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Pricing Lives for Corporate Risk Decisions

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The 2014 GM ignition-switch recall highlighted the inadequacies of the company's safety culture and the shortcomings of regulatory sanctions. The company's inattention to systematic thinking about product safety can be traced to the hostile treatment of corporate risk analyses by the courts. This Article proposes that companies should place a greater value on lives at risk than they have in previous risk analyses and that they should receive legal protections for product risk analyses. Companies' valuations of fatality risks and regulatory penalties have priced lives too low. The guidance provided by the value of a statistical life, which is currently $9.1 million for transportation policies, establishes an appropriate price for lives from the standpoint of corporate safety decisions, regulatory sanctions, and punitive damages. The valuation of defect-related deaths may, however, be even greater than that of preventing fatalities through safety improvements; accordingly, the value of a statistical life may establish a floor, rather than a ceiling, for the appropriate penalties for safety-related defects.

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I. INTRODUCTION

In 2014, General Motors ("GM") incurred government fines of $35 million for failing to report the safety problems stemming from defective ignition switches in several lines of vehicles.[1] The U.S. Department of Transportation's National Highway Traffic Safety

1. Consent Order, *In re* TQ14-001, NHTSA Recall No. 14V-047, at 4 (Nat'l Highway Traffic Safety Admin. May 16, 2014), *available at* www.nhtsa.gov/staticfiles/communications/pdf/May-16-2014-TQ14-001-Consent-Order.pdf; *see also* Jeff Plungis & Tim Higgins, *GM to Pay Record $35M Fine over Ignition-Switch Recall*, 42 PROD. SAFETY & LIAB. REP. (BNA) 534 (May 19, 2014).

Administration ("NHTSA") levied the maximum penalty for failing to report the defect, which caused thirteen documented fatalities.[2] Subsequently, GM launched a series of automobile recalls for defective ignition switches and other vehicle defects; at the time of this writing, the recalls total twenty-nine million vehicles.[3] This incident highlights a wide range of fundamental problems plaguing corporate risk decisions generally, as well as the failures of tort liability and government regulation to rectify these problems.

From an economic efficiency standpoint, a company's product risk objective should provide a level of product safety that is consistent with the level of safety consumers would choose if they were fully cognizant of the product's risk characteristics. Ascertaining which safety attributes are desirable and which features are not worthwhile should not be an entirely haphazard process. What procedure should companies adopt in making this product safety decision? A principal theme of this Article is that companies should confront the pertinent tradeoffs directly and think systematically about product safety; striking a responsible balance between safety and other competing concerns such as cost should be a fundamental component of corporate operations.

Indeed, the detailed NHTSA assessment of GM's practices and the investigative report GM commissioned to examine the ignition-switch recall fail to indicate any systematic economic assessment by GM of safety-related issues.[4] Similar to how a dog's failure to bark became the critical clue in a Sherlock Holmes murder mystery,[5] the glaring missing element in the 315-page GM investigative report on the ignition-switch failure is that there is no mention of any safety-related studies pertaining to the ignition switch or any other aspect of vehicle safety. Instead, there is overwhelming evidence that GM's corporate culture officially discouraged any frank discussion of safety.[6] Even suggesting that there might be a product defect that posed liability concerns was off limits.[7]

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2. *Id.* The GM documentation of "more than a dozen" fatalities is discussed in ANTON R. VALUKAS, REPORT TO BOARD OF DIRECTORS OF GENERAL MOTORS COMPANY REGARDING IGNITION SWITCH RECALLS 1 (May 29, 2014).

3. Jeff Bennett, *GM to Recall 8.45 Million More Vehicles in North America*, WALL ST. J. (June 30, 2014, 3:18 PM), http://www.wsj.com/articles/gm-to-recall-7-6-million-more-vehicles-in-u-s-1404153705, *archived at* http://perma.cc/F6Z2-L3TS.

4. *See* Consent Order, *supra* note 1, at 9; VALUKAS, *supra* note 2.

5. 1 ARTHUR CONAN DOYLE, *Silver Blaze*, *in* MEMOIRS OF SHERLOCK HOLMES, THE COMPLETE SHERLOCK HOLMES 359 (Race Point Publishing 2013) (1894).

6. The GM corporate safety culture is discussed in VALUKAS, *supra* note 2, at 252–58.

7. One of the words GM officials were told to avoid was "defect." *See* Consent Order, *supra* note 1, Exhibit B at 41.

The company's treatment of safety matters might strike outside observers as bizarre. Company officials in safety-related meetings engaged in what became known as the "GM salute" in which they folded their arms and pointed their fingers towards others and away from themselves, shirking any personal responsibility for taking subsequent action on the matters being discussed.[8] Another ingrained corporate practice known as the "GM nod" involved officials at safety meetings nodding that taking action was appropriate, with all participants realizing that this was an empty gesture as there would be no follow through.[9] These behaviors are far removed from any semblance of a diligent effort to assess and implement product safety decisions.

The emergence of GM's lax safety culture was not a historical accident. In this Article, I argue that the company's systematic neglect of safety is not an institutional quirk but rather was likely a response to past treatment of corporate risk analyses in tort cases. In the 1970s and 1980s, as discussed in Parts III and IV, all the major U.S. automobile companies undertook detailed economic analyses of the costs and risk implications of safety-related product characteristics. However, the cases analyzed below indicate that frank assessments of the risks and costs of different design possibilities led these companies to be vilified in the press and penalized by juries for undertaking such safety studies, not simply for specific alleged deficiencies in the analyses. A particularly controversial component of the analysis was the use of tort damages amounts to value the lives lost by failing to adopt additional safety measures. This approach led to an economic value of life that appeared to be offensively low to jurors and also was not consistent with a sound economics approach. These adverse experiences no doubt have contributed to the corporate abandonment of systematic assessments of safety decisions. If there were legal reforms to give companies protections for corporate risk analyses, it would be more feasible for companies to depart from a passive safety culture. This Article proposes such potential remedies to promote more explicit engagement with the merits of product risk decisions.

The linchpin of all these interrelated issues—both from the standpoint of the regulatory agency and corporations—is the price that is attached to risks to life. In particular, what level of higher costs is worthwhile to incur for each expected fatality that will be prevented? This monetary tradeoff between product costs and fatality rates is

8. *See* VALUKAS, *supra* note 2, at 68, 255.

9. *Id.* at 2, 256.

known as the value of a statistical life.[10] Measures of the value of a statistical life play a fundamental role in several dimensions of corporate risk policies. This monetary value enables companies to properly monetize the expected lives that will be saved from additional safety improvements. It also serves as the reference point used by NHTSA and other government agencies in setting regulatory standards.[11]

Additionally, where the value of a statistical life should play a role, but currently does not, is with respect to setting penalty levels for violations of safety regulations, such as GM's failure to report the ignition-switch defect. Should companies' risk assessment efforts fall short, government regulations and sanctions can come into play. However, regulatory sanctions are often limited and do not contain sufficiently severe financial penalties to deter corporations from failing to provide adequate levels of safety. As a result, regulatory agencies provide insufficient impetus to lead companies to engage with safety-related issues in a thorough and responsible manner. Applying the value of a statistical life to regulatory sanctions would consequently dramatically increase the level of these penalties.

Furthermore, the value of a statistical life could exert a restraining function in the context of punitive damages awards, providing a methodology for establishing appropriate levels of deterrence. Punitive damages awards meeting the $100 million cutoff have been termed "blockbuster punitive damages awards."[12] Juries sometimes levy these awards in auto-safety cases, even when there is no sound basis for awards of these magnitudes.[13] Jurors are usually able agree on what behavior is reprehensible, but mapping these concerns into a dollar-penalty figure often proves to be problematic.[14] In addition to not having an understanding of how to calculate punitive

10. W. Kip Viscusi & Joseph E. Aldy, *The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World*, 27 J. RISK & UNCERTAINTY 1, 5 (2003).

11. W. Kip Viscusi, *The Value of Individual and Societal Risks to Life and Health*, *in* 1 HANDBOOK OF THE ECONOMICS OF RISK & UNCERTAINTY 435 tbls.7.2, 7.3 (Mark Machina & W. Kip Viscusi eds., 2014).

12. The following articles utilize the "blockbuster award" terminology to refer to punitive damages awards of $100 million or more and document the awards: Alison F. Del Rossi & W. Kip Viscusi, *The Changing Landscape of Blockbuster Punitive Damages Awards*, 12 AM. L. & ECON. REV. 116, 116 (2010); Joni Hersch & W. Kip Viscusi, *Punitive Damages: How Judges and Juries Perform*, 33 J. OF LEGAL STUD., 1, 2 (2004); W. Kip Viscusi, *The Blockbuster Punitive Damages Awards*, 53 EMORY L.J. 1405, 1408 (2004); and W. Kip Viscusi & Benjamin J. McMichael, *Shifting the Fat-Tailed Distribution of Blockbuster Punitive Damages Awards*, 11 J. EMPIRICAL L. STUD. 350, 350 (2014).

13. *See* sources cited *supra* note 12.

14. Daniel Kahneman, David A. Schkade & Cass R. Sunstein, *Shared Outrage, Erratic Awards*, *in* CASS R. SUNSTEIN, ET AL., PUNITIVE DAMAGES: HOW JURIES DECIDE 31 (2002).

damages, jurors also may lack an appreciation of the constructive role that benefit-cost analysis can play in promoting product safety. The identified loss because of a failure to adopt some additional safety measures will loom larger than the components of an economic analysis that addresses prospective benefits and costs. This Article provides the requisite framework for using punitive damages as an incentive structure.

In all of these domains, the value of a statistical life should play a pivotal role. Surprisingly, there is no evidence that the value of a statistical life played any role either in setting government sanctions for vehicle-related regulatory violations—even though its function in setting regulatory standards is well established—or in driving corporate risk decisions. Overhauling the institutional approaches to corporate safety will require a commitment to deterrence-based analyses and sanctions. Reform will also require additional legal protections so that when corporations do undertake systematic analyses of safety measures they will not be vulnerable to punitive damages awards simply because they have undertaken a thorough examination of the safety-related issues.

II. GUIDELINES FOR PRODUCT RISK ANALYSES

The starting point for the evaluation of corporate risk decisions is the value that companies and government agencies should place on reduced mortality risks. This Part describes this economic value, which is known as the value of a statistical life. Estimates of this value are based on a large body of empirical evidence, principally relating to how workers value risks to their lives. The nature of GM's ignition-switch decision was far removed from a systematic economic assessment that balanced the costs and risks of a defective switch. Part III explores the GM practices that led to the failure to correct the defect and suggests a more responsible corporate safety policy. Systematic assessment of the costs and safety decisions had formerly been an integral part of company safety policies, as indicated by the experiences at Ford, Chrysler, and GM that are described in Part IV. However, these evaluations fell short in terms of their economic approach and also led companies to be punished with very high punitive damages awards, sometimes with awards in excess of $100 million. Unfortunately, the experimental evidence from mock jurors reviewed in Part V suggests that sound analysis alone will not provide companies undertaking sound risk analyses with a shield from unwarranted punitive damages awards. Thus, some form of legal protection for such analyses is needed. The approach of utilizing the value of a statistical life in safety practices

also can serve as the basis for revamping government sanctions for safety violations, as articulated in Part VI, and for setting punitive damages levels, as observed in Part VII. Part VIII offers general conclusions regarding a general restructuring of societal product safety policies.

How companies and government agencies should approach product safety and product risk regulation decisions should be similar. In each case, there should be an effort to strike an appropriate balance between the cost of additional safety and the value to consumers of the safety improvements. This tradeoff is known as the value of a statistical life. What these values mean, where these values come from, and how they should be incorporated in corporate decisions and risk policies is the subject of this Part.

