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Why Relative Economic Position Does not Matter: A Cost Benenit Analysis

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A COST-BENEFIT ANALYSIS***

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Executive Summary

The current debate over cost-benefit concerns in agencies' evaluations of government regulations is not so much whether to consider costs and benefits at all but rather what belongs in the estimated costs and benefits. Overlaid is the long-standing belief that the distribution of costs and benefits needs some consideration in policy evaluations. In a recent article in the *University of Chicago Law Review*, Robert Frank and Cass Sunstein proposed a relatively simple method for adding distributional concerns to policy evaluation that enlarges the typically constructed estimates of the individual's willingness to pay for safer jobs or safer products. One might pay more for safety if it were the result of a government regulation that mandated greater safety across-the-board. Frank and Sunstein argue that the reason for enlarging current estimates is that someone who takes a safer job or buys a safer product gives up wages or pays a higher price, which then moves him or her down in the ladder of income left over to buy other things. Alternatively, a worker who is given a safer job via a government regulation will have no relative income consequences if all workers have lower pay. We show that when considering the core of the Frank and Sunstein proposal carefully one concludes that current regulatory evaluations should be left alone because there is no reason to believe that relative positional effects can be well identified quantitatively, are important to personal decisions in general, or are important to well constructed cost-benefit calculations of government regulations.

One of the practical problems with trying to consider relative position of income and consumption when estimating willingness to pay is that there is no unique way to ascertain, from a statistical model, the person's actual social reference group. A researcher must specify ex ante a reference group and then net out the behavioral effects of a possibly incorrectly attributed reference group's behavior on the individual. There is no well-established result from survey data for a typical person's economic reference group. Moreover, the econometric literature generally finds that reference group or social interaction effects are unlikely to be identified uniquely or are small and easily ignored, perhaps because the relative positional effects of workplace or product safety offset possible reference group effects on income.

To some extent, Frank and Sunstein's recommended increase in the value of willingness to pay for safety used in current regulatory evaluations is already considered. Regulatory evaluations often include a pessimistic and an optimistic value of likely benefits, and Frank and Sunstein's suggested revised value of willingness to pay is still below the optimistic case that carefully formulated cost-benefit studies use. It is easy to show that almost doubling the estimated value of a statistical life would have an inconsequential effect on the economic desirability of a broad set of regulatory policies.

Finally, we argue that the most important refinements in the area of regulatory evaluation would be for agencies involved to adhere more to the framework of what is generally considered a carefully done cost-benefit study and for agencies to make greater actual use of appropriately done cost-benefit studies when recommending regulations.

Introduction

An exciting recent development in cost-benefit evaluation of policy is the issuance of so-called prompt letters by the Office of Information and Regulatory Affairs (OIRA) of the Office of Management and Budget (Hahn and Sunstein 2001). OIRA's prompt letters, which are made public, have openly encouraged agencies such as the Food and Drug Administration and the Occupational Safety and Health Administration to explore specifically named regulations that OIRA believes may be cost beneficial, such as possibly requiring automatic external defibrillators in the workplace. Whether prompt letters and other efforts to reform the regulatory process will be successful depends ultimately on how one values the benefits and costs of the regulations. Frank and Sunstein (2001) propose that benefit estimates used to value lives in regulatory studies, such as the ones OIRA seeks to foster, be increased. Their rationale for enlarging benefit calculations is that, as currently constructed, benefit estimates do not account for the role of people's concerns over relative economic position in society. We argue against replacing the current approach to valuing risks to life and health because pinning down the importance of relative position is statistically impracticable, because there is little evidence that relative position is important to individual decisions, and because even if relative position were important to individual decisions, policy decisions involving cost-benefit calculations would remain largely unchanged.

In the absence of explicit legislative prohibition, a comparison of costs to outcomes coupled with economic balancing is now the default standard when formulating a new government regulation (Sunstein 2000). Cost-outcome balancing means weighing the policy's benefits and costs. Although studies of programs' costs and outcomes have been deservedly criticized for lack of completeness, Executive Order 12866 makes agencies provide a regulatory impact evaluation if a rule or regulation may "have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy,

productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities (Hahn, et al. 2000)." Similar intent that costs and outcomes be considered explicitly appears in the Unfunded Mandates Act of 1995. In what may have a dampening effect on cost and benefit comparisons in decision making, at least in the private sector, juries seem to punish private sector firms that try to balance costs and benefits of harm to customer or worker health when making production decisions prior to accidents and ultimate tort suits (Viscusi 2001). Still, where government regulations are concerned, no longer is the debate mostly over whether to consider costs and benefits but rather mostly over what belongs in the cost and benefit columns.[1]

Frank and Sunstein offer a simple solution to the thorny issue of how to incorporate non-uniform net benefits across initially advantaged versus disadvantaged groups when calculating net benefits of a regulation. In particular, they suggest that the valuation of safety depends on one's reference group and would be quite different depending on which other groups are also paying for safety-enhancing policies. We argue that there are conceptual and practical flaws to the modest proposal of Frank and Sunstein so that producers and users of studies of regulatory cost and outcomes should not adopt their idea. In particular, there is no unique way to identify a person's social reference group from a statistical model of individual behavior, and there are no well-established survey results concerning reference group membership. Moreover, there is much statistical evidence that postulated social reference group effects are small and of little consequence for a broad set of individual behaviors. Because carefully constructed cost-benefit studies consider a range of values that encompass the adjustment suggested by Frank and Sunstein, decision makers should retain the current approach of using absolute benefit values rather than Frank and Sunstein's adjusted benefit values. Of greater value to policymakers than what Frank and Sunstein recommend would be for regulatory agencies to require more careful cost-benefit studies than are now typical, and for the agencies to make greater use of cost-benefit

studies that adhere to best available practice guidelines. Use of speculative reference group adjustments could potentially undermine the perceived legitimacy of the valuation of reduced risks to life and health.

