

# Do Workers Want OSHA's Ergonomics Regulations?

JOSEPH M. JOHNSON and WENDY L. GRAMM

*Mercatus Center, George Mason University, Arlington, VA 22201*

W. KIP VISCUSI

*Harvard University, Cambridge, MA 02138*

## I. Introduction

As discussed elsewhere in this Symposium, OSHA predicts that its ergonomics program rule will benefit workers by improving workplace safety in high-risk industries where musculo-skeletal disorders (MSDs) are common. It also predicts that its mandatory program rule will benefit firms in these industries by reducing the number of days injured employees miss work and the costs of treating MSDs. OSHA estimates that this rule will offer net benefits to employers of \$5.7 billion per year.

Many commentators have questioned OSHA's predicted net benefits to employers, pointing out that if ergonomics programs could really save employers so much money, they would have every incentive to undertake them voluntarily (Dudley, this issue; Hahn and Moyle, 2000). They argue that OSHA has not identified a market failure that would hinder employers from undertaking actions to reduce the risk of MSDs in the workplace to optimal levels (Berkman and David, this issue).

This note takes a slightly different approach and examines OSHA's unqualified claim that its program rule will offer substantial benefits to workers in industries prone to MSD injuries. We examine whether the rule would remedy any inappropriate or inadequate employee incentives to demand optimal protection against MSD hazards. We conclude that while some workplaces are undoubtedly safer than others, this does not necessarily reflect a failure of the market. Indeed, it illustrates an optimal market solution to the problem of MSDs. Because it circumvents the market, the rule has the potential of harming the firms and employees in high-risk industries that OSHA claims will receive the greatest net social benefit.

## II. *The Role of the Market in Determining Levels of Workplace Safety*

Some jobs are inherently less safe than others. Coal miners, professional athletes, and furniture movers face much higher risks of physical injury every day than do teachers, engineers, and car salesmen. Yet millions of people worldwide voluntarily undertake these risks because they perceive that the wage received offers sufficient compensation for taking the risk associated with the job. This idea of compensating differentials has

been a central one in modern microeconomic theory since Adam Smith first stated it in his celebrated *The Wealth of Nations*. Holding all else equal — education, skill, experience, and other factors — a worker in a more risky job will earn a higher wage than one in a less risky job.

The existence of the wage differential as compensation for risk has been widely documented in the empirical literature.<sup>1</sup> Viscusi (1993) finds that the wage premium paid to workers for injury-risk, not fatality-risk, is about \$50,000 for each injury that is sufficiently severe to cause at least one lost workday. Thus, the actual wage increase for a worker in a risky job is \$50,000 multiplied by his or her probability of experiencing such an injury. Put differently, if it is certain that such an injury would occur (probability is one), an employee would receive \$50,000 in addition to the basic wage that would be paid without any risk whatsoever. The usual probabilities of such an injury are, of course, much less than one hundred percent. Clearly, this rate of compensation is significant and demonstrates that the market takes into account workplace risks.

For wage differentials to function properly, the potential employee must have information about the level of risk involved. Workers may not, however, necessarily have full information about job risks when they are hired, but on-the-job experience provides an opportunity for the employee to learn and evaluate such risks. This experience consists of observing the job tasks, the effect of these tasks on physical well-being, and the frequency of injury to cohorts. Indeed, this adaptive process by which workers learn about risks and then quit if the compensation is insufficient accounts for as much as one-third of all manufacturing quit rates.<sup>2</sup> Through this process, the employee revises his or her perceptions about the job risks and then decides whether or not the wage premium is adequate, given the risks involved. In this way, employees sort themselves into jobs with the risk/wage profiles most suitable to their individual preferences.

Job sorting takes place because some employees are willing to work a job with a certain level of risk and wages while others of similar ability and training are not. This means simply that while all individuals prefer less risk to more, the rate at which individuals are willing to trade risk for wages differs. Just as employees exhibit different preferences for leisure vs. labor, job security vs. entrepreneurship, and so forth, they differ in their preferences for safety risk vs. wages. Given an economy of firms with different levels of job risk and employees with different preferences for risky conditions, the labor market will tend to sort individuals such that those who are less averse to risk will find their way into more risky jobs. Workers who would pay less to avoid a risk underbid those who would pay more. The risk and wage profile of a job in any industry is determined jointly by the inherent risk of the job and the risk preferences of employees who sort themselves into that job via the market.

