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Abstract

Insurance catastrophes are increasingly the result of actions by human beings rather than nature. Chief among these insurance changes has been the surge in tort liability insurance costs. Unfortunately, the courts have misunderstood the mechanisms for transmitting these costs throughout the economy. A principal deficiency is that the structure of liability has been inconsistent with the courts' assumption that the losses could be borne by consumers or parties other than the insurer.

Key words: catastrophes, torts, asbestos, insurance, liability

1. Catastrophes in perspective

A principal theme of Richard Zeckhauser's [1995] paper is that financial disasters have increasingly been caused by human beings. This observation, which has often been overlooked, will provide the basis for my analysis of the increasing role of the liability system.

Table 1 summarizes the largest U.S. disasters. A couple of observations are particularly striking. First, the largest disasters in terms of the highest number of fatalities within any particular category occurred early in the century. The most catastrophic flood happened in 1900. The most serious hurricane damage occurred in 1928. The most fatalities from a tornado occurred in 1925. Similarly, the highest fatality rates for various disasters occurred in 1906 for earthquakes, in 1865 for marine accidents, in 1979 for aircraft, in 1918 for railroads, in 1871 for fires, in 1947 for explosions, and in 1907 for mines. Quite simply, society has adapted in a variety of ways to reduce the risk of death, particularly from natural hazards. Recent instances of large-scale catastrophes have arisen from more recently developed sources of risk, such as aircraft, but even in this case the largest disaster happened almost two decades ago.

A second notable pattern is that many of the largest disasters that have occurred have been caused by human beings. Leading the list are those associated with aircraft, but there have also been serious disasters of other kinds as well. For example, the largest disaster in the workplace in the United States resulted from the collapse of scaffolding in a cooling tower under construction in 1978, which took fifty-one lives.¹ The nightclub fire in Kentucky that took 164 lives in 1977, in part because the exit doors were inoperable, heads the list of human-made disasters other than those associated with aircraft.

Commentary on presentation by Richard Zeckhauser, "Insurance and Catastrophes," Geneva Lecture, Paris, France, May 12, 1995.

Table 1. Largest U.S. disasters by category.

	Location and Type	Number of Deaths	Date of Disaster
Floods	Galveston (tidal wave)	6,000	September 8, 1900
	Johnstown, PA	2,209	May 31, 1889
	Ohio and Indiana	732	March 28, 1913
	St. Francis, CA (dam burst)	450	March 13, 1928
	Ohio and Mississippi River Valleys	380	January 22, 1937
Hurricanes	Florida	1,833	September 16-17, 1928
	New England	657	September 21, 1938
	Louisiana	500	September 29, 1915
	Florida	409	September 1-2, 1935
Louisiana and Texas		395	June 27-28, 1957
Tornadoes	Illinois	606	March 18, 1925
	Mississippi, Alabama, Georgia	402	April 2-7, 1936
	Southern and Midwestern States	307	April 3, 1974
	Indiana, Ohio, Michigan, Illinois and Wisconsin	272	April 11, 1965
	Arizona, Tennessee, Missouri, Mississippi, and Alabama	229	March 21-22, 1952
Earthquakes	San Francisco (earthquake and fire)	452	April 18, 1906
	Hawaii, California (Alaskan earthquake-tsunami)	173	April 1, 1946
	Long Beach, CA (earthquake)	120	March 10, 1933
	Alaska (earthquake and tsunami)	117	March 27, 1964
	San Fernando-Los Angeles, CA (earthquake)	64	February 9, 1971
Marine	Mississippi River (<i>Sultana</i> exploded)	1,547	April 27, 1865
	East River (<i>General Slocum</i> burned)	1,030	June 15, 1904
	St. Lawrence River (<i>Empress of Ireland</i> ship collision)	1,024	May 29, 1914
	Chicago River (<i>Eastland</i> capsized)	812	July 24, 1915
	New Jersey (<i>Morro-Castle</i> burned off coast)	135	September 8, 1934
Aircraft	Chicago (crash of scheduled plane near O'Hare Airport)	273	May 25, 1979
	Detroit, MI (crash of scheduled plane)	156	August 16, 1987
	Kenner, LA (crash of scheduled plane)	154	July 9, 1982
	San Diego, CA (two-plane collision over city)	144	September 25, 1978
	Ft. Worth/Dallas Airport (crash of scheduled plane)	135	August 2, 1985
Railroad	Nashville, TN (two-train collision)	101	July 9, 1918
	Eden, CO (two-train collision)	96	August 7, 1904
	Wellington, WA (avalanche hit two trains)	96	March 1, 1910
	Ashtabula, Ohio (bridge collapse under train)	92	December 29, 1876
	Brooklyn, NY (rapid transit train derailment)	92	November 1, 1918

Table 1. Continued.