Current Practice in Policy Evaluation

As currently practiced, analysis of the benefits of risk reduction typically relies on multivariate statistical estimates of what a worker is implicitly willing to accept to incur risks on the job or what a consumer is implicitly willing to pay for a safer product. Estimates of risk-money tradeoffs underlie the estimated benefits of saving a statistical life, known either as the implicit value of life or the value of a statistical life. Risk-money tradeoffs also underlie the estimated benefits of preventing certain non-fatal injuries, sometimes referred to as the implicit value of harm or the implicit value of injury. Government regulations mandating greater safety will lower wages and raise product prices so that the ultimate costs of attendant safety enhancements are paid for by the end users of the safety: workers and consumers. The change in wages or prices then reveals the value of a regulation-induced safety enhancement to compare to cost calculations in a cost-benefit analysis.

The standard procedure used to calculate benefit values for any government program is the amount society is willing to pay for the program's benefits. In the case of risk regulation, the reference point is our willingness to pay for the risk reduction achieved by the regulation. In the case of policies that save lives, the question is not how much people are willing to pay for the particular outcomes in terms of actual lives saved, but how much people are willing to pay for reductions in the risk to life for a much broader population group. The benefit being purchased at the time of the policy decision is reduced risks to life, not the saving of lives that are identifiable ex post.

To establish meaningful values for the tradeoffs people are willing to make between risk and money, economists have examined choices people make in the marketplace. The reason for focusing on actual decisions is that they reflect how much people value safety themselves in their own decisions. In contrast, if government officials picked the values on their own, we would be getting the benefit values of government bureaucrats not the benefits of the population at large. Similarly, instead of relying on market evidence, we could undertake a survey of how much people value safety. Although survey evidence is often useful, obtaining honest and reliable responses is often problematic. The continuing controversy over the use of contingent valuation methods to value environmental damages attests to difficulties over accuracy of contingent value estimates. Obtaining market-based estimates of the value of life is complicated by the fact that risks to life are seldom traded solely for money. Rather, money and risks are bundled as part of a set of many characteristics of jobs or products. The task for economists is to use statistical methods to isolate the tradeoff between money and risk embodied in these market decisions.

A chief source of risk-money tradeoffs information has been estimates from the labor market. Using large data sets on worker behavior, one can estimate the incremental wages workers receive in return for facing added risk, controlling for other aspects of the worker's job. The wage increment approach yields an implicit value of life in the range of $3 million to $7 million for most studies in the literature.[2] For the sake of convenience, we will take the midpoint of about $5 million as indicating an appropriate value of a statistical life based on market wage-risk tradeoffs. So, if workers faced an annual job fatality risk of one chance in 10,000, an implicit value of life of $5 million implies that each worker would require an extra $500 to face the added 1/10,000 risk of death. Put somewhat differently, if there were 10,000 workers affected, each of whom faced a job risk of one chance in 10,000, and then there would be one expected statistical death to the group. In return for facing the 1/10,000 risk there would be a wage supplement of $500 for each of the 10,000 workers, or a total of $5 million more paid in wages. Implicitly, the

group of workers are willing to exchange total compensation of $5 million to accept the extra risk of one statistical death to their group, which gives rise to the value of a statistical life of $5 million. We will refer to estimates of extra group compensation as the implicit value of life figures. Market based estimates of the value of life are not constructed to the labor market. Similar estimates have been derived based on analysis of housing price responses to hazardous waste risks, the higher prices commanded by safer cars, and the tradeoffs reflected in many other product choices related to the price versus the product's safety, quality or reliability.

The sound basis of estimates of the value of life is of tremendous importance in establishing the legitimacy of cost-benefit analyses. Surely, valuation of risks to life is potentially controversial. Indeed, it is an exercise that some might view as immoral. The market values establish a sound basis for estimates of people's benefits of improvements to their health and safety because they can be traced to people's own valuations reflected in real decisions. In addition, the substantial value of life figures that are well in excess of the present value of people's earnings establish a high value that helps diminish concern that risks to life are being undervalued.

Practitioners of cost-benefit analysis have assembled several panels of experts to make recommendations for what a well-formulated cost-benefit comparison should contain in the areas of the environment, health, and medicine with the goal of increasing realism and transparency of calculations and decisions to be drawn (Gold, et al. 1993; Arrow, et al. 1996). A common concern for cost-benefit analysis is that distribution of costs and benefits by, say, income or race not be totally ignored when reporting and applying cost-benefit analysis. If two policies have the same total costs and total benefits one might argue on equity grounds that the policy that does more for the poor should be preferred. However, addressing issues of distribution more generally are controversial and can be used carelessly or strategically (Viscusi 2000b).

A stumbling block in applying adjustments for distributional considerations has been how to do it in practice while maintaining the well-known objective of KISS (Keep It Sophisticatedly Simple). Frank and Sunstein present a clearly argued KISS-based proposal for incorporating income distribution consequences of health and safety regulations into ultimate decisions based on policy analyses. We contend that the conceptual and practical flaws we identify should make practitioners of cost-benefit analysis justifiably unmoved by the refinements offered by Frank and Sunstein.

