Avoiding Regulatory Mismatch in the Workplace: An Informational Approach to Workplace Safety Regulation

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I. INTRODUCTION

More than two decades have passed since then-Professor (now Justice) Stephen Breyer published Regulation and Its Reform, a manifesto challenging regulators to avoid “regulatory mismatch” by narrowly tailoring regulatory mechanisms to respond to particular market failures. Professor Breyer began by positing “a simple axiom for creating and implementing any [regulatory] program: determine the objectives, examine the alternative methods of obtaining the objectives, and choose the best method for doing so.” The best method, Breyer asserted, will generally be the “least restrictive alternative”—that is, the regulatory intervention that preserves the greatest degree of contractual freedom consistent with elimination of the particular market failure at issue.

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2. Id. at 5.
3. Breyer explains: Classical regulation ought to be looked upon as a weapon of last resort. The problems accompanying classical regulation would seem sufficiently serious to warrant adopting a “least restrictive alternative” approach to regulation. Such an approach would view regulation through a procompetitive lens. It would urge reliance on an unregulated market in the absence of a significant market defect. Then, when the harm produced by the unregulated market is serious, it would suggest first examining incentive-based intervention, such as taxes or marketable rights, or dis-
Regulatory mismatch occurs when the government adopts a regulation that is too broad (or perhaps too narrow) to provide a tailored fit to the problem it is supposed to correct. For example, if the market failure is information asymmetry—a substantial discrepancy between the knowledge possessed by the seller of a good and that possessed by prospective buyers—the government generally should not respond by banning the sale of the item at issue. Such a rule would be overly proscriptive and would thwart transactions whose total benefits exceed their total costs. A more narrowly tailored rule would address the informational problem directly by requiring sellers to provide pertinent information to prospective buyers before selling the good.

In the last two decades, policymakers have undoubtedly progressed along the lines Professor Breyer suggested. A number of regulatory innovations display a sensitivity toward eliminating market failures using the least restrictive means possible. In the environmental arena, for example, policymakers have moved away from stringent command-and-control, “end-of-pipe” regulations toward more flexible pollution control strategies that employ pollution taxes and marketable emissions credits to achieve the same level of pollution regulation, bargaining, or other less restrictive forms of interventions before turning to classical regulation itself. It would urge the adoption of classical regulatory methods only where less restrictive methods will not work.

Id. at 185; see also Stephen Breyer, Analyzing Regulatory Failure: Mismatches, Less Restrictive Alternatives, and Reform, 92 HARV. L. REV. 549, 586 (1979) (“[T]he focus on problems accompanying classical regulation supports the notion of looking at economic regulation through a pro-competitive lens and adopting a ‘least restrictive alternative’ approach.”).

4. See infra note 106 (discussing how increased restrictiveness increases costs by eliminating gains from trade).

5. Indeed, this is the regulatory model upon which the federal securities laws are based. The New Deal Congress rejected a “merit review model,” which would have prohibited outright the sale of overly risky securities, in favor of an approach that allowed issuers to sell very risky securities, provided they gave buyers enough information to make an informed investment decision. See STEPHEN M. BAINBRIDGE, CORPORATION LAW AND ECONOMICS 17 (2002).


tion control in a more flexible, cost-effective manner. In securities regulation, policymakers have correctly recognized that information asymmetry, the market failure justifying regulation of the sale of securities, can be alleviated by less restrictive means than once thought and have increasingly permitted securities sellers to opt-out of costly disclosure rules as long as they provide enough information to remedy the market failure.\(^8\) Even in the area of workplace safety, the subject of this Article, policymakers have demonstrated some appreciation for the value of narrowly tailoring regulations: the Occupational Safety and Health Administration’s (“OSHA’s”) Hazard Communication Standard\(^9\) focuses on informing employees of chemical risks in the workplace, rather than on banning such risks, for, as discussed below,\(^10\) the primary market failure with respect to hazardous substances in the workplace is inadequate information.\(^11\)

But the regulatory sophistication evident in OSHA’s Hazard Communication Standard is something of an anomaly for the agency. In general, OSHA continues to address workplace safety hazards the old-fashioned way: by imposing technological standards that employers must, under threat of sanctions, implement. For example, OSHA’s recently adopted (but quickly repealed) ergonomics standard,\(^12\) would have required employers to adopt a series of costly precautions in or-

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\(^8\) See Bainbridge, supra note 5, at 20 (discussing integrated disclosure system for securities); Alan R. Palmiter, Toward Disclosure Choice in Securities Offerings, 1999 Colum. Bus. L. Rev. 1, 2-4 (noting that the extent of market failure in the securities context is receding as a result of investor informational demands and that the disclosure obligations under the securities laws are, appropriately, becoming more flexible as they are tailored to account for the market failure).


\(^10\) See infra subsection II.B.2.


der to eliminate workplace injuries resulting from awkward and/or repeated motions.  

OSHA's standard regulatory approach—mandating particular risk reduction technologies—is subject to the various maladies that typically beset command-and-control regulatory regimes. As discussed more fully below, a regulatory approach based on mandating risk-reduction technologies: (1) thwarts gains from trade, and thus destroys wealth, by precluding voluntary transactions in which less risk-averse employees agree to work (in exchange for a risk premium) for employers for whom risk reduction is particularly costly; (2) fails to enlist workers in accident-avoidance, even in circumstances in which the workers are the cheaper injury-avoiders; (3) requires tremendous amounts of time- and space-specific information, to which centralized regulators likely are not privy; (4) creates disincentives to the development of more effective or cheaper risk-reduction technologies; and (5) encourages inefficient interest-group maneuvering, whereby incumbent firms seek to create barriers to entry by procuring regulations requiring new entrants to adopt the safety measures utilized by incumbents.

These difficulties undoubtedly contribute to OSHA's notorious cost-ineffectiveness. As of 1995, the estimated total cost of OSHA's mandatory health and safety standards was $11 billion per year. According to OSHA's most optimistic benefits figures, which a number of scholars have disputed, the value of benefits produced by OSHA's standards totaled only $3.6 billion per year—a mere third of the cost of the mandatory standards. In terms of workplace fatality rates, there is little evidence OSHA's costly efforts have accomplished any-


14. See infra notes 164-167 and accompanying text.

15. See infra note 168 and accompanying text.

16. See infra notes 169-174 and accompanying text.

17. See infra note 175 and accompanying text.

18. See infra note 176 and accompanying text.


20. See Hahn & Hird, supra note 19, 8 YALE J. REG. at 275-76; W. Kip Viscusi, Risk By Choice: Regulating Health and Safety in the Workplace 35 (1983) (concluding that reviewed data showed that "OSHA inspections or penalties have had no significant effect on worker injuries or illnesses"); Lester Lave, The Strategy of Social Regulation: Decision Frameworks for Policy 102 (1981) (concluding that OSHA regulations have had no positive effects).

21. See Kneiser & Leeth, supra note 19, at 51.
thing. Such rates have exhibited a downward trend, fueled in large part by improvements in safety technology and changes in the occupational distribution of labor, since well before OSHA's establishment in 1970.\textsuperscript{22} In fact, the pre-OSHA drop in the frequency of workplace fatalities from 1947 to 1970 was 70 per cent larger than the post-OSHA drop from 1970 to 1993.\textsuperscript{23} In terms of workplace injuries, the most optimistic studies conclude that OSHA's abatement efforts have reduced injuries by at most 4.6 per cent per year, but that figure assumes that OSHA's inspections have a significant abatement and deterrence effect, and most studies dispute that assumption.\textsuperscript{24}

Given OSHA's poor track record and the high costs of its command-and-control approach, efficiency-minded regulators and legislators should query whether the agency's focus on mandating particular risk reduction technologies amounts to regulatory mismatch.\textsuperscript{25} The agency's command-and-control approach might be appropriate if the market failure leading to sub-optimal safety precautions in the workplace were an externality.\textsuperscript{26} As explained herein, however, employers ultimately bear the costs of safety risks in the workplace,\textsuperscript{27} so there is no genuine externality requiring a command-and-control fix.\textsuperscript{28} To the extent employers are failing to take cost-effective precautions to re-

\begin{itemize}
  \item[22.] Id. at 48-49.
  \item[23.] Id. at 49.
  \item[24.] Id. at 50.
  \item[25.] In many cases, the command-and-control regulations OSHA regulators have adopted are required by legislation. See 29 U.S.C. § 655 (2002) (requiring promulgation of safety standards); see also Daniel B. Rodriguez, The Positive Political Dimensions of Regulatory Reform, 72 WASH. U. L. Q. 1, 12 (1994) (noting that "the Occupational Safety and Health Act of 1970 . . . is a classic command-and-control regulatory statute"). Thus, this Article does not intend to suggest that regulators bear all the blame for the regulatory mismatch that currently exists in the workplace safety arena. To the extent workplace safety statutes require the command-and-control course OSHA has charted, those statutes should be amended to permit the agency to focus more narrowly on remedying the precise market failure at issue.
  \item[26.] Though, as noted, there are less restrictive means than command-and-control for regulating externalities. See supra notes 6 to 7 and accompanying text.
  \item[27.] See supra subsection II.B.1.
  \item[28.] With respect to ergonomic risks, the category of risks OSHA most recently sought to regulate using a command-and-control approach, the agency has frankly admitted that employers are the ultimate cost-bearers. In a section of its proposed ergonomics regulation ironically entitled "The Need for an Ergonomics Standard," the agency noted that in 1997, ergonomic injuries caused employees to miss a total of 626,000 workdays and accounted for $1 of every $3 spent for workers' compensation. 64 Fed. Reg. 65769 (Nov. 23, 1999). OSHA then estimated that employers pay between $15 and $20 billion in workers compensation costs for ergonomic injuries every year. Id. The proposed ergonomics standard, the agency said, would have saved employers $9.1 billion per year. Id. at 66,002. The agency never bothered to explain why, if employers are paying such a high toll for ergonomic injuries, the government needs to force them to take cost-effective precautions to reduce such injuries.
\end{itemize}
duce safety risks in their workplaces, the culprit market failure is some sort of informational deficiency—inadequate information on the part of employees about safety risks, inadequate information on the part of employers about available precautions, or perhaps both. The most narrowly tailored regulatory solution, then, would be some sort of informational regulation that attempts to alleviate any deficiencies.

Or would it? While a number of regulatory theorists, reasoning that employees will demand compensation for known risks and will thereby motivate employers to take all cost-effective precautions to eliminate those risks, have advocated risk-disclosure approaches to workplace safety regulation, there may be good reasons to think that the policies they have proposed will not work. First, insights regarding individuals' "bounded rationality" and evidence from the field of behavioral economics suggests that individuals are subject to cognitive limitations and biases that prevent them from digesting and accurately processing risk information, and a regulatory strategy that focuses on providing employees with risk information may therefore fail to achieve its objectives. In addition, the informational strategies that focus solely on informing employees of risks, as most so far have done, may fail if the factor preventing employers from adopting cost-effective safety precautions is not lack of motivation stemming from employee ignorance of risks but is instead employer ignorance of such precautions. Substantive safety standards provide employers with information about potential cost-effective precautions of which they might otherwise remain ignorant. Hence, OSHA's eschewal of an information-provision approach in favor of substantive safety standards might make sense.

But before approving a command-and-control approach to workplace safety (or rejecting such an approach as overly proscriptive), policy makers should explore the range of regulatory options that could be used to address the problem of untaken cost-effective safety precautions in the workplace. The purpose of this Article is to do just that.

29. See infra subsection II.B.2.
30. See infra note 113 and accompanying text (citing theorists advocating risk disclosure approach to workplace safety regulation).
31. See infra notes 178-207 and accompanying text.
32. See infra note 180 (citing sources arguing that individuals' bounded rationality and cognitive quirks will disable a regulatory policy based on informing workers of workplace safety risks).
33. See infra note 113 and accompanying text.
34. As explained in greater detail below, see infra subsection II.B.2.a, employers will lack motivation to take all cost-effective safety precautions if employees, ignorant of the magnitude of workplace risks, are not demanding adequate "risk premiums" to cover their expected injury costs.
35. As explained in greater detail below, see infra Section II.A, the goal of workplace safety regulation, at least from an efficiency standpoint, should not be to eliminate all safety risks, but only those whose elimination would be less costly than
As it turns out, there is fertile middle ground between the pure libertarian “do nothing” approach and the paternalistic command-and-control approach OSHA tends to favor. Even the middle ground “information-provision” approach a number of theorists have advocated (in imprecise terms) could be implemented several different ways, some of which would be more effective than others. It is therefore possible to make some systematic policy prescriptions that may aid regulators attempting to avoid regulatory mismatch.

In the course of exploring the range of regulatory options, this Article attempts to make several contributions to the literature on workplace safety regulation. First, it seeks to flesh out some concrete policies aimed at providing workplace risk information to employees. While a number of theorists have asserted generally that regulators should focus on informing employees of workplace risks, no theorist has offered a detailed proposal stating what information should be provided and how it may be transferred cheaply. Next, the Article responds to behavioral theorists who argue that individuals’ cognitive limitations and biases necessarily render ineffective an information-provision approach to workplace safety regulation. Thus far, the behavioralists and the information-provision advocates have largely talked around one another. This Article shows that, even if the behavioralists are correct in their claims about individuals’ abilities to process risk information, an information-provision approach may be effective. Finally, the Article demonstrates that the informational inadequacy comprising the market failure sometimes consists of more than inadequate risk information on the part of employees; employers also may face systematic informational deficiencies, and any informational approach should address those deficiencies as well. The Article therefore attempts to provide some guidance as to when regulators should provide information to employers as well as employees, and how they may do so effectively.

Following Professor Breyer’s “simple axiom for creating and implementing any [regulatory] program” (i.e., “determine the objectives, examine the alternative methods of obtaining the objectives, and choose the best method for doing so”), the Article proceeds as follows: Part II defines the objectives of workplace safety regulation, first identifying the socially undesirable “symptom” regulators should be addressing and then diagnosing the more fundamental market failure that is

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the expected cost of the injuries they would cause. To state this more precisely, a risk reduction measure should be taken if its marginal cost (i.e., the additional cost of implementing it) is less than or equal to its marginal benefit (in terms of the incremental injury costs it is likely to avert). Some workplace safety risks cannot be cost-effectively eliminated and, from an efficiency standpoint, should be permitted.

36. See supra note 113 and accompanying text.
37. Breyer, supra note 1, at 5.
II. DEFINING THE TASK

The general question with which an analysis of workplace safety regulation should begin—what are the regulatory objectives?—should be addressed on two levels. First, regulators should decide how the current state of affairs differs from what the optimal state of affairs would be: What “symptom” calls for a regulatory cure? Second, what defect in the scheme of private ordering (i.e., what “market failure”) is leading to the undesirable symptom? The first question concerns effects; the second attempts to diagnose the cause of those effects.

A. The Symptom: Sub-Optimal Precaution-Taking by Employers

The existence of workplace risk in general is not the symptom regulators should attempt to alleviate, for some degree of safety risk necessarily accompanies productive activity, and the only way to eliminate all risk would be to eliminate all productive activity. But regulation should undoubtedly aim to reduce some risks—at least very grave ones that are not necessary to achieve productive gains. Thus, the question is, “Where is the stopping point?” What level of risk reduction should regulators attempt to achieve if the two endpoints—total risk reduction and zero risk reduction—are eliminated? Economics provides an answer to that question.

Because risk reduction generally exhibits increasing marginal costs and decreasing marginal benefits (see Figure A), the efficient

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38. Recall Professor Breyer's “simple axiom” for avoiding regulatory mismatch: “determine the objectives, examine the alternative methods of attaining the objectives, and choose the best method for doing so.” Breyer, supra note 1, at 5.

39. “Market failure” means simply “a failure of market transactions in the real world to live up to the idealized assumptions hypothesized by economists,” under which “the unconstrained choices of consumers, coupled with the provision of goods in the marketplace by competitive firms, lead to efficient outcomes as consumers select the bundle of goods they most prefer.” W. Kip Viscusi, Using Warnings to Extend the Boundaries of Consumer Sovereignty, 23 Harv. J. L. & Pub. Pol'y 211, 212 (1999).

40. This means that as more and more risks are reduced, the incremental cost of eliminating each additional risk increases, and the incremental benefit of reducing the risk diminishes.
point of risk reduction—that level of risk reduction that maximizes societal wealth—occurs where the marginal cost of reducing a risk equals the marginal benefit of the risk reduction (point \( x \)). Reducing risks beyond this point (e.g., continuing to reduce risks to point \( z \)) is inefficient because each additional unit of risk reduction costs more than it provides in benefits. Conversely, failure to reduce risks up to this point (e.g., stopping risk reduction at point \( y \)) is inefficient because continued risk reduction would cost less than the sum of benefits it would produce. Hence, the goal of workplace safety regulation should be to ensure that employers take all, but only, those risk-reduction measures whose marginal benefits, in terms of risk reduction, are greater than or equal to their marginal costs. The “symptom” regulators should address, then, is employers’ failure to do so. Put differently, the symptom is inefficient risk, or risk that could be eliminated cost-effectively.

B. The Market Failure: Systematic Informational Inadequacy

Having determined the symptom to be addressed, regulators should turn their attention to diagnosis by attempting to pinpoint the defect in the free market that prevents employers from taking all cost-effective safety precautions to protect their employees from workplace injuries and illnesses. That market failure is not a negative externality, the market failure most frequently redressed through the sort of command-and-control approach OSHA typically employs, but is instead an informational inadequacy caused by the positive externalities exhibited by risk and precaution information.

1. Not a Negative Externality

Negative externalities—costs that are borne by individuals who have no control over (i.e., are “external” to) the decision to create the costs—are a frequently cited form of market failure and are often used to justify government regulation. When some costs of a decision accrue to individuals other than the decisionmaker, that person is likely to make an inefficient decision that he would not make if he bore the full costs and benefits of his decisions. Hence, theorists have long

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42. See, e.g., A.C. Pigou, THE ECONOMICS OF WELFARE 183-94 (1920).
43. As noted above, see supra Section II.A, the optimal amount of an activity occurs where the total marginal cost of the activity (which tends to rise with increases in the activity) equals the total marginal benefit of the activity (which tends to fall with increases in the level of activity). If the individual in charge of setting the activity level does not bear the full marginal costs or benefits of the activity, he will engage in an in-optimal amount of the activity. An actor who does not bear
argued that government intervention is necessary when there is a negative externality: the government may tax the externality-creating process so that the decisionmaker faces personal costs more closely aligned with the total costs his actions are creating, or, if taxation is impracticable, it may simply ban the activity or command that it occur at a particular rate. Environmental laws provide perhaps the best example of government intervention to address negative externalities: Because factory owners foist smokes, smells, and health risks on their neighbors and thus do not bear the full costs of their production processes, the government intervenes either by taxing the polluting activity or directly commanding the factory owner to reduce pollution to a particular point. Absent government intervention (or well-defined, transferable property rights and the ability to bargain cheaply), the factory owner would engage in a socially in-optimal (i.e., excessive) amount of polluting activity.

To be sure, employees are adversely affected by employers' decisions to underinvest in safety precautions, and one might thus say the full marginal costs of his activity will engage in too high a level of that activity, and one who cannot capture the full marginal benefits of his activity will under-engage in the activity. Figure C, infra, graphically depicts this latter phenomenon with respect to information production efforts.

44. See Pigou, supra note 42, at 195 ("No 'invisible hand' can be relied on to produce a good arrangement of the whole from a combination of separate treatment of the parts. It is therefore necessary that an authority of wider reach should intervene and should tackle the collective problems of beauty, of air, and of light ... "). As Professor Ronald Coase pointed out in his famous article, The Problem of Social Cost, 3 J.L. ECON. 1 (1960), the existence of negative externalities does not necessarily require government intervention. Coase demonstrated that inefficiencies stemming from negative externalities could be (and would be) resolved through private negotiations if property rights were clear and the costs of reaching and enforcing agreements were trivial. For example, if a factory owner could costlessly negotiate with his neighbors, the negotiating parties would eventually end up selecting the more efficient outcome between permitting the pollution and banning it, regardless of whether the factory owner were initially given the right to pollute or the neighbors the right to be free from pollution. Government intervention to control externalities, then, is desirable only when it is cheaper than the costs of private bargaining and contracting. As it turns out, that may frequently be the case.

45. Pigou, supra note 42, at 194-96.

46. See generally Howard Gensler, The Economics of Pollution Taxes, 10 J. NAT. RESOURCES & ENVTL. L. 1 (1994-95) (stating economic case for pollution taxes).

47. See, e.g., 33 U.S.C. § 1342 (2002) (Clean Water Act provision providing for precise effluent limitations). Note that even marketable emissions credits, which are generally thought of as a "free market" innovation, ultimately amount to a governmental command to reduce the total pollution level to a particular point (i.e., the point that will be reached when all available permits are exercised). See generally Adam Babich, A New Era in Environmental Law, 20 COLO. LAWYER 435, 438 (1991) (discussing the marketable permit model).