A. Pricing Risks to Life

Before examining the GM ignition-switch problem, it is useful to explore the context for auto-safety decisions and the essential role of the value of a statistical life ("VSL") in corporate risk analyses. Auto-safety decisions fit the standard paradigm for how one should use VSL estimates in setting the appropriate level of safety: there are well-defined categories of product costs as well as anticipated benefits from additional safety-related product characteristics. Auto-safety decisions inquire whether there should be a limit to the safety features incorporated in the design of the vehicle or whether cars should be made as safe as possible. If all cars were designed to be as safe as tanks, there would be fewer auto-related injuries and deaths. But doing so imposes a cost in terms of higher vehicle prices, lower fuel efficiency, and adverse environmental consequences. The safety design task is to strike an appropriate balance between risk and cost, recognizing that at some point the value of the added safety to the consumer will not be worth the additional expense or loss of vehicle performance.

The intuitive appeal of thinking about vehicle cost and safety tradeoffs plays such a fundamental role in our general understanding of risk-cost tradeoffs that U.S. Supreme Court Justice Stephen Breyer uses auto safety as an example to illustrate the unacceptability of unbounded commitments to reducing risk.[15] Justice Breyer asks whether it is worthwhile to promulgate a regulation that will save ten lives annually over forty years at a cost of $100 billion, which is not an entirely hypothetical regulatory problem. He repositions this question

15. STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION 13–14 (1993).

as being equivalent in risk-cost terms to asking how much a person would be willing to pay for a slightly safer car that would reduce the death risk by five percent:

> Would we pay an extra $1,000 for such a car? An extra $5,000 for that added contribution to safety? To spend $100 billion as a nation to save ten lives annually assumes we value safety so much that each of us would pay $48,077 extra for any such new, slightly safer car.[16]

It is likely that few consumers would find it worthwhile to pay such a price premium.

B. Measuring the Value of a Statistical Life

In practice, we need not repeat this thought experiment for every auto-safety device considered. The tradeoff that people are willing to make between risk and cost is embodied in the VSL estimates. The U.S. Department of Transportation uses VSL estimates to decide whether it is worthwhile to impose motor-vehicle safety regulations, such as tire pressure monitoring systems, roof crush resistance standards, and limits on hours of service of truck drivers.[17] The agency sets regulations after undertaking detailed regulatory impact analyses of the costs and benefits of standards with varying levels of stringency. Using a VSL of $9.1 million, the U.S. Department of Transportation assesses the value of reductions in fatality rates for transportation policies. The agency draws this $9.1 million figure from recent labor market estimates of workers' risk-money tradeoffs.[18] The agency uses the underlying labor market estimates to analyze the wage premium that workers receive for fatality risks, controlling for other aspects of the worker and the job. Thus, if a worker receives $910 for an annual job-related fatality rate of 1/10,000, then collectively a group of 10,000 workers would receive $9.1 million to compensate them for the one expected death in their group. This $9.1 million figure is the VSL in this example.

Thus, the VSL is the value placed on lives from the standpoint of reducing the probability of an expected death. In contrast, court awards of compensatory damages are intended primarily to serve an insurance role for the losses that the family has suffered because of the

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16. *Id.*

17. See Viscusi, *supra* note 11, at 436 tbl.7.2 for examples of NHTSA regulations using the VSL.

18. U.S. DEP'T OF TRANSP., REVISED DEPARTMENTAL GUIDANCE 2013: TREATMENT OF THE VALUE OF PREVENTING FATALITIES AND INJURIES IN PREPARING ECONOMIC ANALYSES (2013), *available at* http://www.dot.gov/sites/dot.dev/files/docs/VSL%20Guidance%202013.pdf, *archived at* http://perma.cc/R245-MQFK.

death.[19] Put somewhat differently, the VSL is primarily an ex ante deterrence value in that it establishes the price per expected life for reducing the risk of death, whereas compensatory damages serve as an ex post insurance role. The magnitude of the VSL estimates is about an order of magnitude greater than the value of the worker's lost earnings, which generally comprises a principal part of the value of compensatory damages.[20] Using court awards as the reference point for pricing lives consequently undervalues the importance of reducing product risks.

Regulatory agencies use the VSL to guide their setting of regulatory safety standards. The U.S. Department of Transportation has long been a leader among regulatory agencies in basing its regulations on a balance between cost and risk. There might be many reasons why agencies such as the U.S. Department of Transportation follow this approach, not the least of which is that the U.S. Office of Management and Budget requires regulatory agencies to assess the costs and benefits of all major regulations.[21] In addition, because the costs of motor-vehicle safety and airplane safety are shifted to consumers in terms of higher prices for cars and airplane tickets in a competitive market,[22] the costs are more salient than costs spread throughout the economy. Most of the costs of transportation regulations are directly borne by the people who benefit from the safety improvements generated by the regulations.[23]

In much the same way that government agencies assess the desirability of prospective safety regulations in terms of their benefits and costs, ideally private firms should undertake similar assessments for potential vehicle design changes. Use of the VSL to value these benefits would establish the appropriate price for safety that consumers would be willing to pay if they understood the benefits that the safer car offered. Thus, there is a direct market linkage between safety

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19. *See* W. Kip Viscusi, *The Flawed Hedonic Damages Measure of Compensation for Wrongful Death and Personal Injury*, 20 J. FORENSIC ECON. 113, 118–19 (2007).

20. For a large set of U.S. studies, the average VSL is $14 million for workers with average earnings of $43,767, which is smaller than the VSL by a factor of 320. W. Kip Viscusi, *The Role of Publication Selection Bias in Estimates of the Value of a Statistical Life*, 1 AM. J. HEALTH ECON. 27, 32 (2015). Ignoring the role of discounting lifetime income in determining present value, this average VSL exceeds lifetime earnings by a factor of ten for workers who work for thirty-two years and a factor of eight if workers have forty years of earnings.

21. President Clinton's Exec. Order No. 12,866, 3 C.F.R. 638 (1994), amended the approach under President Reagan's Exec. Order No. 12,291, 3 C.F.R. 127 (1982), and continues to establish the principal guidance for regulatory oversight.

22. Safety measures that raise marginal costs will raise prices since price equals marginal cost in competitive markets. W. KIP VISCUSI, JOSEPH E. HARRINGTON, JR. & JOHN M. VERNON, ECONOMICS OF REGULATION AND ANTITRUST 81 (4th ed. 2005).

23. W. KIP VISCUSI, FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK 28–29 (1992).

improvements and consumers, as making cars safer will raise the cost of vehicle production and consequently vehicle price. But making these safety improvements also boosts how much consumers are willing to pay for the safer vehicles.[24] For that reason, the costs of government regulations of auto safety that pass a benefit-cost test, as the NHTSA safety standards generally do, should not be viewed as a deadweight societal loss but as providing consumers with a better, highly valued product that average consumers would choose if they understood the risk reduction benefits.

III. THE 2014 GM FAULTY IGNITION SWITCH

While a systematic thinking about costs and risks is the desired product safety framework, how GM set about dealing with the ignition-switch design issues was quite different. As this Part will demonstrate, GM became aware of the ignition-switch defect, but the organizational procedures for dealing with such safety issues fell short due to a well-established lax corporate safety culture. Application of a responsible economic balancing of risks and costs indicates the desirability of the ignition-switch recall that the company had failed to undertake.

A. The Ignition-Switch Defect and Recall Costs

It is instructive to examine what role, if any, that a balancing of benefits and costs of safety played in one of the most prominent product safety problems in this century—GM's faulty ignition switch.[25] There is no publicly available, detailed description of whatever analysis GM did of the defective ignition-switch recall. The two main components of an analysis of a product defect are the nature of the risk and the cost to eliminate it.[26] There is substantial information about GM's assessment of the nature of the defect: the switch could move from the "run" position to the "off" position, resulting in both a loss of power and possibly leading to the airbags not deploying in the event of a crash.[27] However,

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24. The positive relationship between vehicle safety and automobile prices is documented in Mark K. Dreyfus & W. Kip Viscusi, *Rates of Time Preference and Consumer Valuations of Automobile Safety and Fuel Efficiency*, 38 J.L. & ECON. 79, 79–106 (1995).

25. The other auto-safety problem of comparable scale is the unintended acceleration of Toyota vehicles. The extent to which this phenomenon is due to driver error or a defect in the cars' computer system was widely debated. In 2014, Toyota reached a $1.2 billion settlement with the U.S. Department of Justice. *See* Charles Levinson, Jeff Bennett & Devlin Barrett, *Toyota to Pay $1.2 Billion to Settle U.S. Probe*, WALL ST. J. (Mar. 19, 2014, 7:25 PM), http://www.wsj.com/articles/SB10001424052702304256404579449070848399280.

26. W. KIP VISCUSI, REFORMING PRODUCTS LIABILITY 62 (1991).

27. Consent Order, *supra* note 1, at 2.

there is not substantial information about the full extent of the adverse health impacts that have resulted from the defect.

GM attributed thirteen deaths to the ignition-switch problems first linked to the Chevrolet Cobalt.[28] However, the Acting Administrator of NHTSA, David Friedman, believed that the death toll could be greater than the number of deaths GM has blamed on the defect, and the extent of the human toll in terms of nonfatal injuries and possible disabilities is not fully known.[29] Given that the overall death rate for drivers of the Chevrolet Cobalt is the highest of all vehicles in its class,[30] Friedman's fear that the risk might exceed the thirteen fatalities estimated by GM may be well founded. The possibility of additional human costs from the defect is also bolstered by the fact that GM has identified at least fifty-four frontal-impact crashes involving ignition-switch problems that led the airbag to not deploy.[31] GM also has not made public any information regarding its risk and cost assessment other than the statement by its current CEO, Mary Barra, who testified that as of 2007 GM estimated that the cost of a recall for vehicles with the faulty ignition switch would be $100 million.[32] Since the recall did not begin until 2014, GM concluded—at least implicitly—that the recall was not merited given this cost level.

The 2007 recall analysis date and the $100 million cost given by Barra provide my principal reference points for assessing GM's recall analysis decision. One could also examine other cost assessments at different points in time, but the analysis identified by Barra appears to be the most comprehensive. Subsequent news reports indicated other dates and different cost assessments for problems related to the ignition switch. For example, in 2005, a GM engineering manager emailed other engineers and design team members that it would cost ninety cents per

28. VALUKAS, *supra* note 2, at 1–5. The affected vehicles were part of GM's small car product line designed to meet federal emission requirements and to be inexpensive, "cost conscious" vehicles. *Id.* at 17, 22.

29. Mike Ramsey & Jeff Bennett, *GM Toll Likely to Rise*, WALL ST. J., May, 28, 2014, at B2.

30. VALUKAS, *supra* note 2, at 21.

31. *Id.* at 1. There also have been more than one hundred claims for fatalities linked to the ignition switch. *GM Fund Receives 107 Death Claims Blaming Faulty Switches*, WALL ST. J. (Aug. 26, 2014, 10:10 PM), http://www.wsj.com/articles/gm-fund-receives-107-death-claims-blaiming-faulty-ignition-switches-1409105410.

32. GM CEO Mary Barra reported this estimate in testimony before the U.S. Congress on April 1, 2014. *See* Tom Krisher & Marcy Gordon, *New CEO Barra Faces Tough Task in Shedding Old GM*, Yahoo! (Apr. 2, 2014, 7:13 AM), http://news.yahoo.com/ceo-barra-faces-tough-task-shedding-old-gm-040907777.html, *archived at* http://perma.cc/BX7M-BFJN. The recall cost in 2014 has turned out to be much greater. *See GM Total Recall Cost: $4.1 Billion*, CNN.COM (Feb. 4, 2015, 1:07 PM), http://money.cnn.com/2015/02/04/news/companies/gm-earnings-recall-costs/, *archived at* http://perma.cc/6WRH-DZXQ.

vehicle, plus $400,000 for production machinery, to change the switch.[33] Additionally, retrospective cost estimates for ignition-switch recalls reached as high as $700 million in 2014, but this figure includes model years not included in the 2007 analysis.[34] All of these cost assessments mention the cost associated with the recall but do not estimate the risk in terms of the expected number of lives that would be lost or the monetary value that should be placed on these lives.

