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The Fatal Failure of the Regulatory State

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THE FATAL FAILURE OF THE REGULATORY STATE

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ABSTRACT

While regulatory agencies place high values on the benefits associated with the reduction in mortality risks due to regulations, these same agencies substantially undervalue lives in their enforcement efforts. The disparity between the valuation of prospective risks and fatalities that have occurred is often by several orders of magnitude, diminishing whatever safety incentives the regulations might have generated. A review of the practices by the major federal agencies with responsibility for product safety and occupational safety finds that the value placed on fatalities in agencies' regulatory analyses can be a factor of 1,000 times greater than the magnitude of the corresponding sanctions that the agency levies for regulatory violations that led to the fatalities. The source of the mismatch between the valuation of prospective risks and fatalities that have occurred can be traced to agencies' dated and restrictive legislative mandates. This Article proposes revisions in these statutes to create more appropriate, stronger safety incentives. Setting the pertinent price to deter excessive risks will also foster corporate risk analyses so long as companies are also provided with pertinent legal protections.

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INTRODUCTION

The impact of government policies depends on both their design and on their implementation and enforcement.[1] The administrative law literature focuses primarily on matters of regulatory structure.[2] Government agencies entrusted with protection of the environment and promotion of health and safety foster these objectives by designing and promulgating regulations that are sometimes quite stringent.[3] Whether these regulations will in fact generate their intended effects depends on whether they create sufficient economic incentives to discourage risky behavior. This Article will demonstrate a mismatch between the level of stringency of regulatory design and regulatory enforcement. The gaps that are identified do not involve subtle distinctions, as the stringency of regulatory standards often dwarfs that stringency of the enforcement effort.

The economic benefits associated with the reduction of mortality risks constitute the largest component of all regulatory benefits for federal regulations.[4] The principal framework used in assessing the value of the reduction of mortality risk reductions is based on the risk-money tradeoff for very small risks, or what has come to be known as the value of a statistical life, or the VSL.[5] The values currently used by government agencies to value each expected fatality prevented are now in the vicinity of $9 million or more.[6] Although the VSL establishes a substantial price for expected fatalities resulting from different risks, this price pertains to the risks assessed prospectively by regulatory agencies. In situations in which companies violate the regulations in a manner that leads to worker or consumer deaths, the price attached to lives is often quite low. In this Article, the VSL will

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[1] W. KIP VISCUSI, JOSEPH E. HARRINGTON, JR. & DAVID SAPPINGTON, ECONOMICS OF REGULATION AND ANTITRUST (5th ed. 2018).

[2] LISA HEINZERLING & MARK V. TUSHNET, THE REGULATORY AND ADMINISTRATIVE STATE: MATERIALS, CASES, COMMENTS (2006).

[3] STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION 24–27 (1993).

[4] OFF. OF INFO. & REG. AFF., U.S. OFF. OF MGMT. & BUDGET, 2015 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT 13 (2015).

[5] W. KIP VISCUSI, PRICING LIVES: GUIDEPOSTS FOR A SAFER SOCIETY (2018); CASS R. SUNSTEIN, VALUING LIFE: HUMANIZING THE REGULATORY STATE (2014).

[6] U.S. Dep't of Transp., Revised Departmental Guidance 2016: Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses (2016); U.S. Envtl. Prot. Agency, Valuing Mortality Risk Reductions for Policy: A Meta-Analysis Approach (2016); U.S. Dep't of Health & Hum. Serv., Guidelines for Regulatory Impact Analyses (2016); W. Kip Viscusi, *The Value of Individual and Societal Risks to Life and Health*, *in* HANDBOOK OF THE ECONOMICS OF RISK AND UNCERTAINTY 436–41 (Mark J. Machina & W. Kip Viscusi eds., 2015) [hereinafter HANDBOOK].

serve as the appropriate deterrence-based estimate of the value that should be placed on fatalities in agency enforcement efforts. This Article documents the mismatch in the valuations and proposes statutory changes to address the imbalance.

The Article begins by documenting the low values currently placed on life in regulatory enforcement efforts. Section II presents examples involving job safety, food safety, motor-vehicle safety, and environmental quality, which demonstrate that the assignment of low values to fatalities is not an infrequent practice. Why such low values are problematic is the focus of Section III, which outlines the practices used in regulatory impact analyses for prospective regulations and the principles for optimal deterrence. To implement these principles requires changing the current statutory guidance, as the agencies currently are hamstrung by very low caps on allowable penalties. Section IV presents the proposed revisions of several representative statutes pertaining to health, safety, and the environment. Once firms begin to face meaningful enforcement sanctions, this enhanced penalty structure will alter their calculation of the costs and benefits of regulatory compliance. As Section V indicates, establishing penalty levels consistent with law and economics theories of optimal deterrence also will influence the corporate risk analyses used in determining appropriate levels of safety. But realizing the full potential of such changes will require that companies be provided with legal protections for undertaking analyses that balance the competing economic concerns of costs and risks. The concluding discussion summarizes the rationale for rectifying the mismatch between regulatory design and regulatory enforcement.

I. AGENCY PENALTIES FOR FATALITIES

To examine the disparity between the optimal deterrence amounts and the penalties levied for regulatory violations, this section examines the determination of the penalty levels for four government agencies concerned with the promotion of worker safety, product safety, and environmental safety. There are common themes in the analysis of the job safety violation penalties levied by the Occupational Safety and Health Administration, the food safety violation penalties levied by the Food and Drug Administration, the motor-vehicle safety violation penalties levied by the Department of Transportation, and the environmental violation penalties levied by the Environmental Protection Agency. The statutory guidance for each of these agencies establishes the permissible penalty structures and, in particular, the upper limit on the penalties that are permitted. As this review will indicate, the penalty amounts fall far short of what would be adequate from the standpoint of generating incentives for optimal levels of deterrence.

A. Occupational Safety and Health Administration: Worker Fatalities

The very modest level of penalties that federal regulatory agencies assess for regulatory violations that are associated with fatalities is exemplified by the performance of the Occupational Safety and Health Administration (OSHA). OSHA's regulatory approach is to set health and safety standards, to inspect firms to ascertain whether firms are in violation of the standards, and to assess penalties for standards violations that are identified in these inspections.[7] Many of these standards pertain to traumatic injuries so that for these adverse health outcomes there are no latency periods and problems in inferring the work-related causality as there would be for illnesses such as cancer. As a result, OSHA serves as an excellent starting point for considering how and at what level penalties are assessed for regulatory violations involving deaths. As this Article will demonstrate for other federal agencies as well, the statutory structure of the penalties that OSHA is permitted to levy constrains the amount of fines that the agency can impose for regulatory violations, leading to inadequate incentives for safety.

OSHA has several classifications of the level of violations. Those violations that are most directly pertinent to prevention of fatality risks are classified as "serious" violations. "A serious violation exists when the workplace hazard could cause an accident or illness that would **most likely result in death or serious physical harm,** unless the employer did not know or could not have known the violation."[8]

The Occupational Safety and Health Act of 1970 established a cap of $7,000 for each such serious violation.[9] There was no apparent underlying methodological basis for setting such a level, such as reliance on an economic deterrence measure such as the VSL or even the value of compensation in wrongful death cases, which addresses the financial losses after a fatality rather than the value of preventing the risk of death. Each of these measures would have led to considerably greater penalty levels. During the almost half a century period after the establishment of the initial penalty levels, the upper limit on penalties has been updated somewhat for inflation but not otherwise revamped so that the maximum allowable penalty per serious violation had risen to $12,675 per violation in 2017.[10] Even this inflation update is

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[7] W. KIP VISCUSI, RISK BY CHOICE: REGULATING HEALTH AND SAFETY IN THE WORKPLACE (1983).

[8] *Federal Employer Rights and Responsibilities Following an OSHA Inspection—1996*, U.S. OCCUPATIONAL SAFETY & HEALTH ADMIN (last accessed Feb. 7, 2018), https://www.osha.gov/Publications/fedrites.html [https://perma.cc/27ZW-MS9V] [hereinafter *Federal Employer Rights*] (emphasis added).

[9] 29 U.S.C. 666(b).

[10] 29 CFR 1903.15(d)(3), U.S. Department of Labor, Home/OSHA Enforcement/OSHA Penalties.

inadequate, as the consumer price index increased by a factor of more than six since the passage of the Occupational Safety and Health Act of 1970 so that a penalty level per serious violation above $42,000 would be warranted based simply on the change in the cost of living since the passage of the Occupational Safety and Health Act of 1970.[11] Violations that are characterized as "other than serious violations," violations related to posting requirements for notices from OSHA, and violations associated with a failure to abate a violation, also are subject to the same maximum amount per violation.[12] Violations that are willful or repeated and which reflect indifference to employee safety were subject to a statutory cap of $70,000 that has since been updated to $126,749 per violation as of January 13, 2017.[13]

OSHA enforcement efforts inspect workplaces, identify violations of pertinent safety standards, and assess penalties for these violations within these statutory limits on financial sanctions. The enforcement efforts vary, as in some cases the enforcement efforts are implemented through federal enforcement actions, whereas in other situations the states have undertaken the role of enforcing OSHA's regulatory standards. The penalty levels levied on firms for workplace fatalities are inadequate from a deterrence standpoint in each of these instances. The median penalty that was assessed in FY 2016 for violations associated with the death of a worker was $6,500 for federally operated OSHA efforts and $2,500 for state plans.[14] Thus, even though the regulatory violation was associated with a workplace fatality, the median penalty amount is even below the quite modest statutory cap for a single serious violation.

Consideration of the largest penalties ever levied in the history of the agency indicates a low penalty level associated with all regulatory violations that are identified at firms experiencing worker fatalities. Nine of the top ten penalties ever levied by OSHA were for regulatory violations at firms where

[11] Based on the Bureau of Labor Statistics inflation calculator, the purchasing power of $1 in December 1970 would require $6.07 in December 2016 to have the same purchasing power.

[12] 29 U.S.C. 666(c), 29 CFR 1903.15(d)(4), 29 U.S.C. 666(i), 29 CFR 1903.15(d)(6), 29 U.S.C. (666(d), 29 CFR 1903.15(d)(5), and U.S. Department of Labor, Home/OSHA Enforcement/OSHA Penalties.

[13] 29 U.S.C. 666(a), 29 U.S.C. 666(a), 29 CFR 1903.15(d)(1), 29 CFR 1903.15(d)(2), and U.X. Department of Labor, Home/OSHA Enforcement/OSHA Penalties.

[14] AFL-CIO, DEATH ON THE JOB: THE TOLL OF NEGLECT: A NATIONAL AND STATE-BY-STATE PROFILE OF WORKER SAFETY AND HEALTH IN THE UNITED STATES 3 (26th ed., 2017).

there had been a recent worker fatality.[15] These penalty amounts for the entire set of regulatory violations considered in each instance range from $6.6 million to $81.3 million. However, the size of the penalty amount per worker death is fairly low even if one assumes that the entire penalty is for the fatality-related regulatory infractions rather than possibly hundreds of other regulatory violations discovered as part of the OSHA inspection following the deaths.

The two largest penalties ever levied by OSHA were against the BP Texas City Refinery in 2005 and 2009. Each of these penalties were linked to a single workplace event and the company's subsequent failure to undertake abatement actions to address the risks. The second largest penalty levied in OSHA's history was for the March 23, 2005, explosion and fire in the Isomerization Unit of the BP Texas Oil Refinery in Texas City, Texas.[16] This explosion led to the deaths of 15 contractor employees as well as injuries to at least 170 other BP employees and contractor employees.[17] Following the health and safety inspection, OSHA levied a penalty of $21.4 million, which was the largest penalty that OSHA had issued up to that time and remains the second largest penalty in OSHA history.[18] Excluding any role of the penalties to address the valuations of worker injuries or regulatory violations other than those specifically related to the fatalities, the average penalty imposed per worker fatality is only $1.4 million. As part of the 2005 settlement agreement for this explosion, BP agreed to undertake a series of abatement actions and to implement by 2009 all feasible recommendations that OSHA made as a consequence of the inspection.

Subsequent to this incident, the workforce at this BP facility continued to be exposed to serious risks.[19] One contractor was killed in 2006 after being crushed between a scissor lift and a pipe rack, another employee of a contractor was electrocuted in 2007, and in 2008 there was a death of a BP employee as well as the death of a contractor.[20] While these fatalities were indicative of the continued lax safety at the BP facility, it was a related series

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[15] *Top Enforcement Cases Based on Total Issued Penalty*, U.S. OCCUPATIONAL SAFETY & HEALTH ADMIN., https://www.osha.gov/dep/enforcement/top_cases.html (last visited Feb. 5, 2018) [https://perma.cc/L49N-QVFT].

[16] Id. Also see *BP Texas City Violations and Settlement Agreements*, U.S. OCCUPATIONAL SAFETY & HEALTH ADMIN., https://www.osha.gov/dep/bp/bp.html (last visited Feb. 5, 2018) [https://perma.cc/SMH8-JEFK]; and *Fact Sheet on History of 2012 Agreement between OSHA and BP*, U.S. OCCUPATIONAL SAFETY & HEALTH ADMIN., https://www.osha.gov/dep/bp/FactSheet-BP-2012-Agreement.html (last visited Feb. 5, 2018) [https://perma.cc/Z5CU-HZ22] [hereinafter *Fact Sheet*].