48. See supra note 44 (discussing Coase theorem).

49. See Pigou, supra note 42, at 195.
that negative externalities result from employers' decisions not to adopt particular safety measures. But not every instance of spillover costs counts as the type of negative externality for which a government correction is necessary or desirable. Economists draw a distinction between "technological" and "pecuniary" externalities: Pecuniary externalities are mitigated by the price mechanism, while technological externalities are not. So, for example, if one chooses to neglect maintenance on an automobile she plans to resell, there is a negative externality (the new buyer will undoubtedly be affected by the owner's decision to neglect her car), but the externality is wholly pecuniary, for the owner's negligence will be reflected in the price she is able to command for the car. By contrast, there is no mitigating price mechanism when a factory dumps smoke on its neighbors; the externality at issue is technological. Market failure occurs, and thus the efficiency arguments for government intervention apply, only where the externalities at issue are technological. Pecuniary externalities are not inefficient, because the price mechanism ensures that prices equal marginal cost and that the cost-creator is penalized by an appropriately sized reduction in the price he can command for whatever it is he is selling.

Those who would argue that government regulation of workplace safety is necessary to correct for the "externality" inherent in the fact that it is employees who pay for employers' safety gambles err in

50. See, e.g., David Haddock et al., Property Rights in Assets and Resistance to Tender Offers, 73 Va. L. Rev. 701, 723 (1987). Haddock et al. explain: "Externality" is a slippery concept, one less often used to elucidate a supposed "problem" than to justify government intervention to "solve" it. The efficiency issue is not whether any third-party impact takes place—that is inevitable—but whether the appropriate marginal conditions still hold. Many externalities are solely pecuniary; they change prices but do not raise efficiency concerns as long as prices still equal marginal cost. A problem arises only when prices and costs diverge, creating a non-pecuniary (or "technological") externality.

51. In general, third-party effects that occur within a contractual context (i.e., where the cost-creator and cost-bearer are parties to a bargain) will be pecuniary externalities; those that occur in a tort context (i.e., where the cost-bearer is unable to engage in ex ante bargaining with the cost-creator) will be technological.

52. See Haddock et al., supra note 50, at 723.

53. See id.

54. Professor Sidney Shapiro has succinctly summarized the (unsound) externality argument in favor of workplace safety regulation:

[Workplace injuries and illnesses are called "externalities" or "spillover" costs, for the reason the following hypothetical demonstrates. Assume that workers are exposed to fumes in a factory that are dangerous to their health. In an unregulated labor market, i.e., one without workers' compensation or OSHA, the factory would appear to have no incentive to reduce the pollution, which would have the effect of reducing its profit. A portion of the cost of production—the workers' illnesses—therefore "spills over" to the employees in the sense that they, not the factory, will
ignoring the fact that the externalities at issue in the workplace safety context are pecuniary externalities, or externalities that are "internalized" to the employer via the price mechanism. To see this point, consider the elements that comprise the price employers pay for workers. That price can be divided into at least three components. Most obviously, it includes wages. In addition, it includes the monetary value of benefits (e.g., vacation time, pension contributions, various perquisites) as well as the expected value of injury compensation the employer will pay. This last element is equal to the amount of compensation that would be provided for each possible injury times the likelihood that each such injury will occur. Two of the elements of worker price—expected injury compensation and wages—are directly affected by the riskiness of the worker's job: as the risks of a job increase, those elements of worker price will rise, leading to internalization. Consider each in turn.

a. Workers' Compensation: Ex Post Compensation for Risk-Bearing

Workers' compensation laws, which have been adopted by every state, impose strict liability on employers for all on-the-job injuries, thereby ensuring that employers bear the costs of safety risks at work. By forcing employers to pay for on-the-job injuries, workers' compensation laws theoretically motivate employers to take all cost-effective precautions to reduce job-related injuries. That is because requiring employers to pay, ex post, for on-the-job accidents gives them an incentive, ex ante, to continue taking preventive measures up to the point at which the (increasing) marginal cost of adopting an additional precautionary measure equals the (decreasing) marginal pay for the consequences of becoming ill. Put another way, these costs are "external" to the factory. A market with an externality or spillover cost does not operate in an "efficient" manner. There is a market failure because the price of the product made by the factory does not reflect the costs paid by the workers concerning their illnesses. The underpricing of the product leads to overproduction. Because the price is lower than it would be if the factory paid for the spillover cost, consumers will purchase more of it than otherwise. The market is not efficient because more of the product is sold than if it were properly priced.


55. Employers who carry workers' compensation insurance pay regular premiums that reflect the value of this benefit; those that self-insure only pay when an injury occurs but will recognize the expected value of compensation payments as part of the price that must be paid for an additional employee.


57. See, e.g., Mark A. Rothstein et al., Employment Law 539 (2d ed. 1999).
benefit, in terms of decreased accident costs, the measure will produce.\(^{58}\)

On its own, however, workers' compensation does not sufficiently internalize all costs of workplace risks. Theorists have identified at least four categories of "leaks" that lead to workplace injury costs not being fully borne by the employer.\(^{59}\) First, there are leaks resulting from imperfect insurance pricing. To the extent there is a divergence between true injury costs and insurance premiums, as there generally will be, the costs of workplace risks will not be completely internalized.\(^{60}\) Next, even if employers end up paying all direct injury costs, litigating and adjudicating workers' compensation claims in order to achieve cost-shifting is itself costly, and those costs are not generally borne by employers.\(^{61}\) Third, leaks may occur as a result of the vari-

\(^{58}\) See infra Figure A.


\(^{60}\) See id. at 142-55 (1992). Most employers subject to workers' compensation requirements carry some type of workers' compensation insurance. For those employers, internalization occurs through the insurance premiums they must pay. Internalization will be imperfect if the insurance premiums are not "actuarially fair," or, in other words, equal to the discounted expected value of the claim against the insurer (plus a premium for bearing the risk). There are a number of reasons insurance prices may not actually reflect costs. First, there are practical barriers. It is costly for insurance companies to determine with accuracy what the discounted expected value of an insured's annual claims will be. Some means of estimating this figure—such as looking at the average for the last five years, checking to see if changes in operations have occurred that would make the average unrepresentative, and adjusting the estimation to account for those changes—are more likely to produce accurate estimates than are others—such as just looking at last year's experience. With increasing accuracy, however, come higher transactions costs, and insurance firms thus will not always adopt the most accurate means of prognostication. To the extent that estimated costs, and thus insurance prices, diverge from actual costs, there may be externalization. See id. at 143-49, 153-55.

Legal and regulatory constraints may also lead to a divergence between costs and prices, and thus to externalization. For example, private insurance bans, adopted by a number of states, eliminate the competition among insurers that pushes prices in line with costs. Id. at 151. Similarly, minimum capital requirements present a barrier to entry and therefore restrict competition, eliminating some of the pressure that drives price toward cost in each line of insurance. Id. In addition, excess profits statutes, which often define the capped rate of return as the return on capital, motivate insurers to use capital-intensive methods of operation. To the extent these are not cost-minimizing, the overall operating costs of regulated firms will be higher. These costs, then, will be passed on to insured employers in the form of higher prices and may thus widen that portion of the wedge between price and cost that is attributable to administrative costs. Id. at 152.

\(^{61}\) The costliness of litigation leads to three types of externalization. First, some claims are dropped, never filed, or settled for less than full compensation because the anticipated award is less than the anticipated litigation cost. In such cases,
ous funds that numerous states have established to supplement workers' compensation awards to particular classes of injured victims. These funds may lead to externalization for two reasons: First, although the special funds are funded by employers whose employees are potential beneficiaries, the employers' required payments will not generally match the discounted expected value that will be paid to their employees (so that, as with imperfect insurance pricing, there is a divergence between the costs employers impose and the price they must pay). Moreover, all administrative costs attached to the distribution of benefits from special funds are carried by the state, not by the employers imposing the risks. Finally, externalization may occur because of the systematic undercompensation and undervaluation of injuries. Undercompensation occurs because state workers' compensation laws generally impose damages caps and deem some genuine losses, such as pain and suffering, non-compensable. Moreover, compensation awards may undervalue real losses because of inflation and offsets that permit the employer to deduct from awards any amounts the injured employee receives from other specified sources, such as the Social Security Disability Insurance Fund.

the employee's loss is not fully shifted to the employer. Second, the litigation costs of plaintiffs who pursue challenged claims are not generally shifted to the employer. When the claims are valid, such costs should be considered part of the loss resulting from the original injury. Third, the administrative costs of litigating claims—i.e., the incremental costs of running the administrative machinery—are externalized to the public. See id. at 162. Of course, requiring losing defendants to pay all litigation and court costs could eliminate these last two sources of externalization.

For example, such funds may: (1) provide for expenses associated with extended hospital care, (2) support rehabilitation expenses, (3) provide cost-of-living adjustments to permanently disabled workers, (4) provide continuing benefits to workers when an insurer (or a self-insuring employer) fails financially and can no longer provide support, and (5) pay benefits to workers injured while employed in high risk industries. See id. at 166 (citing Lloyd W. Larson & John F. Burton, Jr., Special Funds in Workers' Compensation, in WORKERS' COMPENSATION BENEFITS: ADEQUACY, EQUITY, AND EFFICIENCY 117, 121-22 (John D. Worrall & David Appel, eds. 1985)).

See Hylton & Laymon, supra note 59, at 167 (“[T]here is no guarantee that employers responsible for workers' injuries are actually being required to contribute to the state funds.”).

See id. at 169 (“[S]ince the administrative costs of dispensing these benefits [from special funds] often are carried by the state, these expenses—ordinarily shouldered by insurers and passed on to employers through service fees—are wholly externalized.”).

See id. at 170-76.

Most states do not offer automatic cost-of-living adjustments to disability benefits. See Larson & Burton, supra note 62, at 135-45. Thus, when inflation lowers the real value of a disability payment, the employer is able to get by with paying less than a compensatory amount. See Hylton & Laymon, supra note 59, at 176-78.

See id. at 178-79.
Given these sources of externalization in the workers' compensation system, employers do not fully pay \textit{ex post} for the risks they permit, and one might therefore conclude that there is a negative externality rationale for workplace safety regulation. But economic theory and empirical evidence suggest that the other adjustable element of worker price, worker wages, works in tandem with workers' compensation to ensure that leaks in the injury compensation scheme do not create technological negative externalities that necessitate substantive safety standards.

\hspace{1cm} \textit{b. Compensating Risk Differentials: Ex Ante Compensation for Risk-Bearing}

While workers' compensation requires employers to pay after an injury occurs for the risks resulting from their decisions regarding which safety precautions to adopt, employers must also pay up front for such risks. Consistent with economists' well-established theory of "compensating differentials," an extensive, robust body of empirical economic evidence indicates that employers must pay risk premiums for exposing their employees to perceived risks. Moreover, the data

\begin{itemize}
  \item The theory of compensating differentials has persisted for literally centuries. Stated in perhaps its earliest (and undoubtedly most famous) version, the theory asserts that "[t]he whole of the advantages and disadvantages of the different employments of labor and stock must, in the same neighborhood, be either perfectly equal or tending to equality . . . . The wages of labor vary with the ease or hardship, the honorableness or dishonorableness of employment." \textsc{Adam Smith}, \textit{An Inquiry into the Nature and Causes of the Wealth of Nations} 99-100 (1776, reprinted 1937). Stated more simply, by its perhaps most vigorous contemporary adherent, the theory maintains that:

  If a worker takes a job he knows is risky, there must be some other aspect to compensate for the risk. If the other nonmonetary aspects of the job are equivalent to those for less risky jobs, this compensation will take the form of a higher wage rate. The need to pay higher wages in turn provides a financial incentive for the employer to reduce the risk.

  \textsc{Viscusi}, \textit{Risk by Choice}, supra note 20, at 37.

\end{itemize}
show that even when a workers' compensation regime exists to provide ex post compensation, employers still must fill in the gaps (e.g., pain and suffering damages) left by workers' compensation by providing some ex ante risk compensation in the form of risk premiums.

Those premiums tend to diminish as the level of workers' compensation benefits increases and rise as workers' compensation falls.

The data thus suggest that workers' compensation and risk premiums complement one another: they work together in tandem to provide injury compensation, so that where workers' compensation benefits are relatively high, risk premiums will be relatively low, and

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70. Workers' compensation statutes generally render pain and suffering damages non-compensable. See Arthur Larson, Larson's Workers' Compensation Law § 1.03[4], 1-10 (2000).

71. See Moore & Viscusi, Compensation Mechanisms, supra note 69, at 46-50 (estimating the magnitude of compensating differentials that are paid in addition to the income replacement provided by workers' compensation and concluding that those differentials indicate that workers implicitly value the nonmonetary health losses associated with workplace injuries at between $18,500 and $28,000 per lost workday injury).

72. See id. at 23 (noting that the "two principal results" of wage equation studies are that: (1) "increases in workers' compensation benefits decrease wages in a manner consistent with the compensating differential model," and (2) "wage-risk differentials would be much higher in the absence of workers' compensation, as workers would demand more ex ante compensation for exposure to risk in the absence of ex post guarantees"); id. at 51 ("Higher levels of workers' compensation lead to a reduction in the base wage level that workers are paid."); id. at 54 (noting regression results that "indicate a substantial tradeoff between the base wage rate and workers' compensation benefits").
Leaks in the workers' compensation regime, then, do not permit employers to externalize the costs of workplace risks, for when employees are aware of workplace risks and know that workers' compensation will undercompensate for injuries that do occur, they will demand additional salary or other benefits, thereby forcing employers to pay for the risks workers' compensation does not cover. The upshot is that employers cannot get out of paying for whatever level of risk they permit in their workplaces. They pay either after injuries occur (through workers' compensation) or up front (in the form of higher wages).

Hence, it does not appear that negative externalities are to blame for employers' failure to take all cost-effective safety precautions to protect employees.

73. As Moore and Viscusi explain:

Wages and workers' compensation serve as complementary compensation mechanisms, with wages providing ex ante risk compensation and workers' compensation providing ex post earnings replacement. Each of these wage components reduces worker quitting, and workers accept a lower wage in response to higher workers' compensation benefits. This result reflects the tradeoff workers are willing to make between different forms of risk compensation.

MOORE & VISCUSI, COMPENSATION MECHANISMS, supra note 69, at 109-10.

74. Of course, the fact that employers must supplement workers' compensation with risk premiums that inversely correlate with workers' compensation benefit levels does not prove that the magnitude of risk premiums is sufficient to cover all the leaks in workers' compensation. In other words, just because there are supplemental risk premiums does not mean that they are big enough to ensure full internalization. Empirical evidence, however, does indicate that the risk premiums paid in addition to workers' compensation's income replacement are fairly large. Professors Moore and Viscusi documented supplemental risk premiums (i.e., premiums paid in addition to workers' compensation benefits) large enough to imply that workers were receiving compensation of $18,500 to $28,000 per lost workday injury for the non-monetary (i.e., uncovered) aspects of the injury. See MOORE & VISCUSI, COMPENSATION MECHANISMS, supra note 69, at 49. In fact, the compensation for the non-monetary aspects of injury loss, which came in the form of ex ante risk premiums, exceeded the compensation for income loss, which came in the form of workers' compensation. See id. ("The findings here imply that at least half of current implicit valuations of injuries represent implicit values of the nonmonetary aspects of injuries."). Given the magnitude of risk premiums, one might safely assume that the premiums, taken together with the risk compensation provided by workers' compensation, provide full or nearly full compensation for workplace safety risks so that employers are not creating a significant technological externality by permitting such risks.

75. Indeed, employers pay a lot for exposing employees to risk: In 1993, firms paid $55 million for workers' compensation and an estimated $200 billion for compensating wage differentials to workers for accepting job hazards. See Kneiser & Leeth, supra note 19, at 55. By contrast, OSHA and corresponding state agencies assessed fines of only $160 million that year. Id. Thus, the incentive effects of workers' compensation and compensating differentials dwarf those created by OSHA.
2. Systematically Inadequate Information

Negative externalities, however, do not constitute the only form of market failure that might justify government regulation of workplace safety.\(^{76}\) Even if employers ultimately pay for perceived workplace risks through workers' compensation and employee-demanded risk premiums, they will still fail to implement all cost-effective safety precautions if either: (1) employees are systematically uninformed of workplace safety risks and thus fail to demand adequate compensating differentials, or (2) employers are, for some reason, systematically uninformed of available cost-effective safety precautions. As the following paragraphs demonstrate, systematic underproduction of risk and precaution information may prevent employers from taking all cost-effective safety precautions and may therefore justify some form of government regulation of workplace safety.

a. Employees' Informational Deficiency

In order for employees to demand adequate risk premiums so that employers end up bearing the full costs of the risks they impose and thus have an incentive to take all cost-effective safety precautions, a sufficient number of employees must be aware of the relative risk a job presents.\(^{77}\) On their own, however, employees are unlikely to generate the socially optimal amount of information about workplace safety risks. Moreover, neither employers nor third-parties are likely to provide employees with an optimal amount of such information. Thus, absent government intervention, employees will likely remain systematically underinformed of workplace safety risks and will therefore fail to demand the risk premiums that motivate efficient precaution-taking on the part of employers.

(1) Employee Efforts Insufficient

Information about workplace risks undoubtedly benefits prospective employees, and one would therefore expect prospective employees

\(^{76}\) Welfare economics traditionally recognizes four other general sources of market failure: (1) positive externalities, (2) information asymmetry between producer and consumer, (3) the good to be produced is a public good, and (4) producer monopoly. See BAINBRIDGE, supra note 5, at 424.

\(^{77}\) As demonstrated below, see infra notes 125 to 130, 209 to 211, and accompanying text, not every employee must be aware of job risks for the market wage to reflect those risks. As long as a sufficient number of mobile employees know of the risks and employers are unable to engage in wage discrimination, the market wage will include an accurate risk premium. See Henry N. Butler & Keith W. Chauvin, Economic Analysis of Labor Markets: A Framework for Analyzing Employment Law Issues, 88 KAN. J. L. & PUB. POL'Y 1 (1999) (explaining that "the market can work even if most workers are neither highly mobile nor fully informed of all risks" because market wages are determined by the demands of marginal employees).
to invest in discovering the risks presented by the various jobs they are considering. In most cases, however, employee production of information regarding the relative risk of a workplace will be impracticable, for prospective employees are not privy to, and cannot easily obtain, the accident and injury data necessary to determine the relative safety risks presented at a workplace.\footnote{Cf. Susan Rose-Ackerman, Progressive Law and Economics—And the New Administrative Law, 98 YALE L. J. 341, 355 (1988) ("Knowing that they must compensate workers to take risks, employers would like to keep job hazards secret.").} By contrast, such data generally are available to employers. Accordingly, there is an information asymmetry between producers and consumers: Job "producers" (employers) are privy to important information that is inaccessible to job "consumers" (employees).\footnote{See Michael Abramowicz, Market-Based Administrative Enforcement, 15 YALE J. REG. 197, 259 n.184 (1998) (noting information asymmetry). Information asymmetry between producers and consumers is a traditionally recognized source of market failure. See supra note 76.} Absent some kind of mandatory disclosure regime, employees are unlikely to be able to generate significant information about the relative safety risks of jobs.\footnote{For reasons discussed below, see infra notes 85 to 89 and accompanying text, employers are unlikely to voluntarily disclose information about the safety risks at their workplaces.}

Even if employees are able to gather the data necessary to produce information about the relative risks of a workplace, they are unlikely to produce a socially optimal amount of such information because the information exhibits positive externalities—\textit{i.e.}, benefits not captured by the producer.\footnote{See Cass R. Sunstein, Risk and Reason 255 (2002); Cass R. Sunstein, Television and the Public Interest, 88 CAL. L. REV. 499, 534 (2000) (discussing the positive externalities associated with information and its consequent tendency to be underproduced privately). Note that positive externalities are another of the traditionally recognized forms of market failure. See supra note 76.} Unable to appropriate the full benefits of their efforts to produce information about workplace safety risks, individual employees will produce such information only if their private benefits from doing so exceed the costs of production. In many cases, producing relative risk information would be efficient from a societal standpoint (\textit{i.e.}, the total benefits of the information would exceed the costs of producing it), but, because many of the benefits are externalized, would not be in the interest of any individual employee.\footnote{See generally George Stigler, The Economics of Information, 69 J. POL. ECON. 213 (1961).} An example clarifies this point. Suppose that the cost of producing information about the relative riskiness of a job is $50 and that, armed with such information, a prospective employee could convince his employer to pay an additional risk premium that would be sufficient to cover the expected injury cost not covered by workers’ compen-
sation—say, $30. That $30 risk premium would equal the product of the present value of the non-compensable part of an injury (say, $3,000) times the likelihood of injury (1/100). If the employer had ten employees and wage discrimination was impracticable, she would have to pay an additional $300 ($30 x 10) because of the employee’s information-production efforts. Assume, then, that the employer could eliminate the risk, and could therefore forego the $300 in compensating differentials, by taking a precaution that would cost $150 to implement. She would do so, and society would be better off by $150. That is because the sum of precaution costs and expected injury costs prior to the employee’s information-production efforts ($0 + $300) would be $150 greater than the sum of precaution costs and expected injury costs after the employee’s information-production efforts ($150 + $0). Thus, the employee’s $50 investment in relative risk information would yield benefits of $150 and should be undertaken.