Based on Mary Barra's testimony regarding the 2007 analysis[35] and the information in the NHTSA Consent Order's summary of the ignition-switch problem,[36] for at least the seven-year period between 2007 and 2014, the company was aware of the risk, undertook a cost analysis, concluded that a recall was not worth the cost, and failed to notify either consumers or the government of the problem.[37] By law, the company was required to notify NHTSA of any safety-related defects within five days after a defect has been determined to be safety related.[38] However, it was only on February 7, 2014, or seven years after the 2007 GM cost analysis of a recall,[39] that GM notified NHTSA that there was a safety defect in 619,122 Chevrolet Cobalt vehicles and model year 2007 Pontiac G5 vehicles.[40] Later that month, GM added an additional 748,024 vehicles with that defect, including model year 2006–2007 Chevrolet HHR and Pontiac Solstice, model year 2003–2007 Saturn Ion, and model year 2007 Saturn Sky vehicles.[41] The following month, GM added another 823,788 vehicles that may have received faulty service parts during repairs to the list.[42] These vehicles included model year 2008–2011 Chevrolet HHR and model year 2008–2010 Chevrolet Cobalt, Pontiac Solstice, Pontiac G5, and Saturn Sky vehicles.[43] The GM recalls in 2014 for this defect and recalls for other

33. Jeff Bennett, *GM Report to Address Missteps*, WALL ST. J., June 2, 2014, at B1 & B7. The article also details meetings in 2007 in which NHTSA officials raised issues pertaining to fatal crashes involving the ignition switch.

34. *Id.*

35. *See* Krishner & Gordon, *supra* note 32.

36. H.R. COMM. ON ENERGY AND COMMERCE, STAFF REPORT ON THE GM IGNITION SWITCH RECALL: REVIEW OF NHTSA 1 (2014).

37. NHTSA Acting Administrator David Friedman used language similar to that in the risk analysis court cases: "GM engineers knew about the defect. GM investigators knew about the defect. GM lawyers knew about the defect. But GM did not act to protect Americans from that defect." Bennett, *supra* note 33, at B7.

38. For documentation of this and all subsequent statements regarding GM's contacts with NHTSA, see Consent Order, *supra* note 1.

39. *Id.* at 2.

40. *Id.*

41. *Id.* at 2–3.

42. *Id.* at 3.

43. *Id.*

vehicle defects that were apparently stimulated by the ignition-switch recall total an astounding twenty-nine million vehicles as of mid-2014.[44]

B. The Failed GM Corporate Safety Culture

Although it is not known whether GM did a full blown benefit-cost analysis or just a cost analysis in 2007, GM nevertheless developed corporate practices that reflect the company's desire to suppress any critical comments by the staff relating to product safety. A confidential GM memo included as an exhibit to the NHTSA Consent Order admonished the staff to avoid controversial "judgment words." The memo explained that "[d]ocuments used for reports and presentations should contain only engineering results, facts, and judgments. These documents should not contain speculations, opinions, vague nondescriptive words, or words with emotional connotations."[45] Among the examples of forbidden words provided in the memo were seemingly accurate characterizations of potentially recallable cars, including asphyxiating, bad, critical, dangerous, defect, defective, failure, maiming, potentially disfiguring, problem, safety, safety-related, serious, and unstable.[46] In addition, the memo admonished against using more colorful and possibly inflammatory language, including apocalyptic, big time, cataclysmic, catastrophic, Corvair-like, deathtrap, decapitating, detonate, evil, ghastly, inferno, powder keg, suicidal, terrifying, Titanic, tomblike, and you're toast.[47] With even seemingly innocuous words such as "safety" and "defect" being ruled out of bounds, GM in effect discouraged frank discussion of product risks.

Another GM memo also apparently sought to head off litigation threats by providing guidance for how company drivers of GM vehicles should discuss problems that they encountered while driving the vehicle. The confidential GM memo "**What every company vehicle driver must know. . .**" apparently sought to rein in potentially damaging characterizations of safety problems.[48] The memo listed the following "[e]xamples of comments that do not help identify and solve problems:

- 'This is a lawsuit waiting to happen . . .'
- 'Unbelievable Engineering screw up . . .'

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44. *See* Bennett, *supra* note 3.
45. Consent Order, *supra* note 1, Exhibit B, at 41.
46. *Id.*
47. *Id.*
48. *Id.* at 39.

- 'This is a safety and security issue . . .'
- 'This a very dangerous thing to happen. My family refuses to ride in the vehicle now . . .'
- 'I believe the wheels are too soft and weak and could cause a serious problem . . .'
- 'Dangerous . . . almost caused accident.' "[49]

Instead, the company encouraged comments that downplayed the potential safety implications and opted for blander descriptions of the problems. Perhaps because of such suppression of safety-related concerns, GM officials categorized the ignition-switch problem as a matter of "convenience" rather than safety.[50]

Other aspects of the GM corporate culture embody a similar inattention to safety. CEO Mary Barra described what she referred to as the "GM nod," in which participants in a meeting signal that there should be action taken but do not intend to actually implement the plan.[51] The investigation commissioned by GM to examine the ignition-switch failure identified the GM nod as a common commitment to inaction at safety committee meetings.[52] Another noteworthy GM behavior became known as the "GM salute." Participants in the meeting fold their arms and point in each direction, away from themselves, to indicate that they have no responsibility for taking action, as all responsibility lies with others.[53] The investigation of the GM ignition-switch recall indicated that the shift of responsibility epitomized by this salute was an ingrained aspect of the GM safety culture "that permeated the Cobalt investigation for years."[54]

As evidenced by the suppression of frank safety discussions and the behaviors designed to deflect personal responsibility for safety matters, GM had apparently developed a bunker mentality in which honest efforts to confront safety issues and take action were discouraged. As this Article will demonstrate, GM had a history of undertaking systematic risk and cost analyses of safety-related matters, but these analyses were used against it in litigation. A reasonable hypothesis is that the fear of substantial legal sanctions played a key role in the development of the lax corporate safety culture at GM. While the causal link between litigation fears and the current

49. *Id.*
50. VALUKAS, *supra* note 2, at 70.
51. *Id.* at 256.
52. *Id.* at 2.
53. *Id.* at 68–69.
54. *Id.* at 255.

GM safety culture is not known, there is clearly a litigation-related overtone to the avoidance of controversial safety-related language. Moreover, as one would expect, GM was aware of the potential for legal liability. Beginning in 2010, GM was aware of the potential for punitive damages during the discussion of the ignition-switch defect.[55] Although GM remains vulnerable to litigation with respect to the ignition-switch defect and has established a victim compensation fund from which the injured can recoup scheduled compensation amounts for ignition-related injuries,[56] GM's legal liability would be even greater if it were not for some of the legal protections that may be afforded by its Chapter 11 bankruptcy reorganization in 2009.[57]

C. A Sounder Approach to the Ignition-Switch Defect

GM has apparently shunted safety issues to the side, but what would have been the implications of a sound benefit-cost analysis of the ignition-switch defect? Did GM take the economically justified action by failing to address the defect? Making this assessment by relying on our current knowledge of the extent of the risk takes advantage of hindsight because the internal assessments by the company are not available. However, a benefit-cost analysis drawing on the information that has become public indicates that a recall would have been worthwhile. Even using GM's estimate of thirteen defect-related deaths and the U.S. Department of Transportation's VSL figure of $9.1 million, the value of the expected lives that would be saved by preventing the ignition-related deaths would be $118 million (i.e., thirteen lives x $9.1 million per life).[58] This amount alone exceeds the $100 million estimated cost of the recall. The appropriate benefit amount surely would have been higher if all fatalities, injuries, and property damage linked to the defect were included.

This calculation treats the valuation of a product defect in which customers are experiencing an increase in risk as being the same as the

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55. *Id.* at 140.

56. *See* GM IGNITION COMPENSATION CLAIMS RESOLUTION FACILITY, http://www.gmignitioncompensation.com (Nov. 17, 2014), *archived at* http://perma.cc/EG6L-FFCU.

57. Ashby Jones, *GM Says It Has a Shield from Some Liability*, WALL ST. J. (June 15, 2014, 7:27 PM), http://www.wsj.com/articles/gm-says-it-has-a-shield-from-some-liability-1402874861.

58. The number of valid death claims ultimately found to be related to the ignition-switch defect is much higher. As of January 26, 2015, the administrator of the GM settlements, Kenneth Feinberg, had certified fifty valid claims. *See* Linda Sandler, *GM's Confirmed Ignition Deaths Hit 50 as Claims Deadline Nears*, BLOOMBERG NEWS (Jan. 26, 2015), http://www.bloomberg.com/news/2015-01-26/gm-s-confirmed-ignition-deaths-hit-50-as-claims-deadline-nears.html, *archived at* http://perma.cc/V78D-FX3U. With fifty deaths, the benefit value of repairing the ignition switches would be $455 million.

value of a safety device that leads to a risk reduction. If there is a discrepancy between the valuation of defects and safety improvements, as will be discussed below, the appropriate value per fatality prevented may exceed $9.1 million.[59] The benefits of addressing the defect consequently may be greater than is suggested by a calculation based on the value of safety improvements.

Given that GM did not report the product defect to NHTSA as required by law, what regulatory sanction is warranted? For simplicity, assume that an expected increase in the fatality rate from a defect has the same value as an expected decrease in the fatality rate by a safety improvement. To determine the level of regulatory penalties needed to provide adequate incentives for safety, the VSL provides the appropriate guidance. To convey the value of the lives that are lost by failing to report a defect, NHTSA should impose a penalty of $9.1 million per expected death.[60] However, the regulatory sanction needed to provide an appropriate incentive for efficient control of risks—$9.1 million per expected death—greatly exceeds the penalty caps NHTSA is permitted to levy, which is only $7,000 per violation with a limit of $35 million for a related series of violations.[61] Moreover, any single violation could have resulted in a fatality, and a related series of violations could have led to a much greater number of fatalities than in the defective ignition-switch situation. Thus, the failure of the National Motor Vehicle Safety Act to establish any meaningful linkage between the violations, the extent of the harm, and the expected economic value of the prevented risks impedes the role of these sanctions to function as a safety incentive mechanism.

An appropriately set sanction would have dwarfed the current penalty amount. Suppose that there are only thirteen deaths related to the defect and that the VSL for product defects is the same as for safety improvements. Then, consistent with the benefit-cost analysis summarized above, the appropriate sanction for a readily identifiable risk would have been $118 million rather than $35 million.[62]

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59. Part VI *infra* reviews how the valuation of defects may exceed the value of safety improvements.

60. This deterrence value assumes that NHTSA can identify all lives lost by a company's failure to report the defect. If there is a probability above zero that the company will be able to conceal its behavior, the appropriate penalty will be greater, as discussed below in the context of punitive damages.

61. Consent Order, *supra* note 1, at 2.

62. As discussed below, if the behavior is hidden and may not be readily monitored by the regulator, the efficient penalty level is greater.

IV. RISK ANALYSES AT FORD, CHRYSLER, AND GM: THE FORD PINTO DEBACLE AND OTHER CONTROVERSIES

The potential hazards of undertaking a corporate risk analysis are exemplified by the experiences of Ford, Chrysler, and GM. The first such analysis to receive scrutiny was Ford's assessment of gas tank location risks for the Ford Pinto. Although gas tank location issues often played a prominent role because of the fire-related hazards, there were similar analyses of various safety measures for Ford, Chrysler, and GM. In each case, the company undertook an analysis seeking to ascertain the appropriate balance between cost and safety improvements and ultimately decided not to adopt the additional safety measures. The companies' analyses were flawed in serious ways, with the most important being that lives were valued based on the level of tort damages in wrongful death cases. In addition to this specific shortcoming in the economic methodology, there appears to be an overriding problem that such analyses appear to generate substantial controversy and, in some cases, very large punitive damages awards.

A. The Adverse Repercussions of the Ford Pinto Risk Analysis

The first product risk analysis to garner national attention involved the Ford Pinto, which, much like the GM cars implicated in the ignition recall problems, was an entry-level vehicle.[63] The Ford Pinto case, *Grimshaw v. Ford Motor Co.*,[64] also involved the first documented blockbuster punitive damages award.[65] The injury occurred in 1972 when a Ford Pinto was rear ended after it stopped on the freeway.[66] The thirteen-year-old passenger, Richard Grimshaw, suffered a serious injury and the driver was killed.[67] The impact caused a fire that the plaintiffs attributed to a defective product design for the fuel filler pipe and the placement of the gas tank behind the rear axle.[68] In addition to a compensatory damages award of $2.5 million to Grimshaw and $600,000 to the driver, the jury awarded $125 million in

63. VALUKAS, *supra* note 2, at 17 and 22, describe the cars affected by the ignition-switch recall as small, fuel efficient, "cost conscious" vehicles that were produced on "slim margins." The Ford Pinto was described as an "inexpensive compact car." VISCUSI, *supra* note 26, at 111.