	Location and Type	Number of Deaths	Date of Disaster
Fires	Peshtigo, WI, and surrounding area (forest fire)	1,152	October 9, 1871
	Chicago (Iroquois Theatre)	603	December 30, 1903
	Northeastern Minnesota (forest fire)	559	October 12, 1918
	Boston (Coconut Grove nightclub)	492	November 28, 1942
	Hoboken, NJ (North German Lloyd steamships)	326	June 30, 1900
Explosions	Texas City, TX (ship explosion)	552	April 16, 1947
	Port Chicago, CA (ship explosion)	322	July 18, 1944
	New London, TX (school explosion)	294	March 18, 1937
	Oakdale, PA (munitions plant explosion)	158	May 18, 1918
	Eddystone, PA (munitions plant explosion)	133	April 10, 1917
Mines	Monongha, WV (coal mine explosion)	361	December 6, 1907
	Dawson, NM (coal mine fire)	263	October 22, 1913
	Cherry, IL (coal mine fire)	259	November 13, 1909
	Jacobs Creek, PA (coal mine explosion)	239	December 19, 1907
	Scofield, UT (coal mine explosion)	200	May 1, 1900

Source: National Safety Council [1993, p. 15].

For the most part, society has been quite effective in reducing risk to life and health. Many of the most costly disasters are those associated with property damage rather than with the loss of human life. The most costly insured catastrophe to date is 1992's Hurricane Andrew, which generated \$15.5 billion in insured losses due to wind, flooding, and tornadoes [Insurance Information Institute, 1994, p. 86]. In terms of loss of life, this event did not even rank among the five most serious U.S. hurricanes in history or the twelve most serious natural disasters from 1973 through 1993. However, in terms of financial risk, we continue to remain highly vulnerable.

Many of the most costly disasters, however, represent those associated with human actions that generate liability. By almost any standard, the Exxon *Valdez* disaster, Dalkon Shield, asbestos, and breast implants litigation would rank among the largest insurance disasters. In the case of breast implants, for example, companies have already established a \$4.5 billion trust fund to cover potential losses associated with claimants who had breast implants, and even this trust fund is believed to be inadequate.

Indeed, the insurance crisis in the United States during the 1980s was almost synonymous with the liability crisis.² Within a three-year period from 1984 through 1986 general liability premiums soared. The staggering increase in this line, which includes product liability, was 14 percent in 1984, 78 percent in 1985, and 68 percent in 1986. Medical malpractice premiums experienced a rise that was almost as great. Although premiums have since stabilized at this high level, the overall insurance premium level has greatly increased, and much of the stabilization has occurred from companies withdrawing from the market altogether and firms increasingly opting for self-insurance. In the discussion below, I examine why there has been a surge in liability and why insurance markets will continue to be ill-equipped to deal with this phenomenon.

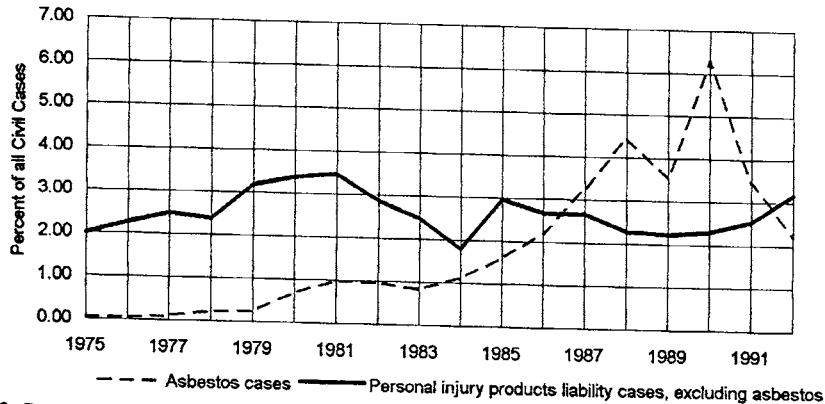


Figure 2. Personal injury products liability cases as a percentage of all civil cases, 1975-1992.

constituted only two percent of all product liability cases in the U.S. federal courts. By 1989, this figure had reached 61 percent, and in 1990, 73 percent of all Federal product liability cases were asbestos related. As these cases have worked their way through the system, the asbestos caseload diminished to 41 percent by 1992. The time pattern is one that would be expected given the massive wave of exposures, particularly during World War II, which have subsequently decreased since the advent of asbestos regulation in the 1970s.