Left to his own devices, however, the employee would not produce the risk information. That is because his private benefits from the information would total only $30—$20 less than his cost of producing the information. Absent some way to claim for himself some of the societal benefits of his risk information, he would not undertake the efforts to produce the information, and the $150 cost-savings (really only $100, since the $50 cost of the employee’s effort must be subtracted) would never be realized.

Stated generally, employees will engage in production of risk information only when their expected individual benefits of doing so exceed the expected costs of producing the information, which they will bear in full. In many (probably most) cases, individual employees cannot expect to reap benefits worth the costs of producing risk information—costs that will tend to be high, since, as noted, safety data are not readily accessible to prospective employees. Figure B illustrates the decision calculus facing individual employees, and Figure C illustrates how the divergence between total and private marginal benefits, a result of the positive externalities associated with risk information, will lead to systematic employee underproduction of information regarding workplace safety risks (i.e., to point x instead of point y).

83. For the sake of simplicity, I am assuming that the employee’s expected individual benefits equal his actual individual benefits, $30. In deciding whether or not to make information-production efforts, he will, of course, weigh his expected benefits against his expected costs.

84. Note that even when circumstances are such that employees would produce relative risk information on their own (i.e., even when their private benefits exceed the costs of production), it is likely more efficient for employers to do so, as they are probably the cheaper producers of such information.
(2) Employer Underprovision of Risk Information

Employees, however, are not the only possible source of information about workplace safety risks. One might expect employers attempting to "sell" their jobs to provide comparative risk information, much the way sellers of consumer products provide shoppers with comparative information about the goods they are selling. Indeed, information about the characteristics of consumer products, like information about workplace risks, exhibits positive externalities, and consumers will therefore engage in a sub-optimal amount of information-creation with respect to the relative quality of various brands and types of consumer goods. Yet, no one could credibly claim that there is a substantial dearth of information about the characteristics of consumer goods. That is because market forces motivate vendors—attempting to sell as many of their products as possible, and at the highest price possible—to provide comparative price and quality information to consumers through advertisements. Sellers of superior quality and/or less expensive goods can thus be counted on to laud their own products and point out the inferiority of their competitors' goods. Unlike consumers, producers and sellers of consumer goods are able to capture most of the benefits of their information-creation and dissemination efforts (through increased sales and/or higher prices), and they therefore assume primary responsibility for generating and distributing information about the quality of their, and their competitors', products.

So why wouldn't job-sellers (employers), like product-sellers, advertise their own safety records and compare them to those of their competitors? For employers with poor safety records, the answer is obvious: they have nothing good to say, so they say nothing at all. But what about employers with exemplary safety records? Why don't they advertise their own achievements and compare them to their competitors' less stellar safety records, thereby providing the labor market with all sorts of information about the relative safety of competing employers?

The answer is that there is a significant difference between jobs and consumer products that makes it unlikely for "sellers" of the former to advertise as extensively as sellers of the latter. Manufacturers

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85. Producers and sellers who advertise reap a higher proportion of the benefits of their information creation and dissemination efforts than do consumers who produce the information themselves. Accordingly, there is significantly less divergence between the total and private marginal benefits of their efforts, and they, unlike consumers, will not tend systematically to under-produce information about the quality of their (and their less worthy competitors') products.

86. Cf. Keith N. Hylton, Labor and the Supreme Court: Review of the 1996-1997 Term, 13 Lab. Lawyer 263, 271 (1997) (hypothesizing that employers that have reduced risks of injuries will "provide information [about their reduced risks] in order to gain a competitive advantage in the labor market").
and sellers of consumer products can easily engage in comparative advertising, because the relevant characteristics of their competitors' products—e.g., price and relative quality—are readily observable. A manufacturer can almost always obtain her competitor's product, examine it, find some way her own product is superior, and publicize that fact. By contrast, employers (job-sellers) generally cannot observe their competitors' workplaces and, in the absence of mandatory disclosure rules, are not privy to competitors' health and safety data. Hence, it is very difficult for employers to state with confidence, "We are safer than..."

Of course, even if an employer could not engage in comparative advertising, she could still laud her own safety record. Instead of stating, "We're safer than...", she could simply announce her own safety statistics. An employer engaging in such "declarative" (as opposed to comparative) advertising, however, risks competitors then being able to say that they have better safety records than she. It is unlikely that an employer would be the first mover in publicizing her safety record unless she knew for certain that she possessed the best record among all competitors. But even in that situation, the employer might not want to be the first mover, for if the other employers just remained silent about safety, her announcement of her workplace accident rate would simply draw attention to the fact that her workplace is somewhat risky. Hence, employers, who cannot engage in comparative advertising, are also unlikely to engage in declarative advertising of their own safety records. Moreover, employers in concentrated industries may tacitly agree not to advertise workplace safety rates in order to avoid drawing attention to the safety risks of the industry as a whole, thereby driving away potential employees. Accordingly, suppliers of jobs (employers), unlike suppliers of consumer goods, cannot

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87. Cf. Howard A. Latin, Environmental Deregulation and Consumer Decisionmaking Under Uncertainty, 6 Harv. Envtl. L. J. 187, 229 (1982) (discussing how environmental assessments of products, unlike comparisons of product quality and price, are difficult because data on pollution associated with the manufacture of products and the resources consumed in manufacturing, unlike data on price and quality, are not readily available to competitors or other evaluators).

88. In the 1930s, automobile manufacturers advertised the comparative safety of their autos. Subsequently, this advertising disappeared because the auto makers believed that calling attention to safety problems could hurt the industry more than it benefited individual firms. See Breyer, supra note 1, at 28.

89. See id. (noting that individual airlines do not advertise their safety records in order to avoid drawing any attention at all to the risks of air travel); see also Cass R. Sunstein, Informing America: Risk, Disclosure, and the First Amendment, 20 Fla. St. U. L. Rev. 653, 656 (1993) (noting, with respect to advertising of comparative product risks, that "competition over the extent of danger may decrease total purchases of the product, rather than help any manufacturer to obtain greater sales," and that this phenomenon has sometimes played a role in discouraging competition over safety among manufacturers of tobacco products).
be counted on to provide comparative information that “buyers” (pro-
spective employees) will not produce on their own.

(3) Inadequate Third Party Provision

But employees and employers are not the only possible private
tools of information about workplace safety risks. In the market for
consumer goods, third-party ratings agencies are fairly common.
Those ratings agencies—such as the Consumer Union, which pub-
lishes Consumer Reports—provide information to interested consum-
ers in exchange for some sort of payment.\textsuperscript{90} While conflict of interest
concerns prevent ratings agencies from being funded by advertisers,\textsuperscript{91}
individuals in the market for consumer goods will frequently pay
enough for publications stating the agencies’ findings to support the
agencies’ information-production efforts. Consumer Reports, for ex-
ample, is subscriber-supported and provides relative price and quality
information about a host of consumer goods.\textsuperscript{92} Of course, the informa-
tion created by ratings agencies still exhibits positive externalities
that cannot be fully captured by the agencies,\textsuperscript{93} and it is thus unlikely
that such agencies would ever generate a socially optimal amount of
information. But they undoubtedly provide a substantial amount of
information about consumer goods, and one might thus question why
similar agencies could not provide information about the risks of vari-
ous jobs and workplaces, obviating the need for a regulatory fix.

There are at least two reasons third-party information providers,
common in the consumer goods arena, will likely never provide a sig-
nificant quantum of information about workplace safety risks. The
first is essentially the same as the primary reason employers them-
selves do not advertise their relative safety:\textsuperscript{94} workplaces, unlike con-
sumer goods, cannot be easily examined and evaluated by third
parties unless the government requires employers to provide access to
the third-party monitors.\textsuperscript{95} The second reason relates to how third-

\textsuperscript{90} Cf. Cass R. Sunstein, Television and the Public Interest, 88 CAL. L. REV. 499, 534
& n.159 (2000) (referring to efforts of Consumer Reports as an effort to “give infor-
mation more ‘private good’ characteristics”).

\textsuperscript{91} See Eugene Volokh, Cheap Speech and What It Will Do, 104 YALE L. J. 1805, 1830
& n.80 (1995) (noting that ratings publications often do not accept advertise-
ments in order to maintain independence).

\textsuperscript{92} For example, a recent issue of Consumer Reports included relative quality and
price ratings of air conditioners, vacuum cleaners, soy, bicycles, bike helmets, and

\textsuperscript{93} See Latin, supra note 87, at 231 (“Many people benefit from Consumer Reports
without paying for it; they read someone else’s copy or learn of product evalua-
tions through word of mouth.”).

\textsuperscript{94} See supra note 87 and accompanying text.

\textsuperscript{95} Cf. Latin, supra note 87, 6 HARV. ENVTL. L. J. at 231 (discussing how environ-
mental assessments of products, unlike comparisons of product quality and price,
are difficult because data on pollution associated with the manufacture of prod-
party information-creation efforts are funded. As noted, the consumers of the information (a sufficient proportion of them, at least) must purchase the information from the providers. *Consumer Reports* is able to survive because it is a general interest publication that provides information about purchasing decisions consumers continually make. It therefore remains of sustained interest to consumers, who are willing to keep paying for it because forthcoming issues may provide useful, cost-saving information. By contrast, an “Employment Report” that evaluated the characteristics of various workplaces would not be of general sustained interest to consumers because relatively few individuals are job-searching at a given moment, and even fewer make continual employment decisions that would justify subscribing to a workplace-rating periodical. In other words, consumer demand for workplace information is not sufficient to support a third-party’s provision of that information. Hence, neither employees, employers, nor third-party ratings agencies are likely to produce sufficient information about workplace risks. And absent such information, employees are unlikely to demand risk premiums sufficient to motivate efficient precaution-taking by employers.

b. Employers’ Informational Deficiency

In addition to employees’ informational deficiency with respect to workplace safety risks, which other theorists have noted,96 a second systematic informational deficiency may contribute to sub-optimal precaution-taking in the workplace: Employers may possess inadequate information about cost-effective safety precautions they might adopt, and the positive externalities associated with information regarding available precautions implies that, absent government intervention or some private means of appropriating the external benefits to the information-producer, such information will be systematically under-produced. Thus, even if motivated to adopt all cost-effective precautions, employers may fail to do so because they are ignorant of such precautions.

Just as employees benefit from information regarding workplace risks, employers, who ultimately pay for such risks, benefit from infor-

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mation about precautions that could cost-effectively reduce the risks. Yet, individual employers will not produce precaution information when their expected private benefits from the information are less than the expected costs of production—even if the total benefits of the information dwarf the costs of producing it. For example, suppose an employer could, for $1,000, develop a precaution that would save employers in her position an average of $700 in risk premiums (which would reflect the discounted present value of expected injury costs not covered by workers' compensation). If there were 100 similarly situated employers, the employer's production efforts would yield net benefits of $69,000.97 The employer, however, would not produce the information because her cost of doing so ($1,000) would exceed her expected individual benefit ($700).98 Where individual employers face this sort of decision calculus (represented graphically by Figure B, supra) they will not invest in precaution-development, even though their development efforts would, from a societal standpoint, be cost-justified. Moreover, the "public good" nature of precaution information (i.e., the information can be consumed without being depleted, and there is no way to prevent it from being shared) implies that employers cannot fully capture the competitive advantage of a safer workplace.99 Thus, precaution information, like risk information, may be underproduced in a free market (Figure C). There may therefore be a role for the government in remediying employers' systematic informational deficiency.100

97. The discounted present value of noncompensable injury costs would fall by $70,000 ($700 per employer x 100 employers), at a cost of $1,000. This Article assumes, somewhat unrealistically, that dissemination of the information to other employees is costless.

98. For the sake of simplicity, this Article assumes that expected benefits equal actual benefits.

99. Information about potential precautions, like workplace risk information, is susceptible to free-riding. For example, a firm that adopts an assembly line configuration that cost-effectively reduces ergonomic risks will not be able to keep competitors from adopting the same configuration. Even if competitors are not able to visit workplaces and obtain precaution information by direct observation, they may learn about safety precautions when employees change jobs and share information about practices in place at their former workplaces. Moreover, even if employees do not switch jobs, they may talk with employees of other firms and share their employers' precaution methods. Accordingly, employers will not be able to capture the full benefits, in the form of the competitive advantage that would result from a unilateral decrease in injury rates, of efforts to research and develop new safety measures, and they will therefore devote a sub-optimal level of effort to discovering new safety precautions.

100. This argument is really a variation of the standard economic argument for public funding of research that provides public benefits (i.e., is not privately appropria-
There is a certain class of precaution information, however, that will not be underproduced by private employers. For some risks, the costs of discovering a precaution will be low relative to the expected benefits the precaution would provide its developer. For example, development of the precaution might cost the employer only $500 and offer her an expected individual benefit of $1,000. With these sorts of risks and precautions, employers will have adequate incentives to develop precaution information, and there is therefore no need for the government, which may be poorly situated to develop workplace-specific precautions, to be involved in producing such information. Obvious workplace safety risks, such as unguarded blades or bright flashes for which eye shades should be worn, would fall into this category. For other risks, the cost of precaution research will be quite high relative to an individual employers' expected cost-savings attributable to the precaution. Ergonomic risks likely fall into that category. For such risks, individual employers—who can reap only their individual benefits from any precaution information discovered—will not engage in extensive research to develop precautions. Thus, the case for government involvement in precaution research and development is more compelling for non-obvious risks that require precautions that are relatively difficult to develop.

C. How to Select a Regulatory Cure: Refining the "Least Restrictive Alternative" Criterion

Once policymakers have identified the symptom potentially requiring a regulatory cure (sub-optimal precaution-taking by employers) and the culprit market failure (systematically inadequate risk and precaution information), they are ready to select specific policy solu-

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101. See infra notes 169-174 and accompanying text (discussing comparative advantage of employers in developing cost-effective precautions, given the need for time- and space-specific information to which centralized regulators are not privy).

102. Of course, it may be more efficient for the government to take the lead in developing even those safety precautions that employers would develop on their own. For example, if the expected costs of developing a precaution are $500 and the expected individual benefits are $700, the precaution will be developed by individual employers, but at a cost of $500 per employer. If it were possible for the government to develop the precaution information once and disseminate it to employers, substantial cost-savings could likely be achieved. See infra text accompanying notes 240-241. For present purposes, however, the important point to grasp is that some cost-effective precautions will be developed privately, so it is not necessary for the government to produce such information.
tions. As noted, efficiency-minded regulatory theorists have suggested that regulators should adopt the “least restrictive alternative” when regulating to correct a market failure. But sometimes the regulatory option that is literally least restrictive will not be socially optimal, because more restrictive regulatory alternatives, though more costly to implement, will provide higher net benefits. Similarly, the “most effective alternative” is a flawed regulatory criterion because the regulatory alternative that is most effective at eliminating market failure will not be most desirable if it costs significantly more than slightly less effective alternatives. From an efficiency standpoint, then, the focus should not be on how restrictive or effective a regulatory option is, but instead on its total net benefits—i.e., how much wealth it creates when its total costs and benefits are taken into account. Sometimes, the optimal regulatory option will be neither the least restrictive nor the most effective alternative.

Regulatory theorists’ call for adoption of the least restrictive alternative probably stems from the fact that the least restrictive alternative criterion is a fairly good proxy for the highest net benefits criterion. That is because the costs of regulatory approaches generally increase as the approaches become more restrictive, so that, ceteris paribus, less restrictive regulatory alternatives will provide higher net benefits. Costs tend to increase with restrictiveness because more restrictive regulations have higher implementation costs and prohibit more wealth-creating private transactions. For example, a regula-


104. Suppose, for example, that simply providing information about a particular workplace risk and available precautions would cost $5 million and would result in precaution-taking that would save $10 million in injury costs, for a net benefit of $5 million. Suppose further that the costs associated with a more restrictive approach mandating substantive safety standards totaled $10 million, and the cost savings in terms of decreased workplace injuries totaled $20 million. The net benefits of this latter regulatory approach would be $10 million, and the approach would be more desirable than the less restrictive, information-provision approach.

105. For example, suppose that the total social cost of a market failure is $40 million and that one regulation—a very restrictive rule—would completely eliminate the market failure (and costs associated therewith) for $30 million. The regulation would create net benefits of $10 million and would thus be cost-justified. It would not be optimal, however, if there were a regulatory alternative that could provide higher net benefits. For example, if a less restrictive regulatory option would eliminate half the cost of the market failure (i.e., reduce it to $20 million) at a cost of $5 million, then that regulatory option, with its $15 million in net benefits, would be preferable, despite the fact that it is less effective.

106. An example may clarify how costs increase with a move from less to more restrictive regulatory alternatives. Suppose an employer wanted to hire an employee to
tion requiring risky goods to be sold with hazard warnings still permits win-win transactions in which risk-preferring consumers purchase such goods from sellers (creating wealth for both buyers and sellers), whereas a more restrictive regulation banning the sale of all such goods prohibits such trades and destroys the wealth created thereby.  

Moreover, rights-based concerns argue in favor of less restrictive alternatives, for such approaches preserve a greater degree of individual autonomy. It thus does make sense to focus on the restrictiveness of alternative regulatory regimes. That said, policymak-

perform task x, which poses risks that are not immediately obvious and that could be reduced by 25% if the employer adopted a relatively unintrusive precaution (p1) or by 50% if the employer adopted a more intrusive precaution (p2). In such a situation, the employer would have a number of options. He could choose to:

(1) hire the employee to do x, without taking any precaution or providing the employee with any risk information;
(2) hire the employee to do x, without taking any precaution but providing the employee with information about the risks of doing x;
(3) hire the employee to do x, but take precaution p1;
(4) hire the employee to do x, but take precaution p2; or
(5) not hire the employee to do x.

Workplace safety regulations designed to reduce the risks of x could preclude any number of these choices. The least intrusive regulation would be a mandatory disclosure rule, which would preclude option (1) by requiring that the employer inform the employee of the risks of x, thus ensuring that the employee would demand an adequate risk premium and thereby motivate the employer to take whatever precautions are cost-effective. A “relaxed” substantive safety standard might require the employer to adopt at least precaution p1 (the less intrusive safety precaution), thus precluding options (1) and (2). A more stringent safety standard might require the employer to implement at least precaution p2, thus precluding options (1) – (3). Finally, a regulation may simply prohibit x altogether. Such a ban would eliminate options (1) – (4).

As the regulations become more restrictive (i.e., as they ban more options), costs increase because mutually beneficial transactions are precluded. For example, when the market failure to be regulated is informational inadequacy, every regulation more restrictive than mandatory disclosure creates costs by thwarting some wealth-creating transactions. This is because if an employer and an employee, informed of risks, would still freely choose to enter a transaction in which the employee agreed to do the job (i.e., to accept the risk) in exchange for some sum of money, that transaction must be mutually beneficial to the parties and thus wealth-creating. If a regulation bans the transaction, the regulation destroys wealth. Because individuals are heterogeneous in their tastes for risk, see W. Kip Viscusi, Risk Equity, 29 J. Legal Stud. 843, 847-48 (2000) (discussing sources of risk heterogeneity), there is great potential for wealth creation through transactions in which less risk averse employees agree to accept risk in exchange for compensation amounts that are less than the cost of reducing the risk. Forced risk reduction thwarts these transactions. See id.

108. See Cass R. Sunstein, supra note 11, 20 Fla. St. L. Rev. at 659 (noting that classic command-and-control regulation should be an option of last resort because “governmentally prescribed outcomes unnecessarily diminish the role of individual decisions and choices in forming individual lives”).

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ers' primary focus should be on the balance of costs and benefits of various regulatory approaches; absent significant distributional inequities (which are themselves costs) policymakers should select the approach that creates the highest net benefits.

III. EXPLORING THE RANGE OF REGULATORY SOLUTIONS

Having defined the objectives of workplace safety regulation and refined the criteria for selecting among policy options, regulators should proceed to the second step of Professor Breyer's "simple axiom" for avoiding regulatory mismatch: "examine the alternative methods of obtaining the objectives." 109 One endpoint on the range of "alternative methods" is the "pure libertarian" approach advocated by the OSHA abolitionists.110 Under that approach, the government would do nothing to regulate precaution-taking in the workplace and would instead rely exclusively on market processes (compensating differentials) and the tort system (workers' compensation) to generate optimal precaution-taking. Pure libertarianism would be optimal only if, at every level, the marginal cost of government efforts to correct the informational inadequacies leading to sub-optimal precaution-taking exceeded the marginal benefit of those efforts.111 For an illustration, see Figure D.