[17] *Fact Sheet*, supra note 16.

[18] Id.

[19] Id.

[20] Id.

of regulatory violations that triggered what remains the largest penalty level ever levied by OSHA. The 2009 OSHA inspection that followed one month after the deadline that BP had been given for completing its abatement efforts concluded that BP had failed to correct 270 instances of violations that it was supposed to abate as a result of the agreement reached after the 2005 incident, leading to a penalty of $50.6 million.[21] In addition, OSHA levied a penalty of $30.7 million for 439 additional willful violations, but this penalty amount was reduced to $13 million based on a negotiated agreement between BP and OSHA.[22] The 2009 BP penalties are the largest penalties ever assessed by OSHA.

If one combines the value of the penalties that BP paid for the 2005 and 2009 enforcement actions, which rank as the top two penalties levied in the history of the agency, if one assumes that the pertinent VSL is about $10 million, the total penalty amount of $85.0 million is far less than the economically efficient deterrence amount based on the magnitude of the adverse health risks and ignoring the role of penalties for the hundreds of willful and repeated violations. The appropriate deterrence amount for the 15 initial deaths alone merit penalties that exceed the combined 2005 and 2009 penalty level. Additional penalties beyond those pertaining to the fatalities are warranted for the continued injuries, hundreds of repeated violations, and hundreds of new regulatory violations.

The other seven most prominent penalty amounts that OSHA has levied follow similar orders of magnitude.[23] The fire and series of explosions at the IMCF/Angus Chemical Plant in Sterlington, Louisiana, led to 8 deaths and 42 injuries, with penalties of $11.6 million levied on IMC Fertilizer/Angus Chemical.[24] The 2008 sugar refinery explosion in Georgia at Imperial Sugar occurred after the knee-high combustible sugar dust exploded, killing 14 workers and causing additional injuries.[25] The OSHA penalty amount of $8.8 million for infractions that OSHA mostly characterized as being willful violations, was ultimately settled for $6 million, or a penalty of $429,000 per death.[26] The fifth and tenth largest penalties arose from a single incident, a construction-related explosion at the Kleen Energy Systems Natural Gas Power Plant. The pressurized natural gas that was being used to blow debris out of pipes led to an explosion that killed

[21] Id.

[22] Id.

[23] *Top Enforcement Cases*, *supra* note 15.

[24] Id.

[25] Larry Peterson, *Imperial Sugar Settles for $6 Million, Admits No Wrongdoing*, SAVANNAH MORNING NEWS, July 8, 2010, http://savannahnow.com/news/2010-07-08/imperial-sugar-settles-6-million-admits-no-wrongdoing [https://perma.cc/4BZA-S57K].

[26] Id.

6 workers and injured 50 other workers.[27] OSHA determined that the 3 contractors and 14 subcontractors were guilty of 371 safety violations.[28] The largest penalties were $8.3 million for O & G Industries, Inc. and $6.6 million for Keystone Construction Maintenance.[29] For the three other top 10 ranked OSHA penalties involving fatalities, OSHA levied $8.3 million in penalties on Samsung Guam, Inc. for 118 violations associated with one worker death, $8.2 million in penalties against CITGO Petroleum for violations that were settled for $5.8 million for an explosion that killed six workers, and $7.5 million in penalties for Dayton Tire for 100 willful violations identified by an inspection after one worker death.[30] The penalty amounts for all other OSHA penalty situations rank below these values.

Whether considering the median penalty amounts for violations related to killing a worker or the entire set of penalties arising in situations after a worker fatality, the financial incentives for safety fall short of what they should be to establish appropriate levels of deterrence. In the case of OSHA, the statutory limits on the penalty levels are unrelated to the value of a statistical life or any other meaningful deterrence concept, leading to penalties after fatalities that fall short of the desirable level. This shortfall in penalty levels is not unique to OSHA, as the subsequent consideration of other federal agencies indicates.

B. Food and Drug Administration: Food Safety

As was the case with OSHA, the Food and Drug Administration (FDA) has caps on the penalties that can be levied. In the case of the FDA, the agency has an enforcement strategy different than that of OSHA as it does not impose fatality-related penalties as the result of either workplace inspections or product inspections. Rather, the fatality-related penalties arise from conduct that is in violation of FDA regulations, including behavior that is sometimes results in consumer deaths, which may also trigger FDA investigations of the causes of the death. The caps on the allowable penalties vary by regulatory area because the agency has a wide range of responsibilities such as those pertaining to prescription drugs, medical devices, adulterated food, and standards for clinical trials. Consequently, there are dozens of civil monetary penalty authorities that are administered

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[27] Dave Altimari & Matthew Kauffman, *5 Years after Kleen Energy Blast, 'Main Actor' Pays Fraction of $6.7 Million Fine*, HARTFORD COURANT, Feb. 9, 2015, http://www.courant.com/news/connecticut/hc-kleen-energy-fine-20150206-story.html [https://perma.cc/TNY9-JTN9].

[28] Id.

[29] Id.

[30] *Top Enforcement Cases*, *supra* note 15.

by the FDA.[31] In some instances, it is difficult for an outside observer to ascertain any specific linkage of penalties to the product fatalities because the agency may have levied penalties for a broad series of regulatory violations. For example, in the case of the painkiller Vioxx, which created substantial heart risks, Merck paid the FDA $950 million for illegally introducing a drug into interstate commerce and for promoting a drug for a use that had not yet been approved by the FDA.[32] Separately, Merck also settled 27,000 lawsuits by patients and the families of those who had taken the drug.[33]

For concreteness, the examples below focus on enforcement efforts with respect to food safety as these case studies are associated with incidents that generated well-defined acute deaths from exposure to hazardous food. Thus, the relation between the penalties and the number of deaths will be more clearcut than for products that pose more deferred risks, such as deaths from heart attacks, for which the extent of the risk increase and the number of deaths specifically attributable to the product may not be known. The FDA provisions pertaining to adulterated food impose caps of $60,000 for any individual introducing adulterated food into interstate commerce, with a limit of $600,000 for all violations adjudicated in a single proceeding.[34]

A 2011 tainted food product incident involving a cantaloupe farm in Colorado led to at least 33 deaths, 147 hospitalizations, a miscarriage, and possibly ten additional deaths.[35] The genesis of this food safety problem was that Eric Jensen and Ryan Jensen, who operated a cantaloupe farm in Granada, Colorado, allegedly changed their process that was used to clean the cantaloupe in order to prevent contamination by harmful bacterial.[36] The farm failed to use chlorine spray to reduce the bacterial risks and also kept the cantaloupe in unsanitary conditions, leading to contamination of the cantaloupes with Listeria monocytogenes and the aforementioned adverse health impacts.[37] After pleading guilty to misdemeanor counts of introducing adulterated food into interstate commerce, these two farmers were required

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[31] Food & Drug Admin., *Maximum Civil Money Penalty Amounts; Civil Money Penalty Complaints*, 79 FED. REG. 6088 (2014).

[32] Duff Wilson, *Merck to Pay $950 Million Over Vioxx*, N.Y. TIMES, Nov. 22, 2011. Also see Rick Valliere, *Merck Agrees to Pay $950 Million To Resolve Vioxx Promotion Case*, 39 BLOOMBERG BNA PROD. SAFETY & LIAB. REP. 1309 (2011).

[33] Maximum civil penalty amounts document cited above.

[34] Id., for 21 U.S.C. 333(f)(2)(A).

[35] Press Release, U.S. Dep't of Justice, Dist. of Colo., Eric and Ryan Jensen Plead Guilty to All Counts of Introducing Tainted Cantaloupe into Interstate Commerce (Oct. 22, 2013). See also Mary Beth Marklein, *Cantaloupe Farmers Get No Prison Time in Disease Outbreak*, USA TODAY, Jan. 28, 2014, https://www.usatoday.com/story/news/nation/2014/01/28/sentencing-of-colorado-cantaloupe-farmers/4958671/ [https://perma.cc/ETT6-Z3BG].

[36] Press Release, *supra* note 35.

[37] Id.

to pay $150,000 each in restitution, to devote 100 hours to community service, and to be subject to 6 months of home detention and 5 years of probation.[38] The optimal deterrence amount based on the VSL for even a single fatality exceeds the monetary value of the regulatory sanctions that were imposed.

More severe sanctions resulted after the E. Coli outbreak resulting from the contamination of Odwalla Inc. apple juice.[39] This incident led to the death of a sixteen month old baby and illnesses affecting at least 66 other people.[40] The case in which the U.S. Department of Justice sought criminal sanctions on behalf of the FDA for the adulterated food violation,[41] led to what was at that time the largest penalty that the FDA ever levied in a criminal case involving food injuries. The total penalty amount was $1.5 million, of which $250,000 took the form of contributions to charitable organizations. As in the case of the cantaloupe contamination, the financial sanctions were seriously inadequate from the standpoint of optimal deterrence.

The FDA levied smaller sanctions per fatality in a 2001 meat contamination case involving the Sarah Lee Corporation.[42] After listeria contamination of hot dogs and cold cuts led to an estimated 15 deaths and dozens of people getting sick, the FDA sought misdemeanor charges against Sarah Lee Corporation.[43] In addition to undertaking a national recall of the tainted meat, Sarah Lee Corporation paid $4.4 million in penalties, which has an average value of under $300,000 per death, excluding any role for penalties other than the sanction per fatality, not the illnesses or other regulatory violations.

The most extreme sanctions ever levied in a food safety case involved criminal sentences for two former officials of the Peanut Corporation of

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[38] Ray Sanchez, *At Sentencing, Cantaloupe Growers Apologize for Deadly Listeria Outbreak*, CNN, Feb. 4, 2014, https://www.cnn.com/2014/01/28/justice/cantaloupe-listeria-deaths-sentencing/index.html [https://perma.cc/629A-JPRB].

[39] *Juice Maker Agrees to Pay Record $1.5M Fine over 1996 E. Coli Outbreak*, CNN MONEY, July 23, 1998, http://money.cnn.com/1998/07/23/companies/odwalla/ [https://perma.cc/38WP-2P3J].

[40] *Juice Maker Fined Record $1.5 Million For Sales of Contaminated Apple Juice*, 26 BLOOMBERG BNA PROD. SAFETY & LIAB. REP. 722 (1998).

[41] U.S. v. Odwalla, E.D. Calif., docket number not available, 7/23/98.

[42] Helen V. Cantwell, Mark P. Goodman, Maura K. Monaghan & Jacob W. Stahl, *Food for Thought: Corporate Executives on Notice That DOJ Will Seek to Hold Them Criminally Liable for Contaminated Food Outbreaks and Product Failures*, 42 BLOOMBERG BNA PROD. SAFETY & LIAB. REP. 1377 (2014).

[43] David Barboza, *Sara Lee Corp. Pleads Guilty in Meat Case*, N.Y. TIMES, June 23, 2001.

America (PCA).[44] The Salmonella-tainted peanut butter from PCA led to 9 deaths and 22,000 illnesses[45]. In addition to charges relating to sales of contaminated food, the company was also charged with wire fraud as well as fraud for claiming that peanuts grown in Mexico were from the U.S. and for misrepresenting where the peanuts had been processed. [46] There has been no attempt by the U.S. Department of Justice to obtain a financial penalty from PCA presumably because PCA had filed for Chapter 7 bankruptcy shortly after the peanut butter recall.[47] However, the former owner and president of the company received a prison term of 336 months, the business partner was sentenced to 240 months in prison, and a third official received a 60-month sentence.[48]

With the exception of the PCA criminal sanctions, the penalties have been relatively modest for companies that have marketed dangerous food products that have caused fatalities. The PCA situation was distinctive in that since the company filed for bankruptcy shortly after the peanut butter recall, there would be little role for financial penalties. In addition, the diversity of the violations that extended beyond only introducing adulterated food products also distinguished the situation so that criminal sanctions of this type remain the exception rather than the norm for FDA violations.

C. Department of Transportation: Motor-Vehicle Safety

The National Highway Traffic Safety Administration (NHTSA) has responsibility for promulgating standards and the enforcement of regulations relating to motor-vehicle safety. As in the case of OSHA and FDA, the pertinent statute, the National Traffic and Motor Vehicle Safety Act, establishes limits on the amount of penalties that can be levied for violations. The maximum penalty for a violation was originally set at $7,000, which was also the maximum OSHA penalty level for serious violations, but the NHTSA maximum penalty level has since been increased to $21,000.[49] Similarly, the maximum penalty for a related series of violations was formerly $35 million,

[44] Press Release, Food & Drug Admin., Off. of Crim. Investigations, Former Peanut Company President Receives Largest Criminal Sentence in Food Safety Case; Two Others Also Sentenced in Their Roles in Salmonella-Tainted Peanut Product Outbreak (September 21, 2015). Also see Cantwell et al., *supra* note 42.

[45] Press Release, *supra* note 44.

[46] Cantwell et al., *supra* note 42.

