Economic Analysis of Limitation of Shipowners’ Liability

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I. INTRODUCTION

Limitation of liability is a feature common to all areas of shipowners' liability.\(^1\) Historically, its justification has been the encouragement of investment in the national shipping sector.\(^2\) The modern-day justification its supporters rely upon is either the lack of capacity or the prohibitively high cost of insurance for unlimited liability.\(^3\) Its most criticized consequence is the deprivation of adequate compensation to victims of maritime accidents.\(^4\) As a result, recent changes in maritime liability laws focus on increasing compensation,\(^5\) sometimes from sources other than liable parties.\(^6\) This approach fails to consider the main goal of a liability system: to deter potentially liable parties from engaging in careless activities. By controlling the magnitude of liability, limitation of liability reduces the expected liability of shipowners and consequently their optimal precaution. It encourages negligent navigation.


2. For historical development of limitation of shipowners' liability, see J. J. Donovan, The Origins and Development of Limitation of Shipowners' Liability, 53 TUL. L. REV. 999 (1979) [hereinafter The Origins of Limitation].

3. For example, the International Chamber of Shipping ("ICS") stated in a submission to the 1976 Limitation of Liability Conference, "The main justification of limitation of liability today is the insurability of the risk with its two elements, the availability of cover and economic cost." Official Records of the International Conference on the Limitation of Liability for Maritime Claims, September 27 1976, LEG/CONF.5/6 112-113 (1983) [hereinafter Official Records of 1976 Liability Conference].


6. For example, some international conventions provide for compensation from international fund sources. See HSN Convention, infra note 14, art. 14.1.
Part II of this paper explains why deterrence is properly considered the main purpose of shipowners' liability. Part III analyzes limitation of liability in terms of its effect on potentially liable parties' behavior and its desirability in maritime liability law. Finally, Part IV illustrates the practicality of the analysis.

II. NATURE OF THE PROBLEM

"If my dog kills your sheep and I freshly after the fact tender you the dog you are without recourse against me." This premise formed the basis of limitation of liability in traditional maritime liability law: if my ship caused your loss and I surrendered to you the ship or its value after the incident, I would be relieved from any further liability. Thus, if the ship causing the damage was completely lost in the accident, there was no liability. On the basis of this principle, in the famous TORREY CANYON oil spill of 1967, the liability of the shipowner was held to be $50, while the clean-up cost to the governments of the United Kingdom and France was $18 million.

It is noteworthy that limitation of liability under international maritime liability conventions is determined according to either the tonnage of the ship or its per-passenger liability limit.

Fast-forwarding forty years from the TORREY CANYON incident, today maritime liability is in much better shape, at least in terms of compensation. Liability limits under general maritime liability

10. The value of the single salvaged lifeboat. Id. at 232.
11. However, the claim was finally settled at $3 million. See Lawrence I. Kiern, Liability, Compensation, and Financial Responsibility under the Oil Pollution Act of 1990: A Review of the First Decade, 24 TUL. MAR. L.J., 481, 503 (2000).
12. See Articles 6 and 7 of the 1976 Convention, supra note 1, at 608–09. However, under the Limitation of Liability Act, the criterion for property damage is still the value of the ship after an incident plus pending freight. The tonnage-based calculation has been part of international maritime law since 1924. See International Convention for the Unification of Certain Rules relating to the Limitation of Liability of the Owners of Sea-going Vessels, x L.N.T.S. 2763 (1924) [hereinafter 1924 Convention].
conventions have been increased twice since the TORREY CANYON spill. Special liability regimes with much higher limits were adopted for oil pollution from tankers and for damage from some hazardous and noxious substances ("HNS"). Besides substantial increases in the amount of compensation, special liability regimes have various mechanisms such as strict liability, compulsory insurance, and direct action against insurers, which help guarantee compensation for victims of maritime accidents. Despite these modifications, one thing remained unchanged: the right of shipowners to limit liability. In fact, this right is now made almost an indefeasible one. This affects the deterrent effect of liability, which is its main purpose under an economic analysis of law.

Under traditional theory, liability serves two purposes:

13. At the time of the TORREY CANYON incident (general liability for maritime claims including oil pollution was governed by the International Convention Relating to the Limitation of the Liability of Owners of Sea-going Ships, 1957 [hereinafter 1957 Convention]. The 1976 Convention, supra note 1, increased the liability limit such that it was more than double the 1957 amount. In 1996, the figure was increased again, resulting in a liability limit that was 2.3 times greater than the 1976 amount. See 1996 Convention, supra note 1. It is noteworthy that general liability convention applies to all maritime liability unless excluded either by the 1976 Convention itself (see art. 3) or by express provision of special liability regimes. Although there are specific liability conventions on cargo liability and liability for passengers' injury and death or for damage or loss of their luggage, these areas of liability are still subject to 1976 Convention. See PATRICK GRIGGS ET AL., LIMITATION OF LIABILITY FOR MARITIME CLAIMS, 106, 109, 134–36 (4th ed., 2005) [hereinafter LIMITATION OF LIABILITY].


15. Provisions requiring insurance certificates are: Oil Pollution Liability Convention, supra note 5, art. VII; HNS Convention, supra note 14, art. 12; International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001, Cm. 6693, art. 7 [hereinafter Bunker convention]; and art.5 of the Protocol of 2002 to the Athens Convention Relating to the Carriage of Passengers and their Luggage by Sea, reprinted in 6 BENEDICT, BENEDICT ON ADMIRALTY, Doc. No. 2-3B (Frank L. Wiswall ed., 7th rev. ed. 1998). For direct action against insurers, see Article VII.8, Article 12 (8), Article 7 (10), and Article 5(10) of the above conventions respectively and for strict liability see art. 4(1) (a) and (b) of the 2002 Protocol to the Athens Convention.