At the opposite end of the regulatory spectrum lies "pure paternalism"—the command-and-control status quo defended by the OSHA apologists.112 Under that approach, the government responds to the problem of employers' failing to adopt all cost-effective safety precautions by determining what those precautionary measures are and forcing employers (via threat of sanctions) to adopt them. The approach is called paternalistic because the government acts as a parent, telling both employees and employers what is good for them. It is "pure" pa-

109. Recall Professor Breyer's "simple axiom for creating and implementing any [regulatory] program: determine the objectives, examine the alternative methods of obtaining the objectives, and choose the best method for doing so." BREYER, supra note 1, at 5.

110. See, e.g., Kneiser & Leeth, supra note 19.

111. For an example in which these conditions appear to hold, consider the market failure associated with home gardening. Without doubt, a market failure exists with respect to individual homeowners' efforts to maintain and beautify their yards: Homeowners are unable to capture all the marginal benefits of their yard-improvement efforts, and neighbors and passersby therefore share the benefits of a beautifully maintained yard without contributing anything to its maintenance. Hence, private homeowners will engage in a sub-optimal amount of yard maintenance. Policymakers, however, generally have not made efforts to remedy this market failure, and the likely reason is that the costs of doing so would outweigh the loss occasioned by the market failure.

112. See, e.g., Shapiro, supra note 54, at 22; Shapiro & McGarity, supra note 96, at 729; McGarity & Shapiro, supra note 96, at 587; Shrader-Frechette, supra note 96, at 311.
ternalism (as opposed to "moderate" paternalism, which is discussed below) because the government's normative judgment amounts to more than just advice; employers and employees do not have freedom to contract around the regulatory commands.

Between the pure libertarian approach of the OSHA abolitionists and the pure paternalist approach of the OSHA apologists lie two middle-ground positions that focus on remediating the particular informational deficiencies at issue. The less restrictive, which might be called a "moderate libertarian" approach, acknowledges that some government fix is desirable in the workplace safety arena but maintains that that intervention should be limited to inducing private parties to provide information. More specifically, the government should motivate employers to disclose information about workplace risks so that employees will demand adequate risk premiums and thereby induce optimal precaution-taking on the part of employers. The government's role is quite limited: Regulators—who are not privy to employees' risk preferences, to employers' costs of risk abatement, or to the time- and space-specific information necessary to craft effective precautions in diverse workplaces—make no normative judgments about what bargain employees and employers should strike in light of the information. Thus, the government's role is in no way paternal. Most of the theorists who have recognized that information inadequacy is the culprit market failure leading to sub-optimal precaution-taking by employers have advocated some form of moderate libertarian, risk disclosure approach.113

The other middle-ground position, which might be called "moderate paternalism," includes the mandatory risk disclosure element of moderate libertarianism but goes further. Under a moderate paternalist approach, the government, in addition to requiring risk disclosure, goes about finding ways for employers to reduce workplace injuries and thereby helps employers and employees achieve the "right" level of precaution-taking in the workplace.114 In contrast to

113. See, e.g., Cass R. Sunstein, Television and the Public Interest, 88 CAL. L. REV. 499, 534 (2000); W. Kip Viscusi, Risk Equity, 29 J. LEGAL STUD. 843, 851-53 (2000) (advocating workplace safety regulation focused on providing hazard warnings so as to generate accurate compensating differentials and thereby to motivate optimal precaution-taking); Cass R. Sunstein, Free Markets and Social Justice 329-30 (1997); Sunstein, supra note 11, at 655-61 (presenting case for informational regulation aimed at disclosing risks); Wesley A. Magat & W. Kip Viscusi, Informational Approaches to Regulation 4-9 (1992); Viscusi, supra note 20, at 84-87.

114. Moderate paternalism includes risk disclosure as well as government involvement in precaution development, because the latter element will rarely be needed when the former is not needed. While there is a theoretical possibility that employees could be adequately informed of workplace risks but employers underinformed about available cost-effective precautions, so that the optimal regulatory approach would be to educate employers regarding available precautions
moderate libertarianism, moderate paternalism involves normative judgments by the government that certain precautions should be taken. In contrast to pure paternalism, however, such precautions are not mandatory. Hence, the approach is paternalistic, but moderately so.

The following subsections examine the two middle-ground informational approaches and compare them to the pure paternalist (command-and-control) status quo. The goal of this exploration is to help regulators avoid regulatory mismatch by determining under what conditions less restrictive alternatives to classic command-and-control regulation may maximize net benefits to society.

A. The Moderate Libertarian Approach: Mandatory Risk Disclosure

Unlike a pure libertarian approach that would abolish workplace safety regulation altogether,\(^{115}\) a moderate libertarian approach acknowledges that there is a market failure, which could be cost-effectively remedied, leading to sub-optimal precaution-taking by employers: Workers are systematically under-informed regarding the relative risks of jobs, and, given the positive externalities associated with workplace risk information and its consequent tendency to be under-produced by private actors in the free market, will likely remain under-informed absent some sort of government intervention.\(^{116}\) Therefore, moderate libertarianism asserts, the government should remedy this systematic informational deficiency by requiring those private parties for whom risk information is most accessible—employers—to disclose it to employees, who will then be equipped to demand

\({}^{115}\) See Kneiser & Leeth, supra note 19, at 46.

\({}^{116}\) See supra subsection II.B.2.a.
adequate risk premiums.\textsuperscript{117} Private employers will then be driven by the profit motive to develop and implement cost-effective safety precautions, which they are best-suited to develop, given their intimate knowledge of their workplaces. Thus, the goal of the moderate libertarian approach is merely to facilitate internalization of risks (and thereby to ensure an efficient level of precaution-taking) by getting risk information into the labor market so that the market wage rate will reflect the risks to which workers are exposed.\textsuperscript{118}

1. \textit{Structuring a Mandatory Disclosure Regime}

In crafting a moderate libertarian, mandatory disclosure regime, policymakers must address two key questions. First, how should the government ensure that risk information gets into the labor market? And second, what type of information must be disclosed?

\textbf{a. Getting Risk Information into the Market: The Need for Universal Disclosure}

Policymakers must first decide how extensive disclosure of risk information must be in order to ensure that the information gets into

\footnotesize{\textsuperscript{117} As noted above, see supra note 77, not every employee needs to demand a risk premium in order to motivate the employer to provide one. See also infra text accompanying notes 125-130 and 209-211. Where price discrimination (wage discrimination) is impossible or difficult, as will likely be the case with most jobs posing safety risks, the size of the risk premium (and, for that matter, the wage amount) will be determined according to the demands of the marginal employee—\textit{i.e.}, the last employee the employer needs to hire in order to be able to operate her business. See Butler & Chauvin, supra note 77, at 1; Sharon Rabin-Margalioth, \textit{Anti-discrimination, Accommodation, and Universal Mandates – Aren’t They All the Same?}, 24 BERKELEY J. EMP. & LAB. L. 111, 120 n.33 (2003) (noting that the valuation decisions of marginal employees, “those employees who are on the margin of participating in the labor market or withholding their labor at the going wage,” determine market wages). The remaining employees may free ride off the bargaining efforts of the marginal employee. Thus, the fact that comparative risk information would not matter to most employees does not imply that a moderate libertarian, mandatory disclosure regime will be unable to internalize workplace risks via increased risk premiums.

\textsuperscript{118} Empirical evidence shows that workers do respond to risk information the way the moderate libertarian approach assumes they will. In a 1984 study by W. Kip Viscusi and Charles O’Connor, workers told that they would soon be working with sodium bicarbonate, a safe chemical, reduced their assessment of workplace hazards by 50 per cent. Workers told that they would be working with either asbestos or TNT increased their assessments of workplace hazards by 200 per cent. While no workers required extra compensation to handle the sodium bicarbonate, workers demanded an extra $3,000 to $5,000 per year to handle the dangerous asbestos or TNT. No workers said that they would quit because they were going to have to handle sodium bicarbonate, but a majority of the workers said they would quit because they would be handling asbestos or TNT. See W. Kip Viscusi & Charles J. O’Connor, \textit{Adaptive Responses to Chemical Labeling: Are Workers Bayesian Decision Makers?}, 74 Am. Econ. Rev. 942 (1984).}
the labor market and influences "prices" for workers. Existing disclosure regimes differ on this issue. Some, such as the Emergency Planning and Community Right-to-Know Act ("EPCRA")119 and the periodic disclosure provisions of Securities Exchange Act,120 require only one centralized filing of information. Others, such as the Federal Trade Commission's ("FTC's") Appliance Labeling Rule121 and the Federal Truth-in-Lending Act,122 require more exhaustive disclosure—i.e., to each potential purchaser. Thus, regulators must decide whether to require employers to provide risk information to each actual and prospective employee (a "universal disclosure" regime), or merely to a single clearinghouse (a "centralized disclosure" regime). In the end, the practicalities of the job search process likely render a universal disclosure approach preferable.

Direct provision of information to each employee would, of course, result in a more exhaustive distribution of information, but universal disclosure would probably cost more than a rule requiring one centralized risk report (per reporting period).123 Moreover, to the extent the goal of a mandatory disclosure regime is efficiency124—i.e., to ensure that employers bear the full cost of job risks so that they have an incentive to take all cost-effective precautions to reduce such risks—the goal need not be to guarantee that each individual employee knows precisely what risks a job entails. The regulation need only ensure that such risk information is available to the market so that the price for workers (i.e., the wage rate) can adjust to reflect the relative riskiness of the job. Accordingly, centralized disclosure might be sufficient, for in a competitive labor market in which wage discrimination is impossible, as long as a sufficient proportion of employees know what the risks of a job are, the market wage will adjust to account for that information, and the uninformed employees will be able to free-ride off the information the informed employees have discovered.

123. The costs to employers would obviously be higher under a rule requiring employers to provide risk information to each employee than under a rule requiring only a one-time (per period) risk report to an information clearinghouse. Of course, such a universal disclosure rule would be less costly to employees, who would not have to access a centralized database to obtain workplace risk information. But, as many (or most) employees—the non-searchers, who free-ride off the efforts of searchers, see infra notes 125 to 128 and accompanying text—would never search a centralized database, the total cost savings to employees under the universal disclosure rule would not likely offset the higher costs to employers. Accordingly, the universal disclosure rule will likely impose higher total costs than a rule requiring centralized reporting.
124. Mandatory disclosure can be justified on both efficiency and rights-based grounds. See infra note 208 and accompanying text.
To see why this is so, consider the “search equilibrium” model that applies to markets for consumer goods. Professors Alan Schwartz and Louis L. Wilde posited this model to explain how the free-riding possibility protects uninformed consumers. Professors Schwartz and Wilde first noted that consumers differ in their shopping behavior: some gather a substantial amount of information (particularly comparative price and quality information) before purchasing a good, some amass no information, and some engage in moderate search. The searching consumers, Schwartz and Wilde contended, end up protecting those consumers who engage in only limited (or no) search, because it is generally too expensive for firms to distinguish among extensive, moderate, and non-searchers and to enter different sales contracts for each of those groups. Therefore, if there are enough searchers in the market for a consumer good, firms have incentives both to compete for the searchers' business and to offer the same terms to non-searchers. Accordingly, Schwartz and Wilde concluded, “[w]hen the preferences of searchers are positively correlated with the preferences of non-searchers, competition among firms for searchers should tend to protect all consumers.”

At first glance, there is reason to think this same free-riding phenomenon might operate in the job market, or at least in the market for jobs posing safety risks. In most such markets, the two key conditions—(1) that the job market is competitive so that employers have an incentive to vie for searchers as well as non-searchers, and (2) that employers are unable to engage in wage discrimination so that they will offer the same wages to non-searchers as searchers—appear to be met. To be sure, price discrimination (i.e., wage discrimination) is much easier when the commodity at issue is a job rather than a consumer good; unlike most over-the-counter sales contracts, most employment contracts do involve some measure of individual negotiating. But for the typical job for which workplace safety is a concern—one involving some sort of manual labor—contract terms are generally pretty standardized. It would be difficult for a factory owner to distinguish “searching” prospective employees from “non-searchers” and offer different wage rates to the two groups. Hence, to the extent the factory owner attempted to woo searching applicants by providing a compensating differential that adequately accounted for the riskiness of the job, non-searching applicants would be protected as well. They would be able to free-ride off the searchers' efforts because the em-

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126. Id. at 637.
127. Id. at 638.
128. Id.
ployer would not be able to discriminate against them in setting wage rates. Accordingly, the regulatory regime may not need to mandate provision of risk information to each prospective employee in order to ensure efficiency. Instead, the government might require merely that the employer provide risk information to a centralized clearinghouse, which searching employees (and their intermediaries) could easily access.\textsuperscript{129} As long as the information got to an adequate number of searching applicants, the wage offered all employees would be efficient in that it would reflect fair payment for the risks imposed and would thus provide the employer with an incentive to take all cost-effective precautions.

But therein lies the rub. For non-searchers to be able to free-ride off the efforts of searchers, there must be a sufficient number of searchers.\textsuperscript{130} If only a very small proportion of prospective employees make the effort to educate themselves concerning the risks of a workplace, the employer will not raise wages to attract those employees unless the supply of workers is extremely tight. In most cases, the employer, rationally assuming that each prospective employee is uneducated regarding the true workplace risks, will refuse to offer a risk premium reflective of the actual, but unknown, risks. The employer may fail to attract the prospective employees who have bothered to educate themselves, but as long as there are not too many of those employees (i.e., as long as there are enough non-searchers to meet the employer's demand for workers), the employer will not need to raise wages to reflect hidden risks.\textsuperscript{131} Hence, free-riding off searchers' efforts cannot occur unless there are enough searchers.

Without engaging in some sophisticated empirical research, it is impossible to say how many searchers would be required for free-riding to occur. But, given the relatively lower education and income levels of employees that accept jobs posing significant safety risks, one would assume that such employees would be relatively unlikely to expend the resources necessary to ferret out relative job risk information. It is therefore likely that there would not be enough searchers to render successful a regulation mandating only centralized disclosure of job risks. Accordingly, a centralized job risk disclosure regime


\textsuperscript{130} \textit{Schwartz \\ & Wilde, supra} note 125, at 638.

\textsuperscript{131} In other words, in order for non-searchers to be protected by the efforts of searchers, conditions of supply and demand in the labor market must be such that the employer must hire some searchers in order to operate at her desired level. If there is a glut of available workers, or if the proportion of searching employees is quite low, the employer may be able to avoid hiring any searchers.
would probably not succeed at generating adequate risk premiums, and, despite the universal disclosure regime's higher administrative costs, requiring employers to provide job risk information to each prospective employee is probably preferable.

b. Presenting the Risk Information: The Need for Presentation of Comparative Risks

The second issue regulators must address in structuring a mandatory disclosure policy is how the risk information should be presented. An extensive body of empirical evidence indicates that, for effective risk communication, presentation matters; individuals tend to respond differently to identical risk information that is presented in different ways. Thus, policy makers should seek to determine how job risk information should be presented so that prospective employees can digest and process it most effectively.

For efficiency purposes, the primary objective of a mandatory disclosure regime is to inform prospective employees of the comparative risks of jobs they are considering. No job, after all, is riskless, and the ultimate goal of mandatory disclosure is to ensure that employees, when negotiating wages, demand risk premiums that accurately correlate with the relative magnitude of safety risks their jobs impose. Hence, what employees really need to know in order for internalization to occur through compensating differentials is how the risks of the various jobs they are considering compare with one another.

This observation might initially suggest that the mandatory disclosure regime should require reporting of comparative risks. Other mandatory disclosure regimes concerned with ensuring that individuals learn of relative characteristics require that information be presented in comparative form. For example, the energy-efficiency labeling rules require presentation of comparative efficiency information, and the truth-in-lending laws require publication of comparative interest rates. But there are some disclosure regimes, equally concerned with informing individuals of comparative risk, that do not require information to be presented in comparative form.


Consider, for example, the securities laws. All securities pose some risk to investors, and the relevant information for investors is how the risks of various securities compare. The securities laws do not, however, require issuers to provide comparative information about the securities they are selling. Instead, they have to provide information about only their own securities. Perhaps the job risk disclosure regime should be modeled after the securities laws, requiring employers to disclose information about only their own risks, without reference to how those risks compare to those of competitors. Such a rule would be less costly to employers, who would not have to obtain data about their competitors' job risks.

But a rule requiring disclosure of information about only one's own risks is probably not the most cost-effective option when all the costs of information transfer are considered. If comparative risk information is really what prospective employees need in order for internalization of job risks to occur, and if employers do not present risk information in comparative form, then employees or some other intermediaries will have to collect the relevant information and perform the comparison; otherwise, the employers' provision of risk information will be pointless. The key question, then, is, "Who is the low-cost comparer?" If employees or their intermediaries can perform comparisons more cheaply than employers, then the mandatory disclosure regime should require only the provision of employer-specific information. If, however, employers are the low-cost comparers, then they should be required to disclose risk information in comparative form. Indeed, this observation that the low-cost comparer should do the comparing may explain the variation among other mandatory disclosure regimes. Securities laws require only issuer-specific information because there is a vast collection of intermediaries (i.e., securities analysts) who have a comparative advantage in comparing securities risks. By contrast, appliance manufacturers have a comparative advantage in comparing the energy efficiency of various appliances. Relative to manufacturers, consumers are poorly situated to perform the necessary comparisons, and the market will not support an industry of intermediaries (i.e., "appliance efficiency analysts") to put the information in comparative form. Hence, the law wisely requires manufacturers to perform the comparison task. Similarly, in the workplace safety arena, employers are in a better position than employees to conduct risk comparison, and there are not likely to be intermediaries who can perform the comparison task more cheaply.

136. See Bainbridge, supra note 5, at 118 (noting that “[b]rokerage houses and investment advisors typically publish a stock’s beta [i.e., a measure of the stock’s relative risk] as part of their investor advising services”).
Thus, employers, the low-cost risk comparers, should be required to provide comparative risk information.

c. What Might a Mandatory Disclosure Rule Look Like?

The FTC's Appliance Labeling Rule provides a model for how the government might require employers to provide employees with comparative risk information.\textsuperscript{137} Adopted in 1980, the Appliance Labeling Rule aims "to assist consumers in making purchasing decisions"\textsuperscript{138} by requiring manufacturers of covered products to attach labels stating (1) the estimated annual operating costs based on the amount of energy and/or water consumed, and (2) the range of operating costs for the particular type of product.\textsuperscript{139} Of course, in addition to helping consumers make purchase decisions, the rule encourages manufacturers to adopt energy efficient designs, for consumer knowledge that an appliance is relatively inefficient will, ceteris paribus, lower the price the manufacturer may charge for the product.\textsuperscript{140} Evidence indicates that the rule has been effective in motivating energy efficient designs.\textsuperscript{141}

In order to guard against "apples to oranges" comparisons, the rule standardizes how annual operating costs\textsuperscript{142} and ranges of operating costs\textsuperscript{143} are to be determined. Then, it requires that all covered manufacturers\textsuperscript{144} present the required information conspicuously and in a

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\textsuperscript{137} The FTC adopted the Appliance Labeling Rule pursuant to the Energy Policy and Conservation Act, Pub. L. 94-163, 89 Stat. 871 (Dec. 22, 1975), which authorizes the Commission to adopt labeling rules specifying the relative energy efficiency for certain electric goods and the relative water efficiency for particular goods that use water. See generally 42 U.S.C. §§ 6292(a)(specifying covered goods), 6294 (providing authority for labeling rule). The statute requires the Commission to mandate disclosure of the estimated operating cost of covered products, see 42 U.S.C. § 6294(c)(1)(A), and the range of estimated annual operating costs for such products. See id. at § 6294(c)(1)(B). It also directs the FTC to standardize the test procedures for determining annual operating cost of covered products, see id. at § 6294(c)(2)(C), and to provide prototype labels and directions for displaying them. See id. at § 6294(c)(2)(D).

\textsuperscript{138} See 42 U.S.C. § 6294(c)(3) (stating that the goal of providing consumer assistance should guide the Commission's determinations of how labels should be displayed).

\textsuperscript{139} See 16 C.F.R. § 305.11 (1999).


\textsuperscript{141} See 16 C.F.R. §§ 305.5; 305.9 (1999).

\textsuperscript{142} See id. at § 305.10 (1999).

\textsuperscript{143} The rule is quite exhaustive, covering refrigerators, freezers, dishwashers, water heaters, room air conditioners, clothes washers, furnaces, central air conditioners, heat pumps, fluorescent lamp ballasts, fluorescent lamps, incandescent lamps, showerheads, faucets, toilets, urinals, and pool heaters. See id. at § 305.3 (1999).
standard format, so that consumers may easily compare the efficiency of various brands. Figure E is a prototype label the FTC has provided manufacturers.

One can easily imagine an analogous regulatory scheme that would require employers to report the relative safety of their workplaces to prospective employees. Such a reporting requirement would not impose significant additional data collection requirements on employers, for OSHA already requires employers to keep a log of injuries and illnesses and to report such data to the agency, and the Bureau of Labor Statistics ("BLS") collects and processes these data and compiles industry-specific data that would enable comparisons similar to those made pursuant to the Appliance Labeling Rule. Indeed, BLS's own website explains how firms may calculate their injury/illness incidence rates, and once an employer had determined her firm's various incidence rates, she could easily compare those rates to readily available BLS data on the incidence rates for similarly-sized firms within her industry and sub-industry.