The difficulty for firms is that there was no immediate feedback for the emergence of asbestos-related cancers. Although the acute lung impairment risks of asbestos have been well known, the cancer risks have not been as well understood. The substantial time lag before the illnesses became apparent meant that the liability system created very weak incentives for safety. Insurers could not anticipate the ultimate costs both because they did not fully appreciate the product risks and because the legal doctrines that would be applied to the asbestos exposures had not yet been developed.

Even after the crisis had emerged, insurance companies were not able to estimate precisely the extent of the ultimate liability. In 1980, the best insurance company estimates of the worst-case scenario was that there would be 80,000 claims.⁴ However, for this same group of companies, the actual number of claims that were experienced by 1990 was 180,000. It is not feasible to adequately insure a risk that cannot be accurately anticipated, which is likely to be the case for such one-time-only events in a liability system in which the rules are constantly changing.

The leading asbestos producer was able to shield itself from much of the liability burden by reorganizing itself under U.S. bankruptcy laws. Manville set up a \$2.6 billion trustfund in 1988 and a \$300 million property cost fund. Within one year after the funds establishment, the claims exceeded the total cash on hand. Despite successive infusions of resources, the settlement fund provided by Manville is believed to be substantially inadequate—by some estimates with a \$6 billion shortfall. However, the deep-pocket insurance companies have no comparable reorganization option, leading to severe financial strains on Lloyds of London and other insurers.

One of the tragedies of the asbestos litigation is that even from the standpoint of asbestos victims this was a highly inefficient mechanism for transferring income. The average

litigation costs were \$25,000 per plaintiff and \$95,000 per defendant for each closed claim. Overall, plaintiffs got 59 percent of the award, and defendants spent 58 percent of the award on defense costs. The result is that litigation costs were \$2.71 per \$1.00 of compensation provided.

4. Adverse consequences of liability

The surge in liability costs has also led to adverse economic repercussions. In the case of the U.S. private aircraft industry, firms manufactured 17,000 planes in 1979. Because of the high liability costs, which had reached \$100,000 per plane, production levels declined to 1,085 by 1987. These liability costs arose as firms were sued in 90 percent of all crashes even though pilot error was responsible for 85 percent of all accidents.

The market that has been perhaps hardest hit is that for pharmaceuticals. Adverse reactions to vaccines create accident victims even though there is no defect in these health-enhancing products. In 1981, thirteen companies produced vaccines for the five serious childhood diseases. This number dropped to three by the end of the decade.

Medical devices have also been high on the litigation list. The National Academy of Sciences concluded that U.S. companies have all but terminated their research on new contraceptive devices or any other products related to the birth process [Financial Academy of Sciences, 1990]. G.D. Searle terminated production of the Copper-7 intrauterine device after spending \$1.5 million to successfully defend itself in four suits, since the litigation costs loomed particularly large when compared to the annual sales of \$11 million. The A.H. Robins company reorganized as a result of the Dalkon Shield litigation and established a \$3 billion compensation fund.

Even in situations in which there was no bankruptcy, liability costs often have substantial effects on firm product liability. Reports in the *Wall Street Journal* of two adverse judicial decisions in the Agent Orange litigation led to stock market losses of \$221 million and \$136 million for the Dow Chemical Company. The stakes involved in liability are enormous, and the consequences both for insurers and the companies themselves are considerable.

5. Conclusion

Aggregate catastrophes that involve large losses for large numbers of people tend to be fairly infrequent. As a society, we have adopted substantial protective measures to limit their consequences. Moreover, writing insurance for such catastrophes is at least feasible since the liability regime associated with natural disasters has been stable.

In contrast, the liability costs associated with product liability, medical malpractice, and environmental risks has involved unpredictable risks coupled with unpredictable liability rules. Part of the blame no doubt should be assigned to insurers. For the most part, U.S. insurance companies behave as classical statisticians rather than as Bayesians. They update the risk assessments too slowly in the presence of changing economic circumstances. By tradition, these companies wait until the loss experience develops before adjusting

premiums. However, failure to respond quickly to shifts in liability rules that will have far-reaching consequences can undermine the viability of the insurance operations.

In the case of natural catastrophes, one seeks to attach the blame to some external force, such as an act of God or nature. An external force also appears to be at work with respect to much of the problem with respect to the liability crisis, as the courts have designed the liability rules based on a misunderstanding of how insurance markets operate. However, insurers would also be remiss if they did not assume some blame for themselves. Insurance companies will need to adapt more quickly than they have or else their markets will shrink to include only the safe and predictable insurance lines.

Notes

1. These statistics as well as those in the rest of this paragraph are drawn from the National Safety Council [1994, p. 15].
2. For further documentation of the statistics cited in this paragraph see Viscusi [1991].
3. For further discussion of the asbestos-related issues see Viscusi [1991].
4. This estimate was prepared for Lloyds of London and is discussed in Sinfield [1994].

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