16. See Article 4 of the 1976 Convention, supra note 1, for exceptions to the limitation of liability.

compensation and deterrence.\(^{18}\) Of the two, compensation seems to be the more dominant purpose both in tort and contract liability.\(^{19}\) Yet when a victim can receive compensation or indemnity for his or her loss from sources other than the liable party, the function of liability as a source of compensation becomes less important. If it were only for compensation, liability might not be desirable. This is especially so when the cost of maintaining a liability system exceeds the benefit, if any, of compensating a victim who would have received compensation from other sources but for liability.\(^{20}\) However, when imposition of liability creates incentives to take care, which in turn reduce losses, the benefits of liability may outweigh the cost, making the liability socially desirable. In other words, the desirability of liability depends on its functional value of reducing harm through deterrence.

In maritime liability settings, victims of maritime accidents will usually receive full compensation or indemnity regardless of shipowners' liability. For example, an owner of damaged or lost cargo will receive indemnity for the loss from his cargo insurers.\(^{21}\) The owners of damaged ships in a collision case will receive indemnity for any uncompensated loss from their hull insurers. The passengers on a ship may receive their unpaid medical expenses or lost earnings from their private insurance or from social insurance.\(^{22}\) The victims of oil pollution on the sea will get


\(^{19}\) It is expressed retrospectively in tort (to put the victim back where he would have been, had the tort not occurred) and prospectively in contract (to put the promisee in a position where he would have been had the contract been performed), although the outcome is same i.e., to pay the plaintiff for his loss. See F. D. ROSE, *Marine Insurance: Law and Practice* 487 (2004).

\(^{20}\) SHAVELL, FOUNDATIONS, *supra* note 17, at 635–38. In such a situation, the desirability of liability as a mechanism for compensation will depend on the value we assign to the classical notion of corrective justice, the idea that a wrongdoer must fully compensate his victim. The value placed on this notion may not be high, or at least not high enough to justify the cost of a system of liability, when seen in light of the fact that that victim will be compensated regardless of liability (e.g., from first-party insurance) and that it is not the wrongdoer but his liability insurer who pays the liability judgment.


\(^{22}\) Passengers who do not have private insurance are likely to be from low-income bracket of the society and their loss of earnings from an accident will unlikely to exceed the limit set out in the either 1976 Convention or the Athens Convention Relating to the Carriage of Passengers and their Luggage by Sea, Dec. 13, 1974, 14 I.L.M. 945. They will thus receive adequate
compensation from various compensation funds. Despite all these sources of compensation or indemnity, liability is still imposed on shipowners. The only conceivable reason for liability, therefore, is deterrence. Limitation of liability will not deprive the victims in any of the above situations of adequate compensation.

This is not to say that victims of maritime losses always receive full compensation from one source or another. Inevitably, there are situations when a victim will not have other sources of compensation and the recoverable damages from the responsible shipowner also falls short of the victim's actual loss because of a shipowner's right to limitation. This is most likely to occur in third-party liability situations where victims are not regular players in maritime activities.

If compensation were the sole objective of liability, special maritime liability regimes could be cited among the best liability regimes in the world. For example, under current oil pollution liability regime, more than $1 billion is available for a single oil spill incident through a three-tier oil pollution compensation regime. The first tier, maximum Special Drawing Right ("SDR"), 89 million ($134.44 million), is the shipowners' liability. The second tier, up to SDR 203 million ($306.64 million), comes from the International Oil Pollution Compensation Fund ("IOPC Fund"), the third tier, up to SDR 750 million ($1.13 billion) comes from the Supplementary Fund. Both these funds are contributed to by the oil companies of the contracting States.

compensation from shipowners. The current liability limit for personal injury or death of per passenger is SDR 175,000 ($264,353) under Article 7(1) of the 1976 Convention, supra note 1, and SDR 46,666 ($70,493) under the 1976 Protocol to the Athens Convention, reprinted in 6 BENEDICT, BENEDICT ON ADMIRALTY, Doc. No. 2-3, art. II (1) ¶ 1 (Frank L. Wiswall ed., 7th rev. ed. 1998). This amount will be increased to minimum SDR 250,000 and maximum SDR 400,000 per passenger, when the 2002 Protocol to the Athens Convention comes into force.

23. See HSN Convention, supra note 14, art. 14.1. They can receive up to SDR 750 million (equal to $1.13 billion) per incident from a three-tier compensation system. See HSN Convention, supra note 14, art. 9, 14.


27. Article 4(2)(b) of the Protocol of 2003 to the Fund Convention, supra note 5.
For oil pollution on Canadian waters, there is an additional national fund, the Canadian Ship-source Oil Pollution Fund ("SOPF"), which exists in case the loss does not fall under the international regime.\(^{28}\) A high amount of compensation will also be available when the HNS convention comes into force. The HNS Fund will provide up to SDR 250 million ($377.65 million) per incident including SDR 100 million ($151.06 million) maximum from shipowners.\(^{29}\) Despite the liberal compensation in these regimes, the deterrent effect of liability may still be hindered by limitation of shipowners' liability, because most of the compensation money in these special liability areas comes from parties who are not directly involved in the navigation of ships.

Although compensation in other areas of maritime liability is not as generous as that for oil pollution or HNS damage, the liability limit has been increased substantially since the TORREY CANYON incident. In general liability regime, the 1996 Protocol, which came into force on May 13, 2004,\(^{30}\) provides for at least SDR 2 million (roughly $3.02 million) for loss of life and personal injury and SDR 1 million (roughly $1.51 million) for property claims per incident.\(^{31}\) For passengers' loss of life or personal injury, the limit of liability for shipowners is an additional SDR 175,000 ($264,353)\(^{32}\) multiplied by the number of passengers the ship is authorized

\(^{28}\) One such case is that of a "mystery-spill" i.e., the source of oil pollution is unknown; Article 4.2 (b) of the Fund Convention, supra note 5. See SHIP-SOURCE OIL POLLUTION FUND—THE ADMINISTRATOR’S ANNUAL REPORT 2005–2006 (2006).