144. See id. at § 305.11(a)(1)-(4) (1999).
147. See Bureau of Labor Statistics, How to Compute Your Firm's Incidence Rate for Safety Management, at http://www.bls.gov/osheval.htm (last modified Dec. 19, 2003). First, the employer must count the number of OSHA recordable injuries and/or illnesses, which the employer must record on the Log and Summary of Occupational Injuries and Illnesses. Then the employer must determine the total number of employee hours worked at the firm. She may use payroll or other time records to determine this figure, or, if employees do not work by the hour, she may estimate the figure on the basis of scheduled hours or eight hours per employee per workday. Once she has ascertained the number of relevant injuries and illnesses and the number of employee hours worked, the employer can easily compute her firm's injury/illness rate by plugging the values into the following formula:

\[
\text{Incidence Rate} = \frac{\text{Number of Injuries/Illnesses} \times 200,000}{\text{Employee Hours Worked}}.
\]

(148. Using BLS's basic formula, an employer could easily determine several different injury/illness incidence rates, for OSHA and BLS data are readily available to enable the employer to ascertain and compare her incidence rates for: (1) total injuries/illnesses; (2) lost workday injuries/illnesses; (3) lost workday injuries; (4) lost workday illnesses; (5) minor (i.e., no lost workdays) injuries/illnesses; (6) minor injuries; and (7) minor illnesses. See Bureau of Labor Statistics, Injury & Illness Data, at http://bls.gov/iif/oshsum.htm#01Quartile%20Data (last visited May 1, 2004). However, in order to avoid information overload, see W. Kip Viscusi, Individual Rationality, Hazard Warnings, and the Foundations of Tort Law, 48 Rutgers L. Rev. 625, 633 (1996), a disclosure regulation should probably require the employer to provide comparative data on only the total and lost workday injury/illness rates.

149. Following the Standard Industrial Classification Manual, BLS divides private industry into "divisions" and then breaks down these divisions into "major
An example clarifies the ease with which an employer could generate information about the relative safety of her firm. Suppose the Capitol Hill Sausage Company has 300 employees and recorded 37 injuries or illnesses in 2001. Assuming the employees work 35 hours per week with two weeks of vacation, Capitol Hill workers log 525,000 hours each year. Once the employer has determined the number of injuries/illnesses and the number of hours worked, she could easily calculate Capitol Hill's total illness/injury incidence rate:\(^{150}\) \[
\frac{37 \times 200,000}{525,000} = 14.1.
\]

She could also easily calculate the company's serious (i.e., lost-workday) injury/illness rate.\(^{151}\) Suppose the company recorded 21 lost-workday injuries. Its lost workday injury/illness incidence rate would be: \[
\frac{21 \times 200,000}{525,000} = 8.0.
\]

Current and prospective employees would want to know where Capitol Hill's injury/illness incidence rates stand relative to those of its peer sausage manufacturers. Figure F presents BLS data for sausage manufacturers with between 250 and 999 employees.\(^{152}\) With a total injury/illness incidence rate of 14.1 and a lost-workday injury/illness rate of 8.0, Capitol Hill is a relatively, but not notably, unsafe sausage manufacturer. With respect to both injury/illness rates, it is within the third-safest quartile, a bit riskier than the median firm.

But prospective and current employees, most likely not limiting themselves to sausage-making jobs, would also want to know how Capitol Hill's injury/illness rates compare to those of other employers.

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\(^{150}\) See Bureau of Labor Statistics, Nonfatal Occupational Injury and Illness Rates of Total Recordable Cases by Quartile Distribution and Employment Size Group, Private Industry 1998, at http://www.bls.gov/special.requests/ocwco/oshwc/osh/os/ostb0770.pdf (last visited Jan 22, 2004). Industries, the most refined unit of analysis (besides individual firms), are rather specific. For example, "preserved fruit and vegetable manufacturers"—an industry group within the major group "food and kindred products," which is in the manufacturing division—is divided into six separate industries: (1) canned specialties; (2) canned fruits, vegetables, preserves, jams, and jellies; (3) dried and dehydrated fruits, vegetables, and soup mixes; (4) pickled fruits and vegetables, vegetable sauces and seasonings, and salad dressings; (5) frozen fruits, fruit juices, and vegetables; and (6) frozen specialties not elsewhere classified. See Executive Office of the President, Office of Management and Budget, Standard Industrial Classification Manual 74-76 (1987). BLS data even break down industries into groups of similarly-sized firms: separate figures are reported for firms with 1-10, 11-49, 50-249, 250-999, and over 1,000 employees.

\(^{151}\) See supra note 147.

\(^{152}\) The information in Figure F is from BLS' website. "Total injury/illness" data are available at http://www.bls.gov/iif/oshwc/os/ostb1133.txt. "Lost workday injuries/illnesses" data are available at http://www.bls.gov/iif/oshwc/os/ostb1134.txt.
In other words, the employees would want to know whether sausage-making in general is particularly risky. Hence, it is useful to compare Capitol Hill's injury rates with those of the manufacturers of all "food and kindred products." Because BLS records aggregate "industry group" data, as well as industry data,153 such comparisons are easy. BLS data provided in Figure G reveal injury/illness rates for all manufacturers of food products.154 These data suggest that sausage manufacturing is a relatively dangerous category of food manufacturing. Capitol Hill's total injury/illness and lost-workday incidence rates (14.1 and 8.0, respectively), which were slightly higher than the median for sausage manufacturers, are substantially higher than the median for food manufacturers in general.

Given the ease with which employers may determine their injury/illness incidence rates and compare them to other firms in their industries and industry groups, it is easy to imagine a regulatory regime, similar to the Appliance Labeling Rule, that would require employers to provide this comparative risk information to employees. The rule might require the employer to procure current and prospective employees' signatures on forms that include a display, modeled after the labels required under the Appliance Labeling Rule, indicating the employer's injury/illness incidence rate and where that rate stands relative to the relevant industry and industry group. The rule could also require that the employer's workers' compensation insurer sign off on the form155 and that the form be prominently displayed around the workplace. Employees, then, would have a fairly good idea of the magnitude of risks presented and would be in a good position to determine whether the compensation the employer is offering is sufficient, given the job risks.156 Employers who initially failed to offer adequate com-

153. See supra note 149.
154. See supra note 152 (identifying data sources).
155. This would help internalize workplace safety risks by ensuring that premiums for workers' compensation insurance accurately reflected the relative risk of the workplace. Of course, insurers have an incentive to (and do) collect injury and illness information from employers, so requiring that the information be provided to insurers may not increase insurer monitoring. It may, however, reduce the costs of such monitoring, as employers are likely able to collect and process the injury/illness information more cheaply than insurers.
156. But what about the situation where a normally safe workplace suffers some sort of freak accident that generates an aberrant incidence rate? Would not the proposed disclosure rule result in unfairness to the employer, who would have to report an injury rate that paints an unduly dire picture of the safety of his workplace? Not necessarily. First, this concern could be addressed by requiring disclosure of, say, a five-year average incidence rate rather than last year's incidence rate. Aberrant years, then, would appear less startling. But there may not be any need to adjust the rule to require multi-year averages. As long as the disclosure rule did not restrict employers from providing additional information, on top of the required comparative information, any unfairness stemming from aberrant years could be mitigated. Employers burdened with having to report a
Compensation would find it difficult to attract qualified employees and would likely end up paying higher risk premiums. In short, requiring disclosure of comparative risk information would help ensure that the costs of workplace risks are internalized to the employers. Figure H presents an example of a safety disclosure form for the Capitol Hill Sausage Company.

2. Evaluation of the Moderate Libertarian, Mandatory Risk Disclosure Approach

When the market failure at issue is systematic employee ignorance of risks and there is no reason to believe that employers are systemati-

bad year would be free to present additional data (e.g., data from previous years) to employees in order to demonstrate that their workplaces are actually safer than last year's data would suggest. Indeed, as the market failure this regulation is aimed at remediying is information inadequacy, additional data presentation should be encouraged. A perhaps more troubling problem would arise when normally unsafe workplaces experience an anomalously safe year. Prospective employees might receive an unduly rosy picture of the employer's safety record, and this concern might thus justify adopting a disclosure rule requiring presentation of multi-year averages. On the other hand, even normally unsafe workplaces should be rewarded when they experience an unusually safe year.

157. As explained above, see supra notes 77 and 117, the risk premium would be based on the demands of the marginal employee, so internalization could occur even if the vast majority of employees paid no attention to the comparative risk information.

158. It is important to keep in mind that the primary purpose of risk disclosure is not to ensure that each individual employee gets paid the "right" amount for the risks he undertakes. While that distributional result may be a fortuitous consequence of risk disclosure, the primary reason for disclosing relative risk is to ensure that the employer ultimately has to pay a premium for the risk he imposes and thus faces an incentive to take all cost-effective precautions to reduce that risk. From the employers' perspective, it does not matter to whom the risk premium is paid. It may be paid to the employees who are actually burdened with the risks, or to other employees, or to the employer's insurer. Regardless of who receives the premium, if the magnitude of the premium is accurately tailored to the size of the risks imposed, then the employer will have an incentive to take a hard look at his workplace, determine where the risks are and how they could be reduced, and take all cost-effective precautions to reduce those risks. Thus, to procure the internalization benefits of a risk disclosure regime, it is not necessary to segment risks by particular positions within the firm. In practice, however, it is likely that the employer will end up paying risk premiums to those employees that deserve them. If, for example, a receptionist from Capitol Hill Sausage Company demanded a risk premium based on the risk information presented above, the employer would likely point out to the receptionist that it is the line workers who are incurring the risks and thus deserve a premium. By contrast, if a line worker used the statistics in an attempt to demand a premium, the employer could not convincingly respond that the risks were borne by others. Thus, in practice, the employees who face the risks will likely be the ones receiving risk premiums. From an efficiency standpoint, however, it does not matter whom the employer ultimately ends up having to pay.
cally under-informed of available safety precautions, a moderate libertarian approach focused on mandatory risk disclosure will provide a narrowly tailored remedy that avoids many of the inefficiencies associated with the paternalistic, command-and-control status quo. As explained below, this may be true even if, as the behavioralist economists claim, individuals possess bounded rationality and are beset with various cognitive quirks that make it difficult for them to process risk information. But mandatory risk disclosure may not motivate optimal precaution-taking when the culprit market failure includes a systematic informational deficiency on the part of employers regarding available cost-effective precautions. In such circumstances, a more intrusive regulatory approach may be warranted.

a. Benefits of the Approach

In most cases, the moderate libertarian, mandatory disclosure approach will produce higher net benefits than, and will thus be preferable to, both the pure libertarianism of the OSHA abolitionists and the pure paternalism advocated by the OSHA apologists. Unlike pure libertarianism, a moderate libertarian approach does not merely ignore the problem of employees' lack of information about workplace risks (an approach that makes sense only in the rare case in which the cost of any amount of effort to educate employees is greater than the benefit produced thereby). A mandatory disclosure approach is also likely, for a number of reasons, to be preferable to pure paternalism's inflexible substantive safety standards.

First, mandatory disclosure thwarts fewer potential gains from trade than command-and-control. The fact is, individuals differ in their tolerance for risk; most are risk averse, but some are indifferent to, or actually prefer, risk. Similarly, employers differ in their costs of eliminating risk; some can do so cheaply, but for others marginal risk reduction is quite expensive—more expensive than simply paying employees an ex ante premium for accepting the risk or compensating them ex post for any workplace accidents. When an employee that is

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159. See supra subsection II.B.2 (noting circumstances in which employers will be adequately motivated to produce information regarding safety precautions); infra subsection III.B.2.b (same).
160. See infra subsection III.A.2.b.(1).
161. See, e.g., Kneiser & Leeth, supra note 19.
162. See, e.g., Shapiro, supra note 54, at 22; Shapiro & McGarity, supra note 96, at 729; McGarity & Shapiro, supra note 96, at 587; Shadrer-Frechette, supra note 96, at 311.
163. See supra note 111 and accompanying text.
164. See supra notes 106-108 and accompanying text.
less risk-averse hooks up with an employer for whom risk reduction is relatively expensive, there is a potential for gains from trade as long as the parties are free to allow the risk to remain. Regulatory flexibility therefore facilitates wealth creation by permitting employees to sell their right to be free from risk.

Second, a regime focused on risk disclosure, unlike a command-and-control regime, enlists employees themselves in preventing workplace accidents, and employees often end up being the cheaper accident-preventers. Workplace accidents are usually not due simply to a risky technology; some sort of employee error is generally required. Accordingly, it may frequently be more efficient to reduce accidents by reducing employee error rather than by eliminating the potentially hazardous technology. Disclosure regimes allow employers and employees to determine who will take steps to reduce injuries. By contrast, technology-based safety standards force the employer to act as accident-preventer, even if the employee could do so more cheaply.

Third, mandatory disclosure lacks command-and-control's stringent (and costly) information requirement. In a command-and-con-

166. See Viscusi, supra note 106, at 847-48. Consider, for example, a situation where a risk-indifferent employee simply does not care about a particular risk that is quite expensive for an employer to eliminate. As the risk is tolerable to the employee and expensive for the employer to reduce, the employer may choose to permit the risk to remain and simply pay the employee some premium for accepting the risk. Compared to the situation in which a rule requires elimination of the risk, the employer gains the difference between the risk premium and the amount he would have to pay to eliminate the risk, and the employee gains the amount of the risk premium. If the law were to force the employer to eliminate the risk, both parties would be worse off.

167. Transactions in which employees agree to accept risk in exchange for a risk premium are Pareto superior, for at least one party (the employer, who freely chooses to pay the risk premium rather than to eliminate the risk) is better off, and no party is worse off. (The employee must perceive himself to be at least as well off with the risk premium as he would be if the risk were eliminated, or he would refuse to accept the job.)

168. As Professors Magat and Viscusi explain:

Information regulation may also be a more effective means of promoting safety than direct technological controls. Most accident situations are the result of two sets of influences: (1) the technological characteristics of the accident context, such as whether a lawn mower has an engine cutoff device, and (2) the role of the potential accident victim. . . . Once the role of individual action in contributing to risks is recognized, the potential roles for regulatory intervention through an informational approach is apparent. Altering behavior may be a more effective regulatory strategy than is the technological approach that dominated the first decade of social regulation in the 1970s.

control regime, the regulator deciding what safety control to mandate
must be privy to all sorts of time- and place-specific information in
order to know whether: (1) the benefits of the regulation outweigh its
costs, and (2) the regulation has higher net benefits than any other
available precaution. Frequently, context-specific factors will render
a precaution that is appropriate in one situation inappropriate in
others. Consider, for example, the part of OSHA's proposed ergo-
nomics standard that barred employers from providing safety incen-
tives to employee groups who remain accident-free. The agency
reasoned that such incentives lead to underreporting of injuries,
thereby preventing management from learning of and eliminating
hazards. While this may be true for some businesses, others have
found that safety incentives are an important part of an accident re-
duction strategy. For example, the General Accounting Office ("GAO")
reported that a significant decline in ergonomic injuries at Texas In-
nstruments was due in large part to the company's safety incentive pro-
gram, which rewarded employee groups who avoided workplace
accidents and injuries. The GAO specifically noted that the corpo-
rate culture at Texas Instruments favors performance incentives and
that the company's safety incentive program was likely successful for
that reason. Centralized regulators are not usually aware of par-
ticular circumstances like regulatees' corporate cultures, but those cir-
cumstances may greatly influence the effectiveness of a precaution
technique. Hence, a risk-disclosure regime, which permits those clos-

170. See Sunstein, supra note 11, at 658 (1993) ("Precisely because of their uniformity,
[rigid safety standards] force a wide range of actors into the same mold. In this
way, too, they diminish economic efficiency."). Cf. Henry N. Butler & Jonathan
R. Macey, Externalities and the Matching Principle: The Case for Reallocating
Environmental Regulatory Authority, 14 YALE J. REG. 23, 50 (1996) ("Federal reg-
ulators have not been, and never will be, able to acquire and assimilate the enor-
mous amount of information necessary to make optimal regulatory judgments
that reflect the technical requirements of particular locations and pollution
sources.").

171. See 64 Fed. Reg. 65798 (Nov. 23, 1999) (interpreting § 1910.212(c) of proposed
ergonomics regulation to prohibit incentive programs that focus on achieving low
numbers of reported ergonomic injuries).

172. See 64 Fed. Reg. 65798 (Nov. 23, 1999) ("[T]he use of incentive or award programs
that focus on achieving low numbers of reported MSDs [musculo-skeletal disor-
ders] may discourage early reporting. Such programs, although sometimes in-
tended to improve employee safety and health, may inadvertently lead to the
underreporting of MSD cases and thus actually increase unsafe working
conditions.").

173. U.S. General Accounting Office, Report No. GAO/HEHS-97-163, Worker Protec-
tion: Private Sector Ergonomics Programs Yield Positive Results 15 (1997) (noting
that "performance targets drive all corporate and facility activities at Texas In-
nstruments, so these kinds of targets have also been established for the facility's
ergonomics programs").

174. Id. at 15-16.
est to the risks and most knowledgeable of local circumstances to de-
cide how the risks should be reduced, may be preferable.

Two final efficiency advantages of a disclosure regime similarly de-
rive from the fact that mandatory disclosure rules, unlike command-
and-control regulations, do not specify technological controls. First, a
disclosure approach, unlike pure paternalism, creates no disincentive
to the development of superior risk-reducing technologies. Requiring
employers to adopt particular technology-based safety standards, as
substantive safety standards typically do, will tend to discourage in-
vestment in less expensive or more effective technologies. If the gov-
ernment requires one technology to be adopted, employers will not
look for cheaper means of achieving the same risk reduction.175 By
contrast, if the government were simply to mandate disclosure of risks
and allow the market to penalize employers for the risks created, em-
ployers would have incentives to adopt all cost-effective precautions
and to engage in research on new cost-effective precautions (at least
until the point at which the private marginal benefits of research ef-
forts equaled the private marginal costs thereof).

Moreover, mandatory disclosure, unlike a regime mandating tech-
nology-based standards, does not encourage inefficient interest group
maneuvering. When Congress and the regulatory agencies are at-
tempts to specify the particular means by which workplace safety is
to be increased, they are especially vulnerable to well-organized pri-
ivate groups, who attempt to promote their own welfare through ob-
taining requirements mandating safety technologies that somehow
benefit them (e.g., that they already have or that will be particularly
expensive for their competitors to adopt).176 Under a mandatory dis-
closure regime that does not impose specific technological standards,
there is no such potential for wasteful interest group wrangling.

In addition to these efficiency concerns, concern for preserving and
enhancing individual liberty argues for a disclosure regime over a
command-and-control approach. Whereas government dictation of
particular outcomes (via the imposition of substantive standards) nec-
essarily reduces individual liberty, an informational approach main-
tains, and can actually increase, individual liberty by enabling
individuals to make better-informed, and thus “freer,” choices.177

175. See Sunstein, supra note 11, at 660.
176. Id.
177. As Professor Sunstein explains:

There are two problems [with directly setting standards rather than pro-
viding information]. The first is that inadequate information is a serious
obstacle to liberty. To the extent that current approaches do not provide
information, they disservice this goal. The second problem is that gov-
ernmentally prescribed outcomes unnecessarily diminish the role of indi-
vidual decisions and choices in forming individual lives. At least across
a broad range of possibilities, people should be allowed to select their
Thus, rights-based concerns (i.e., concern for autonomy and individual liberty) also weigh in favor of moderate libertarianism's disclosure approach over pure paternalism's command-and-control approach.

b. Potential Shortcomings

But all may not be rosy for moderate libertarianism's mandatory disclosure approach to workplace safety regulation. At least two potential difficulties threaten the efficacy of a regulatory approach focused on ensuring risk internalization (and thus optimal precaution-taking) by informing employees of the relative riskiness of workplaces. First, there are potential problems stemming from employees' cognitive limitations. If employees cannot adequately process information about workplace risks, will requiring employers to provide such information accomplish anything? Second, there may be a problem when employees' informational deficiency is not the only information inadequacy leading to sub-optimal precaution-taking; when employers are systematically under-informed about available cost-effective precautions, a regulatory approach that merely mandates risk disclosure may fail to generate efficient precaution-taking. Examination of these two potential shortcomings demonstrates that the former is not fatal to a moderate libertarian regime but that the latter may call for a more intrusive role for the government in reducing certain types of job risks.

(1) Bounded Rationality and Behavioralism

A number of theorists, relying on individuals' bounded rationality and on the insights of behavioral economics, have argued preferred mixes of risk, employment, salary, medical care, and so forth. If their choice is irrational, or if it has large consequences for others, the government is entitled to intervene. But the presumption should be in favor of private choice. Because current regulatory law forecloses private choice in favor of nationally mandated outcomes, it disserves liberty, certainly in comparison to a system in which information is provided.

