is inversely related to the foregone earnings resulting from the injury. Although this inference assists the court in ranking multiple plaintiffs' claims, it does not fix the correct *level* of awards in any individual case.

[72] *See generally*, Kennelly, *Aviation — The Need for Uniform Legislation*, Seventeenth Annual Air Law Symposium, Southern Methodist University 21-38 (1983).

Seven percent of commercial aircraft victims get nothing[73] — did they really value their lives at zero dollars? No-fault proposals are even more arbitrary in valuing life since they invariably place a ceiling on the maximum allowable recovery for a given injury.[74] This is one of the two most serious objections to no-fault insurance.[75] The amount allowed in recovery bears no relation to the value placed on life or limb by the affected party or parties.[76] Since compensation is argued to be a central purpose of accident law by many legal commentators,[77] no-fault insurance has a critical flaw.[78]

The market insurance plan avoids both the arbitrariness of no-fault plans and the judicial guesswork of tort liability. Consumers contract *ex ante* for the level of coverage they want at given market prices. Settlement on policies is rapid, with the exception of certain personal injury cases involving questions of medical proof.[79]

3. *Uniformity of Recoveries*

Third, the multidistrict structure of the United States legal system creates a number of problems. The most se-

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[73] *See* Schwartz, *supra* note 56, at 201. There is also the vexing problem for tort law of the treatment of collateral source compensation. *Id.* at 203-09.

[74] For example, the O'Connell plan permits producers to prespecify a "menu" of awards for different types of injuries. Once approved by the plan's regulator these would be binding limits. *See* J. O'CONNELL, *supra* note 2.

[75] The other objection is discussed *infra* note 76.

[76] The second objection to no-fault insurance is that it creates a serious "moral hazard" problem. *See* Shavell, *On Moral Hazard and Insurance*, 93 Q.J. ECON. 541 (1979). "Moral hazard" is the effect of insurance on the insured's incentives to take care. Although moral hazard would be serious if enacted for products liability in general, this is unlikely for commercial aircraft since producers take care on behalf of consumers and the small number of firms makes it feasible for the insurance industry to monitor them. *Id.*

[77] *See, e.g.*, G. CALABRESI, THE COSTS OF ACCIDENTS (1970); Schwartz, *Forward: Understanding Products Liability*, 67 CAL. L. REV. 435 (1979).

[78] The O'Connell proposal actually allows producers to specify which risks are covered by no-fault insurance, with compensation controlled by a government agency. This gives producers less incentive to elect no-fault the more difficult it is for the plaintiff to prove fault. *See generally* J. O'CONNELL, *supra* note 2.

[79] With respect to the plaintiff showing proof of injury, the market insurance plan is equal to, but no worse than, the other proposals cited. *See supra* note 3 and accompanying text.

rious of these problems is the arbitrary injustice wrought by differing treatment of the laws of different jurisdictions in choice of laws situations.[80] Many observers and some courts argue for uniform legislation.[81] Such uniformity could, at the very least, insure consistent treatment, even when the specific legal plan can be faulted.

In fact, the problems of multidistrict litigation go deeper than simply consistent treatment of plaintiffs. There are also procedural questions created by the institutions established to deal with multidistrict litigation, such as plaintiffs' committees. Although the consolidation of cases and formation of a plaintiffs' committee expedite trial proceedings, it is argued that these devices can interfere with a plaintiff's rights, as well as lead to

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[80] Kennelly has described this issue in graphic terms:

> In regard to the compensatory damages in wrongful death cases, the statutes of some states permit damages for the mental pain and suffering of the surviving next of kin. Others do not. Some states permit damages for the loss of society, companionship, services and consortium to the surviving spouse. Others do not. Some states permit damages for pre-death pain and suffering. Others do not. Some states permit damages for loss of inheritance. Others do not. Some states permit punitive damages in both injury and death cases. Others deny punitive damages in both injury and death cases, while still others permit such damages in injury cases, but not in death cases. Some states allow punitive damages based upon vicarious liability. Others require proof of egregious conduct of a corporation at a managerial level. Some states impose an arbitrary amount of damages for the deaths of single persons without dependents. Others do not. Some states allow prejudgment interest, i.e., interest from the date of death. Others do not. Even as to those states which allow prejudgment interest, the rates of interest vary substantially. There are other patently indefensible differences among the laws of the states regarding damages in wrongful death cases. Under Florida law, for example, which permits damages for mental pain and suffering of next of kin, an award of $1.8 million in damages was affirmed for the death of a 16-year-old boy, as a result of the crash of a commercial airliner. Indiana law, on the other hand, limits the damages in such a case to funeral expenses and nominal costs for administering the estate. This is hardly consonant with common sense or with anyone's concept of justice.