64. 174 Cal. Rptr. 348, 358 (Ct. App. 1981).

65. This award is the first blockbuster punitive damages award included in the data set used in the article by Viscusi & McMichael, *supra* note 12.

66. 174 Cal. Rptr. at 358.

67. *Id.*

68. *Id.* at 359–60.

punitive damages.[69] The punitive damages award was later reduced to $3.5 million.[70]

What was most noteworthy about the case and the ensuing debate about Ford's safety practices is that Ford had performed a risk analysis and concluded that the less-safe design was preferable.[71] Trial lawyer Stuart Speiser termed the analysis "the most remarkable document ever produced in an American lawsuit."[72] Although the *Grimshaw* case pertained to the risk of fire due to rear impacts, Ford's risk analysis pertained to gas tank design changes that might reduce risks of fires associated with rollovers.[73] Ford undertook the study in anticipation of a prospective safety regulation by NHTSA.[74] Even though Ford's study was not related to fire risks arising from rear impacts, the analysis was used in court to characterize Ford's alleged callous disregard for life.[75]

Table 1 summarizes the benefit and cost calculations in Ford's analysis.[76] The calculated costs associated with the design change of $137.5 million are almost triple the safety benefits of $49.6 million, making the change apparently undesirable from a benefit-cost perspective. However, the components of the benefits analysis are seriously flawed. Consider the $200,000 value that Ford placed on each burn death. Ford based this figure on the amount that the estate for a fatally injured person is typically compensated in court cases, which is principally the present value of the net income of the deceased.[77] However, these amounts are focused on meeting the income losses suffered by the survivors, not on preventing the loss of life to the accident victim. The correct economic valuation of preventing a small risk of death is governed by the VSL, which is much greater than this figure.[78] Similarly, burn injuries suffered in a crash often inflict severe pain and sometimes permanent disfigurement so that the value of preventing these risks will surely be greater than the average compensatory damages value.

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69. *Id.* at 358.

70. *Id.*; *see also* Gary T. Schwartz, *The Myth of the Ford Pinto Case*, 43 RUTGERS L. REV. 1013 (1991).

71. Schwartz, *supra* note 70, at 1020–26.

72. Stuart Speiser, LAWSUIT 357 (1980).

73. Schwartz, *supra* note 70, at 1020.

74. *Id.* at 1018.

75. *Id.* at 1020–21.

76. *See infra* Part IX tbl.1 (summary of Ford's analysis).

77. Arthur Lewbel, *Calculating Compensation in Cases of Wrongful Death*, 113 J. ECONOMETRICS 115, 115 (2003).

78. See Viscusi & Aldy, *supra* note 10, at 19 tbl.2, for a summary of estimates of the value of statistical life.

Ford was pilloried for undertaking an analysis that tried to take a hard look at the costs and benefits of a design change.[79] Ideally, we want to encourage companies to think systematically about safety. However, companies should do so in a responsible way. Dramatically underestimating the value of reducing health risks was a serious deficiency of Ford's approach. Use of a compensatory damages payment to value lives should have evoked some concerns about whether Ford was placing adequate weight on the lives at risk.

B. The Inherent Challenge to Risk Analysis Posed by Hindsight Bias

The Ford Pinto analysis also highlights a challenge that Ford would have faced even if it had done a proper analysis. The cost of the design change to prevent the fuel-related fire injuries and deaths was only $11 per vehicle.[80] When jurors confront an identifiable fatality that could have been prevented for $11, the jurors will not be considering a comparison of the total costs and benefits across the entire product line. Rather, the comparison is between the life that has been lost and a relatively inexpensive change to the car. This ex post frame of reference that is an inherent feature of tort litigation is certainly not the appropriate frame to use in judging any risk decision that must be made before the risk outcomes are known. Because it is so difficult for people to overcome hindsight bias and place themselves in the pre-accident situation, it is vital that firms avoid undervaluing the lives at risk.

The prominent role that hindsight bias plays in jury deliberations with respect to product safety has been a major concern of Seventh Circuit Judge Frank Easterbrook, who made the following observations in an escalator injury case in which a person was injured after someone pushed the stop button on an escalator:

> 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 buttons 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.[81]

In this case, the company's tradeoff involved the identified person who was injured by someone pushing the escalator button as compared to

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79. Mark Dowie, *Pinto Madness*, MOTHER JONES, Sept./Oct. 1977, *available at* http://www.motherjones.com/politics/1977/09/pinto-madness, *archived at* http://perma.cc/GDE7-36FD.

80. Schwartz, *supra* note 70, at 1020.

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

all the unidentified persons who were protected by the safety button. In the jury's mind, identified lives that have been harmed will count more than unknown number of statistical lives that have been protected.

C. Other Controversial Ford Risk Analyses

The role of hindsight bias coupled with corporate risk analyses extended beyond the Pinto. Ford did not fare much better in a subsequent case involving a risk analysis that the court termed "safety science management."[82] In *Ford Motor Co. v. Stubblefield*, Terri Stubblefield was in the rear seat of a Ford Mustang II and was killed after being hit from behind by a car traveling about sixty miles per hour, turning the rear seat of the car into a "ball of fire."[83] To punish Ford for making an explicit—and unacceptable—tradeoff between cost and risk reductions, the jury awarded $8 million in punitive damages:

> The evidence here was sufficient to authorize the jury to find that the sum of $8 million was an amount necessary to deter Ford from repeating its conduct; that is, its conscious decision to defer implementation of safety devices in order to protect its profits. One internal memo estimated that "the total financial effect of the Fuel System Integrity program [would] reduce Company profits over the 1973-1976 cycle by $(109) million," and recommended that Ford "defer adoption of the [safety measures] on all affected cars until 1976 to realize a design cost savings of $20.9 million compared to 1974." Another Ford document referred to a $2 million cost differential as "marginal."[84]

The economic use of the term "marginal" means "incremental" with respect to the additional costs of a design change, not that the costs were very low and sufficiently trivial that being guided by marginal costs reflects a flagrant disregard for safety.[85] However, misinterpreting this terminology reinforces the callous image of the company that the attorneys sought to create.

In another case involving a systematic risk analysis, Ford was penalized with a punitive damages award in *Miles v. Ford Motor Co.*, an award which was subsequently overturned.[86] In this instance, the controversial risk analysis concerned a "tension eliminator" for the shoulder harness on a seatbelt.[87] The failure of this part caused Willie Miles, the passenger, to slide through the seat belt after a collision and

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82. Ford Motor Co. v. Stubblefield, 319 S.E.2d 470, 475 (Ga. Ct. App. 1984).

83. *Id.* at 474.

84. *Id.* at 481.

85. For illustration of the role of marginal benefits and marginal costs in setting efficient regulatory standards, see VISCUSI, HARRINGTON & VERNON, *supra* note 22, at 30–33.

86. Ford Motor Co. v. Miles, 141 S.W.3d 309, 319 (Tex. App. 2004).

87. Miles v. Ford Motor Co., 922 S.W.2d 572, 579 (Tex. App. 1996), *remanded for procedural errors*, Ford Motor Co. v. Miles, 967 S.W.2d 377 (Tex. 1998).

suffer head and spinal injuries.[88] Once again, Ford was faulted for undertaking a risk analysis and not incurring the cost for the safety improvement:

> Syson [the plaintiffs' 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.[89]

Ford's efforts to undertake a benefit-cost analysis were well founded from an economic standpoint. However, using court awards in personal injury cases as the yardstick for valuing risk to life and health dramatically understates the level of benefits associated with greater safety. In this instance, the court overturned the punitive damages award and the finding that Ford was "grossly negligent" because Ford's tension eliminators were consistent with those found to be acceptable in a regulatory analysis by NHTSA.[90]

D. A Similar Risk Analysis Controversy for Chrysler

Chrysler Corporation has also been faulted for undertaking a risk analysis. In the blockbuster awards case, *Jimenez v. Chrysler Corp.*, the jury awarded $250 million in punitive damages because of risk-cost comparisons very similar to those in the Ford Pinto case.[91] After his mother ran a red light, Sergio Jimenez, who was an unbuckled passenger in his mother's Dodge Caravan, was thrown from the vehicle and killed.[92] A better door latch could have prevented him from being thrown from the vehicle, but Chrysler concluded that the costs of such a door latch outweighed the value of reducing the risks.[93] According to the plaintiff's posttrial memorandum:

> 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,

88. *Id.* at 578–79.

89. *Id.* at 588–89.

90. *Id.* at 589.

91. *See* Jimenez v. DaimlerChrysler 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) (S.C. Oct. 8, 1997).

92. *Jimenez*, 269 F.3d at 443; Nichole M. Christian, Angelo B. Henderson & Asra Q Nomani, *Chrysler Is Told to Pay $262.5 Million by Jurors in Minivan-Accident Trial*, WALL ST. J., Oct. 9, 1997, at A3.

93. *Jimenez*, 269 F.3d at 444–46, 449.

than concealing the defect and litigating the wrongful death suits that inevitably would result.[94]

The cost and risk reduction comparisons mirror the types of concerns in Judge Easterbrook's hindsight example. On the cost side, there would be a one-time tooling cost of $100,000 and a unit cost of $0.50 per vehicle for the new, superior part.[95] Comparison of the $0.50 cost with the loss of an identified person's life will lead to an adverse judgment for Chrysler, but this is not the appropriate comparison. At the time of the product safety design decision, the company must deal with assessed probabilities of accidents, not identified prospective deaths. Even if the Chrysler analysis had been undertaken using sound benefit values, taking the jury back to the decision Chrysler faced before the accident occurred would require overcoming the well-established role of hindsight bias.

E. The GM Risk Analysis of Fuel Tank Risks

GM also has not fared well in instances in which it has undertaken a risk analysis pertaining to the tradeoffs between vehicle cost and risk. In the 1998 Georgia case *GM Corp. v. Moseley*, GM had undertaken a risk analysis pertaining to the design of the side saddle fuel tanks.[96] Although Moseley survived the initial impact when his GM pickup truck was broadsided by a drunk driver, he suffered fatal burn injuries after his truck's gas tank ruptured and caught fire.[97] The design of the fuel tank, which led to Moseley's death, had been the subject of a previous GM analysis and a corporate decision not to increase the safety of the vehicle.[98]

After a witness presented GM's detailed risk analysis of fuel-fed fires, a "constant refrain among the jurors interviewed" was that "they knew" about the risk.[99] The inherent problem of undertaking a risk analysis for any safety-related feature is that, if the company does not adopt the most protective safety option, the perception that the company chose to ignore a known risk will always be a danger.

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94. *See* Donald C. Dilworth, *Jurors Punish Chrysler for Hiding Deadly Defect*, TRIAL, Feb. 1, 1998, at 14, *available at* http://www.thefreelibrary.com/Jurors+punish+Chrysler+for+hiding+deadly+defect.-a020379898, *archived at* http://perma.cc/3XXS-XD3Z.

95. *Id.* at 16.

96. 447 S.E.2d 302, 310 (Ga. Ct. App. 1994).

97. *Id.* at 305.

98. *See* E.C. IVEY, VALUE ANALYSIS OF AUTO FUEL FED FIRE RELATED FATALITIES (1973), *available at* http://www.autosafety.org/GMAttN.pdf, *archived at* http://perma.cc/XQ35-Y89H; Terence Moran, *GM Burns Itself*, AM. LAW., Apr. 1993, at 68, 73.

99. *See* Moran, *supra* note 98, at 69 (describing the trial strategies, proceedings, and deliberations in *Moseley*).