### III. *What Is the Effect of a Minimum Safety Standard on Firms and Employees?*

A job is not simply a task that is performed for a given wage at a given rate but rather is a package of characteristics including wage rates, number of hours worked, benefits, and working conditions (Trejo, 1991). When labor and product markets are competi-

tive, varying any one of those job attributes affects the others. It is impossible for firms in competitive industries simply to decrease the wages of employees without applying a compensating differential, such as an increase in benefits, because doing so would reduce the number of workers willing to work for the firm. Additionally, a firm would not increase wages without a compensating differential since it would no longer be able to cover its costs of production and remain in business. The risk level of working conditions is simply another aspect of a job and changing it through regulation will affect levels of output and employment.

A profit-maximizing firm will tend to offer an employment package that gives employees the highest utility level at the lowest cost to the firm. Because employees value health and safety, firms would offer less risky working conditions rather than higher wages as compensation were it cost effective to do so. Empirical evidence reveals that some firms prefer to offer employees a wage premium for risk rather than investing in risk reduction, suggesting that risk reduction is more costly. The fact that individuals choose to accept such wage premiums in exchange for taking on higher risk also suggests that they derive greater utility from higher compensation than from greater attempts at risk reduction.

Despite this observation, OSHA predicts that its ergonomics program rule will reduce costs in high-risk industries, benefiting both employer and employee. Economic analysis leads to a different conclusion. Firms in high-risk industries with high costs of effecting safety standards will certainly incur a greater share of compliance costs, but the imposition of these costs is unlikely to benefit either the firm or its workers.

In fact, most of the compliance burden will fall on a relatively concentrated group of industries. Assume for simplicity that industries can be roughly divided into three categories of high, medium, and low risk of MSD safety based on the nature of jobs performed. In the absence of regulation, firms in high-risk industries will find it advantageous to offer wage premiums for risky work. The safety measures to make employees indifferent between a state of high safety and one of low safety will be so costly as to prohibit their installment without reducing wages by a greater amount than employees are willing to accept for the safer environment. Medium-risk firms are probably roughly indifferent as to whether they offer safety or wages. Here the cost of safety is about equal to the reduction in wages necessary to implement it. In low-risk industries firms can offer generously safe working conditions, as the cost is so low that employees are actually made better off in utility terms. That is to say they would be willing to give up more wages than necessary to achieve the safety level these firms can offer. On the margin, the worker's trade-off and the rate at which firms can promote safety at greater cost will be equal.

Interestingly, Berkman and David's examination of the OSHA proposal in this Symposium finds that, according to OSHA's assumptions, data, and analysis, one-third of all industries covered by the rule produce the majority of OSHA's estimated total benefits.<sup>3</sup> This one-third probably corresponds to the high-risk category defined above. However, OSHA's high net-benefit estimate may reflect not a market failure that prevents these high-risk firms from realizing their safety potential but the fact that OSHA's

analysis does not take compensating wage differentials into account. In other words, OSHA seems implicitly to assume that all firms fall into a third category where the costs of achieving safer conditions are lower than the wages required to compensate workers for accepting more risk.<sup>4</sup> If the risks are recognized, such a situation can never exist in a competitive market.

However, the cost to particular industries of risk reduction is not simply the cost to firms of compliance. Although we have spoken thus far of firm and employee reactions to risk in the labor market, it is the combination of firm and employee characteristics that determine the relevant total cost to an industry of implementing safety standards. Loss of welfare among employees in an industry is also a cost of safety regulations. Despite OSHA's findings in its cost-benefit analysis that employees in high-risk industries will be among the beneficiaries of Ergonomic Standards, it is more likely they will be the biggest losers.