[47] Jane Zhang, "Peanut Corp. Files for Bankruptcy," *Wall Street Journal*, February 14, 2009.

[48] Id.

[49] 49 U.S.C. 30165(a)(1), 81 FR 15413, March 22, 2016, Department of Transportation, Office of the Secretary of Transportation, Notice of Increase in Civil Penalty for Violations of National Traffic and Motor Vehicle Safety Act.

but was increased to $105 million in 2016.[50] In each instance, there is no apparent methodological foundation for the maximum penalty level other than some adjustments to reflect the impact of inflation.

The General Motors (GM) ignition switch recall regulatory experience provides a valuable case study of how these financial limits influence the penalties that can be imposed and the relation of these penalties to the sanctions that would be merited from the standpoint of efficient levels of deterrence. Although penalty caps have since been updated, at the time of the NHTSA action pertaining to the GM ignition switch recall, the statutory cap on permissible damages was $7,000 for each violation and $35 million for a related series of violations.[51] By imposing the maximum permissible penalty amount of $35 million on GM, NHTSA levied the largest penalty that NHTSA had issued for delays in reporting defects that related to a safety recall.[52] While the maximum penalty amounts have since been raised to $105 million as part of the recent update in regulatory penalty levels, the discussion below will focus on the regulatory regime in place that was pertinent to GM.[53] Note that the permissible penalty levels continue to be dwarfed by the appropriate deterrence-based values even after accounting for the penalty updates.

NHTSA levied the penalty of $35 million on GM in 2014 because GM had failed to report the ignition switch failure to the agency.[54] Because the switch was designed with too low torque, it could move from the "run" position to the "off" position, causing a loss in power, which in turn resulted in a loss in power steering, loss of power breaks, and loss of function in the frontal airbags.[55] GM was aware of the defect, which one GM engineer involved in trying to rectify the problem referred to as "the switch from hell."[56] The adverse safety consequences of the ignition switch failure led to

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[50] Id.

[51] 49 U.S.C. 30165(a)(1), and Consent Decree.

[52] Jeff Plungis & Tim Higgins, *GM to Pay Record $35M Fine Over Ignition-Switch Recall*, 42 BLOOMBERG BNA PROD. SAFETY & LIAB. REP. 534 (2014).

[53] Dep't of Transp., *Notice of Increase in Civil Penalty for Violations of National Traffic and Motor Vehicle Safety Act*, 81 FED. REG. 15413 (March 22, 2016).

[54] Memorandum, U.S. Dep't of Transp., Nat'l Highway Traffic Safety Admin., TQ14-001 Consent Order 41 (May 16, 2014), www.nhtsa.gov/staticfiles/communications/pdf/May-16-2014-TQ14-001-Consent-Order.pdf [https://perma.cc/A95H-LALY]. See also Plungis & Higgins, *supra* note 52, at 534.

[55] U.S. Dep't of Justice, Southern District of New York, Letter to Anton R. Valukas, Esq., et al, "Re: General Motors Company—Deferred Prosecution Agreement," September 16, 2015, https://www.justice.gov/usao-sdny/file/772311/download [https://perma.cc/PVJ3-2P5D]. Particularly pertinent are exhibits A and B, pp. 16-46.

[56] Elliott v. General Motors LLC (In re Motors Liquidation Co.), 15-2844 (2d Cir. July 13, 2016).

a series of accidents, including 13 documented deaths at the time of the NHTSA penalty, an ultimate documented death toll of 124 deaths, and 275 injuries.[57] Property damage, including harm to the crashed vehicles, also resulted from the product defect.

Setting aside the costs of the accidents other than the fatalities, the penalty amount that was levied had an average value of $2.7 million per fatality based on the early estimate of 13 fatalities due to the defect. Based on the ultimate death toll of 124 deaths, the penalty per fatality was $282,000. The cap on the total damages amount that could be imposed led to inadequate levels of deterrence. Note too that the procedure for calculating the penalties related to the duration of time in which NHTSA failed to report the defect rather than the number of deaths, as the penalty amounts were still capped at $7,000 per violation. Thus, NHTSA did not construct the penalties using a procedure based on an assessment of the penalty level adequate to deter behavior that led to the number of fatalities occurred, which it then could multiply by the value assigned to each fatality. The statutory structure governs the level at which penalties can be set and does not involve the assessment of a monetary sanction per fatality.

Even penalties that can now be levied based on the updated cap of $105 million would be inadequate for a product defect leading to 124 deaths. If the GM case had been undertaken in a regime governed by the new penalty structure, NHTSA could have easily justified penalties equal to the higher total penalty cap since both the penalty per violation and the maximum penalty for a series of violations each tripled. Consequently, the same characterization of infractions that led to a combined penalty of $35 million would now lead to a value of $105 million given the tripling of the penalty levels. Even with such an increase in sanctions, the average penalty amount per fatality, excluding from consideration the number of violations and the failure to report the defect, would only be $847,000 per fatality, which is an order of magnitude below the optimal deterrence level associated with the VSL.

The underpricing of fatality risks is also apparent in the case of the $1 billion settlement that NHTSA reached with the Takata Corp. for airbag-related defects. The defective design of Takata airbags led to the explosion

[57] "More than a dozen" fatalities had been documented by GM, as noted by Anton R. Valukas, Report to Board of Directors of General Motors Company Regarding Ignition Switch Recalls 11 (May 29, 2014), http://www.beasleyallen.com/webfiles/valukas-report-on-em-redacted.pdf [https://perma.cc/8FW5-RH5G]. The total death toll is discussed by Kirsten Korosec, *Ten Times More Deaths Linked to Faulty Switch than GM First Reported*, FORTUNE, August 24, 2015, http://fortune.com/2015/08/24/feinberg-gm-faulty-ignition-switch/ [https://perma.cc/N5CB-WVF4]. That article notes the 275 injuries.

of the airbags and release of shrapnel that has led to 11 deaths in the U.S.[58] The settlement that was negotiated by the U.S. Department of Justice provided for $975 million in restitution to the carmakers and those who suffered losses due to the airbag, and a $25 million payment to the U.S.[59] This $25 million payment was not a fine per fatality but was the penalty for violations such as wire fraud and providing misleading information to car manufacturers, consumers, and regulators about the safety of the air bags.[60] Setting aside all of these rationales for penalties other than the fatalities, the average penalty per fatality that is reflected in the U.S. sanction is $2.3 million. Thus, even if penalties were based solely on the fatalities that occurred and there was no constraint on setting penalties linked to fatalities rather than to each separate violation, as specified in the statute, the penalty levels would be inadequate from the standpoint of using the VSL to determine optimal levels of deterrence.

D. Environmental Protection Agency: Air Pollution Emissions and Pesticide Risk

The Environmental Protection Agency (EPA) administers several statutes, which have different provisions relating to penalties that can be assessed. For example, the civil penalties that can be levied for emissions in violation of the Clean Air Act are capped at $25,000 per day, with a maximum penalty of $200,000.[61] The Clean Air Act imposes a civil penalty limit of $25,000 per day of violations, with total penalties not to exceed $200,000.[62] However, for criminal penalties in the case of violations that are misdemeanors resulting in death, the fines cannot be more than $250,000 for individuals and not more than $500,000 for death.[63] Penalties for violations of the Clean Water Act are subject to a limit of $25,000 per violation.[64] Civil penalties under the Toxic Substances Control Act are limited to a penalty of $37,500 per day.[65] These statutes also have provisions for penalties relating to criminal violations for hazards posing an imminent danger of death or

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[58] Press Release, U.S. Dep't of Transp., Nat'l Highway Traffic Safety Admin., NHTSA Confirms 11th U.S. Fatality Tied to Rupture of Takata Air Bag Inflator (Oct. 20, 2016).

[59] Margaret Cronin Fisk & Jamie Butters, *Takata to Pay $1B in U.S. Air Bag Probe; Execs Charged*, 45 BLOOMBERG BNA PROD. SAFETY & LIAB. REP. 89 (2017).

[60] Id.

[61] 42 U.S.C. 7413(d).

[62] Id.

[63] 42 U.S.C. 7413 of the Clean Air Act refers to 18 U.S.C. 3571 for the schedule of fines.

[64] 33 U.S.C. 1319(d).

[65] 15 U.S.C.A. S 2615(a).

serious bodily injury, such as the Toxic Substances Control Act's criminal penalty cap of $250,000 per violation for an individual and $1,000,000 per violation for an organization.[66]

The penalties that are imposed given this structure are conceptually unrelated to the VSL or other meaningful deterrence concepts and generally fall short of the levels that are needed to generate optimal levels of deterrence. Let us begin with the penalties arising from the Clean Air Act violations associated with DuPont's release of dangerous substances into the Kanawha River.[67] The eight releases of dangerous chemicals posed hazards to the Kanawha River and affected populations, and the exposure to the toxic gas phosgene led to one DuPont worker death.[68] These activities allegedly violated the Clean Air Act, the Comprehensive Environmental Response, Compensation and Liability Act, and the Emergency Planning and Community Right-to-Know Act.[69] EPA assessed $1.275 million in penalties against DuPont for violations associated with one fatality as well as the associated environmental harms.[70]

Tyson Foods, Inc. also had violations of the Clean Air Act, including accidental chemical releases of anhydrous ammonia at facilities in three states, leading to personal injuries, property damage, and one fatality.[71] The company had a continuing pattern of regulatory violations involving anhydrous ammonia releases. The releases in October, 2006 led to one fatality and one injury.[72] Releases in November, 2006 caused three onsite injuries and $125,000 in property damage.[73] Releases in December, 2006 caused 10 injuries as well as toxic air emissions. Subsequent releases in December, 2006 caused 5 on-site injuries and the evacuation of 475 employees.[74] Emissions in October, 2007 and November, 2009 caused injuries to the same employee in each instance.[75] A different October, 2007 release led to one injury as well as air releases of toxic ammonia.[76] A November, 2009 incident burned an employee over 25% of his body,

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[66] 15 U.S.C.A. § 2615(b).

[67] Press Release, U.S. Envtl. Prot. Agency, U.S. Settles with DuPont to Resolve Clean Air Act Violations and Protect Communities, Kanawha River Near West Virginia Facility (August 27, 2014).

[68] Id.

[69] Id.

[70] Id.

[71] Press Release, U.S. Envtl. Prot. Agency, Tyson Foods, Inc. Clean Air Act (CAA) Settlement, https://www.epa.gov/enforcement/tyson-foods-inc.

[72] Id.

[73] Id.

[74] Id.

[75] Id.

[76] Id.

requiring 45 days of hospitalization.[77] A December, 2010 event led to both toxic air emissions as well as 3 injuries.[78] Even if we exclude the rather extensive and continuing list of physical and environmental harms and focus solely on the single fatality, the $3.95 million penalty that Tyson was required to pay falls short of the optimal deterrence amount. Moreover, the continued pattern of serious injuries related to toxic emissions suggests that whatever impact the sanctions have had has been insufficient to lead to an adequate level of safety.

The sanctions that EPA imposes for criminal violations are often set at similar, sometimes modest levels. Four Texas companies were fined a total of $3.5 million under the Clean Air Act for criminal violations that produced an explosion at two oil and chemical processing facilities in Texas.[79] Of this amount, $3.3 million consisted of criminal fines, and $200,000 was a community service payment. In this incident, one worker was killed, and two other workers were severely injured.[80] The company had also falsified records and reports, as well as failing to comply with both environmental and safety laws.[81] Once again, the total penalty associated with the fatality is below the optimal deterrence amount even if the role of penalties in deterring other harms and regulatory violations is not taken into account.

Criminal prosecutions sometimes lead to far lower penalties in situations involving fatalities. The misapplication of a pesticide by an employee of Bugman Pest and Lawn, Inc. led to the death of two young children in Utah.[82] EPA brought criminal charges under the Federal Insecticide, Fungicide, and Rodenticide Act against the company, Bugman Pest and Lawn, Inc., and the pesticide applicator. EPA noted that the act "authorizes only the use of misdemeanor charges to combat the unlawful use of pesticides even when such unlawful use results in death."[83] EPA levied sanctions against both the pesticide applicator and the company. The applicator was sentenced to 36 months probation, a $25 fine, and 100 hours of community service.[84] The company incurred a $3,000 fine and 36 months probation during which time it could not engage in pesticide operations.[85]

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[77] Id.

[78] Id.

[79] Press Release, U.S. Dep't of Justice, Off. of Pub. Aff., Four Texas Companies Agree to Pay $3.5 Million for Criminal Violations of the Clean Air Act at Two Oil and Chemical Processing Facilities (Oct. 12, 2016).

[80] Id.

[81] Id.

[82] Press Release, U.S. Envtl. Prot. Agency, Bugman Pest and Lawn, Inc. and Coleman Nocks Plead Guilty to Unlawful Use of Pesticide (October 11, 2011).

[83] Id.

[84] Id.

[85] Id.

The financial stakes appear to be far below what would be warranted to provide efficient levels of deterrence to prevent two deaths.