\(^{29}\) See HSN Convention, supra note 14, art. 9, 14.

\(^{30}\) See the status of the IMO Conventions at IMO website: http://www.imo.org/home.asp (last visited Mar. 21, 2007).

\(^{31}\) Article 6(1) of the 1976 Convention, supra note 1, at 608, as amended by the 1996 Protocol, supra note 1, at 5-44.4 to 5-44.5. These provisions are for ships with tonnage of 2000 or less. Beyond 2000 tons, limitation is graduated. For personal injury and death claims, the 1996 Protocol allows 800 SDR per ton for each additional ton up to 30,000 tons, 600 SDR per ton for each additional ton up to 70,000 tons, and 400 SDR per ton for each additional ton above 70,000 tons. For any other claims, the corresponding amounts are 400 SDR, 300 SDR, and 200 SDR.

\(^{32}\) Article 7(1) of the 1976 Convention, supra note 1, at 609, as amended by the 1996 Protocol, supra note 1, at 5-44.5. The amount of 175,000 SDR was chosen to comport with the limitation stipulated in the 1990 Protocol to Amend the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, March 29, 1990, reprinted in 6 BENEDICT, BENEDICT ON ADMIRALTY Doc. 2-3A, at 2-22.4 to 2-22.8 [hereinafter 1990 Protocol]. However, the limit of liability was raised in 2002 for Athens Convention but not for the 1976 Convention. Under the Athens Convention it is now minimum of 250,000 SDR per passenger and maximum of 400,000 per passenger. See Protocol of 2002 to Athens Convention, supra note 15.

There may be some unintended inconsistencies between the Athens Convention and the 1976 Convention. According to Article 14 of the Athens Convention, passengers may only make
to carry. However, under Article 19, shipowners may choose either the 1976 Convention or the Athens Convention. Therefore, a shipowner may choose a lower liability limitation if the two Conventions differ, as is the case now. The problem would not arise for a country that is a party to only one of these conventions. The drafters could have avoided this problem by simply cross-referring in the 1976 Convention’s provision on passenger claims to the Athens convention without including any figure in the 1976 Convention. See LIMITATION OF LIABILITY, supra note 13, at 52–55.

33. Another inconsistency between the Athens Convention and the 1976 Convention regards the maximum limit of liability. The 1976 Convention calculates it according to the number of passengers the ship is certified to carry; the Athens Convention uses the actual number of passengers. It is possible that the inconsistency was left deliberately to favor shipowners.

34. The 1996 the limitation of liability was 2.3 times greater than the 1976 limitation of liability. However, to keep up with inflation, it would have needed to be 3 times greater. See LIMITATION OF LIABILITY, supra note 13 at 43. Similarly, the 1976 Convention doubled the amount provided in the 1957 Convention, barely counterbalancing the effect of inflation. See Official Records of the 1976 Liability Conference, supra note 3, at 76–77.

35. They are mainly first party insurance such as cargo, hull or passengers’ indemnity from personal or social insurance.
III. ECONOMIC ANALYSIS OF THE PROBLEM

A. Nature of Economic Analysis

Economic analysis of a legal rule examines the effect of the rule on the behavior of rational individuals, i.e., how they respond to incentives (descriptive or positive analysis). It then evaluates the desirability of the rule in the light of maximization of social welfare or utilities (normative analysis).\textsuperscript{36} For example, a “polluter pays” rule in the case of oil pollution may be analyzed first by examining its effect on potential polluters’ behavior: whether they would take optimal care to prevent pollution or reduce their pollution-generating activities. This would be a descriptive analysis. The next step is to further examine whether the rule is socially desirable by comparing the cost on polluters (i.e., the forgone profits due to increased cost of precaution or reduced activities) to the benefits of a pollution-free sea to other users\textsuperscript{37} and non-users of the sea.\textsuperscript{38} This analysis would be normative. Beside the costs on polluters, the measure of social welfare will also include the administrative costs of implementing the rule.

As for the limitation of liability rule, the descriptive analysis will examine the effect of limitation of liability on the behavior of potentially liable shipowners in their decisions regarding whether or not to exercise optimal care. The normative analysis will compare the social benefits of limitation of liability—both in the past and today, if any—against the costs of maritime losses due to under-deterrence arising from the limitation rule. As the subject of inquiry is the desirability of limitation of liability, not the liability itself, this paper will not discuss whether shipowners’ liability is desirable in the first place. Since shipowners themselves are not opposed to their liability, this paper will assume that liability for maritime losses is desirable. The assumption is largely valid because liability is imposed on shipowners mainly for their fault or negligence. This is because the 1976 Convention on Limitation of Liability for Maritime Claims does not deal with the basis of shipowners’ liability.\textsuperscript{39} It leaves the determination of

\textsuperscript{36} SHAVELL, FOUNDATIONS, supra note 17, at 1–4. Broadly defined, utility is the satisfaction that a person derives from an activity. As it is almost impossible to measure how much satisfaction a person would derive from an activity (e.g., driving a car or buying a product), it is roughly measured by a person’s willingness to pay for a product or service. See id.

\textsuperscript{37} Such benefits may include aesthetic and recreational value to users.

\textsuperscript{38} For example, the satisfaction derived by a non-user from the knowledge of existence of clean sea.

\textsuperscript{39} I.e., “whatever the basis of liability may be,” 1976 Convention, supra note 1, at 607.
liability up to national tort and contract laws. However, this paper will briefly note the conditions under which shipowners' liability is desirable; see Part IV notes 85 to 89 with accompanying text, infra.