Id. at 658-59.

178. "Bounded rationality," a term coined by Herbert Simon, refers to the fact that decisionmakers inherently have limited memories, computational skills, and other mental skills, which in turn limit their ability to gather and process information. See Herbert A. Simon, Rational Choice and the Structure of the Environment, in MODELS OF MAN 261, 271 (1957).

179. As explained in more detail below, see infra notes 190 to 207 and accompanying text, behavioral economics draws on experimental economics and cognitive psychology to argue that individuals systematically depart from rational decision-making even in market settings. See generally Christine Jolls et al., A Behavioral Approach to Law and Economics, 50 STAN. L. REV. 1471 (1998); Russell B. Korobkin and Thomas S. Ulen, Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics, 88 CAL. L. REV. 1051 (2000); Donald C. Langevoort, Behavioral Theories of Judgment and Decision Making in
that risk disclosure approaches to regulating safety and health are destined to fail because individuals face cognitive limitations that prevent them from accurately processing risk information that is provided to them. Given these limitations, the theorists reason, individuals will fail to make "good" risk decisions (i.e., decisions that are utility maximizing given the individuals' personal utility functions) even if they have perfect risk information.\textsuperscript{180} The cognitive limitations can be divided into two categories: limitations in individuals' abilities (1) to digest risk information, or "get it in their heads" (cogni-

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  \item See, e.g., Jeffrey J. Rachlinski, The Uncertain Psychological Case for Paternalism, 97 N.W.U. L. Rev. 1165, 1189 (2003) (noting that individuals' tendency to underestimate personal risks "undermines the notion that workers can protect themselves by bargaining for an optimal level of safety in the workplace," so that "workers arguably need minimal safety standards to protect them from employers who would otherwise exploit their cognitive vulnerability"); Sidney A. Shapiro & Randy Rabinowitz, Voluntary Regulatory Compliance in Theory and Practice: The Case of OSHA, 52 ADMIN. L. REV. 97, 120 (2000) (noting that in order to demand accurate risk premiums, "workers must also be free of psychological defects that distort the way in which individuals process risk information, but individuals commonly misperceive the degree of risk that they face"); Sunstein, supra note 11, at 667-69 (discussing how cognitive quirks could limit effectiveness of risk disclosure); Susan Rose-Ackerman, Progressive Law and Economics – And the New Administrative Law, 98 Yale L. J. 341, 356 (1988) (noting that risk disclosure may not protect workers because of "the limited information-processing capacities of people, especially regarding probabilistic information" and that "rather than engage in a massive educational campaign, it may be more efficient to regulate workplace health and safety directly through administrative orders or incentive schemes"); Frances L. Edwards, Worker Right-to-Know Laws: Ineffectiveness of Current Policy-Making and a Proposed Legislative Solution, 15 B.C. Envtl. Aff. L. Rev. 1, 25 (1987) ("Since there are systematic and predictable errors that most people make in their risk assessment, a policy directive requiring employers to inform the worker of occupational risks through disclosure under right-to-know laws will have a minimal impact."). Cf. Jon D. Hanson & Douglas A. Kysar, Taking Behavioralism Seriously: The Problem of Market Manipulation, 74 N.Y.U. L. Rev. 630, 724-43 (1999) (arguing that cognitive quirks prevent consumers from rationally processing product warnings and provide an opportunity for manufacturers to manipulate consumer perceptions); Howard Latin, "Good" Warnings, Bad Products, and Cognitive Limitations, 41 UCLA L. Rev. 1193, 1195 (1994) (exploring behavioral claims of cognitive limitations and arguing that product warnings will be ineficacious because "[p]roduct warnings and other disclosure mechanisms can be effective only when intended recipients are able to receive, comprehend, and act upon the information imparted"); Robert A. Prentice & Mark E. Roszkowski, "Tort Reform" and the Liability "Revolution": Defending Strict Liability in Tort for Defective Products, 27 Gonz. L. Rev. 251, 291 (1991-92) (relying on behavioral research as one of a number of grounds for favoring strict products liability).
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In attempting to demonstrate the inefficacy of product warnings on consumer goods, Professor Howard Latin outlined a number of cognitive constraints that purportedly prevent individuals from reading and understanding (what I am calling "digesting") all available risk information about consumer products. Consumers will frequently fail to read a warning, Professor Latin argued, because they are functionally illiterate or predictably inattentive or incompetent; they would prefer to rely on explanations by intermediaries or on their own knowledge and experience; or they are facing competing demands on their time and attention or are subject to "information overload." In addition, even if consumers go through the mechanical process of reading risk information, they will frequently fail to understand such information because the warning labels are unclear, over- or under-detailed, or textually ambiguous, or because readers possess inadequate evaluative skills for deciphering complex warnings. While Professor Latin's critique focused solely on product warnings, his arguments about human cognitive constraints would also seem to apply to the moderate libertarian regime for regulating workplace safety. As mandatory disclosure relies on employees' reading and understanding comparative workplace risk information, the cognitive constraints Professor Latin identified would also seem to weaken the efficacy of the moderate libertarian approach.

In addition to cognitive constraints that limit the amount of information employees can digest (or "get into their heads"), Professor Latin and other commentators have drawn on the insights of behavioral economics to argue that even if individuals fully absorbed all available risk information, they would still tend to misuse it. Professor Latin nicely summarized much of the behavioral research in a discussion titled "Cognitive Heuristics and Biases." He there discusses the "representativeness heuristic," the "availability heuristic," cognitive dissonance, framing, anchoring, and prospect theory. Later in
recent years, behavioral economists have conducted a number of empirical studies demonstrating that individuals, when acting under conditions of uncertainty, are not necessarily "rational self-interest maximizers" as classical economic theory has assumed\textsuperscript{191} but are instead subject to "a whole range of systematic errors and biases."\textsuperscript{192}

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191. The notion that individuals are rational self-interest maximizers—the "rational choice model" of human behavior—is a well-established feature of classical economic theory. See Hanson & Kysar, supra note 180, at 640-44 (discussing the dominance of the rational choice model in economic theory and the origins of behavioral research challenging the model). Professor Robert Ellickson has tersely summarized the model as follows:

The economists' model, in its purest form, is based on elegantly simple propositions about both cognitive capacities and motivations. The model assumes that a person can perfectly process available information about alternative courses of action, and can rank possible outcomes in order of expected utility. The model assumes that an actor will choose the course of action that will maximize personal expected utility . . . .


The rational choice model gained a firm foothold in economic theory after the publication of mathematician John von Neumann's and Oskar Morgenstern's Theory of Games and Economic Behavior, published in 1944, which attempted to elaborate axioms of how individuals make rational, utility-maximizing decisions in the face of uncertainty. See Hanson & Kysar, supra note 180, at 640-45 (discussing the importance of John von Neumann & Oskar Morgenstern, Theory of Games and Economic Behavior (1944) and noting that, after its publication, "economists began to assume [the] descriptive accuracy" of the rational choice model).

While a full exploration of these systematic irrationalities is beyond the purview of this Article, it is worth briefly considering the main categories of purported biases to see how they might impair a risk disclosure regime:\footnote{While a full exploration of these systematic irrationalities is beyond the purview of this Article, it is worth briefly considering the main categories of purported biases to see how they might impair a risk disclosure regime:}{193}

(1) Status Quo / Loss Aversion Biases and Framing Effects. A number of theorists have observed that people have a tendency to weigh losses more heavily than gains and may thus be less willing to assume risk when facing the loss of something they have than when potentially gaining something they do not have.\footnote{Professor Donald Langevoort has demonstrated the status quo bias in an experiment involving the reaction of first year law students to a hypothetical contractual setting in which they were asked to advise a shipping company during negotiations with a commercial customer. See \textit{Russell Korobkin, The Status Quo Bias and Contract Default Rules, 83 CORNELL L. REV. 608, 634-41 (1998)}. By changing the applicable contract default rule between subjects, Korobkin found that the "subjects exhibited a large and statistically significant bias in favor of the term embedded in the default rule—the status quo term." \textit{Id.} at 639.}{194} This tendency, which produces a natural bias toward the status quo,\footnote{The summary presented here is based on categories organized by Professor Donald Langevoort. See \textit{Langevoort, supra note 179, at 1503-05.}} suggests that whether options are "framed" in terms of potential gains or losses affects decisions even though the framing may be completely arbitrary and manipulable.\footnote{Professor Russell Korobkin has demonstrated the status quo bias in an experiment involving the reaction of first year law students to a hypothetical contractual setting in which they were asked to advise a shipping company during negotiations with a commercial customer. See \textit{Russell Korobkin, The Status Quo Bias and Contract Default Rules, 83 CORNELL L. REV. 608, 634-41 (1998)}. By changing the applicable contract default rule between subjects, Korobkin found that the "subjects exhibited a large and statistically significant bias in favor of the term embedded in the default rule—the status quo term." \textit{Id.} at 639.}{195} Moreover, it manifests itself in a tendency for people to demand more to sell something they own than they would pay to buy the same item, a tendency referred to as the "endowment effect."\footnote{\textit{See, e.g., Daniel Kahneman, Jack L. Knetsch & Richard Thaler, Experimental Tests of the Endowment Effect and the Coase Theorem, 98 J. POL. ECON. 1325, 1330 (1990) (well-known study documenting endowment effect); George Lowenstein & Daniel Adler, \textit{A Bias in the Prediction of Tastes}, 105 ECON. J. 929, 931 (1995) (discussing experiment demonstrating that willingness to accept values are greater than willingness to pay values).}{197} To the extent that individual reasoning is infected with...
these biases, risk disclosure regimes may be difficult, for individuals may undervalue safety benefits they do not yet possess (i.e., they will not be willing to give up enough ex ante compensation in exchange for the employers’ adoption of a safety measure that they would value more if it were required and was thus, in a sense, “theirs”).

(2) Anchoring and Adjustment. Another set of behavioral observations is that individuals “anchor” on some initial possibility in the decisionmaking process, typically the status quo, and fail to adjust properly as new information becomes available. Moreover, an adjustment that does occur may be overly affected by the salience or recency of the data—i.e., recent information that is widely reported or “hits close to home” is weighed too heavily. This set of biases may affect a disclosure regime in one of two ways: The anchoring bias suggests that individuals will not be properly swayed by accurate risk information if they have already “anchored” onto an idea about how safe a particular workplace is; conversely, the salience or “availability” bias suggests that individuals will be too heavily influenced by new, readily available information, such as a high-profile workplace accident in the area.

(3) Illusory Correlations and Causation Biases. Individuals often irrationally infer causal patterns and relationships from events that are the result of random chance. They therefore tend to ignore statistical base rates in favor of highly salient or available, but less predictive, information. Obviously, this tendency would limit the effectiveness of a regulatory regime focused on informing people of statistical risks.

(4) Irrationalities With Respect to Low Probability Risks. Empirical evidence shows that individuals tend, on the one hand, to ignore

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199. See Hanson & Kysar, supra note 180, at 667-69 (discussing empirical evidence of anchoring biases); Tversky & Kahneman, Judgment Under Uncertainty, supra note 192, at 14-15 (discussing studies demonstrating anchoring effects).

200. This bias is frequently termed the “availability heuristic.” According to Tversky and Kahneman, who coined the term, “a person . . . employs the availability heuristic whenever he estimates frequency or probability by the ease with which instances or associations could be brought to mind.” Amos Tversky & Daniel Kahneman, Availability: A Heuristic for Judging Frequency and Probability, 5 COGNITIVE PSYCHOL. 207, 208 (1973). For discussions of evidence demonstrating the existence of the bias, see Hanson & Kysar, supra note 180, at 662-64 (discussing availability heuristic); Susan T. Fiske & Shelley E. Taylor, Social Cognition 142-79, 245-94 (2d ed. 1991) (providing general review of availability heuristic in contexts of social schemas and social encoding).

low probability risks that are not otherwise made salient and, on the other hand, to display an irrationally strong preference for the elimination of uncertainty (e.g., to value risk reduction from five to zero percent significantly more than a reduction from ten to five percent). As a risk disclosure regime seems to depend on individuals rationally processing information about what are generally low probability risks, these biases would seem to cause problems for the moderate libertarian, disclosure-based regime.

(5) Egocentric Biases (False Self-Confidence). A number of biases fall under the heading “egocentric.” For example, individuals tend to engage in self-serving explanations, attributing successes to efficiency or control and failures to luck or other external circumstances. They also tend to overestimate the extent to which others share their attitudes and beliefs (the “false consensus” effect), and, in assessing what is “fair,” they appear biased toward their self-interest. The most important egocentric bias for purposes of evaluating a risk disclosure regime is the first one mentioned: The tendency to attribute successes to individual control bestows on individuals a false self-confidence—a belief that they can “beat the odds.” Falsely self-confident individuals will, of course, discount objective risks of which they are informed, even if the risks are ones over which they really have no control.

(6) Hindsight, Context, and Intertemporal Biases. The remaining frequently mentioned biases do not seem directly damaging to a risk disclosure regime, but I will briefly mention them anyway, for they provide additional evidence that individuals are not rational self-interest maximizers. The hindsight bias is the name given to people’s tendency to overestimate the extent to which they could have predicted some future event (i.e., its foreseeability) once they learn what actually happened. Context bias refers to the tendency for individual choices to be unduly affected by the availability of alternatives, particularly if they involve compromise possibilities. Intertemporal biases stem from individuals’ tendency to discount future risks and rewards more heavily than standard economic analysis would predict, suggesting a bias toward consumption and against deferred gratification.

As noted, the common thread running through these behavioral observations is irrationality. They tend to disprove the rational choice

202. See Langevoort, supra note 179, at 1504; Cass R. Sunstein, Risk and Reason, supra note 81, at 261 (noting that individuals “have a notoriously difficult time thinking about low probability events”).
203. See Langevoort, supra note 179, at 1505.
205. See supra note 179, at 1505; Sunstein, Behavioral Law and Economics, supra note 190, at 3-4.
206. See Langevoort, supra note 179, at 1505.
model of human behavior, upon which much of classical economic theory—including, according to some, the theory of compensating differentials—is based. More importantly for our purposes, however, they suggest that individuals are particularly bad at processing risk information.

Bounded rationality and behavioralism thus present what seems, on first glance, a formidable challenge to moderate libertarianism's disclosure-based approach: If individual employees cannot digest and process risk information in order to make decisions that are in their best interests given their personal utility functions—and particularly if they tend, as behavioralism suggests, to discount their personal risks—then merely providing employees with risk information will not lead to a sufficient reduction in workplace injuries because employees either will ignore the information or will continue to accept overly risky jobs, believing that they can somehow "beat the odds." To the extent employees systematically miscalculate their subjective risk even when provided with accurate objective risk information, a mandatory disclosure approach would seem doomed to fail.

This argument assumes, however, that the only goal of mandatory disclosure is to assist employees in making "good" decisions (i.e., decisions that comport with their personal utility functions) about what risks to accept. In actuality, the moderate libertarian approach has another, perhaps more important rationale, which is achievable even if individuals routinely misprocess the risk information that is provided to them.

Indeed, there are two primary rationales for a mandatory disclosure approach to workplace safety regulation. One is based on concerns for individual rights and liberties and rests on the notion of informed consent. Mandating risk disclosure preserves an employee's individual rights and liberties by ensuring that she does not unwittingly undertake risks of which she is not informed in advance. The employee's liberty interests are protected because providing information to guide her employment decisions makes those choices "freer," and by enhancing the employee's ability to make free choices, information-provision respects her sovereignty and individual rights. The liberty/rights rationale thus depends on the information-provision approach's ability to help employees make the type of decisions they really want to make.

207. See Mark Kelman, Law and Behavioral Science: Conceptual Overviews, 97 Nw. U. L. Rev. 1347, 1350 (2003) ("The basic theory of 'compensating differentials'—the idea that certain jobs pay more than equally skilled jobs if they are atypically dangerous or boring or unpleasant—can be derived almost entirely from basic bedrock assumptions about the behavior of rational maximizers.").

208. See Sunstein, supra note 11, at 658-69 (arguing that risk disclosure enhances liberty and the right to self-determination).
The second rationale for mandatory disclosure, which by now should be quite familiar, is efficiency-based: When employees have accurate risk information, they will demand premiums (i.e., compensating differentials) that compensate them for the risks to which they are exposed, and those risks will thereby be internalized to the employer, who will be in a better position to decide whether particular precautions that would eliminate the risks are cost-justified. When employees demand accurate compensating differentials, employers have an incentive to take all—and only—those precautions that are less costly than the risks they reduce, resulting in an efficient level of precaution-taking.

There is no doubt that bounded rationality and the insights of behavioralism damage the former (i.e., rights/liberty) rationale for a mandatory disclosure approach. If individual employees are unable to process risk information or are subject to systematic biases in interpreting or processing risk information—say, for example, that they have an optimistic bias or "false self-confidence"—then they may still make decisions that are unwise or irrational given their utility functions, despite the fact that accurate risk information has been presented. Providing risk information therefore does not necessarily make employees' choices freer, more consistent with their personal utility functions, or, in other words, more "self-actualized." Thus, the rights/liberty rationale for an information-provision approach may be weakened.

But critics who marshal behavioral insights and the notion of bounded rationality to argue that the moderate libertarian approach is doomed to failure are focusing on only the rights/liberty-enhancing function of disclosure. The efficiency benefits of the mandatory disclosure strategy may be attainable even if employees are subject to cognitive limitations and biases that prohibit them from rationally processing risk information. That is because the efficiency benefits of a risk disclosure regime do not require that employees who receive risk information actually make job decisions that comport with their personal utility functions, only that their employers be "penalized" according to the risks the employees do decide to accept.

As noted, it is not necessary that every employee, or even a majority of employees, be aware of relative risk information in order for the employer to have to pay compensating differentials, for wage rates, including risk premiums, are determined by the demands of marginal employees. Thus, as long as marginal employees are able to digest the relative risk information and are not overly optimistic about their abilities to avoid risks (and as long as wage discrimination is impracti-

cable), the wage rate will adjust to account for the relative riskiness of the workplace. A substantial body of empirical evidence demonstrates that individuals are not equally bounded in their rationality or uniformly beset by the cognitive quirks identified by the behavioralists; indeed, many individuals appear to act rationally in processing risk information.\textsuperscript{210} And, of course, marginal employees—the employees most likely to decline a job offer or to quit in response to risks for which they are not compensated—are precisely the employees one would expect to (1) pay most attention to relative risk information, and (2) not be irrationally optimistic regarding their abilities to "beat the odds." Thus, employers may have to pay for disclosed risks even if most employees—the non-marginal employees—do not digest and accurately process the risk information provided to them. Just as the efforts of searchers protect non-searchers under the search equilibrium model,\textsuperscript{211} the superior reasoning abilities of marginal employees may protect employees facing more extensive cognitive limitations and biases.

Moreover, neither bounded rationality nor the irrationalities purportedly demonstrated by the behavioralists poses an insurmountable barrier to a regulatory regime based on informing employees of workplace risks. With respect to bounded rationality, individuals' difficulties in digesting risk information could be addressed by tailoring the disclosure rules to overcome the particular barriers that prevent people from examining the risk information that is presented to them. For example, concerns about excessive detail or information overload

\textsuperscript{210} See, e.g., Gregory Mitchell, Why Law and Economics' Perfect Rationality Should Not Be Traded for Behavioral Law and Economics' Equal Incompetence, 91 GEO. L. J. 67, 86-105 (2002) (summarizing the "growing body of empirical research demonstrating that individuals vary widely, and predictably, in their propensities to act rationally"); Gregory Mitchell, Taking Behavioralism Too Seriously? The Unwarranted Pessimism of the New Behavioral Analysis of Law, 43 WM. & MARY L. REV. 1907, 1945 (2002) ("In fact, when one examines the actual data gathered by decision researchers rather than just summary presentations of the data, one finds that at least a significant minority and often a significant majority of the subjects provided the 'right,' or rational, answer to the judgment or decision problem under consideration."); William H. Riker, The Political Psychology of Rationale Choice Theory, 16 POL. PSYCHOL. 23, 36 (1995) ("None of the experiments displaying inconsistencies in choice portray all subjects as inconsistent. For experimenters to recommend the abandonment of expected utility theory when the experiments themselves show that many people—often well over half, as in the preference reversal experiments—are indeed expected utility maximizers is to ignore the evidence that the experimenters have themselves created."); Richard F. West & Keith E. Stanovich, The Domain Specificity and Generality of Overconfidence: Individual Differences in Performance Estimation Bias, 4 PSYCHONOMIC BULL. & REV. 387, 387 (1997) ("Despite this overall finding of overconfidence on many tasks, performance across a sample of participants is almost always characterized by enormous variability. It is almost always the case that some participants show no global bias toward overconfidence.").