Kennelly, *supra* note 72, at 23.

[81] *See, e.g., In re* Air Crash Disaster Near Chicago, Illinois On May 25, 1979, 500 F. Supp. 1044, 1054 (N.D. Ill. 1980), *aff'd in part*, 644 F.2d 594 (7th Cir.), *cert. denied sub nom.*, Lin v. American Airlines, Inc., 454 U.S. 594 (1981); Kennelly, *supra* note 1, at 316-18; Corrigan, *supra* note 3, at 509-11.

practical problems such as intra-committee conflict.[82] Moreover, it can be argued that trial of consolidated cases abrogates the constitutional right to trial by jury[83] or to choose one's own attorney.[84]

The dual problem of separate plaintiffs and parallel federal-state jurisdiction gives rise to final criticism of multidistrict litigation on practical and equitable grounds.[85] The estoppel implications of separate decisions are still open, courts having rendered conflicting decisions in the past.[86]

Despite the problems of multidistrict litigation, the case for national legislation is far from settled. Other scholars and trial lawyers argue with equal fervor that federal codification would usurp states rights,[87] although practical

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[82] See Kennelly, *supra* note 1, at 294-97, for a description of some of these problems and how they impinged on Flight 191 litigation.

[83] Farrell, *Multidistrict Litigation in Aviation Accident Cases*, 38 J. AIR L. & COM. 159, 167 (1972). *But see* MacAlister v. Guterma, 263 F.2d 65, 68-69 (2d Cir. 1958) (district court properly consolidated shareholders' derivative actions under F.R.C.P. 42(a)).

[84] The Fifth Circuit Court of Appeals, commenting on a dispute over the award of attorneys' fees to district court-designated "lead counsel" out of the fees of employed counsel, said that the appellants' approach was:

> [A] nostalgic luxury no longer available in the hard-pressed federal courts. It overlooks the much larger interests which arise in litigation such as this. Each case in the consolidated case was private in its inception. But the number and cumulative size of the massed cases created a penumbra of class-type interest on the part of all the litigants and of public interest on the part of the court and the world at large. The power of the court must be assayed in this semi-public contest.

In re Air Crash Disaster At Florida Everglades on December 29, 1972, 549 F.2d 1006, 1012 (5th Cir. 1977).

[85] If a case is tried first in state court and results in a defense verdict, the federal court is not bound to follow that verdict. On the other hand, a state court is bound by a defense verdict in federal court. Kennelly, *supra* note 72, at 30.

[86] *Compare In re* Multidistrict Civil Actions Involving the Air Crash Disaster near Dayton, Ohio 350, F. Supp. 757, 768 (S.D. Ohio 1972) (subsequent plaintiffs collaterally estopped) with Humphreys v. Tann, 487 F.2d 666 (6th Cir. 1973), *cert. denied*, 416 U.S. 956 (1974) (court of appeals reversed federal district court decision that subsequent plaintiffs were collaterally estopped).

[87] Haskell, *Federal Codification of Tort Law: An Unwarranted Usurpation of State Systems of Common Law*, Seventeenth Annual Air Law Symposium, Southern Methodist University 41-49 (1983).

and procedural problems also loom large.[88]

The issue becomes irrelevant under the market insurance plan. Sovereignty is transferred to the individual consumer, who can decide for himself the answers to the various issues through his insurance purchase decision. There is no need for a judge to second-guess plaintiffs' preferences about such issues as the composition of the plaintiffs' committee, the extent of pretrial discovery, and other such matters since these issues are either circumvented or their terms are contractually established in advance.[89]

4. *Mulitiple Defendants*

Fourth, it is not unusual for aircraft accident litigation to involve multiple defendants,[90] each of whom concedes that one of them is liable but none of whom will accept liability. This creates the costly, time-consuming process of inter-defendant charges and rebuttals during which the plaintiffs, who patently *will* eventually recover, must sit and wait.[91] In a world of certainty in which all courts

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[88] *See, e.g.*, Dombroff, *Against a Federal Law for Air Disaster Litigation*, 10 THE BRIEF 30 (1981); Haskell, *Federal Regulation Not Needed for Airline Liability*, 10 THE BRIEF 26 (1981).

[89] Under the market insurance plan the plaintiff makes the decision about how much insurance to buy for various types of injuries. Insurance policies are provided at cost in a perfectly competitive insurance market. *See supra* notes 51-55 and accompanying text. By contrast, a no-fault plan, such as the O'Connell plan, sets arbitrary damage awards that may be widely at variance with consumer demands. *See* J. O'CONNELL, *supra* note 2 and accompanying text; *See also supra* note 7.