B. Descriptive Analysis of Limitation of Liability

As limitation of liability is conceptually opposed to unlimited or full liability, existence of one reduces the effect of the other. If full liability is necessary to create optimal incentives, incentives will be reduced to the extent liability is reduced by the rule of limitation.

1. The effect of liability on behavior: deterrence

Liability deters potentially liable parties from being negligent in their activities and omissions. A party is negligent for failing to take care or precaution when the cost of precaution is less than the expected harm. As the cost of precaution is certain but the loss is usually probabilistic, the loss would be expressed in expected amount. For example, if there is a 10% chance of a $1000 loss, the expected loss is $100 ($1000 x 10%) and precaution would be optimal if it costs less than $100. Failure to take optimal precautions amounts to negligence. In the literature of economic analysis of law, this is known as the "Hand Formula," named after Judge Learned Hand. In United States v. Carroll Towing Co., Judge Learned Hand held that a person is negligent if \( B < PL \), where \( B \) is the cost of precaution, \( P \) is probability, and \( L \) is magnitude of loss. By our assumption of desirability of shipowners' liability, precaution is optimal in maritime liability cases, i.e., where shipowners' cost of care would be less than the victims' expected loss.

40. The assumption here is that precaution will eliminate the accident. If precaution only reduces the probability, the optimal precaution would be less than the difference between original expected loss and the reduced expected loss. For example, if precaution reduces the probability from 10% to 4%, the optimal cost of precaution would be less than $60 ($100 x 10% - 100 x 4%). See RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW, 168 (6th ed., 2003).

41. 159 F.2d 169, 173 (2d Cir. 1947); see id.

42. When only one party's precaution can optimally eliminate or reduce the loss even though both sides can take precaution, it is socially desirable to impose liability on the "least-cost avoider." Optimal precaution may also require precaution by both parties at the same time. See STEVEN SHAHEL, ECONOMIC ANALYSIS OF ACCIDENT LAW 5-46 (Harvard University Press 1987); SHAVELL, FOUNDATIONS, supra note 17, at 182-89. It is also noteworthy that even though optimal precaution is not possible, liability is sometimes imposed on the basis of society's distributional preferences. See Guido Calabresi and A.Douglas Melamed, Property Rules, Liability Rules, and Inalienability: One View of the Cathedral, 85 Harv. L. Rev. 1089 (1972).
2. The effect of limitation of liability: under-deterrence

In the above example, if the tortfeasor’s liability is limited to $500 instead of $1000, the expected liability would be $50 ($500 x 10% probability). Since this is less than the expected loss, the potential tortfeasor may not take optimal precautions.\(^{43}\) Although any amount below $100 would be an optimal precaution, the potentially liable person would only take a precaution when its cost is below his expected liability, i.e., $50, assuming that he is risk-neutral.\(^{44}\) Although the defendant will be held negligent for not taking care, his limited liability makes it financially advantageous for him to be negligent rather than to take optimal precaution. Limitation of liability thus leads to under-deterrence.\(^{45}\) Being negligent would pay in situations where liability is less than the actual loss.

In terms of deterrence, the effect of limitation of liability is similar to a defendant’s inability to pay his judgment amount. Both produce under-deterrence. Like the defendant with limited liability, the defendant with inadequate assets will not take optimal precautions.\(^{46}\) Drawing from the above example, suppose a defendant with assets worth $50 has faulty brakes in his car that would cost $90 to fix. There is a 10% chance that this may cause $1000 worth of harm to a third party. The defendant’s loss scaled for probability is $100, which is more than he would pay to fix the brakes—but he has little incentive to get the repairs because his actual liability can never be more than $50.\(^{47}\)

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43. Besides the imposition of liability, the imposition of a corrective tax equal to expected or future loss may also encourage the potential injurer to take optimal care. However, if the government cannot observe losses or it is too costly to observe, liability would be a better approach because it creates incentives for victims to report losses. See SHAVELL, FOUNDATIONS, supra note 17, at 93–96. See also A. C. PIGOU, THE ECONOMICS OF WELFARE (4th ed. 1932).

44. Risk-neutrality is the tendency to view various risks indifferently when their expected value is same.

45. For criticism of limitation of liability in the nuclear context, see Michael J. Trebilcock, and Ralph A. Winter, The Economics of Nuclear Accident Law, 17 INT’L REV. L. AND ECON. 215, 216 (1997) [hereinafter Nuclear Accident Law].

46. SHAVELL, FOUNDATIONS, supra note 17, at 167–68.

47. Assuming that he is risk-neutral and there is no risk of his own personal injury.
C. Normative Analysis of Limitation of Liability

1. Social desirability of limitation of liability in the past

   a. Full liability may lead a risk-averse person to over-deterrence

   All of the above examples functioned under the assumption that the parties are risk-neutral. This may be justified, given that the figure used was only $1000. If the figure is changed from $1000 to $100,000, the loss can no longer be considered merely in its expected value. A person will have a greater fear of a 1% chance that he will lose $100,000 than he will of a 10% chance that he will lose $10,000, even though the expected loss in both cases is $1000. This is because most people are risk-averse most of the time. Risk aversion is the tendency to be more afraid of high figures of liability even though the probability of such liability is very low. Risk aversion occurs due to the diminishing marginal utility of wealth. As the value of each dollar is more than the next dollar, the loss of one dollar will reduce our utility more than the gain of one dollar will increase our utility.48

   Risk aversion is a source of social disutility; it either creates over-deterrence or leads to excessive precaution. Both create social loss.