Frank and Sunstein's Refinement to Current Practice

Frank and Sunstein (2001) propose that economists, lawyers, and policymakers not use typical implicit value of life figures but instead use value of life figures that consider persons' relative economic positions. Frank and Sunstein contend that people are on "a positional treadmill" in which they accept extra pay for job risks in an effort to achieve relative economic (income/consumption) status. In their view the standard estimates used in the federal government of a value of life of about $4 million should be increased. Their stated rationale for boosting estimated values of life is as follows:

> The essential reason for our claim is that people care a great deal about their *relative* economic position, and not solely, and often not mostly, about their *absolute* economic position. Current estimates tell us what an individual, acting in isolation, would be willing to pay for, say, an increase in safety on the job. But when an individual buys additional safety in isolation, he experiences not only an absolute decline in the amounts of other goods and services he can buy, but also a decline in his relative living standards. In contrast, when a regulation requires *all* workers to purchase additional safety, each worker gives up the same amount of other goods, so no worker experiences a decline in relative living standards. If relative living standards matter, then an individual will value an across-the-board increase in safety more highly than an increase in safety that he alone purchases.[3]

Frank and Sunstein maintain that a worker's concern over relative economic position means that, as currently calculated, market wage-risk tradeoffs understate the implicit value of life. So, if the government now uses $4 million as the average value of life, in their view,

additional concerns over workers' relative positions should increase the appropriate amount to a range from $4.7 million to $7 million.[4] For the $5 million reference point that we introduced above, the value-of-life range would be from $5.9 million to $8.8 million. Thus, the main effect of their procedure would be to boost the estimated average value of life used in benefit assessment by 18 percent to 75 percent over what is currently used.

The main, and surely controversial, innovation to cost-benefit analysis argued for by Frank and Sunstein is a contention that persons care not only about the other things they can buy besides safety, but also about how their consumption of other things or income compares to the income and consumption of other persons in society. Frank and Sunstein believe that not only does my personal sense of well-being depend on my own income but that it also depends on where I am located in the income pecking order of whatever demographic barnyard I may belong to emotionally. In the Frank and Sunstein view of regulatory evaluation, greater mandated safety has attached to it the additional cost of moving down the income distribution, and conventional estimates of willingness to pay incorporate the individual's cost of having more safety from being made worse off in a comparative residual income sense.

Frank and Sunstein conclude that conventional cost-benefit analysis undervalues health and safety regulation because the benefits are understated. Because a regulation makes everyone in the relevant group consume more safety and suffer similar wage reductions and price increases, there is no change in anyone's relative economic position from a widespread regulation. According to Frank and Sunstein, conventional benefit calculations that use risk-money tradeoff estimates are too low, and therefore conventional cost-benefit calculations are too economically pessimistic about society's gain from the regulation. This is because conventional estimates of the value of life are individualistic and net out the person's private loss from moving down the income distribution. Their bottom line is to argue that conventionally calculated value of life estimates should be increased when deciding whether to adopt a

regulation that would save statistical lives. The obvious possible practical consequence of what Frank and Sunstein contend is that some regulations that are currently viewed as not worthwhile may be considered as generating benefits in excess of costs.

Conceptual and Practical Weaknesses of Frank and Sunstein's Proposal

Often the devil is in the details. Here the devil is in what Frank and Sunstein leave out of the details. The standard economic approach to understanding a person's or a firm's decisions is symmetric in that the price is compared to the economic value of the good or service. Frank and Sunstein want an asymmetry in the individual's decision such that in addition to the usual economic benefit a service or a good provides at a cost equal to its price there is a second price (cost) of safety if one buys it in isolation. The second (hidden) cost is less purchasing power for other things compared to the other members of a person's reference group. Residual income has a so-called positional effect in that the person implicitly buying the safety would also pay an additional amount not to have an associated decline in comparative command over other things such as clothing or pleasure travel. The amount one would pay to avoid moving down the social consumption ladder would then be added into any social calculation of the benefits of a safety-enhancing regulation that is applied universally.

Asymmetric Treatment of Relative Position's Importance

Consumption can surely be a status symbol, and Frank and Sunstein are correct in suggesting that higher income confers greater economic status. However, there are other attributes associated with a job that may be consequential as well. Perhaps most pertinent here is that being in good health is a highly valued attribute. People may simply have a preference for safer jobs because safe jobs protect individual health.

We find the Frank and Sunstein willingness to focus on residual income (non-safety consumption) position somewhat odd. If I care about my relative income I should also care about my relative health and safety.[5] Frank and Sunstein argue that workers know their relative income position but do not know their relative safety position at work. At the risk of sounding like the cartoon sociologist to whom two anecdotes are a large data set and one anecdote is a small data set, a brief story is in order. One of us once worked during the summer in a chemical plant. Everyone in the plant knew that working in the acid production department was much more dangerous than working in the sodium production department. Most butchers we have met have part of at least one finger missing, and most roofers we have met have a broken back of varying degrees of severity. One also need not have the same reference group for safety as for residual consumption.[6] Workers do know their relative workplace safety, so it is difficult to accept safety in the workplace as a non-positional good.

We contend that if income remaining after one implicitly purchases more safety or health affects the feeling of well-being indirectly via the relative ability to purchase fewer other things, then a regulation makes one better off because the additional safety or health is not only absolute but also relative to a reference group. Safety or health may also be commensurately positional because I get additional well-being from being safer than my neighbors or colleagues. If it seems reasonable for one to care about how his or her consumption of non-safety things compares to the consumption of others, then it also seems reasonable that one could care commensurately about how his or her consumption of safety and health compares to others' safety and health. The two positional effects may then simply cancel. The supplemental welfare effect of moving up the safety ladder can cancel the supplemental welfare effect of moving down the consumption of all other things ladder, and we are back to the familiar case where only the absolute levels of safety and residual income need be considered.

One source of evidence regarding countervailing positional effects where health is concerned is revealed by the relationship between income and the desire for health insurance. As people get richer, do they have greater desire to purchase health insurance to protect their health? The evidence here is quite strong. Economic estimates suggest that as one's income increases by some percentage, the demand for health insurance also increases but at roughly half that rate.[7] The observed relationship between income and the desire to protect one's health suggests to us that workers are concerned not only with their income position but also with their health position in society.

An even more direct piece of evidence on countervailing health positional considerations pertains to how persons' attitudes toward bearing risks on the job vary with their income levels. Consider the following evidence on chemical workers' attitudes toward facing greater risks of job injury. For chemical workers in this study the main matter of interest is not the implicit value of life but rather the implicit value of a job injury as reflected in the tradeoff workers are willing to make between higher pay and greater risks of injury from the job. Evidence for chemical workers indicates that the implicit value of a job injury increases quite strongly with income. Thus, a 10 percent increase in income would boost the value attached to avoiding a job injury from 6.7 percent to 11 percent.[8] A higher income enables one to avoid the risky jobs, which quite simply are not that attractive, and means that people seem to show willingness to trade off income position against an improved health position.