[90] Typically, the carrier and the manufacturer are both defendants. In some cases the FAA is also named as a defendant. For instance, McDonnell Douglas and American Airlines may both concede that one of them was liable but may not accept individual liability. Circumstances put the defendants at odds, necessitating time consuming and expensive plaintiff discovery proceedings.

[91] To quote Kennelly:

> There are many aviation cases in which the liability of *at least* one of the defendants is unquestionable. In other words, the facts in the case are such that no court would permit a defense verdict in favor of *all* defendants. The plaintiffs have no interest in how the defendants' liabilities are allocated. The only genuine liability issue in most commercial accident cases involves the extent of the liability of the various defendants in terms of their comparative negligence vis-a-vis one another.

awarded the correct amount of prejudgment interest and plaintiffs could borrow without cost in the capital market at the same implied rate,[92] inter-defendant squabbles would not impose any costs on plaintiffs. However, the present tort system itself creates uncertainty about the length of time until judgment, which prevents plaintiffs from borrowing in the capital markets at a rate comparable to the rate awarded in prejudgment interest. An insurance system does not assign liability *ex post*, thus circumventing problems.

5. *Administrative Costs*

Finally, a comparison of tort liability as it presently exists with the insurance proposal explained above must address the relative administrative costs of the two systems.[93] If an insurance system is too costly to operate, then its other advantages are irrelevant. The approximate cost of operating an insurance system[94] can be estimated from the costs of similar, pre-existing types of insurance, such as automobile or personal accident insurance.

Using these figures, a reasonable estimate of such administrative costs is five to ten percent of each premium dollar.[95] By contrast, evidence on the proportion of tort liability awards that ultimately reach plaintiffs in aircraft accident cases indicates that plaintiffs receive only fifteen to twenty percent of the total amount spent in insuring,

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Kennelly, *supra* note 72, at 31.

[92] If capital markets operated without cost, then plaintiffs expecting damage awards in the future would be able to borrow the expected present value of the award at the time of injury and repay the loan when the award was received. The point is that the prospect of a damages award and its timing is so uncertain under the existing tort system as to make it very poor loan collateral. For the theory of competitive capital markets, see generally E. FAMA & M. MILLER, THE THEORY OF FINANCE (1972).

[93] To see the importance of administrative costs to the evaluation of alternative dispute resolution mechanisms, see G. CALABRESI, *supra* note 77.

[94] Examples of the costs of operating an insurance system are the insurer's overhead costs and settlement expenses.

[95] *See* D. BICKELHAUPT, *supra* note 51.

defending, and paying claims under the current system.[96] Contingent attorneys' fees in some jurisdictions reach as high as fifty percent of awards.[97] Extended discussion has not resulted in proposals that would make the tort system more administratively efficient.

C. *Is Uniform Legislation the Answer?*

Proposals for uniform legislation, whether by the National Commissioners on Uniform State Laws or through federal legislation, deserve separate attention since they are the most likely reform to result from the present dissatisfaction.[98] Regardless of which method is chosen, the benefits of a uniform reform should not be overstated. Uniform legislation will do what its name suggests, unify some fifty disparate systems of law, but it will not resolve all the problems attributed to existing aircraft law. Uniform can mean uniformly wrong. If recently proposed legislation is any guide, many existing problems will persist and some new ones will be created as well.[99]

There is little reason to believe that the National Commissioners on Uniform State Laws will be more successful, since the multijurisdictional nature of the United States tort system is not the basic problem. Despite the heated emotions inevitably generated by proposals to supplant state with federal jurisdiction, the issue is a red herring. Although uniform legislation *could* equalize damage awards, resolve parallel litigation inconsistencies, and *possibly* shorten the delay from crash to resolution, the remainder of the inequities ascribed to state jurisdiction would go unaddressed. Multidefendant disputes would

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[96] Martin, *The Manufacturer's View of "No-Fault"*, 41 J. AIR L. & COM. 223, 234 (1975).

[97] Schwartz, *supra* note 56 at 201.

[98] Various bills to enact uniform legislation have advanced further in Congress than have other types of proposals, and a uniform products liability law appears to be near passage. *See* Lamar, *Proposed Federal Legislation Affecting Products Laibility and Aviation Law*, Seventeenth Annual Air Law Symposium, Southern Methodist University, 3-19 (1983)[hereinafter cited as Lamar].