According to GM's risk analysis, which was prepared by GE engineer Edward Ivey in 1973, fuel-fed fires would lead to a maximum of around "650–1000 fatalities per year in accidents with fuel-fed fires where the bodies were burnt."[100] Ivey's analysis assigned a value per fatality of $200,000,[101] which is reminiscent of Ford's use of average compensatory damages awards in wrongful death cases to value the expected fatalities that would be prevented. The memo's calculations found that the estimated fatality cost per automobile currently operating would be about $2.40.[102] For new cars produced in the current model year, the estimated accident cost would be $2.20 per vehicle.[103] Preventing fuel-fed fires at costs greater than this $2.20 per vehicle figure therefore would not be worthwhile based on this calculation. Ivey's bottom-line conclusion on the accident costs was the following:

> This analysis indicates that for G.M. it would be worth approximately $2.20 per new model auto to prevent a fuel fed fire in *all* accidents . . . . This analysis must be tempered with two thoughts. First, it is really impossible to put a value on human life. This analysis tried to do so in an objective manner but a human fatality is really beyond value, subjectively. Secondly, it is impossible to design an automobile where fuel fed fires can be prevented in all accidents unless the automobile has a non-flammable fuel.[104]

Notwithstanding his expressed misgivings about the value of a human fatality, Ivey's analysis produced an extremely low value of safety that would make safety improvements to eliminate fuel-fed fires not worthwhile if they cost more than $2.20 per new vehicle.

The jury awarded $4 million in compensatory damages, $1 in pain and suffering, and a blockbuster punitive damages amount of $101 million.[105] This blockbuster punitive damages award was based on the company's risk analysis and the specific fuel fire risks involved in the case, not the overall safety of the vehicles, as GM trucks were involved in only slightly more fatalities per 10,000 crashes than Ford trucks (1.51 deaths versus 1.45 deaths).[106] The construction of the punitive damages number was based on an irrelevant mathematical exercise—the value of $20 per vehicle multiplied by 500,000 GM trucks on the road, plus an extra $1 million "exclamation point."[107] It is noteworthy that the value of the lives that were lost due to the product design never entered the plaintiff attorney's damages request or the jury's

100. IVEY, *supra* note 98, at 1.

101. *Id.*

102. *Id.*

103. *Id.* at 2.

104. *Id.*

105. GM Corp. v. Moseley, 447 S.E.2d 302, 305 (Ga. Ct. App. 1994).

106. Walter Olson, *The Most Dangerous Vehicle on the Road*, WALL ST. J., Feb. 9, 1993, http://walterolson.com/articles/gmtrucks.html, *archived at* http://perma.cc/4WFB-Z8WU.

107. Moran, *supra* note 98, at 82.

conceptualization of the punitive damages amount. From the standpoint of proper deterrence, the number of fatalities and the VSL associated with these fatalities should play a central role in establishing the appropriate level of deterrence.

F. Use of the Fuel Risk Analysis Memo against GM in Automobile Litigation

The Ivey memo resurfaced in a subsequent rear-end crash involving a 1979 Chevrolet Malibu. Patricia Anderson, her four children, and a family friend suffered severe burns after her Chevrolet Malibu was hit in the rear by a speeding drunk driver when Anderson was approaching a red light.[108] The six burn victims received a compensatory damages award of $107.6 million and a punitive damages award of $4.8 billion, making it the largest blockbuster award in any motor-vehicle case.[109] Some observers speculated that the landmark Master Settlement Agreement in the cigarette litigation had an anchoring effect, leading jurors to think in terms of award levels in the billions rather than the millions.[110]

Once again, the VSL and the value of preventing risks of death did not enter the procedure for setting the punitive damages award. The jury used two benchmarks—linking the $4.8 billion figure to GM's advertising expenses over a long period[111] and "two-thirds more than GM's entire profit for 1998."[112] Such reference points should be irrelevant. In any reasonable approach to setting punitive damages to promote safety, the value of preventing fatalities must be a critical component. Instead, the jury utilized a form of voodoo economics that

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108. *See* Andrew Pollack, *$4.9 Billion Jury Verdict in G.M. Fuel Tank Case*, N.Y. TIMES, July 10, 1999, at A8, *available at* http://www.nytimes.com/1999/07/10/us/4.9-billion-jury-verdict-in-gm-fuel-tank-case.html, *archived at* http://perma.cc/TM3S-U6LN; *GM Hit by $4.9 Billion Verdict*, CNN, July 9, 1999, http://money.cnn.com/1999/07/09/home_auto/gm_verdict/, *archived at* http://perma.cc/2XEE-R6AS.

109. *See* Pollack, *supra* note 108.

110. *See* Ann W. O'Neill, Henry Weinstein & Eric Malnic, *GM Ordered to Pay $4.9 Billion in Crash Verdict Liability*, L.A. TIMES, July 10, 1999, at A1 ("Legal experts say the verdict was the largest ever in a personal injury case."); Frank Swoboda & Caroline E. Mayer, *Jury Hits GM with Historic Crash Verdict*, WASH. POST, July 10, 1999, at A01, *available at* http://www.washingtonpost.com/wp-srv/national/longterm/supcourt/stories/jury071099.htm, *archived at* http://perma.cc/3GWC-U6QZ (quoting a nationally recognized lawyer who said, "[T]he new figures of billions of dollars that have begun to be tossed around in the tobacco cases have changed the perspective of the American jurors.").

111 Michael White, *$4.9 Billion Awarded in Gas Tank Accident*, TOPEKA CAP.-J., July 10, 1999, http://cjonline.com/stories/071099/bus_gmaward.shtml#.VPYOQPnF98F, *archived at* http://perma.cc/NYS4-8C2P.

112. Swoboda & Mayer, *supra* note 110.

led the *Washington Post* to observe that such punitive damages awards "send a message to the public at large that the courts are more like a casino than a hall of justice."[113]

The cost-risk tradeoff in the Ivey memo played a central role in assessing the safety of GM's designs. According to the plaintiffs, moving the tank an additional nine inches away from the bumper would have eliminated the risk for a cost of $8.59 per vehicle.[114] Compared to a benefit of reduced risks to life that averages $2.20 per vehicle for new vehicles and $2.40 per vehicle for existing vehicles, the measure failed a benefit-cost test since costs were about four times as great as benefits.

The plaintiffs' lawyers were able to demonize GM based on this analysis. In post-trial comments, one plaintiff's lawyer concluded: "The jurors wanted to send a message to General Motors that human life is more important than profits."[115] Jurors echoed this perspective: "Jurors told reporters that they felt the company had valued life too lightly. 'We're just like numbers, I feel, to them,' one juror, Carl Vangelisti, told Reuters. 'Statistics. That's something that is wrong.' "[116]

Economists are more comfortable with numbers than these jurors, but a critical problem with GM's numbers to value lives is that they were too small. GM grossly undervalued the reduced fatality risks from preventing fuel-fed fires. The conclusion that the costs of preventing the fires exceed the benefits hinges quite critically on the value assigned to the reduced fatalities. Based on estimates in the economics literature around at the time of the trial, the VSL was $7 million (in year 2000 dollars), or thirty-five–times greater than what GM used in the analysis.[117] Rather than failing a benefit-cost test, moving the gas tank to prevent fuel-fed fires provides safety benefits that greatly exceed costs, easily passing a properly executed benefit-cost test.[118] Using statistics need not undervalue life or lead to less-safe cars if the valuations are undertaken properly.

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113. Editorial, *Casino Justice*, WASH. POST, July 13, 1999, at A18.

114. Andrew Pollack, *$4.9 Billion Jury Verdict in GM Fuel Tank Case: Penalty Highlights Cracks in Legal System*, N.Y. TIMES, July 10, 1999, at A8, *available at* http://www.nytimes.com/1999/07/10/us/4.9-billion-jury-verdict-in-gm-fuel-tank-case.html, *archived at* http://perma.cc/JD32-USLX.

115. *Id.* (quoting Brian J. Panish, lawyer for the accident victims).

116. *Id.*

117. *See* Viscusi & Aldy, *supra* note 10, at 63 (stating that the median value of a statistical life is about $7 million).

118. The value of fifty-five fatalities at $7 million per fatality is $385 million. With five million automobiles produced each year, the safety benefit per automobile is ($385 million/5 million automobiles), or $77.00 benefit per vehicle, which is almost an order of magnitude greater than the $8.59 per vehicle cost.

However, even if the analysis had been done properly, GM would have faced a considerable challenge in convincing jurors of the desirability of making risk-cost tradeoffs. One juror expressed a "zero-risk mentality" in her observation: "There was no evidence that the car they put out there was as safe as what they could have put out there."[119] A similar zero-risk mentality phenomenon was borne out in experimental studies of consumers' willingness to pay for reduced risks from toilet bowl cleaner and pesticide. Studies have found consumers willing to pay a huge premium to reduce the risks from 5/10,000 (0.05%) to zero, with values far exceeding what they were willing to pay for much larger product risk reductions that did not lead to zero risk.[120]

G. Other GM Risk Analysis Controversies

GM's problems with risk assessments also have included its risk analyses of allegedly faulty door latches in the Chevrolet Blazer. Based on the plaintiff's experts, GM's estimate of the cost of fixing the safety latch problem was $916 million, or $216 million for parts and $700 million for labor.[121] As characterized in the court proceedings, the presence of the risk analysis showed that GM was aware of the risk based on crash tests, had calculated the costs to fix the problem, and had concluded that the costs outweighed the risk reduction benefits.[122] A man who was paralyzed in a crash implicating the alleged door latch problems received a total award of $150 million, including a $100 million blockbuster punitive damages award.[123] Once again, a corporate risk analysis played a central role in a blockbuster punitive damages awards case.

H. Lessons Learned

Officials at GM and other U.S. automobile companies have been able to observe the ramifications of risk analyses undertaken by their company and by other firms. Such analyses leave companies vulnerable to charges that they were aware of possible safety improvements but

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119. Jeffrey Ball & Milo Geyelin, *General Motors Is Ordered by a Jury to Pay $4.9 Billion in Fuel-Fire Case*, WALL ST. J., A3 (July 12, 1999), *available at* http://www.wsj.com/articles/SB931552704721866921.

120. *See* W. Kip Viscusi, Wesley Magat & Joel Huber, *An Investigation of the Rationality of Consumer Valuations of Multiple Health Risks*, 18 RAND J. ECON. 465, 474 (1987).

121. *See* J. Stratton Shartel, *Defense Timeline Plays Key Role in Trial Against GM*, INSIDE LIT., July 1996, at 1, 3.

122. *Id.*

123. *Id.* (discussing Hardy v. General Motors Corp., No. CV-93-56 (Lowndes Cnty. Ala. Cir. Ct. June 3, 1996)).

chose not to incur the costs to bolster product safety. Companies have been vilified for undertaking these assessments, often triggering substantial punitive damages awards. Because these assessments can lead jurors to the conclusion that companies have a callous or indifferent attitude toward consumer safety, companies might reasonably respond by ceasing to undertake risk analyses at all. I have not found any recent risk analyses with respect to the ignition-switch problems or other issues, and the internal review of the ignition-switch problem commissioned by GM did not report any such assessments.

Recall that the previous assessments undervalued lives by using the value of tort awards in wrongful death cases to calculate the benefits from additional safety measures. A risk assessment based on sound economic principles might be less vulnerable in court. We should not be so quick to dismiss a potential role for meaningful risk analyses because the corporate alternative of forgoing risk analyses, as well as failing to address safety concerns and associated tradeoffs in vehicle design, would be less effective in advancing consumer welfare. Even from the standpoint of corporate profits, it is not clear that it is desirable to adopt a corporate culture in which frank discussions of safety matters are discouraged and sanctioned. The costs of ignoring the safety concerns may be greater than the costs of adequately addressing product defects.

V. WOULD SOUND RISK ANALYSES FARE BETTER OR POSE NEW HAZARDS?

Whether analyses with different valuations of life might be more successful in addressing jurors' concerns can be examined using experimental studies. In this Part, I summarize the results of a series of experiments in which jury-eligible citizens considered various case scenarios involving corporate risk decisions. The findings suggest that there remains substantial resistance to even sound economic risk analyses. This Part concludes by suggesting possible legal reforms that would serve to incentivize corporations undertaking sound risk assessments.