The undesirability of hazardous work is also reflected in who takes such jobs. Are the most dangerous jobs in the firm the most sought after positions by workers in an effort to boost their economic status relative to their peers? That those dangerous jobs are sought after because they allow relatively high consumption of goods and services is the story line that would offer much support for the Frank and Sunstein perspective that workers try to boost their economic status through hazardous work. In practice, what we observe is opposite the basic Frank and

Sunstein proposition. Risky jobs tend to be staffed in large part by new hires that tend to have very little job experience.[9] Indeed, as many as one-third of all manufacturing quits may be due to the influence of job hazards.[10] Rather than workers seeking out risky positions, new workers fill hazardous jobs that tend to be primarily entry level and are jobs that workers quit quickly to avoid facing the attendant health risks. The rapid flight of workers from the risky entry level jobs is consistent with our empirical observation that hazardous jobs tend to be among the least attractive positions in any enterprise. They also tend to be smelly, dirty, and undesirable jobs in other respects as well. Risky jobs are not the treasured targets of opportunity for upward mobility that Frank and Sunstein envision.

To be fair, Frank and Sunstein acknowledge the possibility that safety and health are positional goods, too, although they claim the positionality of health and safety is less than the positionality of residual income. Frank and Sunstein also consider implications of a situation where safety or health is partly positional, but not as positional as residual consumption.[11] Specifically, Frank and Sunstein mention the situation where the positional effect of residual consumption is half offset by the positional impact of safety. Does it matter whether safety and health are partly versus totally non-positional to the practice and use of cost-benefit analysis? Does the core of their argument affect what is "good enough for government work?" Soon we will demonstrate that "where the rubber hits the road," so to speak, in the practice of cost-benefit analysis, nothing will change because of the refinements Frank and Sunstein propose.

Finally, although Frank and Sunstein mention the phenomenon of loss aversion, they do not explore fully how it weakens the argument for a possible role of relative position effects in benefit assessment.[12] To elaborate, loss aversion can alter how we view the role of job risks. If people are, in reality, quite averse to incurring substantial losses in income, then it will have tremendous consequences for the attractiveness of hazardous jobs. If one is maimed or killed on the job, either the worker or the worker's survivors will experience a substantial drop in income.

Because hazardous jobs are intrinsically linked to the prospect of substantial losses, it is unclear that a worker will gain relative social status through work on dangerous-high wage jobs. The key aspect is that a job is a bundled commodity that includes both current and future income consequences, adverse health consequences, and potentially unattractive non-pecuniary losses. Given an undesirable mix of attributes along with the higher wage premium for the job, will working on a dangerous job in fact confer the kind of social climbing effects that Frank and Sunstein envision?

Flawed Evidence of Relative Position's Importance

Getting a handle on how people value their relative position with respect to others is a difficult empirical task. There is little multivariate statistical evidence that people's economic behavior depends importantly on peer or reference group behavior.[13] Frank and Sunstein present a variety of suggestive evidence that relative economic position may matter, but the character of their evidence tends to be less compelling than that for market values of wage-risk tradeoffs. It is also less concrete than our contradictory evidence presented above, which is based on actual market behavior rather than thought experiments and general surveys of people's happiness.

One type of evidence they present pertains to various types of thought experiments. For example, would you rather live in World A where you earned $110,000 per year while others earned $200,000, or would you rather live in World B where you earned $100,000 per year while others earned $85,000? The subjects in their positional income thought experiment are also told that the income figures represent real purchasing power. About half their experimental subjects, which include University of Chicago Law School students, say that they would prefer the World B situation with higher relative income. Frank and Sunstein interpret the slight majority favoring World B as evidence of the importance of relative position. An even more plausible interpretation of the subjects' conjectures is that experimental situations premised on an economic falsehood will not be taken at face value by respondents. People will realize that in

World A, where they earn just over half of what everybody earns, the prices of goods and services will be bid up and they will be less well off than if their earnings are greater than everyone else's. Including the disclaimer that income figures represent real purchasing power does not overcome the underlying difficulty that the disclaimer is an economic falsehood. The equal purchasing power disclaimer will not be fully credible to experimental student subjects who realize the importance of their income within the context of the incomes of other people in giving them access to goods and services in our economy.

A second kind of evidence Frank and Sunstein muster pertains to happiness surveys. Researchers have found that when you ask people whether they are "very happy," "fairly happy," or "not happy" their answers are strongly correlated with their relative income within the country.[14] How should one answer a categorical happiness question when it is posed? One cannot resort to a thermometer or a weight scale to obtain an objective reading. Categorical happiness questions are by their nature answered within their social context. The same kinds of research as discussed by Frank and Sunstein indicate that the distribution of responses to categorical happiness questions tends to be unaffected by changes in overall levels of income over time. The phenomenon of no income-level effect is also consistent with the relative character of the question. If one asked a person in the late 1800s to assess personal happiness, the person might have indicated that he or she was very happy if there were a functioning well and an outhouse in close proximity. However, having the two amenities from the year 1800 today would probably not make one feel "very happy."

In much the same way, studies regarding what budget is needed to obtain some minimum comfort level or "to get along in this community" are also likely to be influenced by the current standard of living.[15] People's life expectancies were less 50 or 100 years ago, and many of the products we now purchase on a mass scale, such as a telephone or a television, were formerly restricted to a narrow band of relatively wealthy consumers. What we need "to get along in this

community" necessarily changes with the community's standard of living. Relative questions will necessarily generate relative answers, but they do not bolster the Frank and Sunstein core proposition. Answers to questions about relative income or consumption simply do not constitute a valid test of the importance of relative positional effects in willingness to pay calculations.