\textsuperscript{211} See supra notes 125 to 128 and accompanying text.
could be addressed by requiring the risk information to be presented in a simple, straightforward manner. Indeed, the simple comparative risk forms presented above, modeled after the required energy-efficiency labels, would seem to address concerns about textual ambiguity, excessive detail, and information overload. Employee inattention could be addressed by requiring employers to obtain employees' signatures next to the diagrams presenting the comparative risk information, much the way sales contracts often require buyers to initial particularly important sections of agreements, such as insurance waivers, in order to guarantee informed consent. Employee incompetence and functional illiteracy could be addressed by requiring employers to obtain proof that they had presented the risk information to employees in an understandable fashion. (For example, employees could be required to sign a statement certifying that they understood the risk information.) In short, cognitive constraints—limitations on individuals' abilities to digest risk information—could be addressed by tweaking the details of disclosure rules.

The irrationalities purportedly demonstrated by the behavioralists also fail to impair the efficiency benefits of a risk disclosure regime. Such benefits are attainable even if employees systematically discount the risks to them of taking a particular job, because they will still demand a risk premium for job risks incurred, and that premium will be based on objective job risks. The behavioralist model, after all, attacks only one aspect of the “rational choice” model underlying classical economics: Whereas that model posits that individuals are rational self-interest maximizers, behavioralism claims only that individuals are systematically irrational. Behavioralism does not maintain that individuals systematically fail to maximize what they perceive to be their self-interest. They are, under the behavioral model, irrational self-interest maximizers, but self-interest maximizers nonetheless. Hence, the behavioral model suggests that individuals, because they irrationally discount risks, may take risks that are “too large” (given their personal tastes for risk), but it in no way implies that they will not attempt to maximize their self-interest by demanding the highest level of compensation they can obtain for accepting those risks. In other words, the fact that individuals irrationally think they can beat the odds does not prevent them from demanding compensation for taking objective risks, and, as long as employers are unable to tell which prospective employees irrationally discount risks\(^\text{212}\) (so that they cannot wage discriminate against those

\(^{212}\) As noted, empirical evidence shows that individuals are not equally beset by the cognitive constraints and biases noted by the behavioralists and that a substantial proportion of individuals rationally process risk information. See supra note 210 and accompanying text. If employers cannot tell which employees are ra-
employees), employees will be able to extract risk premiums that are reflective of objective risks.\footnote{213}

An example may help illustrate how risk premiums will be tied to objective risk levels, even if employees irrationally discount those risks and therefore accept jobs that are "too risky." Suppose the universe of possible employers consists of three widget-makers: Er1, Er2, and Er3. Er1 is the lowest risk widget-maker—the lowest risk endpoint on the comparative risk information given to prospective employees—with an injury/illness rate of zero. With a zero injury rate, the risk of working for Er1 is $x$ (where $x > 0$ because there will still be some statistical risk, even if there has never been an injury or illness at Er1's facility). Er2 has a higher injury rate, and the risk of working at his facility is, say, $x + 1$. Er3 has an even higher injury rate—the highest risk endpoint on the comparative risk information presented to prospective employees—and the risk of his job is $x + 2$. For each employer, the rational risk premium employees should demand, $y$, is a function of the objective risk. So, $y_1 = f(x)$; $y_2 = f(x + 1)$; and $y_3 = f(x + 2)$. Obviously, $y_1 < y_2 < y_3$.

Now suppose a prospective employee ("Ee") applies for a job at Er3 (the highest risk employer) and is given the comparative risk information the moderate libertarian approach would mandate.\footnote{214} Also suppose, as the behavioralists would assert, that Ee irrationally discounts his personal risk, despite the objective comparative risk data. In fact, suppose Ee, because of the "optimism" and "false self-confidence" biases,\footnote{215} discounts his personal risk to $x$—the residual risk level one would face working at a job where no one had ever reported an injury or illness. Under these assumptions, Ee would believe that, for him, there is no difference in working for Er3 or Er1 (the lowest risk employer); because he believes himself capable of beating the odds, the jobs are equivalent in his mind.

But Ee, despite his tendency to mishandle risk information (i.e., to discount his personal risks), is still a wealth-maximizer, who wants to get as much as he can for doing his job. Thus, in negotiating his salary

\footnote{213. The point here is that, even if employees are irrational about risk and are likely to discount their personal risk to zero, they will, as long as they are also utility-maximizers, charge the highest rate they can charge for their work. And employers, unable to distinguish rational from irrational employees, will agree to pay accurate risk premiums in order not to lose employees (i.e., those that are not irrationally optimistic regarding their personal risks) to less risky employers. Thus, ceteris paribus, riskier employers will end up having to pay more than less risky employers, and the desirable incentive effects of a mandatory disclosure regime are preserved.}

\footnote{214. See infra Figure H.}

\footnote{215. See supra note 203 and accompanying text.}
with Er3, he will, knowing there are other employers who offer the same job with objectively less risk, demand a risk premium of y3. Er3, however, knowing that individuals are generally subject to cognitive biases and that Ee therefore likely discounts his subjective risk, might offer to pay only y1 (the minimum any employer could pay), and one might initially think that Ee would accept this offer, for Ee really perceives that his subjective risk is only x. But, given that Ee is still a wealth—maximizer (despite the fact that he is irrational about risk), he will know that he could credibly threaten to reject Er3’s offer in favor of a job with Er1, which would provide him with the same wage rate (wages plus y1) with less objective risk. Even though Ee himself perceives no difference between Er3’s job and Er1’s (because he irrationally discounts Er3’s risk), his threat to go with Er1 will be credible as long as there are a sufficient number of employees who would legitimately prefer Er1’s lower risk job to Er3’s job, all else being equal, and Er3 cannot tell whether Ee is one of those employees.216 Thus, in order to attract Ee, Er3 will raise his risk premium above y1. Similarly, he will raise his risk premium above y2 in order to woo Ee away from Er2. (Otherwise, Ee would credibly threaten to refuse Er3’s job in favor of Er2’s.) When this entire process has run its course, the riskiest employer will end up paying a risk premium greater than that paid by the next riskiest employer, even if the employee perceives the two employers’ jobs to be equally attractive.217 Thus, a risk disclosure regime will result in employers’ being penalized for risk, even if many or most employees are beset by cognitive quirks that cause them to discount their personal risks.

In addition, the presence of labor unions in the negotiating process will tend to ensure that risk premiums are high enough to reflect objective risk, even if individual employees make poor risk decisions. For many risky jobs, unions will play a key role in negotiating worker wages, and unions presumably are not susceptible to the cognitive limitations and biases that beset individual employees.218 Hence, un-

216. See supra notes 210, 212, and accompanying text.
217. But will the risk premium Er3 ultimately ends up paying be big enough? That is, will the risk premium reach y3—the level necessary to provide full compensation for the risks imposed? Yes, as long as (1) there is a critical mass of employees that are not irrational with respect to risk and thus would not accept the job for a risk premium less than y3, see supra note 210; (2) conditions of supply and demand are such that the employer has to hire some of those employees in order to operate at her desired productivity level; and (3) the employer is unable to distinguish rational employees from those that irrationally discount their personal risks. In such circumstances, prospective employees’ threats not to accept the job unless paid a risk premium of y3 will be credible, and the employer will end up paying the premium even to those employees that discount their personal risks.
218. See W. Kip Viscusi, Structuring an Effective Occupational Disease Policy: Victim Compensation and Risk Regulation, 2 Yale J. Reg. 53, 59 (1984) (noting that “many large unions have specialized expertise on risk issues and possess the bar-
ions—rational agents—will determine the wage rate, accurately taking into account the objective risk information, and individual employees—quasi-rational agents—will decide merely whether or not to accept the job. Employees may tend to be too willing to accept the job at the given wage because of optimism biases (the belief that they can beat the odds), etc., but because of the negotiating efforts of unions, they will at least be compensated for the risks they really bear and those risks will therefore be internalized.

(2) Failure to Remedy Employers' Informational Deficiency

A second potential shortcoming of moderate libertarianism's risk disclosure approach is that it addresses only one type of informational inadequacy leading to sub-optimal precaution-taking: insufficient risk information on the part of employees. The moderate libertarian approach does not deal with the problem of employers' remaining rationally ignorant of available cost-effective precautions, a problem that may persist despite the fact that workers are fully informed of risks and therefore demand adequate compensating differentials. Even if sufficiently motivated to take all cost-effective precautions to reduce workplace risks, employers will not do so if they are ignorant of some such precautions, and they will tend to remain ignorant of workplace safety precautions that appear to cost more to research and develop than they would likely benefit any individual employer.\textsuperscript{219} For example, even if employees knew all there were to know about ergonomic risks and therefore demanded an adequate compensating differential for accepting such risks, employers would still not adopt all cost-effective means of reducing ergonomic risks if, due to the high costs and limited \textit{individual} benefits of developing measures to develop ergonomic injuries, employers had under-invested in safety research and were thus ignorant of methods by which ergonomic risks could be cost-effectively abated. Thus, moderate libertarianism's singular focus on informing employees of risks may fail to generate optimal precaution-taking (\textit{i.e.}, it ensures that employees demand adequate risk premiums and thereby motivate employers to take all cost-effective precautions), but it does not address the employer ignorance obstacle.

\textsuperscript{219} See supra notes 98 to 100 and accompanying text.
That obstacle will exist, however, only in situations where the expected cost of developing a precaution is less than the expected individual benefit provided by that precaution. When the employer's expected individual benefit exceeds her expected costs, as will generally be the case with obvious risks that require relatively simple technological fixes, the employer will produce the precaution information without government intervention. In many cases, then, employers will not face a systematic informational deficiency that renders the moderate libertarian approach ineffective.

C. Moderate Paternalism: Mandatory Risk Disclosure Plus "Encouragement" of Particular Precautions

To the extent that employers' ignorance of available cost-effective precautions, rather than merely their lack of incentive to adopt such precautions, precludes optimal precaution-taking, a regulatory strategy in which the government discovers and encourages employers to take particular precautions (in addition to requiring employers to disclose risks) may be preferable. As noted above, this would be a moderate paternalist approach, for unlike the moderate libertarian approach, it would involve the government acting as a parent (by encouraging certain precaution activity), but it would not mandate the adoption of particular precautions, as occurs under the purely paternalist status quo.

1. Structuring a Moderate Paternalist Approach

The key issue in implementing moderate paternalism is how to cheaply but effectively convey precaution information to employers. The least activist (and least costly) approach would be to initiate a simple research and development program in which the government attempted to discover potential cost-effective safety precautions and made its findings available to interested employers. Under such an approach, the government would not actively disseminate information about available precautions but would instead simply make that infor-

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220. See supra notes 101 to 102 and accompanying text.
221. A moderate paternalist strategy of encouraging employers to adopt particular precautions should supplement, not supplant, a mandatory risk disclosure regime. See supra note 114 and accompanying text (explaining that when employer education regarding available cost-effective precautions is desirable, employee education regarding relative risks will also be desirable).
222. The costs of this type of program would likely be lower than more ambitious programs under which the government would disseminate its findings to employers, for the government would not bear the dissemination costs, and, while employers would have to expend resources to obtain the information the government had created, their costs of doing so would probably be less than the government's costs of engaging in general dissemination, for only interested employers—those most likely to use the information—would make efforts to access the information.
information available through, for example, pilot projects that interested employees could observe or information clearinghouses that they could access. Simple research and development may not succeed in effectively providing employers with precaution information, however, because the burden would rest on employers to seek out the information, and employers frequently do not even know they are failing to engage in optimal precaution-taking.

Regulators might therefore opt to directly disseminate to all relevant employers the government's findings regarding available cost-effective precautions. Regulators take this type of approach when they promulgate voluntary guidelines. For example, OSHA's voluntary ergonomics guidelines for the meat-packing industry amounted to "advice" from the government to employers about potential cost-saving safety precautions meat-packers might implement. Given that employers must ultimately pay for workplace risks through workers' compensation and risk premiums, direct dissemination of information about available precautions, coupled with risk disclosure to ensure adequate risk premiums, would seem sufficient to generate optimal precaution-taking on the part of employers.

The potential problem with this direct dissemination approach is that, absent some kind of carrot or stick with which to motivate employers to take the information presented seriously, it is difficult for regulatory agencies to achieve meaningful communication of potential precautions. After all, information about available safety precautions is usually boring and technical, and busy employers, deluged with all sorts of information from a variety of sources, are likely to ignore it.

223. Recently, OSHA has provided clearinghouses of information related to a number of safety risks and available precautions. For example, the agency's website now includes information on precautions related to, inter alia, automated external defibrillators, bloodborne pathogens, ergonomics, and heat stress. See U.S. Dep't of Labor, Compliance Assistance, available at http://www.osha.gov/dcsp/compliance_assistance/index.html. In addition, the agency posts information about available industry-specific precautions. See U.S. Dep't of Labor, Industry-Specific Resources, at http://www.osha.gov/dcsp/compliance_assistance/industry.html (last viewed on May 1, 2004).


225. See Ergonomics Program Management Guidelines for Meatpacking Plants, supra note 224.

226. For example, as meat-packers must ultimately pay for ergonomic injuries, providing their employees with risk information and them with information about ways to reduce ergonomic injuries would seem to be enough to motivate them to implement all cost-effective steps to reduce injuries.
In addition, even if employers were to take time to examine the information provided, they would be likely, given the long history of antagonism between private employers and regulatory agencies,\textsuperscript{227} to view it with skepticism. They may see it as a subtle attempt by regulators to wrest control of business processes.

Regulators might therefore choose to provide precaution information \textit{along with} some incentive that would increase the likelihood that employers would give the information its due regard. For example, regulators might reward managers who attended a precaution training session or penalize managers who refused to attend such a gathering.\textsuperscript{228} The government could thereby ensure that employers at least digested the information about available precautions and did not simply ignore it.

Of course, such an “information-plus-incentive” approach would cost more to implement than would a direct dissemination approach. First, there would be the cost of providing a reward or imposing a penalty. While some rewards (such as a waiver of safety inspections for some period of time) and some penalties (such as cutting off certain subsidies or tax credits) would actually conserve government resources, most rewards or penalties would impose some cost on the government.\textsuperscript{229} In addition, the need to monitor whether employers had paid proper attention to the information presented would require the government to engage in relatively costly forms of information dissemination. For example, regulators could not simply mail out packets containing precaution information, as there would be no way to determine which employers actually read and digested the information in the packets. An information-plus-incentive approach, then, would require the government to present the information in a relatively resource-intensive fashion—for example, in monitored training sessions—and would thereby impose greater administrative costs.

\textsuperscript{227} According to a survey of small businesspeople, OSHA is the second most “frustrating” federal agency to deal with. The Internal Revenue Service is first. See Kneiser & Leeth, supra note 19, at 52.

\textsuperscript{228} In recent years, OSHA has become more receptive to the idea of providing incentives to employers who carefully consider OSHA’s recommended precautions. For example, the “OSHA Strategic Partnership Program for Worker Safety and Health,” adopted in November 1998, provides for rewards for firms that “partner” with OSHA in developing plans for achieving safety improvements. See U.S. Dep’t of Labor, What Is an OSHA Partnership?, available at http://www.osha.gov/fspo/vpp/partnership/what_is.html (last viewed on May 1, 2004). Among the incentives OSHA offers in exchange for permitting it a close advisory role are penalty reductions and targeted, rather than general, inspections. See U.S. Dep’t of Labor, Incentives and Enforcement in Partnerships, available at http://www.osha.gov/fspo/vpp/partnership/incentives/html (last viewed on May 1, 2004).

\textsuperscript{229} Some of the incentive awards offered through the OSHA Partnership program (e.g., targeted and reduced inspections) would conserve government resources. Others (e.g., penalty reductions) would reduce them. See supra note 228.
than a direct dissemination approach. The net benefits of an information-plus-incentive approach, however, may be greater than those of direct dissemination, for information-plus-incentive would probably be more effective at meaningfully communicating precaution information to employers and would therefore be more likely to motivate optimal precaution-taking by employers.

Because all the moderate paternalist options discussed so far focus exclusively on providing precaution information to employers, they would not address the other informational deficiency leading to an inefficient level of precaution-taking in the workplace—i.e., inadequate risk information on the part of employees—and thus would require separate implementation of a risk disclosure requirement. Regulators might therefore explore ways to lower the administrative costs of informational regulation by adopting a regulatory strategy that would accomplish both information-provision objectives simultaneously. They might, for example, impose "opt-out regulations." An opt-out regulation would specify a particular cost-effective precaution an employer must take unless she opts out of complying with the rule by notifying her current and prospective employees of (1) the hazard the precaution would address, (2) the nature of the precaution at issue and the fact that the government has recommended it, and (3) the fact that she is opting out of compliance with the rule. Opt-out regulations, then, would be presumptively mandatory but could be waived if the employer were to document that she had made the notifications necessary to opt out of compliance.

Such regulations would thus occupy a middle ground between direct dissemination of precaution information (e.g., OSHA's voluntary ergonomics guidelines for meat-packers) and mandatory regulations (e.g., OSHA's proposed ergonomics standard). They would be significantly more informative than direct dissemination campaigns, for they would force employers, who would have to make a calculated choice about whether to implement the precautions at issue, to give the recommended precautions serious consideration. They would also ensure that employees are informed of any risks that employers declined to reduce by adopting the waiveable safety measures. They would therefore tend to move an employer to adopt all, but only, cost-effective precautions, because the employer's choice would be either: (1) to comply with the regulation, which she would do if she believed the precaution would save more in injury costs and risk premiums than it would cost to implement, or (2) to notify, which she would do

230. See supra notes 114, 221, and accompanying text (explaining that a moderate paternalist approach should generally include a risk disclosure element as well as an employer education element).
231. See supra note 224.
when the sum of expected injury compensation and risk premiums (which would tend to rise as employees learned more about risks and untaken precautions) was less than the cost of compliance. If the substantive requirements of an opt-out regulation were truly cost-effective, as they certainly should be if they are going to be mandated by the government, then employers would tend to adopt them voluntarily—that is, they would choose not to opt out. Employers who could not cheaply comply and for whom the expected savings in injury costs were less than the costs of compliance, however, would not be forced to adopt an inefficient precaution as long as they provided the information that would ensure that they ended up paying (in the form of risk premiums) the full costs of risks they impose. Hence, opt-out regulations could provide a way to remedy both employees' and employers' informational deficiencies in a cost-effective fashion.

2. Evaluation of Moderate Paternalism

A moderate paternalist regulatory option will generally cost more to implement than the moderate libertarian approach because moderate paternalism's employer education will be pursued in addition to moderate libertarianism's employee education. But moderate paternalism will likely cost less than a pure paternalist, command-and-control regime because moderate paternalism's flexibility allows it to retain several of the efficiency advantages moderate libertarianism holds over command-and-control. The key questions for evaluation purposes, then, are (1) in what situations will the added benefits moderate paternalism provides relative to moderate libertarianism outweigh the additional costs of the more activist regime, and (2) in what situations will the added benefits pure paternalism provides, relative

233. See supra note 221 (explaining that employer education regarding precautions typically is necessary only where employees are systematically under-informed of risks).

234. For example, because moderate paternalism, like moderate libertarianism, allows less risk-averse employees to contract with employers for whom risk reduction is expensive to allow risks to remain (in exchange for increased compensation), it permits gains from trade that an inflexible command-and-control regime would prohibit. See supra notes 164 to 167 and accompanying text. In addition, moderate paternalism does not inflexibly prescribe particular technologies and thus does not inhibit technological innovation the way pure paternalism does, and moderate paternalism's flexibility decreases its ability to impose competitive barriers and, accordingly, its tendency to induce wasteful interest group maneuvering. See supra note 176 and accompanying text. Moderate paternalism's flexibility also lowers the information requirement of the strategy relative to that of inflexible command-and-control. Because command-and-control prescriptions are inflexible, regulators must predict whether they will work well in a many different situations. See supra notes 169 to 174 and accompanying text. By contrast, regulators need not foresee each possible application of a rule if the rule is flexible and may be ignored in cases in which it misfires.
to moderate paternalism, justify incurring command-and-control's additional costs? The answers to these questions determine the contours of the “window” in which moderate paternalism will be the optimal regulatory strategy.

a. Vis-à-vis Moderate Libertarianism

When private employers are sufficiently motivated to engage in research and development of workplace precautions, they will likely possess a comparative advantage over the government in discovering cost-effective safety precautions. That is because government regulators are typically far removed from workplace processes and are unfamiliar with the time- and place-specific factors that render a precaution workable or unworkable.\(^{235}\) Private managers, by contrast, are quite familiar with the designs of their workplaces and will generally be more efficient at crafting cost-effective precautions. Government involvement in discovering and encouraging particular precautions, then, should generally be limited to those situations in which private employers are insufficiently motivated to take up the task themselves.\(^{236}\)

As noted above, employers will be adequately motivated to engage in research and development of safety precautions when the expected cost of developing the precautions is exceeded by the expected benefits to individual employers.\(^{237}\) This will typically be the case when the precaution at issue is somewhat obvious (so that expected development costs are relatively low, see Figure I) or when the expected accident costs, absent a precaution, are relatively high (so that expected individual benefits of precaution development are relatively high, see Figure J). These circumstances are more likely to occur in connection with acute workplace risks, such as unguarded blades or extremely bright lights. Ironically, then, the case for moderate paternalism’s more activist governmental role is weaker with respect to acute, severe, and obvious workplace safety risks.