   Over-deterrence occurs when a risk-averse person will not participate in an activity due to risk, even though the expected benefit will outweigh the expected cost. Such a forgone benefit is a social loss. Excessive precaution occurs when a risk-averse person takes more than optimal precaution, i.e., takes precaution even though $B > PL$ according to the Hand Formula. For example, even though investing $100,000 in a factory will generate profit of $2000 per year, a risk-averse person would probably not do so if there were a 1% possibility of a $100,000 liability (expected loss of $1000). The forgone net benefit of $1,000 (i.e., $2000 - [1% x $100,000]) is the social cost stemming from the problem of risk aversion. Alternatively, the risk-averse person may open the factory, but invest more than $1000 in safety measures annually, even though the expected loss with safety precaution is only $1000. Spending more than $1000 will be a social waste because more resources are sacrificed to save less. In the days before liability insurance or for those with an underdeveloped concept of corporation, these two risk-aversion phenomena resulted in the lack of investment in the shipping business and in an

48. SHAVELL, FOUNDATIONS, supra note 17, at 258.
excessive fear of liability among the few shipowners.

b. Limitation of liability: a mechanism against over-deterrence in the past

It thus made sense, in those days, for the government to provide the protection of limitation of liability to shipowners. This encouraged investment in the shipping sector. By safeguarding the personal assets of shipowners against the potential liability, the Legislature solved the problems of excessive fear in the minds of shipowners and lack of investment in the shipping industry. The intention of the government was clearly stated in the preamble of first English legislation on limitation of shipowners' liability: "Whereas it is of the greatest consequence and importance to this Kingdom, to promote the increase of the number of ships and vessels, and to prevent any discouragement to merchants and others from being interested and concerned therein ..." 49

Although some other reasons are also cited in the introduction of the English limitation of liability legislation, they are mainly contributing factors to the problem of risk aversion. For example, one such reason was helplessness of shipowners in having any control against the negligent misconduct or theft by master and mariners once the ship left the home port. 50 If liability arising from such conduct were unlimited, a risk-averse person would have been even more reluctant to invest in shipping. Another reason was the protection of local shipowners against foreign competition. 51 This argument was based on two facts. First, a judgment against foreign shipowners could be implemented only by the arrest of their ships, while all the personal assets of a local shipowner were exposed to liability. 52 Second, when foreign shipowners had competitive advantage because of their country's laws limiting their liability, local shipowners

49. Preamble to Responsibility of Shipowners Act of 1733; cited in P. Griggs, Limitation of Liability for Maritime Claims: The Search for International Uniformity, [1997] LMCLQ 369, 370. Similar concern was behind the American Limitation of Liability Act. For example, in Moore v. American Transportation Co., 65 U.S. 1, 39 (1860), the court held that the Act was adopted "to promote the building of ships, and to encourage persons engaged in the business of navigation."

50. See A.H.E. Popp, Q.C., Limitation of Liability in Maritime Law—An Assessment of its Viability from a Canadian Perspective, 24 J. MAR. L. & COMM. 335, 336 (1993); see also GILMORE & BLACK, supra note 4, at 877.

51. Popp, id., at 336.

argued for similar legislation in their country. In the face of such foreign competition, limitation of liability was thought desirable for the already under-invested national shipping sector.

2. Social desirability of limitation of liability today

a. Insurance now solves the problem of over-deterrence

Availability of liability insurance offsets the over-deterrence that risk-averse investors experience in the face of unlimited liability. Simply put, insurance takes care of the risk-aversion problem. Insurance makes the position of a risk-averse person vis-à-vis potential liability similar to that of a risk-neutral person. An actuarially fair premium will be roughly equal to the expected liability. For example, the insurance premium for $100,000 liability with 1% probability will be the same as for $10,000 liability with a 10% chance of liability (i.e., $1000). When the investor in our earlier example can protect himself against the annual 1% risk of $100,000 liability by purchasing insurance with $1000, he will not hesitate to invest $100,000 in the factory when his annual profit is $2000 and will not take excessive precaution by spending more than $1000. Thus, when full liability insurance is available, there is no need for limitation of liability in order to encourage him to invest in the factory or in the shipping business.

Shipowners in fact have virtually unlimited coverage against any liability. The International Group of Protection and Indemnity Clubs ("IGP&I"), which covers more than 90% of the world tonnage, provides coverage up to $5.4 billion per incident. There has been no incident in

53. Senator Hannibal Hamlin of Maine, who introduced the bill for American limitation of shipowners' liability, argued that the new Act would put the American marine interest "upon the same basis as that of England." The Origins of Limitation, supra note 2, at 1015, citing The Congressional Globe, 31st Cong., 2d Session 332 (1851) at 713.

54. SHAVELL, FOUNDATIONS, supra note 17, at 258 n.2.

55. Maritime liability insurance is mainly mutual insurance provided by the shipowners' P&I clubs. For an introduction, see Mark Tilley, The Origin and Development of the Mutual Shipowners' Protection & Indemnity Associations, 17 J. Mar. L. & Com. 261 (1986).

56. International Group of P&I Clubs, The Pooling Agreement, http://www.igpandi.org/external.php?primary_nav_selected=The+Group+Agreements&secondary=The+Pooling+Agreement (last visited Mar. 21, 2007). In the event of an accident, the liability share arrangement among the clubs in the group is as follows: first $7 million by the liable shipowner's club (i.e., individual club retention), then up to $50 million by all the clubs in the group through their general excess of loss reinsurance (this reinsurance is divided into two pools: lower pool for up to $30 million including the $7 million of individual club retention and upper pool for up to $50 million). There are then 3 more layers of general excess reinsurance for up to $2 billion (first two layers are $500 million each and third layer is for $1 billion). Each
the Group's history requiring coverage above reinsurance levels.\textsuperscript{57} This rebuts the shipowners' argument that there would be a shortage of insurance if liability is unlimited. Capacity shortage for insurance may be true only in the case of liability for nuclear plants. Yet some countries impose unlimited liability for nuclear damage.\textsuperscript{58} As for the cost of shipowners' liability insurance, it represents only 3.5\% to 4\% of total operating costs.\textsuperscript{59} Although cost may increase if there is no cap on liability, the reduction of the accident rate—due to optimal care induced by unlimited liability—will most likely offset the additional cost of insurance.\textsuperscript{60}