A. Experimental Findings on Punitive Damages and Risk Analyses

Historically, GM and other auto companies were hit with considerable penalties when the companies attempted to systematically examine the tradeoffs between risk and cost. Is undertaking such a cost-risk analysis necessarily a red flag that leads jurors to conclude that the company has displayed a callous disregard for human health?

Ideally, companies should not be found liable for punitive damages if they used an appropriate VSL and adopted all safety measures for which the expected health benefits exceeded the cost.

In earlier works, I completed two experimental studies that explored jurors' potential sensitivity to responsible risk-cost tradeoffs using a total sample of almost seven hundred jury-eligible citizens.[124] The studies presented respondents with case scenarios that differed in terms of whether the company did a risk analysis and the nature of the analysis that it undertook. Each sample group received a different case scenario. The scenarios principally differed in terms of how expensive it was for the company to reduce fatality risks with improved designs.

Consider the first study, in which all scenarios given to respondents stated that the additional manufacturing cost of the vehicles per life saved was $4 million. More specifically, the company could change the electrical system design of the vehicle at a cost of $40 million to prevent ten expected deaths. Doing so would cost $400 per vehicle. Additionally, in all of the scenarios, the survey told respondents that the courts had awarded the victim's families $800,000 for pain and suffering and other compensatory damages and that after this case, the company altered future designs to eliminate the problem. After providing participants with standard jury instructions for punitive damages, they were asked whether they would favor an award of punitive damages and, if so, what the amount would be.

In the first scenario, the company did not perform any benefit-cost analysis and chose not to adopt a particular safety-enhancing feature. The respondents received the following information about the company: "The company thought there might be some risk from the current design but did not believe it would be significant. The company notes that even with these injuries, the vehicle has one of the best safety records in its class."[125] A striking 85% of the participants favored punitive damages, with a median punitive award of $1 million.[126]

In the next case scenario, the company undertook a risk analysis of the prospective safety improvement. The approach was similar to that used in the Ford and GM examples in that the company assigned

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124. Further details of the first of these studies are reported in W. Kip Viscusi, *Corporate Risk Analysis: A Reckless Act?* 52 STAN. L. REV. 547 (2000) [hereinafter Viscusi, *Corporate Risk Analysis*], and W. Kip Viscusi, *Punitive Damages: How Jurors Fail to Promote Efficiency*, 39 HARV. J. ON LEGIS. 139 (2002) [hereinafter Viscusi, *Punitive Damages*]. The sample in this first study was 489, and 206 jury-eligible citizens participated in a sequel.

125. Viscusi, *Corporate Risk Analysis, supra* note 124, at 554.

126. *Id.* at 556, 594. Another scenario involving a cost per life saved of $1 million yielded similar results, with 92% of the mock jurors favoring punitive damages, with a median award of $1 million. All scenarios discussed in the text below involve a cost per life saved of $4 million.

a value to the expected lives lost based on court awards and used the compensatory damages amount of $800,000 to value each fatality. Undertaking such analysis in this scenario did not alter the likelihood of a punitive damages award but did boost the median award level to $3.5 million. Thus, valuing lives based on the compensatory damages amount led to a *larger* punitive award than undertaking no risk analysis at all. Here, respondents resisted the company's attempt to monetize fatality risks and wanted to send the company a price signal that exceeded the $800,000 amount the company used to value lives.

What if the respondents are told that the company used the VSL that NHTSA uses in its regulatory analyses of safety measures, which at the time of the study was $3 million? This scenario should have been more favorable to the company in two ways. First, the value assigned to the fatalities at risk is almost four times as great as when the company uses court awards; thus, the company is not undervaluing the lives lost. Second, the company is following established safety norms adopted by the government agency charged with setting safety standards. Nevertheless, the respondents continued to take an unfavorable view of benefit-cost analyses. There was no reduction in the frequency of punitive damages award, and the median award escalated to $10 million.[127]

Why did placing a higher value on the lives at risk and consequently making safety a more prominent concern adversely affect the damages levied against the company? A reasonable hypothesis is that the $3 million VSL figure used by the company established an anchor that the jurors had to top in order to establish greater financial incentives for safety than the company already displayed in its risk analysis. Thus, instead of high VSL numbers reducing the sanctions against the company, valuing lives more highly and adhering to the benefit-cost practices of a government agency had counterproductive effects. If these experimental results are borne out in practice, doing the analysis correctly with higher valuations of fatalities may boost court verdicts rather than reduce them.

To explore ways in which this discouraging outcome could be avoided, a sequel to the study, involving over one hundred jury-eligible adults for each scenario, altered the company risk analysis description.[128] In one scenario the company performed a benefit-cost analysis but ignored it, while in another scenario the company attempted to persuade jurors that benefit-cost tradeoffs are reasonable. Perhaps if jurors understood the constructive role that risk analyses

127. *Id.*

128. Viscusi, *Punitive Damages*, *supra* note 124, at 139–67.

could play in fostering appropriate vehicle designs with safety features that consumers truly valued, there would be less of a tendency to want to punish corporations for risk analyses.

Consider first the scenario in which an employee at the company undertook a benefit-cost analysis, but the company didn't utilize the employee's analysis in the safety design decision. "The company said it never used the study in the design of the vehicle. It was an analysis by a staff engineer that did not play any role in the design decision."[129] Apparently doing an analysis and ignoring it is slightly less reprehensible than doing an analysis but more reprehensible than doing no analysis at all. Compared to the situation in which the risk analysis guides the company's safety decision, doing an analysis that is ignored led to a frequency of punitive award verdicts of 89% and reduced the median award to $3 million.[130]

Conceivably a more favorable scenario is one in which, instead of ignoring the analysis or not undertaking a risk analysis at all, there is information provided in an attempt to persuade jurors that benefit-cost analyses have a useful, constructive role to play. Such a scenario that attempted to overcome jurors' aversion to cost-risk tradeoffs provided the following additional information:

> The company had undertaken a series of similar risk analyses for other safety measures. These studies led to improved structural reinforcements in the doors, stability controls, and other improvements. But in this instance the company concluded that the extra costs to consumers were too great in comparison to the safety benefits. The company chose instead to make other design changes that might save more lives at less cost.[131]

This effort to convey the constructive role of benefit-cost analysis reduced the frequency of jurors favoring punitive awards to 76%, which is the lowest punitive award percentage in the scenarios tested in the two studies, and reduced the median award to $1 million. Note that this median punitive damages award level is the same as was found when the company did no benefit-cost analysis at all.[132] In effect, providing a rational basis for the benefit-cost analysis can neutralize and have some modest reduction in resistance to risk analyses as compared to the no-analysis situation.

How a risk analysis would fare based on current fatality benefit assessment practices is not clear. A more vigorous and concrete articulation of the benefits of risk analysis and use of the current, higher VSL of $9.1 million may persuade jurors of the legitimacy of cost-

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129. *Id.* at 155.

130. *Id.* at 166.

131. *Id.* at 155.

132. *Id.* at 166. However, the geometric mean award dropped to $2.1 million as compared to $3.0 million for the no analysis scenario.

risk tradeoffs. However, the higher VSL also may have a counterproductive anchoring effect in instances where punitive damages are awarded, pushing jurors to award higher levels of punitive damages in order to provide greater financial incentives for safety than the company's own valuations of risk would provide.

Even with a well-motivated benefit-cost analysis, the public will generally be uncomfortable with a risk decision that leads to a higher fatality rate when other, more expensive choices are available. Government safety agencies generally claim that their mission is to make cars, planes, drugs, and food "safe."[133] They could make more accurate claims, such as that the agency hopes that the food safety regulations can limit the annual number of fatalities related to food illnesses to under three thousand. Confronting safety decisions in a responsible and open manner will continue to pose challenges, but failing to think systematically about these issues will lead to policies that are less effective in saving lives.

B. A Proposal for Overcoming the Aversion to Risk Analyses

To address the inherent challenges proposed by risk analyses and to simultaneously encourage companies to think systematically about safety, it is desirable to give companies legal protections so that the content of the risk assessments cannot be used against them in trials. It would be beneficial to establish a safe harbor for risk analyses that follow the procedures used for federal regulatory impact analyses and that adopt the VSL used by the U.S. Department of Transportation. If such an analysis indicates that a particular design feature implicated in an accident did not pass a benefit-cost test, the company should be able to introduce this evidence in its defense, but the plaintiff should not be permitted to introduce it separately. A company that does not adopt a safety measure that fails a benefit-cost test is not negligent, but plaintiffs may misconstrue such studies as indicating that the company knowingly chose to market an unsafe product. If the analysis indicated that the design feature did pass a benefit-cost test and the company nevertheless chose to not adopt the design, there should be no legal protection for the analysis.

One could easily envision that over time there might be a rationale for stronger versions of such a proposal. There could, for example, be a regulatory compliance defense against lawsuits alleging negligence for the particular design choice if the company's analysis met

133. For example, companies must show the safety and efficacy of pharmaceutical products. Federal Food, Drug & Cosmetic Act § 505, 21 U.S.C. § 355(b) (2012).

government standards and the company adopted designs that passed a benefit-cost test. To formalize this process, companies could file the risk analyses with the U.S. Department of Transportation, which could assume a formal role of reviewing and approving the risk assessments.

Either of these safe harbor proposals could yield several dividends. By stimulating risk analyses, there would be a dramatic shift in the current corporate culture in which there has been a pronounced retreat from confronting safety issues. Incentivizing companies to take on the same methodology and VSL levels that the government uses would put the analysis on sound footing. The VSL is the value of life that a benefit-cost analysis should use in evaluating the desirability of a safety feature. This approach, in turn, would lead to design changes that are in consumers' best interest. Dampening the liability risks posed by undertaking benefit-cost analyses would also shift the focus of these cases to the substantive merits of the accident and away from a conception that anything less than an unbounded commitment to safety is an irresponsible corporate act.

VI. WHY VALUATION OF PRODUCT DEFECTS MAY BE DIFFERENT THAN THE VALUE OF SAFETY FEATURES

Certainly a productive starting point for corporate risk analyses is to utilize government estimates of the VSL to value the expected lives saved from additional safety measures. However, relying on a single number may not capture the degree of variation in the tradeoff between costs and mortality risks depending on the direction of change in the risk level and the particular segments of the population who are affected. This Part examines such refinements that could lead to a bolstering of the emphasis on safety, particularly with respect to unanticipated product defects.

A. Why Defects and Safety Attributes Differ

Proper valuation of product safety may require distinguishing between the value of risk reductions from safety improvements and the value of risk increases from product defects. Consumers' valuation of product defects, such as a faulty ignition switch that was expected to operate properly, could be quite different than the valuation of additional vehicle safety features that the consumer chose to forgo. Each situation involves a tradeoff between vehicle cost and risk, and the risk decrease from the safety feature may be the same as the risk increase from the product defect. However, product defects in which the vehicle fails to perform in a manner that is consistent with industry

norms and the consumer's expectations regarding vehicle safety may be valued much more highly than safety-enhancing improvements. The rationales for different treatment include influences that can be traced to both behavioral economic factors and more conventional economic concerns.

Consider an assessment of the valuation of product defects using the VSL as the starting point for benefit valuation. Suppose the consumer is considering buying a new car and faces a choice between two models. One model has added safety features that reduce the fatality risk by 1/100,000 but costs $100 more. Because the consumer has a VSL of $9.1 million, the safer car is worth only $91 more, making the less-safe car the preferred alternative because it is $100 cheaper. Suppose instead that the consumer's current car has a product defect that increases the fatality risk over the life of the car by 1/100,000. Based on an average VSL of $9.1 million, that consumer will suffer an expected loss of $91. Since the risk changes of 1/100,000 are identical for the product defect on the current car and for the forgone safety equipment on the prospective new car, shouldn't the consumer have the same valuation in each case? If the cost to the company of recalling and repairing the defect exceeds $91, based on how much the consumer values his own well-being, is the company on solid ground in deciding to fix the cars? Would paying $91 to each owner of a defective vehicle make them just as well off as they would have been without such a defect?