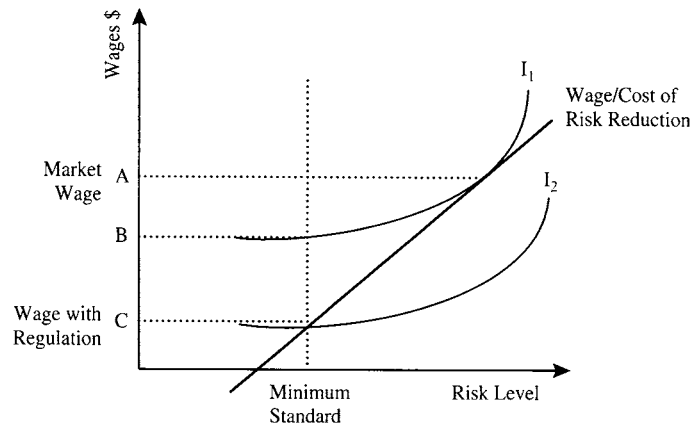
We have already discussed the fact that some employees are more tolerant of risk and therefore demand a lower wage premium for working under risky conditions. Employees who are more tolerant of possible MSDs will tend to work in industries where MSDs are more likely because they can underbid others for the same job. Just as an investor chooses a portfolio based on his or her risk-return profile, so too an employee chooses a job based on his or her risk-wage profile. When a minimum safety standard is imposed on a workplace, all employees who work in jobs where the risk is above the minimum threshold will be forced to take a reduction in wages larger than what they would be willing to pay for the increased safety provided by the standard. Indeed, they will no longer be able to take a job with the optimal risk-wage profile, as those jobs are effectively outlawed under the regulatory standard.

Workers will trade risk for higher wages as risk is an economic "bad." What happens to employees who are no longer able to choose their optimal risk-wage combination? As Figure 1 demonstrates, workers in high-risk industries face a potentially large utility loss due to mandated minimum safety standards.

Using indifference curves allows one to recognize the consequences of a universal minimum standard for ergonomics in the workplace. The indifference curves show the typical employees' in high-risk industries subjective willingness to trade increased risk for higher wages. The diagonal line is the firm's rate of technological transformation of wages into safety risk reduction.<sup>5</sup> When the market is permitted to operate, employees sort themselves into jobs where their willingness to trade risk for wages is equal to the firm's marginal rate of transformation. Thus there exists an efficiency condition in the market demonstrated by the tangency of  $I_1$  to the wage/cost of risk reduction line. The reduction of MSDs through safety standards is so costly to firms where MSDs are more probable that forcing employees to accept a compensation package featuring the required safety level and lower wages reduces their utility levels to  $I_2$ .

Using Figure 1, it is also possible to quantify the loss that workers experience in concrete terms. Workers experience a drop in welfare from the indifference curve  $I_1$  to  $I_2$  as a result of the minimum safety standard. At that regulated level of safety, workers

Figure 1



would need a level of additional wage compensation equal to the vertical distance BC in order to have the same level of welfare that they had before the regulation. The fact that such compensation is needed does not mean that workers do not place any premium on the added safety from the regulation. That premium is given by the vertical distance AB. The problem is that they do not value the greater safety by as much as their wage has been reduced. The imposition of a regulatory requirement creates a greater level of safety but at a greater cost than what the workers believe it is worth based on their own risk-money trade-offs.

Because the market already seems to work so well at matching employees to jobs, the distribution of employee risk-wage profiles is highly ordered. Risk tolerant workers tend to work in relatively risky environments. This regulation will have a greater negative impact on certain segments of the economy and most assuredly on all workers who are more willing to accept risks. Perversely, the segments this logic suggests will be most negatively affected by the mandate, high-risk industries, are the very industries to which OSHA attributes the majority of benefits.

Furthermore, the fact that high-risk industries and their employees will lose does not mean that the converse is true: that low-cost industry firms and employees will gain. These firms are already offering greater safety as part of their compensation package. In fact, many firms already have ergonomic standards in place that reduce MSDs significantly.<sup>6</sup> Furthermore, MSDs have been declining over recent years at a rate of nearly 4 percent per year from 1994 to 1997.<sup>7</sup> If the firms that can actually save money by enacting ergonomics programs have already done so to a large extent, then forcing the standards on other industry segments can accomplish nothing but impose costs and utility losses on a concentrated group of firms and employees. The end result is a potentially large deadweight loss from a gross reduction in market efficiency.