By contrast, when, as in Figure K, the risk is more subtle (so that expected accident costs, and thus the expected individual benefits of precaution efforts, are relatively low)\(^{238}\) and the precaution is less obvious (so that expected development costs are relatively high), individ-

\(235.\) See supra notes 169 to 174 and accompanying text.

\(236.\) But see infra text accompanying note 241 (noting possibility that government development of precautions employers would privately develop may be optimal if it were to reduce total development costs).

\(237.\) See supra subsection II.B.2.b.

\(238.\) The actual accident costs (and consequent benefits of precautionary measures) may be relatively high, but as long as the expected costs of accidents (and benefits of precautions) are low, the individual employer will be less inclined to expend the resources required to develop a precaution. Thus, subtle but genuine workplace safety risks, such as the ergonomic risk posed by repeated motions, may not
ual employers will be less likely to engage in significant efforts to develop precautions, and the case for a more activist role for the government in developing precautions will be stronger. These circumstances are most likely to occur in connection with risks such as the ergonomic risk related to repetitive motions, where neither the likely accident costs nor the available precautions are immediately obvious. Moderate paternalism is thus more likely to be optimal when the risk at issue is subtle and the precaution non-obvious.

But what about the column on the right of these graphs—total societal benefits? Are there instances when very high societal benefits from developing precaution information may justify efforts by the government to develop such information, even though circumstances are such that private employers would do so without government assistance (i.e., even though the situation resembles that represented in Figures I or J)? Perhaps, but such situations will be rare. As noted above, individual employers, who, unlike centralized regulators, are privy to the time- and space-specific information necessary to formulate cost-effective precautions for their particular workplaces, typically possess a comparative advantage in precaution development. Accordingly, the government should generally refrain from research and development of workplace precautions whenever private employers are sufficiently motivated to undertake such efforts on their own. However, the fact that information is a public good that can be consumed without being depleted suggests that, even if individual employers would likely develop precaution information on their own, it might make sense for the government to take the lead in doing so in order to limit the total societal effort expended in producing the information. After all, if precaution information can be shared (and if private sharing of such information is unlikely), then a regime relying on each employer's separate development of the information would in-

239. Safety risks related to repetitive motions (and thus the expected cost-savings from developing precautions) are neither obvious nor, given the latency period for most ergonomic injuries, acute. The discovery of design changes that can reduce the injuries associated with repetitive stresses has taken significant effort, and few individual employers likely stand to gain enough from developing ergonomic precautions to undertake the efforts to do so. These facts may explain why employers have not voluntarily engaged in programs to reduce ergonomic injuries, despite the fact that such injuries cost employers billions of dollars per year and can be reduced relatively cheaply. See 64 Fed. Reg. 65768-69 (Nov. 23, 1999) (noting that employers pay more than $15-20 billion in workers' compensation for musculoskeletal disorders every year, that the other expenses associated with those disorders may increase employers' total costs to $45-50 billion per year, and that the workplace changes required by OSHA's proposed ergonomics standard would save employers $9.1 billion per year).

240. See supra notes 169-174 and accompanying text.

241. See supra text accompanying note 236.
volve wasteful duplication of research and development efforts. Of course, as the "shareability" of precaution information decreases (because the precautions are not transferable across a wide variety of workplaces), the case for government development efforts is weakened. Moreover, the precautions that are readily transferable across workplaces likely will be the obvious precautions that require little development effort in any event. If that is so, then government development of such precautions likely will not be optimal, for the sum of government development costs plus the costs of disseminating the information to employers will likely exceed the sum of private development costs. Thus, there probably will be few cases in which it would be more efficient for the government to develop the precautions that private employers would develop on their own.

b. Vis-à-vis Pure Paternalism

Are there ever situations in which a pure paternalist, command-and-control regime will be superior to a more flexible, moderate paternalist regime? In theory, yes. But such situations are likely to be exceedingly rare, and policymakers should therefore narrowly constrain the scope of pure paternalism, perhaps by employing a "dual-track" regulatory regime in which command-and-control applies only in those labor markets in which a moderate paternalist approach is likely to fail. Once again, the relevant question for determining whether a move from moderate to pure paternalism is justified involves a balancing of incremental costs and benefits: Are the marginal costs of mandating particular precaution technologies, rather than merely recommending them, outweighed by the marginal benefits of making such technologies mandatory?242

Mandating precaution technologies will almost never be justified on grounds that the marginal costs of requiring particular precautions, as opposed to recommending them, are low. That is because when the marginal costs of moving from recommendations to commands are low, the marginal benefits of doing so will generally be even lower. To see this point, consider that the marginal cost of mandating a precaution technology, rather than merely recommending it, decreases as the likelihood increases that the technology is one for which fully informed employers and employees would voluntarily contract.243 But, of course, the more universally appealing a precaution

242. Regulatory stringency involves the sort of increasing marginal costs and decreasing marginal benefits represented in Figure A, supra. See supra notes 106-108 and accompanying text. Efficiency is maximized at the point at which the marginal cost of a unit of regulatory restrictiveness equals the marginal benefit thereof. See infra Figure A.

243. More specifically, the marginal costs of moving from an approach that encourages but does not inflexibly require particular precautions to pure paternalism's com-
is, the more likely it is to be adopted voluntarily so that nothing will be gained by mandating it (i.e., there will be no marginal benefit associated with requiring, rather than recommending, the precaution). Thus, it is highly unlikely that a move to pure paternalism could ever be justified on grounds that making such a move involves low marginal costs.

If pure paternalism is ever justified, then, it will be because of the high marginal benefits of mandating, rather than merely recommending, particular precaution technologies. Those marginal benefits will increase as the likelihood rises that moderate paternalism will not achieve its ultimate objective of inducing employers to take all cost-effective safety precautions. Thus, the less likely it is that (1) providing employees with relative risk information will lead them to demand accurate risk premiums, and (2) providing employers with information about available cost-effective precautions will lead them to adopt such precautions voluntarily, the stronger the case for pure paternalism becomes. Assessing the benefits of a move to pure paternalism therefore requires consideration of the circumstances in which risk disclosure is unlikely to lead to risk premiums and employer education efforts are unlikely to lead motivated employers to take cost-effective precautions.

So when will employees fail to demand risk premiums despite being informed of relative risks? Recall from the discussion above that not every employee needs to be aware of, or influenced by, relative risk information in order for such information to generate risk premiums and thereby motivate employers to take all cost-effective precautions to reduce safety risks. Instead, the existence and size of risk premiums will be determined according to the demands of marginal employees—those last employees the employer needs to hire in order to

244. Recall that the "symptom" to be addressed in the workplace safety arena is employers' failure to take all cost-effective precautions. See supra Section II.A.
operate at her chosen capacity. Where wage discrimination is impracticable, as will likely be the case for most jobs posing safety risks, the infra-marginal employees may free ride off the demands of the marginal employees and will thereby be protected by their negotiating efforts.

But all this assumes that the marginal employees will be effective "deputies" who will successfully demand risk premiums on behalf of themselves (and, because of the impracticability of wage discrimination, on behalf of their co-workers). To be effective deputies that could generate risk premiums, the marginal employees would have to be (1) aware of the relative risk information (i.e., they could not be "non-searchers," to use the terminology of the search equilibrium model), and (2) somewhat representative in their tastes for risk (i.e., they could not be anomalous risk-preferrers, who would not demand risk premiums). If conditions of supply in demand in the labor market are such that an employer is able to avoid hiring a critical mass of employees that meet these criteria, then disclosing relative risks may not result in internalization of safety risks, and employers therefore may not be properly motivated to take all cost-effective precautions to reduce such risks.

An employer could fulfill all her labor requirements without hiring employees that will demand representative risk premiums if she were able to hire exclusively: (1) risk-preferring employees, who would not demand a risk premium; (2) non-searchers (i.e., employees that would not pay attention to the relative risk information and thus would not demand a risk premium); or (3) a combination of non-searchers and risk-preferring searchers. In each of these cases, the employer could avoid paying adequate risk premiums and therefore would not be motivated to take all cost-effective precautions.

In actuality, there is probably little reason to worry about any of these hypothetical labor markets. With respect to the first—the one in which the employer is able to fulfill all her requirements using risk-preferring employees—the employer's failure to be motivated to take optimal safety precautions presents little concern, for what is an "optimal" level of risk ultimately depends on the risk preferences of the employees. If all of an employer's employees prefer risk and make an informed decision to accept a risky job without demanding a risk pre-

245. See supra notes 125-130, 209-211, and accompanying text.
246. See supra notes 125-128 and accompanying text.
247. As explained above, though, even risk-preferring employees may still demand risk premiums if given objective information about the relative risks of their workplaces. That is because the employees would know that their employer could not tell they were risk-preferring and would therefore probably be responsive to a demand for increased pay based on relatively high safety risks. See supra notes 212-216 and accompanying text.
mium, then requiring the employer to expend resources to reduce risks would be sub-optimal. Of course, this assumes an absence of third-party effects stemming from the employees' risk-taking decisions. The existence of such effects—e.g., psychic costs to the employee's loved ones or increased costs to the government of having to support an injured employee—may present a reason to worry about labor markets in which employers are able to fulfill their requirements using solely risk-preferring employees.

The second and third hypothetical labor markets—the ones in which the employer is able to fulfill her requirements by hiring only non-searchers or a combination of non-searchers and risk-preferring searchers—likely does not present a problem because such markets likely do not exist. Providing relative risk information, presented in the easily understood format discussed above, to each prospective and current employee will greatly limit the number of non-searchers, so it would be quite difficult for any employer to fulfill her labor requirements by hiring only individuals who remain ignorant of the relative risks of the employer's workplace. Moreover, the employer likely could not hire only non-searchers and risk-preferring searchers, for most searchers will also be risk-averse (otherwise, why would they be searchers?). As long as it is necessary for an employer to hire a critical mass of searching, risk-averse employees, then she will have to pay risk premiums (on which the other employees may free-ride) and will therefore have an incentive to take all cost-effective precautions.

In any event, to the extent there were concerns that one of these hypothetical labor markets might exist so that risks were not being internalized to employers via marginal employees' demands for risk premiums, the proper policy response would not be across-the-board imposition of a pure paternalist, command-and-control regime. A less restrictive, more efficient regulatory solution would be to impose command-and-control only in those labor markets in which there was cause for concern. For example, particular precaution technologies might be mandatory in geographic regions with high unemployment rates (i.e., labor buyers' markets, in which employers might be able to avoid hiring marginal employees who would demand risk premiums).

248. Even risk-preferrers are likely to demand a risk premium of some sort (because they know that, as long as their employer cannot identify them as risk-preferrers, they can credibly threaten to leave if not paid such a premium). See supra notes 212-216 and accompanying text.

249. Third-party effects are frequently cited as a justification for what initially appear to be purely paternalistic regulations. See, e.g., Pope, supra note 103, at 455 & n.154.

250. See Viscusi, supra note 20, at 79 (acknowledging possible third-party effects).

251. See supra notes 137-158 and accompanying text.

252. See supra notes 125-128, 209-211, and accompanying text.
but merely recommended—through, say, “opt-out” regulations—elsewhere. This sort of dual-track regulatory approach would, in Professor Breyer’s words, “urge the adoption of classical regulatory methods only where less restrictive methods will not work.”

The discussion so far has focused on situations in which an informational approach may not address the employer motivation hurdle to optimal precaution-taking. But what about the employer knowledge hurdle? In situations in which the precaution information to be conveyed is abstruse or the recipient employers are particularly skeptical of government “advice” due to a history of antagonism with regulators, educating employers about available cost-effective precautions may be somewhat difficult. One might therefore think that mandating particular precautions, rather than merely recommending them, could be appropriate in those situations.

It is doubtful, however, that the challenges involved in communicating precaution information could justify imposition of a purely paternalist, command-and-control regime. Most of the difficulties related to communicating precaution information to employers could be overcome by selecting an appropriate means of disseminating precaution information. For example, promulgating an opt-out regulation would provide an employer with a strong incentive to carefully consider the recommended precaution technology. Given that an opt-out regulation is mandatory unless the employer notifies her employees of the hazard addressed by the regulation, the nature of the precaution the rule would mandate, and the fact that the employer is opting out of compliance with the rule, an employer confronted with an opt-out regulation could not simply ignore the precaution at issue. She would have to either implement it or, at the very least, be required to signify her choice.

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254. For example, OSHA might adopt an overarching rule that its safety regulations would be opt-out regulations unless the county unemployment rate were to fall below x%, in which case the regulations would be mandatory.

255. Breyer, supra note 1, at 185.

256. Employers may fail to be motivated to engage in optimal precaution-taking if employees are systematically underinformed regarding the relative risks of the workplace and therefore fail to demand adequate risk premiums. But even if properly motivated to do so, employers may fail to take all cost-effective precautions if they are systematically underinformed regarding the availability of such precautions. See supra text accompanying notes 96-102.

257. As explained in subsection III.C.1 supra, there are a number of ways for the government to provide precaution information to employers: it could (1) engage in simple research and development and allow employers to access a centralized database of information regarding available precautions, (2) directly disseminate the information to employers, (3) disseminate the information along with some sort incentive for employers to take account of the information, or (4) impose presumptively mandatory “opt-out” regulations. See supra notes 221-232 and accompanying text.

258. See supra text accompanying notes 230-232.
study it enough to describe it to her employees (and, most likely, offer an explanation as to why it was not worth adopting given the circumstances at hand). It appears, then, that moderate paternalism provides means for overcoming the challenges related to communicating precaution information to employers. Accordingly, a move to a purely paternalist, command-and-control regime likely cannot be justified on grounds that it is difficult to communicate precaution information to employers.

In sum, the regulatory status quo, pure paternalism, is rarely justified. It cannot be justified on grounds that it costs little to implement relative to moderate paternalism, for the circumstances in which it will impose low costs—situations in which the mandated precaution is one that would be voluntarily chosen by fully informed employers and employees—are precisely the circumstances in which it is least needed. Nor can it be justified on the ground that informing employers of available cost-effective precautions is too difficult. If it is to be justified, then, it will be because conditions of supply and demand in the labor market preclude risk disclosure from generating adequate risk premiums. Pure paternalism, then, should be limited to "labor buyers' markets," in which there is a glut of available workers relative to available jobs. A dual-track regulatory scheme imposing pure paternalism only where the unemployment rate exceeds a certain percentage would ensure that the high costs of command-and-control are not incurred unnecessarily.

IV. CONCLUSION

Given that the current command-and-control approach to workplace safety regulation appears to cost about three times more than it provides in benefits, it is time for efficiency-minded policy makers ask whether the current regulatory paradigm is an incidence of regulatory mismatch. They should follow Justice Breyer's "simple axiom for creating and implementing any [regulatory] program: determine the objectives, examine the alternative methods of obtaining these objectives, and choose the best method for doing so." This Article has sought to do just that.

The exploration presented here has revealed that there likely is a cheaper, more-effective way to induce efficient precaution-taking in the workplace. That alternative approach—a middle-ground between the OSHA abolitionists' exclusive reliance on market processes and the tort system (i.e., pure libertarianism) and the command-and-control regime—provides means for overcoming the challenges related to communicating precaution information to employers.

259. Another moderate paternalist option would be the "information plus incentive" option discussed above. See supra notes 228-230 and accompanying text.

260. See supra notes 19-21 and accompanying text.

261. See supra note 2 and accompanying text.

262. See Kneiser & Leeth, supra note 19, at 1.
control status quo defended by the OSHA apologists (i.e., pure paternalism)—would focus directly on the market failure leading to suboptimal precaution-taking in the workplace: systematically inadequate information concerning relative risks and, in some situations, available precautions. By ensuring that employees are informed of workplace risks, it would harness the market-based incentives created by compensating differentials—incentives that literally dwarf the regulatory incentives created by OSHA's costly command-and-control regime. And, when circumstances are such that employers are likely to be systematically under-informed of available cost-effective precautions, the middle-ground approach would address that informational deficiency as well. Only in highly unusual labor markets would the middle-ground approach resort to the command-and-control status quo. It would therefore narrowly address the particular market failures at issue in the workplace safety arena and would avoid the regulatory mismatch of which Justice Breyer warned.

263. See, e.g., Shapiro, supra note 54, at 22; Shapiro & McGarity, supra note 96, at 729; McGarity & Shapiro, supra note 96; Shrader-Frechette, supra note 96, at 311.

264. In 1993, employers paid an estimated $200 billion in compensating differentials, while OSHA and its counterpart state agencies levied fines of just $160 million. See Kneiser & Leeth, supra note 19, at 55. The incentive effects of compensating differentials therefore outweigh those of OSHA's command-and-control approach by a factor of 1250 to one!

265. See supra notes 246 to 253 and accompanying text.
Figure A: The Efficient Level of Risk Reduction

$x = \text{socially optimal level of risk reduction.}$

$y = \text{too little risk reduction.}$

$z = \text{too much risk reduction.}$

Figure B: Decision Calculus Facing an Employee Considering Whether to Engage Production of Risk Information

*Because Costs > Individual Benefits, employee will not produce info. even though magnitude of Total Benefits justifies costs.*
Figure C: How the Positive Externalities Associated With Workplace Risk Information Leads to its Underproduction

\[ y = \text{socially optimal level of research into risks} \]
\[ x = \text{level of risk research that will occur privately, given the divergence of private and total marginal benefits of research efforts} \]

Figure D: Circumstances in Which a Pure Libertarian Approach Would Be Optimal
Figure E: Sample Label

All copy Arial Narrow Regular or Bold as below. Helvetica Condensed series typeface or other equivalent also acceptable.

Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
With Through-the-Door-Ice Service

XYZ Corporation
Model ABC-W
Capacity: 23 Cubic Feet

Compare the Energy Use of this Refrigerator
with Others Before You Buy.

This Model Uses
800 kWh/year

<table>
<thead>
<tr>
<th>Uses Least</th>
<th>Uses Most</th>
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</thead>
<tbody>
<tr>
<td>Energy</td>
<td>kWh/year</td>
</tr>
<tr>
<td>685</td>
<td>1000</td>
</tr>
</tbody>
</table>

Energy use (kWh/year) range of all similar models

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 22.5 and 24.4 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate. This model's estimated yearly operating cost is:

$65

Based on a 2000 U.S. Government national average cost of $0.03 per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Prototype Label 1
Figure F: 2001 Injury / Illness Incidence Rates For Sausage Manufacturers With Between 250 And 999 Employees

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<th>1st Quartile: One-quarter of establishments had a rate lower than or equal to</th>
<th>Median: One-half of establishments had a rate lower than or equal to</th>
<th>3rd Quartile: Three-fourths of establishments had a rate lower than or equal to</th>
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<tbody>
<tr>
<td>Total injuries/illnesses</td>
<td>8.4</td>
<td>12.0</td>
<td>17.0</td>
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<tr>
<td>Lost-workday injuries/illnesses</td>
<td>5.2</td>
<td>7.2</td>
<td>11.3</td>
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</tbody>
</table>

Figure G: 2001 Injury / Illness Incidence Rates For “Food And Kindred Products” Manufacturers With Between 250 And 999 Employees

<table>
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<th></th>
<th>1st Quartile: One-quarter of establishments had a rate lower than or equal to</th>
<th>Median: One-half of establishments had a rate lower than or equal to</th>
<th>3rd Quartile: Three-fourths of establishments had a rate lower than or equal to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total injuries/illnesses</td>
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<td>10.5</td>
<td>14.9</td>
</tr>
<tr>
<td>Lost-workday injuries/illnesses</td>
<td>2.9</td>
<td>5.2</td>
<td>8.8</td>
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Figure H: Comparative Risk Disclosure Form for Capitol Hill Sausage Company

CAPITOL HILL’S INJURY/ILLNESS RATE COMPARED TO SIMILARLY-SIZED SAUSAGE MANUFACTURERS

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<th>Least Risky</th>
<th>8.4</th>
<th>12.0</th>
<th>17.0</th>
<th>Riskiest</th>
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</table>

CAPITOL HILL’S INJURY/ILLNESS RATE COMPARED TO SIMILARLY-SIZED FOOD MANUFACTURERS

<table>
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<th>Least Risky</th>
<th>7.7</th>
<th>10.5</th>
<th>14.9</th>
<th>Riskiest</th>
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<tbody>
<tr>
<td>CAPITOL HILL</td>
<td>14.1</td>
<td></td>
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</tr>
</tbody>
</table>
Even though Expected Individual Benefits are relatively low, they exceed Expected Costs of Info. Production, so employers will develop precautions.

Even though Expected Costs of Info. Production are relatively high, they are exceeded by Expected Individual Benefits of Information Production, so employers will develop precautions.
Figure K: Subtle Risk/Non-Obvious Precaution

Where Expected Costs of Info. Production > Expected Individual Benefits of Info. Production, employer will not produce info. even though magnitude of Total Benefits justifies costs.