The linchpin of the Frank and Sunstein insights on policy evaluation of workplace safety regulation is that workers seek a positional status benefit by accepting dangerous jobs, which confer higher income. How much higher income? Suppose we again use as a starting point for discussion a value of life estimate of $5 million, which exceeds the $4 million figure Frank and Sunstein use as their baseline. The average worker in the United States economy faces an annual death risk on the order of one chance in 20,000.[16] With a value of life of $5 million and a death risk of one chance in 20,000, the average worker exposed to such a risk will receive supplemental annual compensation of 1/20,000 × $5 million = $250 a year, which is roughly $5 extra gross earnings per week. Working on a dangerous job may enable you to buy an extra value meal every week at McDonalds but will not buy a Rolex watch, a BMW, or any high-impact status symbol that one can flaunt to demonstrate one's higher economic status. The point is that one does not buy much extra relative consumption for accepting a job that is two or three times more dangerous than the average job.

The Frank and Sunstein maintained proposition, that positional effects are important to evaluating willingness to pay and attendant regulatory benefits, is flawed with respect to their attribution of the relevant reference group. As is indicated by the quote above, Frank and Sunstein believe that if all workers are required to purchase additional safety, then there will not be a positional effect. Only when an individual worker must have greater job safety is relative position consequential, so that regulatory policies will supposedly not be subject to the positional evaluation bias that affects market tradeoffs. However, safety policies in the United States are not financed by general revenues so that costs are spread across the entire society. If there is a

government regulation of, for example, the risks of explosion in a grain elevator, then the regulation will boost the costs to the firm and will be borne, at least in part, by other workers at the firm because the regulation can raise the price of the product and reduce sales and the firm's subsequent demand for workers. The neighbors of the grain elevator workers who perhaps work for a construction firm or the highway department will not be affected by the costs of the grain elevator safety regulation. Only the grain elevator's workers will incur the major share of the regulatory costs. In the case of the typical regulation just described, there will still be the economic status effects that concern Frank and Sunstein. Only when everybody in society shares in a regulation's cost will there be no positional reshuffling. How a regulation's cost must be shared for there not to be a positional effect is unclear. We do not know whether it is the absolute cost amount that should be equalized across people or whether it should be a proportional effect on their income, or some other formula in order to ensure positional neutrality.

We end our discussion of the fundamental empirical issues surrounding supplementing cost-benefit analysis with relative positional effects by noting that what Frank and Sunstein idealize is not practicable. Because possible reference groups are nested inside each other, the individual's reference group cannot be uniquely identified in multivariate statistical models of individual outcomes (Manski 1993, Moffitt 2001). To elaborate, suppose we consider the effects of others' incomes on my behavior and that my true reference group is only my neighbor living in the house to the east. The researcher cannot know that only the income of one neighbor enters my decisions, so that a statistical model incorrectly attributing my reference group as all the houses on my block will find that the average income on my block is statistically significant to my behavior because incomes are positively correlated across houses nearby.

Narrow Practical Implications

Let us come at the issue of positionality in cost-benefit analysis from the perspective of persons outside the Ivory Tower who use and defend cost-effectiveness calculations. Frank and

Sunstein contend that income position matters in addition to income level where individual well-being is calculated and then linked to safety. They suggest a 50 per cent add factor on the value of life estimates currently in play. A second anecdote is in order. One of us spent a year in the private sector doing cost-effectiveness studies in a major drug company where there is much financial incentive to discover defensible arguments for increasing the benefits of a health enhancing pharmacotherapy. Even in an environment as profit-oriented as a drug company, it would be impossible to use made-up examples of Smith and Jones and introspection to convince senior managers that the company could justify increasing the advertised benefit of the pharmacotherapy by half. No one on the cost-benefit analysis firing line is going to cite thought experiments or a comparison of pay and performance in three selected occupations as justification for changing benefit calculations as typically done now. Multivariate statistical evidence of the extent of any positional effects in income will be needed, and we have just noted that reference group effects cannot be uniquely estimated.

The only study of even tangential relevance available on possible welfare effects of relative income position is the Dutch study by van de Stadt, Kapteyn, and van de Geer (1985) that Frank and Sunstein discuss. Without commenting on the quality of the statistical model or the generalizability of the results in the Dutch study used by Frank and Sunstein, let us simply note that Frank and Sunstein interpret the results of the Dutch data as indicating that a 33 percent increase in willingness to pay is implied because a person would feel indifferent between the current situation and one in which he or she got a 33 percent increase in income while everyone else of importance to the individual got a 100 percent increase in income. The implication is that someone who would pay $1.00 for additional safety when consuming it alone via a $1 higher product price or $1 lower wage would also pay $1.33 if everyone else were regulated to consume the extra safety so that there is no relative decline in one's residual consumption. If safety is

partly, but not totally positional too, then the add factor is perhaps half of the 33 percent or 17 percent.

In our judgment, the best estimate Frank and Sunstein could offer is to increase values attached to the benefits of risk reduction by 17 to 33 percent in the typical cost-benefit study. However, it does not matter for evaluating a regulation's cost effectiveness whether one increases regulatory benefits, as usually computed, by 17, 33, or even 50 percent. Bumping up the benefits by the amounts suggested by Frank and Sunstein will not change how benefit estimates enter currently conducted regulatory evaluations.[17]

Another useful measure of the extent to which the Frank and Sunstein approach might make a difference in policy evaluation comes from finding the number of additional regulations that would pass a cutoff of benefits being greater than costs if one applied the Frank and Sunstein 33 percent add factor to benefits. For the sake of concreteness, let us rely on the cost per life saved table compiled by the U.S. Office of Management and Budget (OMB) and reported in a book by Justice Stephen Breyer.[18] We have converted Judge Breyer's table into graphical form as Figure 1. In his book, Breyer summarizes the cost per life saved for 53 different government policies. Now take the reference point value of $4 million per statistical life saved, which Frank and Sunstein take as the current applied government standard when evaluating regulations. So, policies with a cost per life saved less than $4 million would pass the benefit-cost test, and policies with a cost per life saved greater than $4 million would fail the benefit-cost test. Suppose we raise the value of life to $4.7 million (= $4 million × 1.17), the most conservative add factor Frank and Sunstein discuss. Upping the benefit per statistical life saved by $0.7 million leads to three additional regulations to now pass a benefit-cost test: rear lap/shoulder belts for autos, standards for radionuclides in uranium mines, and benzene NESHAP regulation (original: fugitive emissions).