B. Why Defects May Be Valued More Highly

Despite the risk and cost parallels of product defects and forgone safety improvements, the situations involving product defects and safety equipment for new cars may be quite different. For starters, the consumer is worse off after learning about the defect unless the auto manufacturer pays the consumer $91. If the consumer is not compensated for the product defect in any way, there will be a loss relative to the situation the consumer would have been in had the vehicle not developed a defect.

In the case of the product defect, something has been taken away from the consumer. The consumer has suffered a loss from the expected level of safety. There is often a profound behavioral asymmetry in how people react to such a loss rather than a comparable gain, even though this asymmetry is inconsistent with standard economic models.[134]

134. W. Kip Viscusi & Joel Huber, *Reference-Dependent Valuations of Risk: Why Willingness-to-Accept Exceeds Willingness-to-Pay*, 44 J. RISK & UNCERTAINTY 19, 20 (2012).

This asymmetry is present in a wide variety of contexts, including those in which aspects of risk are involved.[135] Consider the following experimental evidence with respect to how people have different values for positive and negative changes in health risks posed by widely used consumer products. In the first set of studies to be discussed, which were undertaken by the Environmental Protection Agency, hundreds of consumers considered a series of household chemical products.[136] The survey administrators told the consumers that the products had been reformulated.[137] Some products posed greater risks than before, and some posed lower risks.[138] In the case of household insecticide, consumers were willing to pay an extra $1.04 per bottle for an insecticide that reduced the inhalation risks and skin poisoning risks by 5/10,000.[139] How did consumers react to an alternative version of the insecticide that posed an increase in risk of an identical magnitude? When the survey asked an initial sample of shoppers how much of a discount that they would require to purchase a bottle of insecticide that posed an added injury risk of 5/10,000, almost all the consumers balked at this opportunity.[140] The consumers were not even willing to be paid to use the riskier product.[141] The reactions were so strong that the researchers feared that people would stop participating in the survey after being asked that question. The researchers then revised the study so that the risk increase was only 1/10,000, or one-fifth the size of the risk decrease that they considered.[142] Even with this reduction, 77% of the respondents refused to buy the product, and those who did wanted a price reduction of $2.86, or almost triple what they required for a risk decrease that was five times as great.[143] The study found similar results for other types of insecticide risks and for toilet bowl cleaner risks.[144]

These results are mirrored in subsequent studies of how households value the safety of drinking water. Increases in the morbidity risk associated with drinking water are valued several times

135. *Id*; *see also* Viscusi, Magat & Huber, *supra* note 120, at 477.

136. WESLEY A. MAGAT & W. KIP VISCUSI, INFORMATIONAL APPROACHES TO REGULATION 53–54 (1992) (referencing chapter three, coauthored with Joel Huber).

137. *Id.* at 56.

138. *Id.* at 56–57.

139. *Id.* at 60.

140. *Id.* at 62.

141. *Id.* at 63.

142. *Id.* at 62–63.

143. *Id.* at 63.

144. *Id.*

as highly as comparable risk decreases.[145] The starting point seemed to anchor consumers' cost and risk level reference points, and changes from the accustomed reference point are not viewed equivalently. The potential influence of such reference point effects is quite broad.[146]

An underlying psychological phenomenon driving these disparities can be traced to the work of Kahneman and Tversky.[147] Their work did not focus on probabilities or health risks but instead dealt with accustomed income levels. People consider decreases in income to be much worse than comparable increases, meaning that people are very averse to income losses.[148] This loss aversion phenomenon and related behaviors have been characterized as "status quo bias" by Zeckhauser and Samuelson.[149] Economists have documented a wide range of situations in which there are discrepancies between willingness-to-pay values and willingness-to-accept values.[150] For environmental goods, the average ratio of willingness-to-accept to willingness-to-pay is over seven.[151]

How one should treat disparities in the valuation of risk increases and risk decreases that arise from behavioral factors is unclear. Does the difference embody a form of irrationality in which people overreact to increases in risk because they exaggerate the risk levels? In that case, a premium for product defect risks does not appear warranted. But what if the difference in the valuations reflects a more fundamental concern that people do in fact suffer a real additional loss when something that they had has been taken away, as compared to the situation in which their baseline has never shifted but was always lower? That type of behavioral effect appears to pose a more fundamental loss. But unless the disparity between reactions to risk increases and risk decreases can be shown to be a rational phenomenon as opposed to an overreaction of misperception of risk changes, basing compensation on the VSL is the appropriate yardstick.

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145. Viscusi & Huber, *supra* note 134, at 27–36.

146. John K. Horowitz & Kenneth E. McConnell, *A Review of WTA/WTP Studies*, 44 J. ENVTL. ECON. & MGMT. 426, 442 (2002).

147. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 277–78 (1979).

148. AMOS TVERSKY, PREFERENCE, BELIEF, AND SIMILARITY: SELECTED WRITINGS 409 (Eldar Shafir ed., 2004).

149. William Samuelson & Richard Zeckhauser, *Status Quo Bias in Decision Making*, 1 J. RISK & UNCERTAINTY 7, 47–48 (1988).

150. *See* Tuba Tunçel & James K. Hammitt, *A New Meta-Analysis on the WTP/WTA Disparity*, 68 J. ENVTL. ECON. & MGMT. 175 (2014) (summarizing existing studies analyzing circumstances under which individuals' willingness to pay to avoid a certain risk differs from their willingness to accept payment to subject themselves to a certain risk).

151. J.K. Horowitz & K.E. McConnell, *supra* note 146, at 428.

Traditional economic reasons without any behavioral underpinnings come into play. The $9.1 million VSL estimate is simply an average across the worker population. One reason why involuntarily imposed risks may impose large welfare losses is that there may be wide variations in individual preferences. In a market situation in which people are voluntarily exposed to the risk and receive compensation, people can sort into the risky jobs and products consistent with their preferences. People with a lower VSL will be more willing to undertake risky pursuits and purchase less-safe cars. When the risks are imposed involuntarily, there is no such matching process. Some people with very high valuations of risk will suffer a loss if they are only compensated based on the average VSL. Life and health are also distinctive in that they are irreplaceable, thwarting efforts to suitably compensate people after the fact for risks that these people did not choose.[152]

Even people who are reluctant to bear risks always have some cutoff on expenditures after which purchases of additional safety are not worthwhile. Explorations of the heterogeneity of VSL in the labor market yield some estimates as high as $20 million or more.[153] Such a doubling of the VSL to reflect some people's valuation of involuntary risks that are imposed on people who are particularly risk-averse boosts the level of benefits when undertaking a benefit assessment but does not undermine the procedure. If the average VSL across the population is $9.1 million, then using a value of $20 million may be correct for some people but will overvalue the risks of safety improvements to the great majority of individuals. Unlike in market contexts in which known risks can be matched to consumers based on their willingness to bear risk, no such matching is possible for emerging hidden risks associated with product defects. However, if the consumer population for the product has risk preferences similar to the average worker, use of the VSL remains appropriate.

Another possible economic rationale for treating product defects differently is that the presence of unanticipated defects may affect the consumer's overall assessment of the safety of the product. If the ignition switch is defective, what other things might go wrong? The existence of a product defect also may serve to undermine consumers' overall sense of the safety of the product and could potentially lead to consumer fears of other hazards. The resistance of the consumers in the household chemical survey to purchase reformulated but riskier new

152. Even in a standard consumer product situation, if the product that has been taken away cannot be replaced, compensating consumers based on the purchase price will not adequately compensate any consumer whose valuation exceeded the purchase price.

153. Thomas J. Kniesner et al., *Policy Relevant Heterogeneity in the Value of Statistical Life: New Evidence from Panel Data Quantile Regressions*, 40 J. RISK & UNCERTAINTY 15, 28 (2010).

products might have arisen because they wondered what kinds of additional threats might be posed by a product that has been reformulated and is now riskier than before. If one aspect of the product is now more hazardous, should we be more concerned about other potential hazards that have not yet been disclosed? And if the defect is not disclosed, consumers are unaware of what precautionary actions they should take to mitigate the risk, potentially resulting in a preventable loss in health or unnecessary precautions.

Regardless of whether one wants to incorporate the differences between willingness-to-pay values and willingness-to-accept values in benefit assessment, it is likely that consumers will continue to view emerging safety defects that are an unwelcome surprise as being much more problematic than having the option to purchase less expensive cars that have been equipped with fewer safety-related features. Nevertheless, the VSL usually provides appropriate guidance for valuing mortality risks and is not subject to distortions generated by alarmist responses to risk.

VII. USING PUNITIVE DAMAGES AND REGULATORY PENALTIES TO GENERATE ADEQUATE INCENTIVES FOR SAFETY

The VSL statistics that should play a fundamental role in corporate risk decisions also should be the pivotal values in other institutions' response to safety matters. That is, the VSL can provide appropriate guidance for regulatory agencies in setting sanctions and to the courts in their quest for the appropriate punitive damages amounts. This Part outlines the general pertinence of the VSL measure to establishing safety incentives and compares the likely award levels using the VSL to the blockbuster punitive damages awards that have been levied in motor-vehicle cases.

A. Regulatory Sanctions and Punitive Damages to Promote Safety

In a situation of product risk design, companies should use the VSL to value the expected fatalities that are reduced. But what if the company uses an inappropriately low value for prevented fatalities, ignores the implications of a cost-risk tradeoff analysis, or doesn't do any systematic analysis at all, leading to vehicles that lack highly justified safety improvements? If the company is found liable for the wrongful death of a person injured by the company's product, the usual form of compensation is equal to the present value of lost earnings that the household has suffered and the value of the services provided by the

deceased—not the VSL.[154] That compensatory damages amount will not provide adequate incentives for deterrence.

Similarly, government-imposed penalties are often quite limited by statute. NHTSA, for example, can only level a civil penalty of up to $7,000 for each violation of failing to notify the government of vehicle defects, and the penalty for a related series of violations cannot exceed $35 million.[155] In effect, regulatory damages are capped, whereas court awards usually are not.[156]

If the company's behavior meets the criteria for awarding punitive damages, which are intended to punish and deter such conduct in the future, the court award or regulatory penalty can achieve levels of deterrence that sufficiently incentivize the company to choose the efficient level of safety. In situations where there is a 100% chance that the company will be caught for its behavior, the appropriate financial incentive for deterrence purposes is provided by a cost penalty equal to the VSL. Thus, either the regulatory penalty or, in the case of the courts, the total award of compensatory and punitive damages should equal the VSL. This amount will price safety at the correct levels.

It may be, however, that the company's behavior is not always detectable. The company may, for example, have not disclosed key information about defects or may have settled cases and sealed the information relating to the case to prevent others from ascertaining that there was a systematic defect in the product. If the chance of detecting the company's behavior is 50%, then the appropriate total award amount is 2VSL. If instead the chance of detection is only 10%, then the efficient level of setting the award is 10VSL.

This straightforward mathematical approach to damages has a long history in the literature but has not yet been adopted by the courts.[157] One practical difficulty is that once a company has been brought to trial for marketing a defective product, the company's behavior has been detected with certainty. The appropriate question to ask is what was the probability of detection at the time the company undertook the wrongful conduct? That probability and the VSL serve as the two main components to setting the damages amount.

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154. *See* Lewbel, *supra* note 77, at 115; Viscusi, *supra* note 19.

155. 49 U.S.C. § 30165(a)(1) (2012); 49 C.F.R. § 578.6(a) (2014).

156. There are some states with caps on punitive damages awards and on pain and suffering awards, but no state caps economic loss.

157. A. Mitchell Polinsky & Steven Shavell, *Punitive Damages: An Economic Analysis*, 111 HARV. L. REV. 869, 896–900 (1998). Earlier scholars that they cite on this issue include Jeremy Bentham. The specific proposal here follows that of Joni Hersch & W. Kip Viscusi, *Saving Lives Through Punitive Damages*, 83 S. CAL. L. REV. 229, 238 (2010).