E. Implications for Assessment of the Adequacy of Penalty Levels

Consideration of the penalty levels assessed for regulatory violations reveals a series of consistent patterns that are borne out across different regulatory agencies. First, agencies do not have complete discretion to set penalty levels in a manner that is appropriate in a particular instance. Rather, the maximum penalty amounts are stipulated by the statues governing the particular regulatory area. Second, the penalty levels are not tied to the VSL or any other methodological deterrence-related framework but are set at numerical levels without any associated justification for their rationale. Third, the statutes that established the penalty amounts date back almost a half a century so that the penalty amounts are often based on a different economic environment as well as a situation in which the law and economics theories of regulations and optimal deterrence were less well developed than they are today. Fourth, consideration of the civil violation penalty levels set by each of the agencies that were reviewed did not reveal any instances in which the penalty amounts were at the appropriate deterrence amounts even if the penalties were designed to address only fatalities rather than other transgressions associated with the regulatory incident. Because of the statutory guidance pertaining to limits on penalties, if all violations other than the fatality were excluded from consideration, the penalty levels would be reduced. Fifth, imposing possible criminal sanctions does not necessarily lead to penalties that produce optimal levels of deterrence. Such criminal sanctions can be quite stringent, as in the case of the Peanut Corporation of America, but also may be very modest, as reflected by the sanctions imposed for the pesticide misuse that led to two deaths.

The regulatory agencies considered all were subject to statutory guidelines that were first established during the initial wave of health, safety, and environmental regulations almost a half century ago. There is no reason to believe that the chosen penalty maximum values were pertinent deterrence amounts then or would be now, even after accounting for the impact of inflation. As indicated above, for decades the sanctions were unchanged since the initial legislation, as evidenced by the penalty of $7,000 per violation for the GM ignition switch defect and the company's failure to report the problem. During that time, there has been a major shift in how federal agencies value risks to life when designing and evaluating proposed government regulations.[86] Valuations that were formerly based on the financial losses associated with a fatality have now been supplanted by

[86] HANDBOOK, *supra* note 6, at 436–41.

estimates of the value of a statistical life.[87] In addition, the levels of these estimates have risen over time and converged to the amounts estimated in the economics literature. In terms of regulatory design, government agencies have adopted appropriate deterrence-based measures for reducing the risk of fatalities. However, for these regulations to establish appropriate incentives for behavior, the level of regulatory penalties associated with violations should be aligned with the values that are pertinent when setting regulatory stringency.

II. ESTABLISHING THE OPTIMAL DETERRENCE REFERENCE POINT

The ultimate objective of risk and environmental regulations is to have an impact on health, safety, and environmental outcomes. If these policies were public expenditure efforts than matters would be different. The government could undertake the projects needed to generate acceptable levels of risk. However, if the governmental mechanism is through regulatory policies, to have an effect these regulations must alter the behavior of other economic actors, such as firms, consumers, and workers. Influencing behavior in a manner than creates efficient levels of safety will correspond to what this Article will refer to as the optimal deterrence reference point. Setting the penalty levels per fatality will establish the incentives to promote efficient levels of safety.

A. Promoting Optimal Levels of Deterrence

In situations involving risk, policies have two principal objectives—creating optimal levels of deterrence and providing optimal levels of insurance. For financial risks, matters are straightforward, as it is possible for a single policy mechanism to achieve both objectives.[88] Social institutions such as tort liability that provide full compensation for the financial harm that has occurred both compensate the victim for the value of the harm and provide the appropriate financial incentive for the injurer to take efficient levels of care.[89] For physical harms, such as fatalities, matters become more complicated because financial transfers after a person's death do not restore their well-being to the pre-injury situation. Providing coverage for the financial loss suffered by the decedent's family addresses the financial loss, but does not address the welfare loss of the deceased or provide adequate incentives for deterrence. In general, it is not feasible for a single policy

[87] VISCUSI, PRICING LIVES, *supra* note 5.

[88] STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 179–274 (2004).

[89] Id.

mechanism to achieve both optimal deterrence and optimal insurance in situations involving fatality risks.[90] Addressing only the insurance aspects provides inadequate deterrence, and payments sufficient to provide optimal deterrence provide excessive levels of insurance. Whether there is any payment or financial incentive at all also assumes that there is a party that has been found to be responsible for the injury. The coverage of tort liability is incomplete, as firms or other parties are not liable for every accident, illness, or injury that occurs. As a consequence, government regulations often have a critical role to play in fostering appropriate levels of safety and environmental quality.

Whereas tort liability is concerned with both the insurance and deterrence objectives, risk and environmental regulations have a narrower focus. These governmental efforts do not transfer funds to injured parties or their survivors and consequently are not engaged in any insurance-related functions. Rather, they create incentives to generate sufficiently protective levels of safety that in theory could address the optimal deterrence function. Other social institutions such as tort liability, workers' compensation, social insurance policies, and private insurance could serve the insurance role.

From the standpoint of creating economically efficient levels of deterrence of risk, how should regulatory agencies value risk reduction and what is the magnitude of these figures? When assessing the desirability of regulations or setting their stringency, the standard procedure throughout the federal government is to use the value of a statistical life (VSL) to monetize the fatality risks reduced by the policy.[91] The VSL is the money-fatality risk tradeoff reflected in the decisions by workers and consumers in their risk-taking activities. Consider an example in which a worker faces a 1/10,000 risk of death and receives additional wage compensation of $900. Then the value per unit risk is $900/(1/10,000), or $9 million. Put somewhat differently, if 10,000 workers faced similar risks and were each paid $900 in wage compensation to bear the risk, then collectively they would experience one expected fatality and would be compensated a total of $9 million for this single expected fatality. This thought experiment gives rise to the terminology of the value of a statistical life to characterize the risk-dollar tradeoff by dividing the amount of wage compensation for risk by the size of the risk reduction.

[90] Michael Spence, *Consumer Misperceptions, Product Failure and Product Liability*, 44 REV. ECON. STUD. 561, 567 (1977).

[91] Off. of Info. & Reg. Aff., U.S. Off. of Mgmt. & Budget, Circular A-4, Regulatory Analysis 29–31 (September 17, 2003).

B. Empirical Evidence and Policy Practices

There are many sources of empirical evidence on the VSL.[92] It is possible to use interview techniques known as stated preference studies to elicit how much people are willing to pay for greater safety. Such approaches assume that people can process hypothetical risk information and give thoughtful and honest answers to how they value hypothetical risk changes. Alternatively, one could rely on revealed preference studies that assess the wage premiums workers are paid for risky jobs or the price premiums that are commanded by safer products, such as cars with a better safety record. Each of these approaches can generate a monetary premium associated with a particular change in the fatality risk. U.S. government agencies have relied on both stated preference studies and revealed preference evidence.[93] Most of the emphasis has been on labor market studies that determine the extra pay that is commanded by hazardous jobs. Since workers' employment agreements seldom specify the occupational risk and the associated hazard pay, economists have employed statistical methods to isolate the extra premium workers are paid for dangerous jobs, taking into account a variety of personal characteristics and job characteristics that might affect the wage rate.

Whereas formerly agencies valued fatality risks based on the compensation amounts in wrongful death cases, or what agencies termed the "cost of death," this practice changed in the 1980s.[94] The U.S. Office of Management and Budget rejected a proposed Occupational Safety and Health Administration (OSHA) regulation that would have introduced requirements that dangerous chemicals be labelled because in its view, the costs of the regulation exceeded the benefits[95]. After appealing the regulatory decision to then Vice-President George H.W. Bush, economist W. Kip Viscusi was asked to settle the dispute between the two agencies.[96] Monetizing the fatality risk benefits using the VSL led to an increase in the assessed benefits of the regulation by an order of magnitude, and led to the issuance of the regulation.[97] Although some agencies were slow to adjust the monetized value that they placed on fatality risks, there has been increasing convergence

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[92] Id. at 19–24, 30.

[93] In some cases, agencies have used both kinds of evidence. *See* U.S. Envtl. Prot. Agency, *supra* note 6.

[94] VISCUSI, PRICING LIVES, *supra* note 5; W. KIP VISCUSI, FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK (1992), and Pete Earley, *What's a Life Worth? How the Reagan Administration Decides for You*, WASH. POST MAGAZINE, June 9, 1985, at 36.

[95] Earley, *supra* note 94.

[96] Id.

[97] Id.

of these estimates to figures similar to the VSL estimates in the literature.[98] As a consequence, the value that government agencies place on fatality risks for purposes of regulatory impact analyses and regulatory design is in line with the VSL, or what is the appropriate economic deterrence value for fatality risks.

The current result of this effort is that agencies have reviewed the pertinent literature and now use VSL estimates that are often over $9 million per expected life saved by the policy. The official guidance values are $9.4 for the Department of Transportation, $9.7 million (2013 dollars) for the Environmental Protection Agency, and $9.6 million (2014 dollars) for the Department of Health and Human Services.[99] For example, the Department of Transportation bases its figure on a review of 15 of the labor market estimates of the VSL using Bureau of Labor Statistics occupational fatality rate data that it considers to be the most reliable.[100] Other agencies have also increased their VSL estimates over time so that agencies no longer use much lower values to monetize fatality risks, such as the amounts that are more in line with the value of wrongful death awards.[101] Recent estimates in the literature have concluded that a value of $10 million per statistical life is in line with the estimates based on the most reliable labor market data, which is also very similar to the inflation-adjusted values used by many federal agencies.[102] For concreteness, this Article uses the $10 million figure for expositional purposes as the appropriate economics deterrence value in the discussion below.[103]

C. How the Values Influence Regulatory Criteria

If government agencies use the VSL in setting the stringency of government regulations, it will lead to an economically efficient level of risk that would be consistent with legal theories of the optimal levels of deterrence.[104] First, to be efficient, the benefits of the regulation must exceed the costs.[105] Using the VSL to monetize the fatality risk reduction benefits provides the appropriate basis for calculating the benefits provided by risk and environmental regulations. However, there may be multiple regulatory

[98] HANDBOOK, *supra* note 6, at 436–41 (reviewing about 100 regulatory analyses and their associated VSL).

[99] VISCUSI, PRICING LIVES, *supra* note 5.

[100] U.S. Dep't of Transp., *supra* note 6.

[101] HANDBOOK, supra note 6.

[102] VISCUSI, PRICING LIVES, *supra* note 5.

[103] The $10 million figure is also used in VISCUSI, PRICING LIVES, *supra* note 5.

[104] More specifically, it sets the marginal costs equal to the VSL, as suggested by Off. of Info. & Reg. Aff., *supra* note 91, at 2.

[105] Id. See also VISCUSI, HARRINGTON & SAPPINGTON, *supra* note 1.

policies at different levels of stringency for which the benefits exceed the costs. The benefits may exceed costs by a greater extent for some regulations more than do others. As a result, there is a second requirement for the most efficient regulatory policies which is that the optimal regulatory policy will generate the greatest possible spread between benefits and costs, or the highest net benefits less costs.[106] In many situations, this occurs by tightening regulatory standards until the incremental cost of saving an additional expected life increases to the point where the cost equals the VSL. Thus, the VSL serves as the cutoff for setting the maximum price that should be paid for additional levels of safety if regulatory agencies set their regulatory standards based on benefit-cost principles.

In some situations, agencies may go beyond this requirement in terms of the level of stringency of the regulatory requirements. Restrictive legislative mandates may require that agencies set regulatory policies to promote safety or environmental quality to ensure a safer level than might result from benefit-cost balancing.[107] For that reason, executive branch guidance includes a provision that exempts agencies from being bound by a benefit-cost requirement when this approach conflicts with their statutory mandate.[108] The result is that in some situations regulations would be more stringent than would result based on benefit-cost balancing using the VSL, resulting in regulations with a higher cost per life saved than the VSL.[109]

That there might be such a disparity bolsters the implicit price that regulatory agencies place on fatality risks. The VSL consequently serves as the floor rather than the upper bound of the value placed on fatality risks by the regulations promulgated by the agency. The result that the VSL is a lower bound on the amount that regulators assign to fatality risks is important to the analysis of regulatory sanctions for regulatory violations that have led to deaths. This Article's review of regulatory sanctions involving product-related deaths and job-related deaths in Section II found that these sanctions are well below the magnitude of the VSL. As a consequence, these regulatory sanctions are even further below the implicit price that agencies assign to the expected lives saved when setting regulations that are even more stringent than is warranted based on benefit-cost criteria.

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[106] Off. of Info. & Reg. Aff., *supra* note 91, at 2–3.

[107] See Industrial Union Department, AFL-CIO v. American Petroleum Institute, 448 U.S. 607 (1980) and American Textile Manufacturers Institute v. Donovan, 452 U.S. 490 (1981).

[108] William J. Clinton, Executive Order No. 12866, Regulatory Planning and Review (October 4, 1993).

[109] BREYER, *supra* note 3, at 24–27 (providing examples of these regulations).