\textbf{b. Insurance may cause under-deterrence}

Full protection against liability may, however, create under-deterrence. An insured shipowner will have less incentive to take optimal care against a loss or liability because he does not have to pay for it directly. This tendency is known as 'moral hazard.' For example, in a modification of the earlier example, assume that the factory owner can reduce the probability of $100,000 loss from 1\% to 0.5\% by spending $400 on safety measures. This spending will be optimal, as the expected liability will be now only $500 and the net benefit is $100 (1000 - [500 + 400]).

reinsurance layer is with unlimited reinstatements. The group has recently arranged for $1 billion collective overspill protection with one reinstatement on top of the $2 billion reinsurance layers. Beyond this total sum of $3.05 billion, the group can cover a loss for up to $5.4 billion through a loss-sharing pooling agreement among the clubs. There is no premium under the pooling agreement. \textit{See} International Group of P&I Clubs News and Information with the attached chart to the link, http://www.igpandi.org/internal.php?primary_nav_selected=News+and+Information#News (last visited Apr. 11, 2007). However, the reinsurance coverage including the individual club retention for oil pollution liability is only up to $1.05 billion. \textit{See also} http://www.igpandi.org/internal.php?primary_nav_selected=The+Group+Agreements&secondary=Pool+reinsurance+programme (last visited Apr. 11, 2007). http://www.igpandi.org/internal.php?primary_nav_selected=The+Group+Agreements&secondary=The+Pooling+Agreement (last visited Apr. 11, 2007).


58. Such countries include Switzerland, Germany, and Japan. \textit{Nuclear Accident Law, supra} note 45, at 215, 221.


60. This is also proved from the lower cost of insurance for personal injury and death claim than property claim due to fewer personal injury and death claims and their lower magnitude despite the fact that the liability limit has always been higher in the personal injury and death claim. \textit{Id.} at 368–69.
Yet he would not do so if he had full coverage. His insurer may, however, induce him to do so by reducing the premium from $1000 to $500 when he spends $400 on safety. An insurer will only take this step if it can observe or verify the precautionary measures taken by the insured.  

As there are many aspects of precaution or safety measures an insurer cannot observe, an insured will not take optimal precautions when coverage is full, even though such precautions will ultimately reduce the premium. This is because the premium reduction may not be immediate, while the cost of taking precautions is immediate. Moral hazard, when unchecked, may also lead to adverse selection, i.e., indemnity of high-risk insureds at the expense of low-risk insureds. However, insurers are able, by and large, to check the problem of moral hazard or under-deterrence through various strategies such as partial coverage, deductibles, and differentiating premium rates based on past loss experience. In other words, the problem of under-deterrence from having full insurance coverage is not unmanageable. In the maritime liability insurance context, P&I clubs control the problem of “moral hazard” mainly by differentiating individual shipowners’ premium rates based on their claim history, loss experience, fleet size, and condition of ships. For example, in 1969, the P&I club SKULD offered individual tanker owners premiums that varied from 3 cents per gross ton to 150 cents per gross ton.

**c. Corporation: another mechanism to ameliorate the problem of over-deterrence**

Like limitation of liability, the concept of corporation was introduced as a mechanism to encourage investment in socially beneficial activities. It is, therefore, no surprise that both concepts gained legal recognition from the Legislature around the same time. By limiting the liability of investors to the amount of their investment, a corporation encourages risk-averse people to invest. In fact, a corporation and a shipowner’s limitation of liability have served a similar purpose in the past. For example, five people could invest in a shipping business and could

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61. SHAVELL, FOUNDATIONS, supra note 17, at 262.
64. Lord Mustill, Ships are different—or are they?, [1993] LMCLQ 490, 492.
limit their liability to the value of the ship. Alternatively, they could form a shipping company with the company’s only asset being the ship. In both cases, their personal and total exposure were the same.\textsuperscript{65}

As shipowners can form corporations, and most of them do already, an individual shipowner’s risk aversion is no longer a justification for limitation of liability.\textsuperscript{66} By being a corporation, a shipowner’s liability is already limited to the assets of that corporation. Limitation of liability now gives shipowners an additional benefit: it further limits the liability of the corporation’s already-limited liability. A shipowner corporation may not only form one company for all its ships; it could form one company for each of its ships. The practice of forming one-ship companies is common among corporate shipowners to shield the corporation from liability against its other ships in case the limitation principle does not apply because of conduct barring limitation.\textsuperscript{67}

To be sure, the problem of under-deterrence also arises from the limitation of a corporation’s liability to its corporate assets. The problem may be serious when a corporation can hide its assets by forming various subsidiary companies. However, in the case of corporations, this problem may be curbed by minimum asset requirements or compulsory insurance before the corporation may engage in an activity.\textsuperscript{68} Although compulsory insurance is also required of shipowners in many cases, the coverage is limited to the same amount as it would be under limitation of liability. Modern availability of well-developed liability insurance raises questions about the justification for limiting a corporation’s liability to its assets. This may explain the growing trend towards compulsory insurance in many areas of activities that are usually undertaken by corporations.\textsuperscript{69}

\textsuperscript{65} Limitation proceedings resemble bankruptcy proceedings in many respects. \textit{See} The LIVERPOOL (No. 2) [1963] P. 64, 83–84 (C.A.) (Eng.).

\textsuperscript{66} GILMORE & BLACK, supra note 4, at 818, 822.

\textsuperscript{67} \textit{See} R. MICHAEL M’GONIGLE & MARK W. ZACHAR, POLLUTION, POLITICS, AND INTERNATIONAL LAW: TANKERS AT SEA, 149–50 (1979). For conduct that bars liability limitation, see Article 4 of the 1976 Convention, supra note 1, at 608.