What if instead we use the most liberally adjusted (for positional effects) estimate of the value of life that Frank and Sunstein consider, $7 million (= $4 million × 1.75)? No additional regulations would be affected by increasing the value of life cutoff from $4.7 million to $7 million. In all, only three of the 53 regulations listed by Justice Bryer would become cost-effective if we moved from current value of life amounts to the upper bound of the Frank and Sunstein estimates. Almost doubling the value of life in economic regulatory evaluation as is currently would have little effect on the economic desirability of a wide range of regulatory policies. The most basic improvement we could make to policy decisions currently is not the comparatively minor refinement in the estimated value of life proposed by Frank and Sunstein. More valuable would be greater agency care in producing cost benefit studies that adhere to currently accepted practices as discussed and described in Gold et al. (1996); and Hahn et al. (2000) as well as greater agency adherence to the implications of the estimated benefits and costs when setting regulatory policy as discussed and described in Viscusi (1998) and Sunstein (2000).

The Need for Regulatory Reform

The policy remedy proposed by Frank and Sunstein involves increasing the value of life used by federal agencies in assessing health and safety risk regulations. In our view, the more pressing concern is to get agencies to use conventional values of life estimates in their calculations of economic benefits of regulations and, more importantly, to select regulations so as to achieve a balance between the benefits and costs of regulatory activities.

In an effort to overcome the legislative constraints that restrict the ability of agencies to base policies on benefit-cost tradeoffs, Congress has considered a variety of proposed forms of legislation aimed at regulatory reform. A particularly active year for reform proposals was 1995, but none of the proposed bills were ever enacted.

A key provision in regulatory reform bills is a super-mandate in which the restrictions preventing the implementation of benefit-cost test would be overridden by the regulatory reform

legislation. In its restrictive form, reform bills could require that no agencies were permitted to issue regulations in the absence of demonstrating that the benefits of the regulation exceeded the costs. A less stringent possibility (that has not yet been embodied in legislative proposals) would be to permit agencies to consider benefits and costs within the process of promulgating regulatory policies, which would eliminate the current legislative constraints on regulatory agencies and would permit the U.S. Office of Management and Budget to promote the balancing of benefits and costs as part of the regulatory oversight process. Although requiring that agencies demonstrate that benefits are in excess of the costs of the regulation is more aligned with economic efficiency principles, imposing an efficiency test as a legal requirement could complicate the process of issuing a new major federal regulation.

Some regulatory reform bills have proposed a more elaborate regulatory review process. The requirement that the agency demonstrate benefits exceed costs for the regulation could potentially generate considerable legal uncertainties for policies in which the benefits are not readily quantifiable because they involve goods that are not traded in markets. Many environmental amenities have the non-traded property, and economists have been developing survey techniques in an effort to attach monetary values to societies' willingness to pay for policy benefits of non-traded goods. One of the more prominent regulatory reform proposals included provisions that would provide for peer reviews of regulatory proposals and judicial reviews. Additional layers of review potentially could stymie the development of new regulations, however.

A second component of possible regulatory reform is to incorporate risk-risk analysis tests, so that on balance, the regulation will have a safety enhancing effect. One form of risk-risk tradeoff pertains to substitution risks. Suppose, for example, that the government had chosen to ban saccharin as an artificial sweetener. If, instead, people drank products containing sugar, the risks of obesity and the attendant hazards posed by obesity would be increased. Thus, to

determine the net health benefits banning saccharin, one must take into account how health risks will be affected on balance once other changes in behavior are taken into account. Another form of risk-risk tradeoff arises because all economic activity poses some form of health and safety risk. If, for example, the government were to impose a regulation that entailed the manufacture of new forms of pollution control equipment, then it is possible that some workers might be injured or killed in the production of the additional pollution control equipment, and the net health enhancing effects of the regulation would be, to some extent, diminished.

The most controversial form of risk-risk analysis, however, pertains to the health consequences of excessive regulatory expenditures. Regulatory allocations involve an opportunity cost in that they impose real financial costs on consumers and taxpayers because the money spent on regulatory costs would otherwise be spent on other bundles of consumer commodities. Based on the risk-risk approach, economists have estimated that when government agencies propose risk-reducing regulations that impose a cost per life saved at levels of $50 million or more, then, on balance, the regulation harms individual health. The rationale is that consumers could have spent the money on an ordinary bundle of consumer goods and services, including health care, the net benefits of which would be health-enhancing (as is reflected in the fact that individual longevity increases with income, not only in the United States, but throughout the world). Examining the net risk effects of regulation remains important, but the role of risk-risk analysis in preventing regulations that are so expensive per life saved that, on balance, they harm the individuals' health should diminish once benefit-cost tests are imposed more generally.

A third major agenda item, with respect to regulatory reform, would be the adoption of unbiased risk assessments within the context of regulatory analyses. At present, regulatory agencies frequently use various upper-bound values in assessing the risk. Thus, rather than using the mean or median risk values, agencies construct risk estimates using parameters that are often

upper bounds of the distribution, such as the 95th percentile. By using, for example, the 95th percentile for every parameter in a risk analysis, the risk value that is calculated lies well beyond the 95th percentile of the distribution of the true risk. In the case of the risks of hazardous waste sites, the calculated risk following U.S. EPA assumptions is well beyond the 99th percentile of the distribution of the true risk. Regulatory reform bills that provide for unbiased risk assessment would force agencies to base regulations on the risks that are likely to occur rather than on worst case scenarios. The present policy tilts regulatory agencies away from true risks that actually exist and towards dimly understood risks for which the best estimates of the risk are likely to be much lower than the figures calculated by the regulatory agency.