D. Setting the Price for Corporate Decisions

Just as the VSL serves as the reference point for how agencies should structure regulations to provide economically efficient levels of safety, the VSL also serves as the appropriate price for valuing additional levels of safety provided by companies and other economic agents. The selection of safety levels incorporated in products and the workplace safety conditions provided by firms all can be assessed using the same type of approach that government agencies use in setting regulatory standards. In particular, it is desirable for companies to design products that provide additional levels of safety so long as the incremental cost of safety per statistical life that is saved is below the price that the company assigns to each statistical death. The key determinant of how the firm will select their valuation of the fatality risks prevented by safer products will be the price signal that the firm receives with respect to the value of safety. These financial incentives can come from market forces or through incentives created by government regulations. If markets functioned perfectly so that consumers and workers were fully cognizant of the risk, then the VSL would be transmitted to the firm in terms of how much consumers were willing to pay for safer products and how much workers require to work on hazardous jobs.[110] Thus, the appropriate financial signals will be sent to the firm automatically if markets functioned perfectly. But this favorable result is unlikely to be the case in situations where the government has chosen to intervene since the inadequacy of market performance is typically an important determinant of whether government regulation is warranted. Based on Office of Management guidelines, a key component of the rationale for any regulatory intervention is that the agency demonstrate that there is a market failure.[111] Otherwise, the assumption is that there is no shortcoming that needs to be addressed by the regulation. Consequently, it is reasonable to assume that market forces are not setting the appropriate price for risk when agencies have enacted regulations. The failure of market forces to be functioning perfectly is particularly likely to be the case for environmental risks. Risks of air pollution, water pollution, and hazardous wastes are among the many environmental risks that are spread across broad population without any market transaction in which those affected by the risk accept the risk voluntarily and are compensated for the harm that is imposed by the risk.[112]

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[110] This underlying economic theory is described in VISCUSI, FATAL TRADEOFFS, *supra* note 94.

[111] Off. of Info. & Reg. Aff., *supra* note 91, at 4.

[112] The limitations to private bargains for environmental externalities are explored by Ronald H. Coase, *The Problem of Social Cost*, 3 J. L. ECON. 1 (1960).

If government regulations are in place and firms fail to comply with these regulations, what should be the appropriate regulatory sanction to create effective incentives for safety? Given that the focus here is on fatalities, let us consider a situation in which a consumer has been killed by a product risk that arose because the firm failed to manufacture the product in line with regulatory standards. If the penalty the regulatory agency levies for the fatality-related violation equals the VSL, it will be setting an appropriate price on greater safety that will encourage firms to adopt an economically efficient level of product safety. Viewed somewhat differently, when firms are producing products that are in violation of the regulation, they will know that this violation will lead to a penalty equal to the VSL in the event of a fatality, thus leading to the internalization of the appropriate economic value for fatality risks. In much the same way that government agencies can set efficient levels of safety by tightening the regulatory standards until the incremental cost of greater levels of safety equals the VSL, the firm likewise will have an incentive to internalize the appropriate economic valuation fatality risks.

This scenario assumes, however, that the regulatory agency can determine that there has been a fatality and can be certain that the fatality can be linked to a violation of regulatory standards. Some fatality risk events might be quite evident, as in the case of a major explosion that leads to a series of worker fatalities. However, major catastrophes are often a best case for being able to identify that a harm has occurred. In much the same way that there is a chance of a failure of the judicial system to detect behaviors that should lead to tort awards, there also are circumstances in which there is a chance that not all fatalities associated with regulatory violations will be known to the regulatory agency. For example, a firm might fail to disclose a regulatory violation to the regulatory agency or might enter into confidential settlements with those who are injured by the product. Thus, firms potentially could engage in behavior that decreases the ability of the regulatory agency to identify the regulatory violation and the resulting harm.

Suppose that there is some probability p that the regulatory violation leading to the fatality is known by the regulatory agency. Then, if the penalty for a fatality associated with a regulatory violation is set at a value equal to the VSL/p, it will create the appropriate incentives for safety for the firm.[113] The reasoning behind this formula is that if the firm multiples this penalty amount by the chance p that the penalty will be levied, the expected penalty amount associated with each fatality will be the VSL. The analytic rationale

[113] This result assumes that the firm is risk-neutral.

for this approach is identical to that for setting punitive damages in situations in which the probability of detection is below 1.0.[114]

E. The Role of Other Financial Incentives

Establishing appropriate incentives for safety is straightforward when the regulatory sanctions constitute the total penalty that the firm must pay. In that instance, a penalty equal to the VSL will suffice to create the appropriate financial incentives for safety. However, the company may incur other kinds of costs as well. Wrongful death awards may provide financial compensation to the estate of the deceased. If the company self-insures, then the company will pay the cost directly. If the liability costs are covered by insurance and if the insurance policy is experience-rated, then there will be a linkage of the value of future payments to the firm's liability history. In the situation of job-related accidents, state workers' compensation programs cover medical costs and earnings loss. As in the case of general liability insurance coverage, one would expect that the firm's accident record will affect future premiums so that the insurance payments are not costless to the firm.

How then should the regulatory sanctions incorporate the influence of these additional financial incentives, if at all? Should there be a downward adjustment in the regulatory penalty to account for the payments that the company will make in other venues? If so, how should such an adjustment be made given that wrongful death cases are not resolved at the time of the fatality, and there may be a considerable time period before any insurance or workers' compensation rates can be altered to reflect the firm's risk history? Since the prospect of tort liability awards or insurance adjustments is often uncertain, should the regulatory penalties be put on hold until these are resolved? Another possibility is to eliminate the possibility of such liability or workers' compensation payments if the firm is going to be penalized by the regulatory agency. Doing so would, of course, eliminate the possibility of having total damages in excess of the VSL. While such an approach would create efficient incentives for safety through penalties equal to the VSL, it would not serve the insurance role of meeting the income and medical expense needs of those who are injured or the families of the deceased. These social institutions play a vital, constructive role in ameliorating the financial harms associated with risks. Failing to provide such compensation will lead to a welfare loss attributable to the financial burdens resulting from fatalities.

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[114] A. Mitchell Polinsky & Steven Shavell, *Punitive Damages: An Economic Analysis*, 111 HARV. L. REV. 869 (1998) present this analysis in detail, including tracing its historical roots to writers such as Jeremy Bentham. Joni Hersch & W. Kip Viscusi, *Saving Lives through Punitive Damages*, 83 S. CALIF. L. REV. 229 (2010) develop the analog of this argument in situations involving the VSL and fatality risks.

Even if regulatory sanctions are set at a level that will establish efficient incentives for safety when there are regulatory infractions, there remains the additional task of ameliorating harms to those affected by the fatality.

Alternatively, one might devote part of the regulatory sanction to providing payment for the financial harms that have occurred. That would convert regulatory agencies into social insurance agencies, which is currently outside of the purview of their responsibilities. Practical problems of implementation would also arise. In the case of wrongful death litigation, the firm would not have a financial incentive to defend against a claim for compensation that is less than the regulatory sanction harm. If the regulatory agency wanted to increase the portion of the sanction that went to the government, it would be in the odd position of defending corporate conduct that it found to be in violation of its regulatory standards. As a result, shifting the burden of providing coverage for financial losses to the regulatory agency is likely to be both unworkable as well as inconsistent with the agencies' role as regulators of health, safety, and environmental quality rather than assuming a more broadly based insurance function.

One possibility is to ignore the potential additional payment amounts and simply impose regulatory sanctions equal to the VSL. Thus, the financial penalty would equal the VSL plus the cost to the firm of whatever additional compensation that is required to provide income support for those affected by the tragedy. Although this approach represents a departure from setting the penalty precisely at the level of the VSL, it may not involve a great departure. Suppose, for example, that the penalty level is set at $10 million and the wrongful death award is $1 million. Then the departure from the efficient penalty amount would only be an additional 10% of financial sanctions above the efficient level for promoting safety.

In addition to being only a modest premium above the VSL, there are several reasons why such a penalty premium might be warranted. First, it is not always feasible to identify all regulatory violations so that the ex ante probability of determining that a fatality occurred and was due to a regulatory violation may be less than 1.0, particularly if the company does not report product defects to the government. A prominent example of such behavior is that of the GM ignition switch failure for which the company failed to report the defect to the National Highway Traffic Safety Administration. At the time the agency imposed regulatory sanctions, the company had reported 13 switch-related deaths, which the agency thought was a low estimate, with the ultimate death toll being 124 deaths.[115] Based on theories of optimal deterrence, the penalty should exceed the efficient deterrence amount with perfect information about the harm. Second, penalizing the company based

[115] See Valukas, *supra* note 57, and Korosec, *supra* note 57.

solely on the VSL only replicates what the company should have done based on setting an efficient level of safety. But the company has incurred a regulatory violation for which some might suggest that there be an additional punishment amount.[116] Third, the regulatory sanction affects prospective behavior and the appropriate future levels of safety. But if the company is guilty of a regulatory violation that has led to fatalities, there still remains the welfare loss to the survivors of the deceased, which will also generate an efficiency loss from the standpoint of not meeting their legitimate insurance needs. Setting an additional cost above the VSL serves the additional constructive objective of providing compensation. Finally, given the importance of both promoting safety and providing compensation, some legal scholars such as Posner and Sunstein have advocated payments for wrongful death cases that include compensation for financial losses as well as the VSL in order to provide adequate insurance and deterrence.[117] My proposal is more limited in that I have introduced the VSL in addition to conventional tort remedies only in instances in which there are regulatory violations.

F. Implications for Setting the Deterrence-Based Penalty Levels

Basing the penalties for regulatory violations that lead to fatalities on the VSL will send the appropriate price signals to firms with respect to providing adequate control of risks. Government agencies have adopted this approach for the design of regulations. As the review of the penalties assessed by OSHA, FDA, NHTSA, and EPA indicated, the current magnitude of the penalties levied for fatalities is quite low, far below the VSL. The statutory caps on fines may limit the sanctions to levels that may be as low as less than one thousandth of the VSL. As a result, even if regulatory agencies fully exploited the leeway that they have in setting penalties, the sanctions would be far too low to send meaningful financial signals to firms regarding the importance of reducing health risks. Implementing the use of the VSL for regulatory enforcement would make the economic incentives created by the enforcement of regulatory policies consistent with the economic principles on which regulations are designed. On a decentralized basis firms then would be making the calculations of the costs and benefits of safety that parallel the assessments that comprise regulatory impact analyses by government agencies.

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[116] Polinsky & Shavell, *supra* note 114, at 957–962 (noting that there is often a similar provision for the role of punishment in the determination of punitive damages, but whether and how such punishment should enter remains controversial).

[117] Eric A. Posner & Cass R. Sunstein, *Dollars and Death*, 72 U. CHI. L. REV. 537 (2005).

III. RECTIFYING THE PENALTY STRUCTURE

Altering the penalty structure to accommodate a more deterrence-based penalty approach does not require that all such limits be abolished. However, it is essential to raise these limits to make it possible both to reflect the VSL level in setting the penalty and to make allowances for the number of deaths that have occurred. Thus, there often must be a revision both in the penalty amount as whether this amount is determined by factors such as the number of violations or whether it can also be altered based on the number of fatalities. Consideration of how different prominent statutes for the regulatory agencies discussed above illustrates the range of modifications that are required.

A. Occupational Safety and Health Administration

Analysis of the revisions for OSHA is relatively straightforward since the agency's statutory guidelines are derived from a single law, the Occupational Safety and Health Act of 1970. The law has provisions for sanctions for a variety of different types of violations—serious violations, other than serious violations, posting requirements, failure to abate violations, and willful or repeated violations. Raising the penalty limits would be desirable in each instance.

The most pertinent violation category for risks of fatality are serious violations. "A serious violation exists when the workplace hazard could cause an accident or illness that would **most likely result in death or serious physical harm**, unless the employer did now know or could not have known of the violation."[118] For this class of violations, the original cap on penalties was set at $7,000: "Any employer who has received a citation for a serious violation of the requirements of section 654 of this title, or any standard, rule, or order promulgated pursuant to section 655 of this title, or of any regulations prescribed to this chapter, shall be assessed a civil penalty of up to $7,000 for each such violation."[119] A subsequent updating of the penalty amount raised the upper limit on penalties to $12,675 per violation.[120]

Modifying the statutory language to generate optimal levels of deterrence requires replacing the $7,000 limit with an upper limit of $10 million, leading to the following proposed changed language: "Any employer who has received a citation for a serious violation of the requirements of section 654 of this title, of any standard, rule, or order promulgated pursuant to section 655 of this title, or of any regulations prescribed pursuant to this

[118] *Federal Employer Rights*, *supra* note 8 (emphasis added).
[119] 29 U.S.C. 666(b).
[120] 29 CFR 1903.15(d)(3).

chapter, shall be assessed a civil penalty of up to $12,675 per violation, unless such a violation results in a person's death, in which case the employer shall be assessed a penalty up to $10,000,000 per death caused by the violation."