\textsuperscript{68} SHAVELL, FOUNDATIONS, supra note 17, at 231–32.

IV. RELEVANCE OF THE ANALYSIS IN ACTUAL MARITIME ACCIDENTS

If maritime liability law is thought to have any effect in influencing the behavior of shipowners in terms of taking precautions, the analysis will have practical relevance. Limitation of liability causes social loss when that reduction in liability influences a ship owner not to take precautions that the shipowner would have taken if that shipowner were subject to actual liability for the amount of harm caused. However, incidents causing losses exceeding the shipowners’ limitation fund may be rare and thus the benefit of unlimited liability may be slight. Yet if we can achieve even a seemingly minor addition benefit without any extra cost, the analysis is worth the effort.

This raises the question of whether unlimited liability would involve any extra cost. A shipowner will surely jump to his feet and say, “Yes, it will increase the cost of insurance.” But doesn’t this imply that the number of accidents exceeding shipowners’ limitation funds is higher than shipowners would like to admit? Premium rates for liability insurance should reflect the actual liability, especially when both the insured and the insurers are the same group of people. A significant difference between premiums for unlimited and limited liabilities suggests an indirect admission by shipowners that liability falls short of the actual loss in many cases. However, this may also be due to very high losses in few accidents exceeding the limitation funds. A few particularly expensive incidents increase the difference between a victim’s expected loss and a shipowner’s expected liability under limitation, making the under-deterrence more likely in those cases and thus proving this paper’s point even more persuasively. In other words, the arguments of the high cost of insurance and the rarity of incidents that slightly exceed the liability limit are contradictory to each other. Both cannot be true at the same time. This is

70. Cost of insurance predominated in every international conference on maritime liability. For example, see id. Under Article 8(5) of the 1996 Protocol to the 1976 Convention, cost of insurance must be taken into account when an amendment to increase the liability limit is considered.

71. For example, if the expected loss is $1 million (magnitude of loss $100 million multiplied by 1% probability) but the expected liability is $100,000 (maximum liability is $10 million under limitation multiplied by the same 1% chance of the accident), shipowners will not spend more than $100,000 even though the optimal precaution can cost up to $1 million.

72. This is also proven by the lower cost of insurance for personal injury and death claims than property claims due to fewer personal injury and death claims and their lower magnitude, despite the fact that the liability limit has always been higher in the personal injury and death claim. See Official Records of the 1976 Liability Conference, supra note 3, at 368–69.
not to deny that unlimited liability will impose some extra cost on shipowners, either in the form of increased premiums or expanded precautions.\textsuperscript{73} The increased cost will, however, be offset by the social gain: the unlimited liability will result in optimal care, which in turn will decrease the number of accidents.

Shipowners and their insurers also argue the possible lack of insurance capacity if liability is unlimited.\textsuperscript{74} Here, I think, unlimited liability is mistaken for unpredictable liability. First of all, although there is no limitation for most of the non-maritime liability areas and liability could be very high, there is no shortage of insurance coverage in those areas. However, there may be a coverage shortage due to unpredictability of future loss or liability. This is understandable because predictability is the basis on which to calculate insurance premiums. Insurers cannot determine premiums when liability is highly unpredictable. Such unpredictability can be a short- or long-term phenomenon. Examples of coverage shortage from short-term uncertainty are terrorism-related coverage after September 11, 2001,\textsuperscript{75} and product-related liability insurance in the 1980s due to sudden increase in court awards for product-related injuries.\textsuperscript{76} A shortage of coverage due to long-term unpredictability exists mainly in nuclear liability.\textsuperscript{77} Even in cases of liability for nuclear disasters, some countries adopted unlimited liability, and this actually increased the market capacity of nuclear liability insurance in those countries.\textsuperscript{78} Losses from maritime accidents are unlikely to be as grave as those from nuclear accidents.\textsuperscript{79} Besides, the International Group of P&I clubs is able to

\textsuperscript{73} It is possible that premiums may actually decrease due to optimal care, although cost of care will increase.

\textsuperscript{74} See the statement of the ICS on justification of limitation of liability, supra note 3.

\textsuperscript{75} Patrizia Baur & Rudolf Enz, Reinsurance—a Systemic Risk?, SIGMA, No. 5, 2003, 15.

\textsuperscript{76} See Priest, supra note 62.

\textsuperscript{77} Even though liability is predictable, shortage of coverage may sometimes occur due to the very high probability of loss or liability for each insured in the pool, making the insurers unable to spread the loss among uncorrelated insured.

\textsuperscript{78} For example, the data from 1992–93 shows that available nuclear liability insurance coverage per operator in countries with unlimited liability including Switzerland, Germany and Japan, were $382 million, $343 million and $241 million respectively, whereas in US, UK and Canada the maximum coverage was $200 million, $39 million and $28 million respectively. Nuclear Accident Law, supra note 45, at 221.

\textsuperscript{79} The Chernobyl incident, one of the worst nuclear disasters seen by the world, caused more than $20 billion in domestic financial cost alone. Id. at 218. On the other hand, in maritime liability history, only a few oil spill incidents in highly sensitive areas, such as EXXON
provide coverage up to $5.4 billion per incident.\textsuperscript{80} It is, however, argued that this high amount of coverage may not be available if liability becomes unlimited.\textsuperscript{81} As mentioned before, this argument equates unlimited liability with unpredictable liability. Moreover, unlimited coverage may not be even desirable. As discussed earlier in relation to moral hazard problem, partial coverage is better to create optimal precaution.