Other provisions of regulatory reform bills are less essential, but may be worthwhile. Some bills have required that agencies engage in additional research and training of regulatory officials. Other provisions include requiring that the agency undertake a detailed set of comparisons of the risk it is regulating with other risks that it might choose to regulate. Indicating the agencies' priorities among alternative regulations that it might pursue has also been suggested as a way of rationalizing polices. Prioritizing comparisons may be less important to sound regulatory decisions once OMB has the leeway to impose benefit-cost tests.

Our agenda for proposed regulatory reform is in many respects much simpler and streamlined than many of the proposed regulatory reform bills. First, in their examinations of regulatory programs, agencies should base their assessment of the risks on the mean values of the risk using the best available scientific evidence, which will save the greatest expected number of lives and should be a paramount social concern. Second, agencies should calculate the cost of regulations and assess the value of the benefits using the values of statistical life that have been developed in the literature. In our view, there is no reason to adjust their values because of the factors pertaining to the positional externalities in the Frank and Sunstein analysis. Third, agencies should be permitted to consider fully the benefits and costs of regulations when setting

policy. Full consideration of benefits and costs is a provision that should be the minimal requirement. There should be either a benefit-cost requirement as part of the regulatory reform legislation or a meaningful regulatory oversight effort ensuring that only regulations generating more benefits to society than the costs that are incurred will be promulgated.

Much of what appears in the detailed regulatory reform proposals is not essential and is not on our proposed menu of reform. Detailed judicial reviews, lengthy peer review processes, retrospective agency assessments of regulations that already exist, and other peripheral proposals might be considered in the longer term. However, from the stand-point of the immediate policy needs, the major task is to put health and safety risk regulations on sound footing in terms of the fundamental character of the regulatory approach. The Frank and Sunstein proposal does not contribute to a strengthening of the role for established scientific methods, but indeed further undermines the integrity of the use of value of life approaches.

Conclusion

The issue of evaluating distributional equity in costs and effects of government intervention is like the old saying about the weather, "Everyone complains about it but nobody does anything about it." Just as scientists do not have the technology to change the weather, empirical researchers have not generally had the statistical tools to study the average overall effect of state intervention in behavior while examining accompanying distributional consequences in a transparent and statistically well-justified way. The good news is that things are changing, and elegant statistical techniques have started to appear that produce empirically robust conclusions about cost and benefit distribution consequences. The bad news is that because of their complexity, even the most transparent of the statistical techniques for understanding distribution issues are still a long way from being put into widespread use.

As alluring as the Frank and Sunstein attempt to introduce simply the distribution of outcomes into the typical cost-benefit calculation is, there are good reasons not to do it their way. When there is real money on the table, decision makers want evidence based on observed behavior in a real-life setting that has been examined with a multivariate statistical model. It is not feasible to identify the individual's reference group uniquely with a statistical model applied to observational product and labor market data. Another objection to enlarging the benefits side of the typical cost-benefit analysis based on the concerns of Frank and Sunstein is that there may be countervailing positional effects stemming from the distribution of the benefit. One's drive for status will include a concern with health and the risk of death or disability, not just income. Finally, boosting value of life measures as they recommend will have little consequential effect on policy evaluations.

Despite the obvious sensitivity of assigning a value to risks to life, the use of value of life calculations to value policy benefits has become standard practice throughout the government. What accounts for this widespread adoption of the method? In our view, the fact that the estimates are based on real market data for life and death choices rather than hypothetical thought experiments is a major contributing factor. Moreover, given the sensitivity of the concerns, it is noteworthy that implicit value of life estimates are derived from the value workers themselves place on risks of death as reflected in their labor market decisions. The Frank and Sunstein adjustments are based on hypothetical experiments and happiness surveys in the Netherlands and elsewhere for which the link to how people value risks to their life is much less transparent.

Superimposing speculative adjustments to value of life figures through the Frank and Sunstien approach is not an innocuous policy exercise. Valuing risks to life remains one of the most controversial components of policy evaluation. Given this inherent sensitivity, the ability to trace value of life benefit numbers back to the revealed preferences of the citizenry gives them a

degree of legitimacy that may be compromised by adjustments based on hypothetical classroom experiments and "happiness" surveys of dubious reference. What is at stake is not simply the benefit-cost cutoff for policies, which may not be altered greatly. Future proposals for other speculative adjustments to benefits values could, of course, have more consequential effort. However, the greatest immediate danger is to the underlying integrity of the benefit assessment process and the credibility of these estimates.

Our advocacy of implicit values of life as typically constructed does not imply that there are no remaining issues to be explored. Among the most glaring informational needs are how we should value the lives of the elderly, who may have few years of remaining life expectancy, and children, who have an entire lifetime ahead. Risks to future generations also are difficult to value. Progress along the age and generational lines of program beneficiaries and payers will hinge on ascertaining what the accurate risk-money tradeoff is for each group of interest. Frank and Sunstein seek to complicate policy evaluation with a concern for how a small decrease in one's income implicit in purchasing a reduction in risk will affect one's position on the economic status treadmill. However, we find no compelling evidence that the quest for economic status should lead to any adjustment in the value of life currently used in policy evaluations.