It would also be appropriate to lift the cap for other kinds of violations, though they may be less likely to involve fatalities than are serious violations. Other than serious violations are directly related to job safety and health, but do not qualify as serious.[121] One might think that given the categorization of such violations that penalties appropriate for deterring risks of fatalities would never be warranted. As in the case of serious violations, the statutory cap of $7,000 per violation was raised to $12,675 per violation.[122] Raising the cap to $10 million if the violation involved fatalities with language that follows that used for serious violations could nevertheless come into play if the violation did not merit the serious designation since there was the risk of a fatality, but the probability of death was not so great that the violation "would most likely result in death or serious physical harm."[123] However, even if the probability of death was not sufficiently high to qualify as being categorized as "most likely" to cause death, the VSL provides the pertinent sanction conditional on a death occurring. Suppose, for example, that the risk of death is only 1/10 and, for simplicity, assume that there is only a risk of a single death. Then with a regulatory sanction of $10 million for each fatality that has occurred, the company will undertake the safety improvement to eliminate the violation so long as the cost is under $1 million. The VSL-based penalty structure establishes the appropriate, effective financial incentives for safety.

Posting requirements pertain the requirement employer that employers must post notices of violations near the place where the violation occurred. The statutory penalty cap of $7,000 was increased to $12,675.[124] Posting requirements can play an important role with respect to safety if they serve to alert workers to dangerous conditions that pose the risk of fatality. Alerting workers to these conditions may lead them to be more cautious in avoiding exposure to the risk that led to the violation or could prompt them to identify related violations pertinent to their safety. Revision of the statutory cap of $7,000 to $12,675 when fatalities are not involved and $10 million per fatality when the failure to post results in a person's death would establish the appropriate deterrence-based incentives.

Suppose that a company has been found guilty of a violation but has not remedied the safety infraction. OSHA has two classifications of violations related to that behavior. The less severe situation is that of a failure

[121] 29 U.S.C. 666(c).
[122] 29 U.S.C. 666(c), 29 CFR 1903.15(d)(4).
[123] *Federal Employer Rights*, *supra* note 8.
[124] 29 U.S.C. 666(i), 29 CFR 1903.15(d)(5).

to abate violation: "A failure to abate violation exists when the employer has not corrected a violation for which OSHA has issued a citation and the abatement date has passed."[125] However, the penalty for this classification of violations is not in terms of the penalty per violation but the penalty per day, where there is a statutory cap of $7,000 that has since been raised to $12,675 per day.[126] As a result, my proposed revision of the statute is a bit different in that it will be in terms of penalty per day, not per violation: "Any employer who fails to correct a violation for which a citation has been issued under section 658(a) of this title within the period permitted for its correction (which period shall not begin to run until the date of the final order of the Commission in the case of any review proceeding under section 659 of this title initiated by the employer in good faith and not solely for delay or avoidance of penalties), may be assessed a civil penalty of not more than $12,675 for each day during which such failure or violation continues. If the failure to abate results in death, the employer shall be assessed a penalty up to $10,000,000 per additional death caused by the failure to abate." As a result, my proposed penalty structure retains a daily penalty amount for failing to post the notice that follows the current penalty structure but adds the possibility of having a penalty amount of up to $10 million per fatality that has resulted from this particular violation. It would not be appropriate to mimic the current daily penalty structure by adding a $10 million penalty per day of failure to abate violations since that would lead to excessive levels of deterrence.

Willful and repeated violations of regulatory standards have significantly greater caps than do other violation categories. A violation is categorized as willful if it meets the following criterion: "A willful violation is defined as a violation in which the employer either knowingly failed to comply with a legal requirement or acted with plain indifference to employee safety."[127] The criteria are somewhat different than that of failure to abate violations for whether a violation is repeated: "An employer may be cited for a repeated violation if, upon re-inspection, the same or a substantially similar

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[125] OCCUPATIONAL SAFETY & HEALTH ADMIN., EMPLOYER RIGHTS AND RESPONSIBILITIES FOLLOWING AN OSHA INSPECTION, OSHA 3000-08R (2005), https://www.osha.gov/Publications/osha3000.pdf [https://perma.cc/5JDA-9SXX]. *See also* 29 U.S.C. 666(d) ("Any employer who fails to correct a violation for which a citation has been issued under section 658(a) of this title within the period permitted for its correction (which period shall not begin to run until the date of the final order of the Commission in the case of any review proceeding under section 659 of this title initiated by the employer in good faith and not solely for delay or avoidance of penalties), may be assessed a civil penalty of not more than $7,000 for each day during which such failure or violation continues.").

[126] 29 CFR 1903.15(d)(6).

[127] *Federal Employer Rights*, *supra* note 8.

condition is found and the citation has become a final order."[128] The penalty structure for these violations includes a penalty ceiling that is 10 times greater than that for other violation categories, as the upper limit is $70,000 in the statute and $126,749 based on the penalty update.[129] From a deterrence standpoint, a higher penalty level may be warranted from the standpoint of a probability of detecting a willful or repeated violation that is less than 1.0. In addition, the statute specifies a penalty floor of $5,000 for each willful violation. My proposed revision of the statutes is that: "Any employer who willfully or repeatedly violates the requirements of section 654 of this title, or regulations prescribed pursuant to this chapter may be assessed a civil penalty of not more than $126,749 for each violation, but not less than $5,000 for each willful violation. In addition, any additional death cause by the willful or repeated violation assessed under this section shall result in an additional penalty of at least $10,000,000 for each death, but not to exceed $100,000,000 for each death." Unless OSHA has reason to believe that the firm engaged in willful or repeated behavior that had a low probability of detection, a penalty cap of $10 million would be pertinent. But if the company was guilty of stealthy behavior and sought to prevent OSHA from learning about its violations, then a penalty in line with optimal deterrence theory would be warranted. To date, neither the courts nor federal agencies have embraced linking the regulatory sanctions to the probability of detection. But the proposed penalty structure in this Article does not preclude the imposition of additional penalties such as those that are related to failure to report motor-vehicle defects to NHTSA or drug-related fatalities to the FDA, where such behaviors may affect the ability of regulators to identify regulatory violations.

B. Food and Drug Administration

The FDA has a variety of regulatory responsibilities, but the focus of the examples provided above was on food safety, which will be the emphasis here as well. As in the case of OSHA, there are legislative caps on the penalty amounts, but the specified levels are greater than for OSHA, with caps sometimes as great as $500,000. Nevertheless, it is essential to raise the statutory caps so that penalties can be in line with the optimal deterrence amounts. Adding a clause indicating the penalty caps in situations involving fatalities is sufficient to accomplish this change for a wide range of FDA

[128] OCCUPATIONAL SAFETY & HEALTH ADMIN., *supra* note 125, at 8. *See also* 29 U.S.C. 666(a) ("Any employer who willfully or repeatedly violates the requirements of section 654 of this title, any standard, rule, or order promulgated pursuant to section 655 of this title, or regulations prescribed pursuant to this chapter may be assessed a civil penalty of not more than $70,000 for each violation, but not less than $5,000 for each willful violation.").

[129] 29 CFR 1903.15(d)(1), 29 CFR 1903.15(d)(2).

regulations. Thus, the statutory language can remain unchanged except for the addition of a provision to permit sanctions of up to $10 million per fatality. In the case of adulterated food, my proposed statutory language is the following: "Any person who introduces into interstate commerce or delivers for introduction into interstate commerce an article of food that is adulterated within the meaning of section 342(a)(2)(B) of this title or any person who does not comply with a recall order under section 350/ of this title shall be subject to a civil money penalty of not more than $50,000 in the case of an individual and $250,000 in the case of any other person for such introduction or delivery, not to exceed $500,000 for all such violations adjudicated in a single proceeding, unless the violation results in death, in which case the person will be fined not more than $10,000,000 per death."[130] Adding the clause "unless the violation results in death, in which case the person will be fined not more than $10,000,000 per death" suffices to make the cap no longer overly restrictive.

Similar changes can rectify the structure of other FDA statutory provisions such as those pertaining to medical devices. In the case of medical device violations, the statutory cap was set at "$1,000,000 for all such violations adjudicated in a single proceeding."[131] This cap has since increased to $1.2 million.[132] Once again there should be an exception violation results in a death, in which case the cap should not be more than $10 million per death.

However, to align the penalty structure with optimal deterrence amounts, additional changes may be required. The damages caps for postmarket studies and clinical trials might appear to be most in line with the optimal deterrence amounts because they include a statutory cap of $10,000,000, as the statute specifies that penalties for violations are "not to exceed $10,000,000 for all such violations adjudicated in a single proceeding."[133] However, this cap is also insufficient as it does not accommodate the possibility of multiple deaths that may be involved in large scale uses of a drug. Moreover, because the statutory penalties also include additional sanctions for matters such as doubling of penalties for each 30-day period (or any portion thereof) that the party is in violation, the penalties are not tied to the adverse health outcomes alone.[134] I would advocate the $10 million penalty cap per fatality and also propose eliminating any upper bound on the total civil penalty. Thus, my proposed statute would include the

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[130] This proposed text is identical to that in the statute, 21 U.S.C. 333(f)(2)(A) except for the addendum regarding $10 million.

[131] 21 U.S.C. 333(f)(1)(A).

[132] 21 CFR 17.2. (typo?) 45 C.F.R. § 102.3 $1.8 million

[133] 21 U.S.C. 333(f)(4)(A)(i) and 21 U.S.C. 333(f)(4)(A)(ii).

[134] Id.

following additional provision: "If the violation results in a death, the person will be fined not more than $10,000,000 per death without a cap on the civil monetary penalty amount."

C. Department of Transportation

The statutory guidance for motor-vehicle safety violations is well-defined and has an implausibly small cap given the large number of people who could be affected by a mass marketed consumer product. As was discussed in connection with the GM ignition switch defect, NHTSA had a statutory cap of $35 million on a related series of violations. While this cap has since been increased to $105 million, that amount would be too low if there were more than 10 fatalities related to the violation.[135] Violations for transgressions other than the fatalities also may affect the total penalty amount so that it would be inappropriate to cap the penalty at the optimal penalty value for the fatalities alone. To rectify this situation, I propose the following statutory language: "A person that violates any of section 30112, 30115, 30117 through 30122, 30123(a), 30125(c), 30127, 30141 through 30147, or 301137, or a regulation prescribed thereunder, that results in death, is liable to the United States Government for a civil penalty of not more than $10,000,000 for each death. A separate violation occurs for each death caused by a defect in a motor vehicle or item of motor-vehicle equipment. There is no maximum penalty under this subsection for any related series of violations." Because the penalties pertain not only to fatalities but also to matters such as the failure to report the defect to NHTSA in a timely manner, the overall penalty cap is not constrained to the fatality-related amounts alone but can exceed the $10 million per fatality amount.

D. Environmental Protection Agency

Amending the statutory guidance of the EPA requires similar kinds of changes in that there are statutory caps on penalties and the level of these caps prevents the penalty structure from being aligned with optimal deterrence amounts. Typically, the changes involve specifying that penalties of up to $10 million per fatality be allowed. If there are also rationales for sanctions other than for fatalities related to regulatory violations, then provision for a higher total penalty amount may be appropriate. Because of the strong parallels in the nature of the statutory revisions across different areas of agency responsibility, the focus here is on three representative policy areas, the regulation of toxic substances, the regulation of water quality ,and the regulation of air quality.

[135] 81 FR 15413, 49 U.S.C. 30165(a)(1).

In the case of the Toxic Substances Control Act, the fines are limited to an upper limit of $250,000 for an individual and $1,000,000 for an organization, though there also is the possibility of criminal sanctions.[136] While the statute specifically provided for penalties for placing "an individual in imminent danger of death or serious bodily injury," it did not establish a penalty structure commensurate with these harms.[137] To address the shortcoming, I propose the following language for individuals to incorporate the $10 million optimal deterrence value in the specification of the penalty structure: "Any person who knowingly and willfully violates any provision of section 2614 or 2689 of this title, and who knows at the time of the violation that the violation places an individual in imminent danger of death or serious bodily injury, shall be subject on conviction of a fine of not more than $250,000, or imprisonment for not more than 15 years, or both, unless the violation results in a death, in which case the person will be fined not more than $10,000,000 per death." The counterpart provision for organizations would include a per violation penalty cap of $1 million when the sanctions are for violations other than those involving fatalities.

Fatalities can also result from violations of the Clean Water Act. However, this penalty structure is not linked to the health outcomes per se, but is set in terms of a daily penalty rate of $25,000 per day for each violation.[138] Thus, if EPA identifies a violation that led to a fatality but has occurred for under 400 days, the resulting maximum penalty would be under the appropriate optimal deterrence amount for a fatality. The following statutory language would rectify the situation: "Any person who violates section 1311, 1312, 1316, 1317, 1318, 1328, or 1345 of this title, or any permit condition or limitation implementing any of such sections in a permit issued under section 1342 of this title by the Administrator, or by a State, or in a permit issued under section 1344 of this tile by a State, or any requirement imposed in a pretreatment program approved under section 1342(a)(3) OR 1342(b)(8) of this title, and any person who violates any order issued by the Administrator under subsection(a) of this section, shall be subject to a civil penalty not to exceed $25,000 per day for each violation. If a person's violations of this statute cause the death of another person, the violator shall be subject to a civil penalty not to exceed $10,000,000 per death for each death."