Unlimited liability, however, may increase the cost of litigation by reducing settlements and increasing litigation. As the maximum liability is fixed under limitation of liability, both parties may have the same expectation about trial outcome and will tend to settle in order to avoid litigation cost. Limitation of liability thus encourages settlements\textsuperscript{82} and saves in litigation cost. However, a mutually beneficial settlement is possible as long as the plaintiff’s expectation of trial outcome does not exceed the defendant’s by more than their total cost of trial,\textsuperscript{83} whether liability is limited or unlimited. Besides, a plaintiff may prefer trial over settlement if that plaintiff believes it is possible for him to prove an exception to set aside the defendant’s purported liability limit.\textsuperscript{84}

So far, we have assumed that liability rules in maritime law are socially desirable because they encourage optimal precaution by shipowners. Suppose, however, precaution is not desirable or possible, either because (1) the cost is higher than the expected loss or the expected reduction in probability of loss that precaution would cause, or (2) there is simply no precaution that is possible (e.g., accidents from an unexpected storm). In these situations, liability law does not create any incentives to take precautions; if there are no incentives, the liability is not socially desirable, and there should be no liability at all. There is no social gain from imposing liability in such case. Liability is not usually imposed in such case. For example, even though the law imposes strict liability for oil

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\textsuperscript{82} Id. at 81.

\textsuperscript{83} SHA VELL, FOUNDATIONS, supra note 17, at 403.

\textsuperscript{84} This is very unlikely, as the shipowners’ right is almost indefeasible. See Article 4 of the 1976 Convention, supra note 1, at 608.
pollution, shipowners are exonerated if the incident was the result of an act of God, a war, an act or omission of third party, or the negligence of the government.  

On the other hand, when optimal precaution is possible, limitation of liability will discourage the potentially liable entities from taking precautions. In the usual maritime settings, shipowners or their employees are in a better position to take precautions as they are in control of the ship and the cargo. There is thus the real possibility that abolition of limitation of liability will lead to better safety measures. Even when optimal precaution is not possible, liability may sometimes be socially desirable to internalize harm to third parties (externalities) when the activity level is thought to exceed its optimal level. Strict liability for oil pollution or for damage from HNS may be explained in this light. Strict liability, compulsory insurance, and direct action against insurers should not, therefore, be thought as justifications for limitation of liability. Strict liability may be further justified in oil pollution or HNS accident cases, due to difficulty of determining the actual level of care or dangerousness of damage. Compulsory insurance and direction actions against insurers are strategies to prevent shipowners from escaping liability through corporate veils or using flags of convenience.

It is argued that an increase in shipowners’ liability will ultimately hurt the consumers, as the cost of marine transportation will increase and this cost will be passed on to the consumers of the products transported by sea. This argument assumes that full liability has no effect on the behavior of liable persons or that maritime accident rate is irreducible. As argued before, there is no point of liability if its impact on behavior is nonexistent. In most of the maritime areas, liability is imposed for negligence and negligence implies the possibility of optimal care. In fact, the imposition

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85. Oil Pollution Liability Convention, supra note 5, art. III.2. The 1976 Convention, supra note 1, does not mention these exceptions because the convention deals only with the limit, not the basis, of liability. The basis of liability for maritime claims is the national law of the parties, and these exceptions are recognized by almost all national laws.


87. Gauci, supra note 4, at 67.

88. Liability is desirable in such situation only when due to high transaction costs the party generating the externality and the party suffering it will not engage in a market transaction. See R.A. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

89. See the arguments of ICS in the Official Records of the 1971 Fund Conference, supra note 63, at 199.
of full liability will, in the long run, reduce the cost of products by reducing maritime loss. Full liability, however, will affect the shipowners’ profits as they will have to spend more on precaution. Although some of these costs will be passed on to the consumers in the product price, the product prices will likely to become lower due to reduced incidents of loss during transportation.\textsuperscript{90}

The problem of under-deterrence due to limitation of liability is made worse by the new test to deprive shipowners of the right to limit. The right is made almost indefeasible by requiring the victim to prove not only the personal fault but also the subjective intention to cause the loss or damage.\textsuperscript{91} As the previous test of “actual fault or privity” was easier to prove and thus to break the liability limit, it created some incentives to take optimal care despite the right to limit.\textsuperscript{92} The new test has been adopted in all the maritime liability conventions with minor differences in the wording.\textsuperscript{93}

\section*{V. Conclusion}

Identification of a problem is the first step to its solution. The wrong diagnosis can lead to the wrong medicine. While the main problem arising from limitation of liability is under-deterrence, the policy-makers place more emphasis on adequate compensation. As a result, the usual focus in international conferences on maritime liability has been to increase compensation without abolishing the principle of limitation. The policy-makers do not usually question the desirability of this policy of limitation in terms of its effect on shipowners’ behavior. This approach ignores the very purpose of liability in inducing potentially liable parties to take optimal care. If liability schemes fail as a deterrent, there should be no liability in the first place. On the other hand, if liability is desirable for its impact on shipowners’ behavior, the liability has to be equal to the victim’s

\textsuperscript{90} Product price may become higher when higher liability will be paid to third parties, whose loss so far had not been accounted for in the price of the product. Yet, higher liability will reduce social costs.

\textsuperscript{91} “A person liable shall not be entitled to limit his liability if it is proved that the loss resulted from his personal act or omission, committed with the intent to cause such loss, or recklessly and with knowledge that such loss would probably result.” Article 4, 1976 Convention, \textit{supra} note 1, at 608 (emphasis added).

\textsuperscript{92} See the statement of Canadian delegation on November 05, 1976 in the Official Records of the 1976 Liability Conference, \textit{supra} note 3, at 268–69.

\textsuperscript{93} For the comparison of the wording and the possible effect of such difference, see \textit{LIMITATION OF LIABILITY}, \textit{supra} note 13, at 31–34.
actual loss. The costs of maintaining maritime liability systems would be social waste when the limited liability fails to deter negligent behavior.