[99] See Lamar, *supra* note 98, at 5-8, and Kennelly, *supra* note 1, at 293-97, for a description and general assessment of proposed and existing legislation.

still exist, questions would still surround the composition of plaintiffs' committees, and the size of awards would still be a judicial guess as to the worth of a particular plaintiff's life. If a good system of uniform legislation were instituted tomorrow, legal debate about many problems we experience now would begin immediately.

V. CONCLUSION

This catalog of the shortcomings of the present aircraft litigation system and the comparison of its performance with the proposed insurance based system points to a clear conclusion. The insurance proposal is immune from the major criticisms of the current tort system. The underlying reason is that tort liability is a system best suited to resolving conflicts between parties which are apart. On the other hand, insurance is an example of contract between parties who interact in advance. Mass air travel, for all of the superficial indications that it involves interactions between strangers, is closer to a contractual relationship than is widely believed.

The evidence presented earlier[100] showing stock price reactions to aircraft accidents indicates market responses to perceived new information and contradicts the strict "market failure" view required for efficient strict liability.[101] Because such clear evidence of market response was not previously available, it is not altogether surprising that most observers have responded to failings in the present structure of aircraft accident law with proposals that exclude an effective role for consumer choice.[102]

There is no need to settle for a second-rate system when institutions already exist to institute a superior program. The insurance industry insures far more complicated risks than commercial air carriers,[103] and consumers engage in far more complicated transactions than travel

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[100] *See supra* notes 35-50 and accompanying text.

[101] *See supra* notes 12-31 and accompanying text.

[102] *See generally supra* note 3.

[103] For example, commercial insurance for oil shipments through the Straits of

insurance.[104] A carefully structured insurance system would transfer the locus of decision-making authority to the consumer and, by so doing, eliminate the major problems of tort liability. It is not possible or necessary to claim that an insurance system would work perfectly nor have I made such a suggestion. The point is that the present system is inadequate and proposed reforms do not address the genesis of the problems. An insurance system goes to the heart of the issue — the locus of decision-making authority — and thereby permits participants to take safety precautions and establish optimal compensation levels.

Hormuz or the loss on major commercial ventures are more complicated risks than those risks associated with commercial air carriers.

[104] Compare the simple decisions involved in travel insurance with the consumer's analysis of the complicated contingent claims entailed in the purchase of life insurance.

APPENDIX

Methodology for Computing the Forecast Errors

Define P_{it} = price of security i in period (day) t.
D_{it} = dividend of security i in period (day) t.

Then $R_{it} = \dfrac{P_{it} - P_{it-1} + D_{it}}{P_{it-1}}$ = the return on security in the period (day) t

R_{mt} = return on the market portfolio in period (day) t.

The expected return on security i in period t is assumed to behave according to the "market model."[1]

$$R_{it} = \alpha + \beta R_{mt} + \epsilon_{it} \qquad (1)$$

The measure of market returns used in both studies cited in the test is the CRSP (Center for Research in Security Prices) equally-weighted index of all NYSE and AMEX stocks. Equation 1 can be used to estimate the coefficients (α, β) over a time period outside the event period when a crash occurred. The predicted coefficients ($\hat{\alpha}$, $\hat{\beta}$) are then used to obtain predicted returns ($\hat{R}_{it}$) on stock i during the event period. Viz:

$$\hat{R}_{it} = \hat{\alpha} + \hat{\beta} R_{mt} \qquad (2)$$

Under the alternative hypothesis of reputation effects, the forecast error

$$\hat{e}_{it} = R_{it} - \hat{R}_{it} \qquad (3)$$

from equation (2) is negative.

Summing across j crashes (j = 1,...,i,...,n) we can obtain $\bar{\hat{e}}_{it}$, the mean forecast error for each period t:

$$\bar{\hat{e}}_{it} = \sum_{j=1}^{j=n} \frac{\hat{e}_{it}}{n}. \qquad (4)$$

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[1] *See* Sharpe, *A Simplified Model for Portfolio Analysis*, 9 Management Science 277 (1963).

Summing $\bar{\hat{e}}_{it}$ from the event date T + 29 obtains the cumulative mean forecast error CMFE:

$$\text{CMFE} = \sum_{t=T}^{T+29} \bar{\hat{e}}_{it}. \qquad (5)$$

CMFE is reported in Figure 1 (the large sample of crashes) and Figure 2 (the Chicago DC-10 crash). The t-statistics reported in the text are valid if e_{it} is normally distributed. Refer to the original papers *Products Reputation* and *Market Forces* for full details of the statistical tests and econometric checks conducted in the course of the analysis.