Basing the appropriate sanction for failing to report the ignition-switch defects on a readily identifiable risk is not appropriate in this situation. The ignition-switch defect does not fit the well-known risk paradigm. GM was able to keep the defect secret from NHTSA, the government agency to which it is required by law to report safety-related defects, for at least seven years.[158] In addition, GM settled some claims related to the ignition defect but did so with confidential settlements in which the nature of the risk was not disclosed.[159] Thus, in both the regulatory arena and judicial contexts, GM made a concerted effort to keep the risks hidden. This established policy of keeping the risks hidden lowers the probability of detection. If, for example, the chance of identifying the defect and linking it to all the harms was 1/10, the appropriate regulatory sanction for thirteen deaths valued at $9.1 million each would be $118 million/0.1, or $1.18 billion. Had NHTSA identified fifty deaths, the sanction would be $5.49 billion.

GM's corporate strategy of fostering secrecy with respect to product-related risks is not unique to auto-safety situations. Hersch identified a similar phenomenon with respect to medical devices.[160] In particular, companies settled cases involving leaking breast implants, keeping the terms of the settlement confidential as well as the nature of the risks.[161] The companies did not notify the Food and Drug Administration ("FDA") of the defects and kept the information out of the public domain by making the settlements confidential.[162]

Government safety agencies such as NHTSA and the FDA lack the resources to undertake the kind of detailed monitoring needed to track the performance of products. Even if companies do not disclose the financial terms of the settlements, they are required to disclose the product defect to the respective government agency, which has the

158. GM reported the defect in 2014. Consent Order, *supra* note 1, at 2. In 2005, GM considered proposed fixes of the ignition-switch problem, and in 2007 a Wisconsin trooper issued a report on an ignition-switch–related fatality and sent it to GM, though there is no evidence that the report was read. *See* VALUKAS, *supra* note 2, at 8, 115.

159. Paul M. Barrett, *The GM Fiasco and Overuse of Secret Settlements: Four Blunt Points*, BLOOMBERG BUSINESSWEEK (June 25, 2014), http://www.businessweek.com/articles/2014-06-25/the-gm-fiasco-and-the-overuse-of-secret-settlements-four-blunt-points, *archived at* http://perma.cc/GSB6-JZGA.

160. Joni Hersch, *Breast Implants: Regulation, Litigation, and Science*, *in* REGULATION THROUGH LITIGATION 142, 172 (W. Kip Viscusi ed., 2002). Note that these product defects included subsequently well-established morbidity risk problems with breast implants that were targeted by government regulations, such as product leakage, and extended well beyond the more widely debated risks linked to leakage such as that of autoimmune diseases.

161. *Id.* at 170–72.

162. *Id.* at 172.

option of making the information public.[163] While companies already have such an obligation to report product defects, the sanctions for subsequent efforts to keep the defects hidden by utilizing such confidentiality agreements should be enhanced. These secretive efforts serve to lower the probability of detection and dampen the safety incentives that the courts and regulatory agencies can provide. If the regulatory sanction for failing to report defects is linked to the probability of detection, then efforts to hide the defect through confidential settlements of litigation could be used in assessing the probability of detection and boosting the appropriate regulatory sanction.

The role of VSL in product safety situations is consequently twofold. First, it sets the price that companies and regulatory agencies should use in valuing the fatality risks associated with alternative designs. Second, if the company has been found to be remiss and either the courts or regulatory agencies wish to levy a penalty that incentivizes the company to produce and sell products that provide for an efficient level of safety, then incorporating the VSL in this procedure is essential.

B. Blockbuster Punitive Damages Awards in Motor-Vehicle Cases

Use of VSL amounts in conjunction with the probability of detection has a strong theoretical foundation for establishing safety incentives and would bring greater discipline to the setting of punitive damages. It would provide a formal structure to what is currently an untethered process. At present, jurors lack any specific methodology for mapping their concerns with corporate behavior into a dollar punitive damages amount. There have been just over one hundred blockbuster punitive damages awards in the United States. Table 2 lists the eleven punitive damages awards in excess of $100 million (i.e., blockbuster punitive damages awards) that have been awarded to date in motor-vehicle cases involving personal injury.[164] Ten of these awards are against major U.S. auto companies, and one is against the Bridgestone and Firestone tire companies. The final column in Table 2 describes the nature of the case and the alleged defect. Although there are some exceptions involving several victims, most of these cases involve an alleged product defect causing a single fatality. A punitive damages award in the $100 million range could be warranted in such instances,

163. *E.g.*, 49 U.S.C. § 30118(c)(1) (2012) (requiring automobile manufacturers to disclose any known defects relating to motor vehicle safety).

164. For a list of these cases and the award amounts, see *infra* Part IX tbl.2.

provided that the jury believed the probability of detecting the wrongful conduct is low. However, there is no evidence that this deterrence-based logic has played any role in these awards. Plaintiff attorneys' requests for punitive damages typically are based on irrelevant anchors that are divorced from the task of establishing appropriate levels of deterrence.[165]

Five of the cases listed in Table 2 played a prominent role in the discussion of the corporate risk analyses above. Thus, half of the blockbuster award cases in which auto companies were defendants were those in which a purported transgression of the company was that it undertook a systematic risk analysis. Consequently, there has been a diminished prominence of such risk analyses in later auto liability cases, perhaps in part because companies have been severely sanctioned for attempting to think systematically about the risk and cost of vehicle design.

VIII. CONCLUSION

Risk analyses in which there is a systematic assessment of costs and benefits can play a pivotal role in fostering efficient levels of safety. Benefit-cost analyses using appropriate levels of the value of a statistical life have played an increasingly prominent role in regulatory policy and now guide the development of regulatory standards by government agencies. In contrast, the role of corporate risk analyses has diminished over time. Early efforts by companies to assess the risks and costs associated with design choices appear to have been well intentioned but were hindered by a systematic undervaluation of risks to life and health. Valuations more in line with government agencies would certainly have bolstered the credibility of the analyses and would have led to different safety decisions in some instances. But undertaking any analysis poses inherent problems of a company becoming aware of the risks and costs and, in some instances, choosing to not incur the costs to reduce the risks, both of which makes the company vulnerable to punitive damages awards. Although a concerted effort to educate jurors on the overall merits of systematic analysis of the competing concerns may diminish the repercussions from

165. Company profits, sales, and advertising budgets are examples of company characteristics that are less pertinent than the VSL. Even anchors with no stated rationale are influential. *See* Reid Hastie, David A. Schkade & John W. Payne, *Do Plaintiffs' Requests and Plaintiffs' Identities Matter?*, *in* PUNITIVE DAMAGES: HOW JURIES DECIDE, *supra* note 14, at 73 (conceptualizing the decision to award punitive damages as an "anchor-and-insufficient-adjustment process" and noting that "an arbitrary anchor value can sometimes exert a large influence on the final judgment").

undertaking a benefit-cost analysis, the role of hindsight bias will continue to discourage prospective risk and cost assessments.

A potential solution to this problem would be the analog of a regulatory compliance defense for regulatory analyses. If a company undertakes an analysis consistent with the procedures used by the pertinent regulatory agency, which would be NHTSA for auto safety, and if the analysis indicates that the safety design feature is not warranted, then these analyses should not be used against the company in tort litigation. This risk analysis regime would also make the VSL the cornerstone of safety decisions rather than compensatory damages awards, which undervalue lives at risk.

Wholly apart from fostering more responsible corporate risk analyses, the VSL could play a central role in reformulating the penalty structure of current safety regulations. The limitations on the penalties that NHTSA has imposed on company failures have resulted in potential regulatory sanctions that are far below either the value of the lives at risk or the costs to the company of addressing the defect. The corporate strategy of suppressing information about safety defects and failing to fix the defects should not become a profitable option simply because government sanctions are better suited to promoting carefully completed paperwork rather than disclosing fundamental product risks. Pricing lives by integrating the VSL into corporate risk practices and government regulatory efforts would produce more protective safety policies.

IX. APPENDIX

Table 1: Benefit-Cost Calculations for the Ford Pinto

Panel A: Benefit calculations for increased safety in Pinto gas tank design

Outcome of Faulty Design	Ford's Unit Value	Ford's Total Value
180 burn deaths	$200,000	$36 million
180 serious burn injuries	$67,000	$12.1 million
2,100 burned vehicles	$700	$1.5 million
Total		**$49.6 million**

Panel B: Cost calculations for increased safety in Pinto gas tank design

Number of Units	Unit Cost	Total Cost[a]
11 million cars	$11	$121 million
1.5 million light trucks	$11	$16.5 million
Total		**$137.5 million**

[a] Excluded is the minor cost component of the lost consumer's surplus of customers who do not buy Pintos because of the $11 price increase.

Source: W. KIP VISCUSI, REFORMING PRODUCTS LIABILITY 112 (1991), which in turn cites the internal 1973 Ford Motor Company document, Memorandum, E. F. Grush & C. S. Saunby, Fatalities Associated with Crash-Induced Fries and Fuel Leakages, http://www.autosafety.org/uploads/phpq3mJ7F_FordMemo.pdf, *archived at* http://perma.cc/7XFH-3KDG, discussed in BRENT FISSE & JOHN BRAITHWAITE, THE IMPACT OF PUBLICITY ON CORPORATE OFFENDERS 43–44 (1983).

Table 2: Blockbuster Punitive Damages Awards against Automobile Companies

Case	Year	State	Punitive Damages Amount ($ millions)	Punitive Damages Amount ($2012 millions)	Nature of Plaintiff's Claim
Grimshaw v. Ford Motor Co.	1981	CA	125	309.33	Ford was aware of design flaws with the Pinto's fuel system and fuel tank placement. The rear-end collision punctured the Pinto's tank, burning up the vehicle and its occupants.
Moseley v. General Motors	1993	GA	101	157.23	GM placement of the fuel tank outside the vehicle frame of its GMC Sierra truck. GM analysis showed that the design was dangerous, leading to a fire and the death of a vehicle occupant following a side-impact collision.
Hardy v. General Motors	1996	AL	100	143.36	Some GM door latches were substandard and problematic (according to engineers' reports), resulting in the ejection of vehicle occupants in a crash.
Jimenez v. Chrysler	1997	SC	250	350.38	A defective rear liftgate latch in a 1985 Chrysler minivan resulted in the opening of the liftgate during a rollover accident, leading to the death of a boy who was ejected from the van.

Case	Year	State	Punitive Damages Amount ($ millions)	Punitive Damages Amount ($2012 millions)	Nature of Plaintiff's Claim
Robinson v. Ford Motor Co.	1998	MS	120	165.60	A defective design in a 1976 Ford Ranger increased the risk of a rollover during turns, injuring two people and killing one.
Romo v. Ford Motor Co.	1999	CA	290	391.56	During a rollover, different components of a Ford Bronco's roof collapsed or broke, killing three people and injuring two people.
Anderson v. General Motors	1999	CA	4,775	6,447.21	The fuel tank in a Chevrolet Malibu exploded during a collision, resulting in severe burns to six passengers.
White v. Ford Motor Co.	1999	NV	153.18	206.82	A parking break failed to stop a Ford F-350 truck from rolling down a hill, killing a boy when the truck inadvertently shifted from first gear to neutral.
Dorman v. Bridgestone/ Firestone Inc.	2000	MO	100	130.63	A multi-piece tire exploded while a man was filling it with air, seriously injuring him.
Jernigan v. General Motors	2002	AL	100	125.04	A design defect in an Oldsmobile 88 resulted in inadequate protection for the passenger compartment.

Case	Year	State	Punitive Damages Amount ($ millions)	Punitive Damages Amount ($2012 millions)	Nature of Plaintiff's Claim
Buell-Wilson v. Ford Motor Co.	2004	CA	246	292.94	A Ford Explorer was defectively unstable and not crashworthy because of a design defect in the roof.

Source: All statistics are drawn from the database used in W. Kip Viscusi & Benjamin J. McMichael, *Shifting the Fat-Tailed Distribution of Blockbuster Punitive Damages Awards*, 11 J. EMPIRICAL L. STUDIES 350, 357 (2014). Almost all of these cases are also listed in Alison F. Del Rossi & W. Kip Viscusi, *The Changing Landscape of Blockbuster Punitive Damages Awards*, 12 AM. L. & ECON. REV. 116, Appendix Tbl.A1 (2010).