Endnotes

1.   For a brief and readable discussion, see Kniesner (1997).

2.   For a review of the evidence, see Viscusi (1998), especially Table 4.2.

3.   See Frank and Sunstein at page 326.

4.   See Frank and Sunstein at page 323.

5.   For additional theoretical discussion of offsetting positional effects, see Besharov (2001).

6.   For additional theoretical discussion of multiple reference groups, see Besharov (2001).

7.   See, for example, Newhouse and Phelps (1976).

8.   Evidence based on the evidence on page 369 of Viscusi and Evans (1990).

9.   See Viscusi (1979).

10.   See Viscusi (1983).

11.   For more discussion of the size of positional (externality) effects, see Besharov (2001).

12.   See page 340 of Frank and Sunstein as they discuss loss aversion with respect to how people must pay for regulation.

13.   Among the extensive empirical studies of peer group effects is the important recent study by Ginther, Haveman, and Wolfe (2000), who find that any estimated effects of neighborhood characteristics on young persons' schooling completion and non-marital childbearing disappear when the multivariate model includes

extensive information on the individual's and the family's characteristics. For an overview of the econometric literature on peer or reference group effects see Moffitt (2001) and Brock and Durlauf (2001). Our extensive bibliography of peer group effects is on file at and available upon request from the editorial office of the *Yale Journal on Regulation*.

14. See pages 337–338 of Frank and Sunstein.

15. These examples are from page 353 of Frank and Sunstein.

16. See page 46 of the National Safety Council (2000).

17. Users of statistical results concerning human behavior typically consider not only the estimated average outcome but also a range of possible outcomes based on theoretical considerations or on the expected precision of the estimated average outcome (Krantz 1999). Incorporating the statistical accuracy of an estimate means that policy evaluations usually consider a range of outcomes rather than just the best single estimate of the outcome. Our own preference is for the use of mean values of parameters when undertaking assessments of benefits and costs. However, government agencies often rely on worst case assumptions in assessing risk, or upper bound values. It is noteworthy that the Frank and Sunstein estimates fall within the bounds of error for estimated value of life. Consider the well-known estimate of the value of a statistical life from Thaler and Rosen (1975). Using Thaler and Rosen's core results, we find a range for workers' implied willingness to pay for workplace safety that is the average minus 80 to 240 percent and the average plus 80 to 240 percent. Notice that the smallest optimistic outcome for willingness to pay that a careful policy analyst would routinely consider in our example is the average plus 80 percent. This is a 2.4 times greater adjustment than Frank and Sunstein's (33 percent) back-of-the envelope calculation of how current practice supposedly underestimates the value of life by ignoring distributional issues. Even if the estimated average value of life is, say, five times as large as its standard error, a comprehensive policy evaluation would consider the average plus 60 percent, which is almost double the add factor Frank and Sunstein offer.

18. See Breyer (1993), Table 5.

26

Table 1: Costs of Selected Regulations

Regulation (a)

$ Millions

Regulation (a)	Cost Per Premature Death Averted ($ millions 2000)
Underground construction standards (c)	0.1
Steering column protection standard (b)	0.1
Auto passive restraint/seat belt standards	0.1
Aircraft cabin fire protection standard	0.1
Unvented space heater ban	0.1
Trihalomethane drinking water standards	0.3
Standards for servicing auto wheel rims (c)	0.5
Auto fuel-system integrity standard	0.5
Alcohol and drug control standards (c)	0.5
Aircraft seat cushion flammability standard	0.5
Concrete & masonry construction standards (c)	0.8
Aircraft floor emergency lighting standard	0.8
Passive restraints for trucks & buses (proposed)	0.9
Crane suspended personnel platform standard	0.9
Auto side door support standards	1.1
Children's sleepwear flammability ban (d)	1.1
Side impact standards for autos (dynamic)	1.1
Low-altitude wind shear equipment & training standards	1.7
Electrical equipment standards (metal mines)	1.8
Traffic alert and collision avoidance (TCAS) systems	2.0
Trenching and excavation standards (c)	2.0
Hazard communication standard (c)	2.1
Side impact standards for trucks, busses, and MVPs (proposed)	2.9
Grain dust explosion prevention standards (c)	3.7
Rear lap/shoulder belts for autos	4.2
Benzene NESHAP (original: fugitive emissions)	4.5
Standards for radionuclides in uranium mines (c)	4.5
Ethylene dibromide drinking water standard	7.5
Benzene NESHAP (revised: coke byproducts) (c)	8.0
Asbestos occupational exposure limit (c)	10.9
Benzene occupational exposure limit (c)	11.7
Electrical equipment standards (coal mines) (c)	12.1
Arsenic emission standards for glass plants	17.8
Ethylene oxide occupational exposure limit (c)	27.0
Arsenic/copper NESHAP	30.3
Hazardous waste listing for petroleum refining sludge	36.4
Cover/move uranium mill tailings (inactive sites)	41.8
Benzene NESHAP (revised: transfer operations)	43.3
Cover/move uranium mill tailings (active sites)	59.3
Acrylonitrile occupational exposure limit (c)	67.9
Coke ovens occupational exposure limit (c)	83.7
Lockout/tagout (c)	93.4
Asbestos occupational exposure limit (c)	97.5
Arsenic occupational exposure limit (c)	140.8
Asbestos ban	145.8
Diethylstilbestrol (DES) cattle feed ban	164.4
Benzene NESHAP (revised): waste operations	221.6
1, 2-dichloropropane drinking water standard	860.3
Hazardous waste land disposal ban (1st 3rd)	5,520.9
Municipal solid waste landfill standards (proposed)	25,173.9
Formaldehyde occupational exposure limit (c)	113,572.7
Atrazine/alachlor drinking water standard	121,303.8
Hazardous waste listing for wood-preserving chemicals	7,509,869.9

Cost Per Premature Death Averted ($ millions 2000)

(a) 70-year lifetime exposure assumed unless otherwise specified
(b) 50-year lifetime exposure
(c) 45-year lifetime exposure
(d) 12-year exposure period

Source: Stephen Breyer, Breaking the Vicious Circle: Toward Effective Risk Regulation (Harvard University Press, 1993), Table 5, p. 24-27. Breyer's data converted from 1990 to 2000 dollars.

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