The penalties under the Clean Air Act are similar to those for other environmental violations, but there are also provisions for criminal penalties linked to fatalities. The civil penalties for Clean Air Act violations are set as follows: "The Administrator may issue an administrative order against any

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[136] 15 U.S.C.A. S 2615(b).
[137] Id.
[138] 33 U.S.C. 1319(d).

person assessing a civil administrative penalty of up to $25,000, per day of violation…the Administrator's authority under this paragraph shall be limited to matters where the total penalty sought does not exceed $200,000…"[139] Once again, it is straightforward to revise the language for civil penalties as follows: The Administrator may issue an administrative order against any person assessing a civil administrative penalty of up to $25,000, per day of violation, unless the violation results in death, in which case the Administrator shall assess a civil administrative penalty of not more than $10,000,000 per death…the Administrator's authority under this paragraph shall be limited to matters where the total penalty sought does not exceed $200,000, unless the civil administrative penalties are assessed for deaths, in which case there shall be no cap on the penalty amount.

The criminal penalty fines under the Clean Air Act make specific reference to fatalities in terms of a "misdemeanor resulting in death."[140] The current upper limits of such penalties to $250,000 for individuals and $500,000 for organizations can be replaced by penalties that should not be more than $10,000,000 per death. Recognition of the VSL and permitting the penalties to incorporate the total number of deaths will rectify the principal shortcomings of the current penalty structure.

E. Implications for Regulatory Enforcement

Revising the statutes of risk and environmental regulation agencies to permit regulatory sanctions that will provide optimal levels of deterrence has many commonalities across the different regulatory agencies. The principal change needed is allowing penalties of up to $10 million per fatality to establish deterrence-based penalty levels. In addition, there also may be situations in which it is desirable to eliminate the cap on overall penalty levels if it is important to provide leeway to take into account the role of other sanctions.

Raising the statutory cap does not, however, ensure that regulatory agencies will levy penalties that are in line with the cap. One possibility is to not give agencies leeway but instead specify that when regulatory violations result in a fatality, the penalty per fatality must equal $10 million. Doing so would be a major departure from the current statutory approach, which gives the agency discretion in setting penalty amounts up to some maximum value. Even without making the $10 million penalty amount a requirement, the establishment of a cap that is usually several orders of magnitude greater than the current caps will conceivably have an anchoring effect, signaling to

[139] 42 U.S.C. 7413(d)(1)

[140] 42 U.S.C. 7413 of the Clean Air Act refers to 18 U.S.C. 3571 for the schedule of fines.

regulators that fines in this general range are warranted and appropriate for creating meaningful safety incentives. Regulators also might value retaining some leeway in setting of the sanctions to account for the role of other financial sanctions that may be operative, such as workers' compensation premium amounts or settlement funds for accident victims. The regulators might wish to also take these costs into account when determining the total penalty level. Providing regulators with an understanding of the principles of optimal deterrence rather than simply highlighting the potential for setting the penalty at a new, higher level than before, may assist them in formulating an effective enforcement approach.

IV. PENALTIES AND CORPORATE RISK ANALYSES

The ultimate objective of imposing penalties is not simply to shift money from companies to the government, but rather it is to create incentives that will incentivize regulatory compliance and lead to greater levels of health, safety, and environmental quality. In making their risk decisions, companies should take into account the various financial incentives for safety that are generated through regulations, tort liability, and the market. The review that is presented below of a series of examples of corporate risk analyses indicates that the damages amounts that firms pay in tort liability often play an instrumental role in establishing the financial incentives that companies take into account. However, the incentives created by tort liability, which are based largely on the financial loss suffered by the decedents and their families rather than the VSL, fall short of those needed to create efficient levels of deterrence.[141] This shortfall is especially likely to be great for fatalities resulting from occupational exposures since companies are not subject to the usual tort liability remedies when workers' compensation coverage is provided. This section provides a review some of the examples of corporate risk analyses and their failure to incorporate the VSL in their monetization of the costs of fatalities. Changing the penalty structure for regulatory violations by eliminating the current penalty caps and having government agencies base their penalties on the VSL, as outlined in the previous section, would transform the valuations that companies assign to the prevention of fatalities through their product safety decisions. However, undertaking a risk analysis of safety-related matters is not innocuous, as it may have adverse ramifications for the company's liability and whether usual criteria for the award of punitive damages are met. Thus, this Article proposes coupling the shift to the VSL-based approach with additional legal protections for companies undertaking responsible risk analyses.

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[141] W. Kip Viscusi, *Misuses and Proper Uses of Hedonic Values of Life in Legal Contexts*, 13 J. FORENSIC ECON. 495 (2002); Posner & Sunstein, *supra* note 117.

A. The Ford Pinto Experience

A particularly prominent example of a corporate risk assessment related to product safety decisions is the risk analysis undertaken by Ford with respect to the Ford Pinto. The company's analysis pertained to the location of the gas tank, the costs associated with the gas tank's placement, the injuries and fatalities associated with different placements, and the economic value of the accident-related costs.[142] The main matter of concern was whether incurring an additional cost to move the gas tank from the rear of the vehicle to reduce the risk of fire-related injuries upon rear impact warranted the additional expense. Based on the risk analysis, Ford concluded that the placement of the gas tank in a position that made it vulnerable to rear impacts was desirable from the standpoint of corporate profitability. The safer gas tank design imposed an additional cost of $137.5 million, which greatly exceeded what Ford considered to be the safety benefit from moving the tank, which it estimated to be $49.6 million.[143] The value that Ford used to monetize the fatalities that would be reduced by changing the risky gas tank placement was $200,000, which was in line with wrongful death awards at that time.[144] After a Ford Pinto was rear-ended, the driver was killed and Richard Grimshaw, the thirteen-year-old passenger, was injured. In the subsequent case, *Grimshaw v. Ford Motor Co*., the plaintiffs attributed the injuries to the defective product design for the fuel filler pipe and the placement of the gas tank behind the rear axle, leading the jury to make a punitive damages award of $125 million, a compensatory damages award of $2.5 million to Grimshaw, and a $600,000 award to the estate of the driver.[145] Although the rationale for the particular punitive damages award amount is not known, the relatively minor cost of the design change of $11 per vehicle may have appeared to have been inconsequential in relation to a fatality and a serious personal injury.[146] The vantage point for the jury's retrospective assessment was a comparison of the unit cost of the design change and the value of the harms caused by the accident. The punitive damages award was later reduced to $3.5 million.[147] In addition to the very high financial

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[142] Gary T. Schwartz, *The Myth of the Ford Pinto Case*, 43 RUTGERS L. REV. 1013, 1020–1025 (1991).

[143] W. KIP VISCUSI, REFORMING PRODUCTS LIABILITY 111–13 (1991), which in turn cites the internal 1973 Ford Motor Company document by E.F. Grush & C. S. Saunby, *Fatalities Associated with Crash Induced Fuel Leakage and Fires*, archived at https://perma.cc/7XFH-3KDG, discussed in BRENT FISSE & JOHN BRAITHWAITE, THE IMPACT OF PUBLICITY ON CORPORATE OFFENDERS (1983).

[144] Id.

[145] 3174. Cal. Rptr. 348, 358 (Ct. App. 1981).

[146] VISCUSI, REFORMING PRODUCTS LIABILITY, *supra* note 143.

[147] Schwartz, *supra* note 142.

penalties, Ford also was pilloried by the media for its analysis of the financial costs and benefits of the design change.[148]

B. GM's Risk Analysis Efforts

GM similarly used comparable litigation cost estimates to value fatalities in its analysis of the injury costs associated with fires resulting from accident-related impacts on side-saddle fuel tanks.[149] Placement of the fuel tanks on the side of a vehicle made them vulnerable to crash impacts, but alternative placement of the tanks would entail additional costs. The engineer's assessment of the value of the fatalities that would result from the proposed vehicle design monetized them using a value of $200,000, as in the case of Ford Pinto analysis.[150] With an estimated maximum number of deaths of 650-1,000 from fuel-fed fires, the analysis concluded that the cost of the safety enhancement were too great to warrant the additional expenditures to avoid the injuries that would be prevented.[151] The driver of a GM pickup truck that had this risky gas tank placement was injured and subsequently died after the gas tank of his GM truck caught fire after having been broadsided by a drunk driver.[152] The GM analysis in which the company assessed the costs and benefits of a safer design and chose not to incur the additional cost led to a "constant refrain among the jurors interviewed" that "they knew" about the risk.[153] The jury award in this case, *GM Corp. v. Moseley*, was $101 million in punitive damages, $4 million in compensatory damages, and $1 in pain and suffering damages.[154] There was no apparent sound methodological basis that the jury used in setting the punitive damages award, such as a VSL. Rather the jury constructed the figure by engaging in the arbitrary exercise of multiplying $20 per vehicle by the 500,000 GM trucks on the road, and then adding an extra $1 million "exclamation point."[155]

The same GM risk analysis memo also played a pivotal role in a subsequent case involving a rear-end crash of a Chevrolet Malibu that caused

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[148] Mark Dowie, *Pinto Madness*, MOTHER JONES, Sept./Oct. 1977, http://www.motherjones.com/poloitics/1977/09/pinto-madness [http://perma.cc/GDE7-36FD].

[149] 447 S.E.2d 302, 310 (Ga. Ct. App. 1994).

[150] See Memorandum, Edward C. Ivey, Value Analysis of Auto Fuel Fed Fire Related Fatalities (June 29, 1973), transcript available at http://www.cnn.com/US/9909/10/ivey.memo [https://perma.cc/EQD7-Z34S]; and Terence Moran, *GM Burns Itself*, AM. LAW., April 1993, at 68, 73.

[151] Id.

[152] *GM Corp. v. Moseley*, 447 S.E.2d 302, 310 (Ga. Ct. App. 1994).

[153] See Moran, *supra* note 150, at 69.

[154] Id.

[155] Moran, *supra* note 150, at 82.

burn injuries for all of the occupants.[156] Whereas the GM memo compared the design costs and the monetized health benefits based on the average costs of wrongful death cases, in the view of one plaintiff attorney the jurors believed that the company should have had a different perspective: "The jurors wanted to send a message to General Motors that human life is more important than profits."[157] In setting their punitive damages amount, the jury used as its seemingly arbitrary reference points for the appropriate damages amount the long term trajectory of GM's advertising expenses[158] and two-thirds of the company's annual profits.[159] The result of basing the punitive damages value on these anchors was a compensatory damages award of $107.6 million and a punitive damages award of $4.8 billion.[160]

To the extent that punitive damages serve a deterrence function, then constructing the punitive damages value based on the VSL would have provided an appropriate deterrence-based reference point, as opposed to the multi-billion dollar award level. If one uses the VSL as the maximum value for the value of preventing the risk of nonfatal injuries, then adoption of the VSL as the upper bound value of each individual's loss as the regulatory sanction would provide adequate deterrence, with no additional punitive damages needed to establish the efficient level of care. Thus, in instances such as this in which juries may impose inordinately large awards, the VSL could potentially play a restraining role, in addition to aligning penalties with the appropriate deterrence amounts.

C. Controversial Risk Analyses by Ford and Chrysler

There are other examples of companies that have been subject to criticism for undertaking similar efforts to balance costs and benefits. Ford came under such criticism in *Miles v. Ford Motor Co*. for its risk analysis

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[156] See Andrew Pollack, *4.9 Billion Jury Verdict in G.M. Fuel Tank Case*, N.Y. TIMES, July 10, 1999; *GM Hit by $4.9 Billion Verdict*," CNN MONEY, July 9, 1999, http://money.cnn.com/1999/07/09/home_auto/gm_verdict/ [http://perma.cc/2XEE-R6AS].

[157] Editorial, *Casino Justice*, WASH. POST, July 13, 1999, at A18 (quoting Brian J. Panish, lawyer for the accident victims).

[158] Michael White, *4.9 Billion Awarded in Gas Tank Accident*, TOPEKA CAPITAL J., July 10, 1999, http://cjonline.com/stories/071099/bus_gmaward.shtml#.V3WKDbgrKUk [http://perma.cc/NYS4-8C2P].

[159] Frank Swoboda & Caroline E. Mayer, *Jury Hits GM with Historic Crash Verdict*, WASH. POST, July 10, 1999, http://www.washingtonpost.com/wp-srv/national/longterm/supcourt/stories/jury071099.htm [http://perma.cc/3GWC-U6QZ].

[160] See Pollack, *supra* note 156.

involving a "tension eliminator" for the shoulder harness on a seatbelt.[161] "Syson [the plaintiff's accident reconstruction expert] testified that when Ford identified what it believed was a defective product it would first run a "cost benefit" analysis to see what the cost would be to fix or repair the defect. Next, Ford would assign arbitrary values to each death or serious injury and would predict the number of occurrences which would involve either death or serious injury. Finally, Ford would determine the cost to litigate such deaths and injuries. Syson testified that if the cost to repair the defect exceeded the other costs, Ford would not correct the defect."[162] In this case, Ford incurred both compensatory and punitive damages awards, where its transgressions included running a cost-benefit analysis and assigning a monetary value on the deaths and serious injuries based on the litigation costs associated with these adverse health outcomes.[163]

Chrysler Corporation likewise was punished with a $250 million punitive damages award in *Jimenez v. Chrysler Corp*. because it undertook a similar analysis of the risks and costs which in this case pertained to door latch design.[164] As in the earlier examples, the company calculated the costs of an alternative, safer designs and compared these costs to the economic value or the reduction in fatalities. The monetization of the health effects did not focus on the VSL or government sanctions for safety defects but instead relied on the value that the companies would pay in wrongful death suits: "Chrysler officials at the highest level cold-bloodedly calculated that acknowledging the problem and fixing it would be more expensive, in terms of bad publicity and lost sales, than concealing the defect and litigating the wrongful death suits that inevitably would result."[165] Once again, a company analysis focused on the damages payments in litigation rather than regulatory sanctions or the use of measures such as the VSL to monetize the fatality risks.