#### IV. Conclusion

OSHA's proposed Ergonomics Rule will clearly impose serious costs on firms across many industries, but industries where MSD risk is highest will face much greater costs. OSHA recognizes this by excluding some high-risk industries. For the higher risk industries that are covered by the proposal, OSHA suggests that benefits to firms and employees will outweigh these costs. We argue that OSHA has ignored the importance of differences in individual preferences for accepting risk and that compensating wage differentials allow different individuals to maximize their utility by making trade-offs between safety and wages.

For many firms with higher risks of MSDs, the elimination of MSD risk among their work forces will be extremely expensive or even impossible due to the inherent nature of the job performed. Through market processes, these firms have already attracted employees whose personal subjective willingness to accept risk is high compared to others. Thus, by paying a wage premium, they are able to induce workers knowingly to accept the risk. OSHA's MSD safety mandates circumvent the market and remove the incentive for job matching between employees and employers. Without this additional efficiency frontier, workers and firms in certain high-risk industries lose. Firms face higher costs, part of which will be passed along to consumers. Employees lose utility, as they are no longer permitted to accept a higher wage in return for taking greater risks. Thus both firms and employees are made unambiguously worse off by the regulation intended to help them.

#### NOTES

<sup>1</sup>See for example Thaler and Rosen (1976), Viscusi (1993, 1998), and Viscusi and Moore (1990).

<sup>2</sup>For the underlying analysis and supporting empirical evidence, see Viscusi (1979).

<sup>3</sup>Interestingly the authors find that firms in the "high-risk" group also spent more on average on ergonomics programs by implementing all of the cost-effective safety fixes prior to regulation.

<sup>4</sup>Note that some industries are excluded from OSHA's proposed rule, including agricultural services, construction, maritime industries, and mining (excluding some oil and gas).

<sup>5</sup>Here the line is linear for convenience and simplicity. Assuming increasing marginal costs to adding safety would potentially exacerbate the problem as obtaining the last increases in safety becomes ever more costly causing even greater wage decreases.

<sup>6</sup>See Berkman and David in this Symposium for evidence on the number of firms and employees with ergonomics programs already in place.

<sup>7</sup>Mercatus Center Regulatory Studies Program, Public Interest Comment: OSHA's Proposed Ergonomics Standard Program, available at [www.mercatus.org](http://www.mercatus.org).

## REFERENCES

- Berkman, Mark P. and Jesse David. "Where Is the Market Failure? A Review of OSHA's Economic Analysis for Its Proposed Ergonomics Standard." *Journal of Labor Research* 22 (Winter 2001): 75-94.
- Dudley, Susan E. "The Benefits and Costs of OSHA's Proposed Ergonomics Standard." *Journal of Labor Research* 22 (Winter 2001): 95-109.
- Hahn, Robert W. and Petrea R. Moyle. "Developing a Framework for Sensible Regulation: Lessons from OSHA's Proposed Ergonomics Rule." American Enterprise Institute-Brookings Joint Center for Regulatory Studies, Washington, D.C. Regulatory Analysis 00-2 (March 2000).
- Moore, Michael J. and W. Kip Viscusi. *Compensation Mechanisms for Job Risks*. Princeton: Princeton University Press, 1990.
- Thaler, Richard and Sherwin Rosen. "The Value of Saving Life: Evidence from the Labor Market." In N. Terleckyj, ed., *Household Production and Consumption*. New York: Columbia University Press, 1976.
- Trejo, Stephen J. "The Effects of Overtime Pay Regulation on Worker Compensation." *American Economic Review* 81 (September 1991): 719-40.
- Viscusi, W. Kip. *Employment Hazards: An Investigation of Market Performance*. Cambridge: Harvard University Press, 1979.
- \_\_\_\_\_. "The Value of Risks to Life and Health." *Journal of Economic Literature* 31 (December 1993): 1912-46.
- \_\_\_\_\_. *Rational Risk Policy*. Oxford: Oxford University Press, 1998.