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[161] *Miles v. Ford Motor Co*., 922 W.W.2d 572, 579 (Tex. App. 1996), remanded for procedural errors, *Ford Motor Co. v. Miles*, 967 S.W.2d 377 (Tex. 1998), and *Ford Motor Co. v. Miles*, 141 S.W.3d 309, 319 (Tex. App. 2004).

[162] Id, 588–89.

[163] Id.

[164] See *Jimenez v. Daimler Chrysler Corp*., 269 F.3d 439, 443 (4th Cir. 2001); *Jimenez v. Chrysler Corp*., No. 2: 96-1269-11, 1997 WL 743644, at 1 (LRP Jury) (SC Oct. 8, 1997).

[165] Donald C. Dilworth, *Jurors Punish Chrysler for Hiding Deadly Defect*, TRIAL, February 1, 1998, http://www.thefreelibrary.com/Jurors+punish+Chrysler+for+hiding+deadly+defect.-a020379898 [http://perma.cc/3XXXS-XD3Z].

D. The Decline in Corporate Risk Analysis Efforts

Perhaps as a result of these adverse experiences with risk analyses, there appear to be few recent examples of motor-vehicle companies undertaking benefit-cost analyses of product safety measures. The GM experience with respect to the defective ignition switch is particularly noteworthy. If monetized assessments of the benefits and costs of safety measures continued to play an instrumental role, one would expect that for high stakes defect cases that that the company would undertake a comprehensive evaluation of the merits of enhancing product safety. After the GM ignition switch controversy emerged, GM commissioned an independent analysis to assess the controversy. The detailed report that GM commissioned to examine the decision making that led to the ignition switch defect problems did not mention any systematic attempt to balance benefits and costs.[166]

The conclusion of the report was that GM appeared to have begun to suppress all such discussion by prohibiting frank assessments of safety-related matters. Two measures undertaken by the company are particularly telling. First, the company admonished employees not to use particular safety-related words. GM officials were counseled not to use controversial judgment words in any reports or presentations.[167] Some of the words were seemingly innocuous, or certainly might be the kind of language one would expect to see in a corporate risk analysis, such as always, safety, safety-related, bad, critical, flawed, dangerous, defect, defective, failed, failure, never, problem, serious, unstable.[168] Other words might be more inflammatory and one wonders if some of the examples of "judgment words" had been used in internal discussions or documents: Corvair-like, decapitating, disemboweling, genocide, ghastly, grisly, Kervorkianesque, powder keg, rolling sarcophagus (tomb or coffin), suicidal, Titanic, you're toast.[169] Second, a GM memo instructed employees who drove GM vehicles to avoid potentially harmful characterizations of any problems they encountered, such as statements such as: "Dangerous…almost caused accident," "This is a lawsuit waiting to happen," "This is a safety and security issue," and "This is a very dangerous thing to happen. My family refuses to ride in the vehicle now."[170] Perhaps as a consequence of these admonitions,

[166] Valukas, *supra* note 57.
[167] Memorandum, U.S. Dep't of Transp., *supra* note 54.
[168] Id.
[169] Id.
[170] Id. at 39.

GM officials characterized the ignition switch defect as a problem of "convenience" rather than a matter of "safety."[171]

Given the controversial history of corporate risk analyses, it is not surprising that companies on their own initiative have not adopted the VSL as the technique for monetizing the fatalities prevented by safer designs. If companies were to introduce the use of damages values based on the VSL in their corporate risk analyses, there would might be the problem of jurors operating in hindsight and comparing the identified victim's loss with the modest cost per product unit of enhancing safety. Rather than considering the company's prospective decision in which the company assesses the costs and benefits across an entire product line, there is a tendency by jurors to compare the incremental cost of the safety improvement with the identified fatality, creating an imbalance that will be to the disadvantage of the company. That type of thinking was apparent in the aforementioned examples of corporate risk analyses in which the unit cost of the safety improvements that were identified in the internal company analyses led the jurors to conclude that the company merited a substantial punitive damages award.

As Seventh Circuit Judge Frank Easterbrook observed in a case involving the safety of escalator design: "The ex post perspective of litigation exerts a hydraulic force that distorts judgment. Engineers design escalators to minimize the sum of construction, operation, and injury costs. Department stores, which have nothing to gain from maiming their customers and employees, willingly pay for cost-effective precautions….Come the lawsuit, however, the passenger injured by a stop presents himself as a person, not a probability. Jurors see today's injury; persons who would be injured if bottoms were harder to find and use are invisible. Although witnesses may talk about them, they are spectral figures, insubstantial compared to the injured plaintiff, who appears in the flesh."[172]

E. Establishing a Supportive Legal Environment for Corporate Risk Analysis

If government agencies adopted the VSL as the metric for monetizing fatality risks in their regulatory enforcement efforts, then they would be establishing the appropriate deterrence values for the reduction of fatality risks. Doing so sends companies the pertinent financial signal for the importance of reducing fatalities. When assessing the financial return from product risks, companies would consider not only potential wrongful death awards but also the possibility of substantial regulatory sanctions. There would not be the need for companies to undertake the initiative to introduce

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[171] Valukas, *supra* note 57, at 70.

[172] *Carroll v. Otis Elevator Co*., 896 F.2d 210, 215–16 (7th Cir. 1990).

the VSL into their calculations, as anticipation of appropriately established government penalty levels would achieve that objective. This cost level for monetizing the fatality risks would be pertinent whether corporations undertook formal or informal analyses of the consequences of marketing unsafe products.

The integration of the VSL into the regulatory penalty structure would enable companies to set a price on fatalities by alluding to the government penalty structure. Thus, rather than indicating that the company was going to establish its own value on regulatory fatalities the company could instead use a figure based on the maximum regulatory sanction for such outcomes. Positioning this sensitive valuation as implementing guidance provided by government regulators rather than the company's own valuation may frame the valuation task in a manner that is less likely to generate criticism of the company's efforts to assess the costs and benefits of safety measures.

Nevertheless, there could be risks that the companies might face if they formalized their assessments of the benefits and costs of the safety measure. If companies incorporated the value of these monetary sanctions for fatalities in their risk analyses, the companies undertaking such assessments would still be subject to the vagaries of hindsight bias to the extent that juries regard monetization of fatality risks as evidence of corporate behavior that serves as a trigger for a punitive damages award. Experimental studies involving hundreds of mock jurors suggest that this possibility is quite real, as jurors are likely to view the VSL as a valuation amount that should serve as a floor for possible penalties that juries should levy in order to convey to the company that lives should be more highly valued.[173] The extent to which using high dollar values for fatality risks has a counterproductive effect in boosting awards can be muted to some extent by conveying to jurors the important role such valuations have in fostering safety in other contexts.[174] Nevertheless, if there is a tendency of jurors to award punitive damages when companies undertake risk analyses that monetize risks and if jurors set the damages amount above whatever value the company used in its analysis, there will be a strong disincentive for using the VSL in explicit corporate risk analyses.

Given the impediments that corporations face with respect to such monetization, which may involve very large punitive damages awards, it is likely that additional legal protections for such analyses could play a constructive role in protecting companies from jurors misinterpreting the function of responsible corporate risk analyses. In particular, suppose that

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[173] See W. Kip Viscusi, *Corporate Risk Analysis: A Reckless Act?* 52 STAN. L. REV. 547 (2000); and W. Kip Viscusi, *Punitive Damages: How Jurors Fail to Promote Efficiency*, 39 HARV. J. LEGIS. 139, 157–58 (2002).

[174] Viscusi, *Punitive Damages*, *supra* note 173, at 155.

undertaking such analyses and the content of these analyses could not be introduced as evidence in personal injury cases.[175] Such a legal protection is analogous to the role of apology laws in medical malpractice contexts. In the 32 states that have adopted apology laws, if the physician has apologized to the patient for a medical error or an unfavorable treatment outcome, the plaintiff cannot introduce the apology as evidence in the trial.[176] Typical of such laws is the apology law in Virginia, which includes the following provision: "The portion of statements, writings, affirmations, benevolent conduct, or benevolent gestures expressing sympathy, commiseration, condolence, compassion, or a general sense of benevolence, together with apologies that are made by a health care provider…to the patient…shall be inadmissible as evidence of an admission of liability."[177] One could easily formulate similar statutory protections for corporate risk analyses. A less broad extension of the apology law concept for corporate risk analyses would be to prohibit the introduction of such evidence if the risk analysis indicated that additional safety measures weren't warranted, but to permit plaintiffs for introducing the apology if the benefits of the additional safety measure did not outweigh the costs.[178]

CONCLUSION

There is currently a fatal mismatch between the value that regulatory agencies place on lives when designing regulations and the values that they levy as sanctions for violations that lead to fatalities. This imbalance in turn diminishes the economic incentives for safety that will be provided to the regulated firms. As a consequence, regulatory policies are less protective than they would be if the incentives were safety were bolstered.

Unfortunately, simply recognizing the existence of a mismatch is not sufficient to enable regulatory agencies to remedy the problem. So long as regulatory agencies have statutory caps that establish inordinately low upper bounds on the penalty levels that can be assessed it will not be feasible for agencies to set penalties at the optimal deterrence levels. Restructuring the statutory guidelines to permit penalties in line with the VSL will enable agencies to set sufficiently large penalties to promote safety. This Article provided detailed guidance on how these statutes can be revised to permit agencies to set penalties in an effective range.

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[175] VISCUSI, PRICING LIVES, *supra* note 5.

[176] Benjamin J. McMichael, R. Lawrence Van Horn & W. Kip Viscusi, *Sorry Is Never Enough: The Effect of State Apology Laws on Medical Malpractice Liability Risk* (Vanderbilt Working Paper), https://ssrn.com/abstract=2883693.

[177] Va. Code Ann. § 8.01-581.20:1.

[178] VISCUSI, PRICING LIVES, *supra* note 5.

However, having the leeway to levy sufficiently large penalties does not ensure that agencies will implement a penalty structure at this higher level. Indeed, current penalties are often not even at the allowable caps, which are considerably below the levels needed to create optimal deterrence. Having appropriate penalty caps in the revised statutory guidance can serve as a signal to regulatory agencies regarding the magnitude of penalties that should be appropriate. But there is also a need for agencies to better understand the principles underlying the law and economic theories of optimal deterrence, which are quite straightforward, but nevertheless would assist officials in understanding that the particular penalty amounts are not random numbers from an arbitrary penalty schedule but have meaningful economic effects in establishing appropriate incentives to save lives.

This overhaul of regulatory enforcement efforts in turn will have fundamental ramifications for how firms assess the economic merits of improvements in job safety and product safety. With weak regulatory enforcement, the main matters of concern in situations where market influences are inadequate and regulations are needed may be the financial costs such as the liability costs resulting from product-related fatalities or the workers' compensation costs linked to job injuries. Establishing meaningful economic sanctions for violations that result in fatalities will lead firms to place a greater weight on improvements in product safety. If given additional legal protections, firms may also undertake explicit assessments of the benefits and costs of safety improvements in their corporate risk assessments of alternative safety-related measures. A principal dividend from bolstering the economic incentives generated by agencies' enforcement efforts is that companies will also become more vigilant in promoting safety.

Adoption of a $10 million penalty cap per fatality is in line with current economic estimates of the value of preventing an expected death, but it may be appropriate to increase the upper limit in future years. Inflation over time will tend to erode the purchasing power associated with this penalty cap. Similarly, if there are continued increases in societal income levels over time, those changes too will boost the appropriate deterrence value.[179] However, such updates are much more modest in scale than, for example, boosting the maximum OSHA penalty for serious violations that pose fatality risks from $12,675 to $10 million. The updates of the VSL for inflation and related changes are now addressed in the routine practices of federal agencies.[180] Maintaining a penalty structure that is in line with providing effective incentives for controlling risk will be quite feasible once there is the

[179] W. Kip Viscusi & Clayton J. Masterman, *Income Elasticities and Global Values of a Statistical Life*, 8 J. BENEFIT-COST ANALYSIS 226 (2017).

[180] See, for example, U.S. Dep't of Transp., *supra* note 6, as well as the counterpart documents in previous years.

appropriate restructuring of the penalty approach to generate optimal levels of deterrence. The critical task is to overhaul a penalty structure that was established almost a half century ago and has undergone only minimal changes since then for increases in the cost of living. Regulatory agencies should rectify the current inconsistent policy approach in which prospective hypothetical lives are highly valued but actual lives are not.